Strategic Alliance Motivation for Technology Commercialization and Product Development

Abstract

Purpose – This paper investigate the relationship among alliance motivation, execution of cooperation and alliance performance of strategic alliance for commercializing technology and developing products.

Design/methodology/approach – The measurements were constructed and tested empirically through a survey of 320 strategic alliances in the food processing industry in Thailand. Confirmatory factor analysis and structural equation modelling were applied to refine scales for measuring alliance motivation, execution and cooperation performance.

Finding –This research found that firms adopted social interaction with alliance partners in order to establish mutual expectations about technology characteristics, access opportunity and organisational management styles, factors that are shown to have positive influences on both commercial and partnership performance. Findings also confirm a significant positive impact of technology characteristics, access opportunity, market potential and financial benefit on the adoption of a formal partnership agreement, but a significant impact only on commercial performance.

Research limitations/implications – Further research should use random samples in different industries in other emerging economies, and other data analysis methods to assess decision-making in strategic technology alliances that may include different types of partnerships.

Practical implications – The findings are also useful for managers who leverage operations with external resources obtained through strategic alliances parameters both in the process of managing relationships and achieving results.

Originality/ value – This article contributes to extant literature by developing a practical measurement system of alliance motivation, actual execution of cooperation and resulting performance in an emerging economy country. It also contributes to clarify the decision-making of firms that form strategic alliances for commercializing technology and developing products to facilitate more quality management research in other industries and countries.

Paper type – Research paper

Keywords – Managing collaboration, Management of Technology, Strategic alliance, Motivation, Commercializing technology, Product development

1. Introduction

Global competition makes strategic alliances for technology businesses particularly attractive. Firms are working harder than ever to develop new products, enter new markets and meet rapidly changing demands in the context of changes in technology and intensifying competition (Koc and Ceylan 2007; Faems *et al.* 2005; Pittaway *et al.*2004; Arranz and Frez de Arroyabe 2008). Cooperative networking strategies enable firms to respond to advances in new technology, deliver new products and meet their business targets with greater efficiency. When a strategic alliance becomes successful, it is a vehicle for transmission of novel ideas,

new technologies and the latest managerial and other skills (Wu and Callahan 2005; Lavie 2006; Quintana-García *et al.*2011). Previous studies have demonstrated that the key to success in achieving effective cooperation lies in sound and integrated decision-making on the part of participating companies (Hemphill and Vonortas 2003; Nielsen 2002).

Although the literature proposes many insights, particularly the identification of critical factors for firms entering into strategic alliances and the significant variables that affect the performance of strategic alliances, there are areas where understanding can be improved. Firstly, most previous studies use a single methodology. Many have used only one approach to investigate a firm's motives in forming and managing alliances and achieving results from cooperation with partners. Such methods include literature reviews, secondary data, case study data or an empirical survey (Wu and Callahan 2005; Wu *et al*. 2009; Sambasivan et.al., 2011; Ma, *et.at*, 2012; Bertrand-Clood, *et.at*, 2011; Fadol, and Sandhu, 2013; Ray, 2013; Perone, 2013; Zheng and Zhao, 2013). Secondly, critical factors of strategic alliances such as alliance motivation(AM), actual execution of cooperation(EC) and alliance performance results(AP) have been studied separately both with respect to the relationship model and measurement; in some studies, alliance performance has been measured by considering component factors as a whole. Examples include studies by Franco and Haase (2013), (Bai and O'Brien (2008), Quintana-Garcia and Benavides-Velasco(2011), Olsen (2008), Bertrand-Cloodt *et al*. (2011), Chen *et al*. (2008), Cao *et al*. (2010), Wu (2012), Caner and Tyler (2013), Bicen and Hunt (2012) and Lin *et al*. (2012), Mazzola and Perrone (2013), Noseleit and Faria (2013). The focus on a single methodology and separate factor analysis conducted in previous studies actually causes critical components of the integrated relationship model to be missed. Such problems have been a major concern of both academics and practitioners, hence this study adopts a more sophisticated approach.

More specifically, while most studies have focused on developed countries, for example, Spain (Bayona *et al.* 2001), the United States (McCutchen and Swamidass 2004; Rahman and Korn 2010), Japan (Yasuda 2005), Denmark (Olsen *et al.* 2008), Belgium (Veugelers and Cassiman 2005), Germany (Becker and Dietz 2004) and the United Kingdom (Tether 2002), much less research has addressed component factors of strategic alliances in some emerging economy countries. Studies that have been undertaken include thoseof Taiwan (Lai and Chang 2009; Lee 2007), South Korea (Han *et al.* 2008; Lee 2010) and China (Du *et al.* 2013). However, no systematic studies have proposed an integrated model designed to assess motivation, execution of cooperation and alliance performance, and no studies are available within a Thai context, an emerging economy that continues to upgrade its industrial technology base.

Therefore, the objectives of this paper are first to analyse a specific integrating model from the practical perspective based on the systematically multi-methodologies, and second to shed light on the relationships among decision-making practices which lead to the start of a specific alliance motivation, its execution and resulting performance. The food processing industry in Thailand was employed as an example. This industry is one of the major globally competitive industries in Thailand. It is one in which strategic alliances are common, driven by firms that are active in improving production technology. This study provides an exemplar for analysis of industries in an emerging economy country. This is of relevance to other countries with similar contexts which might apply the findings as part of their strategic technological development designed to achieve industrial competitiveness.

2. Theoretical background and hypotheses development

2.1 *Strategic alliance motivation*

2.1.1 Alliance motivation related to technology characteristics

A fundamental aspect of whether an alliance is formed and whether it is likely to be successful is the characteristics of the technologies which the alliance is designed to develop. Characteristics are not only technological but also relate to uncertainty, tacitness, complexity, novelty and appropriateness of the technology: they form essential considerations in alliance cooperation (Lai and Chang 2009). Uncertainty originates from issues of commercialisation and market acceptance that make technological uncertainty even more unpredictable. Tacitness indicates that it is difficult to document implicit know-how, or lack of uniformity presented or expressed in a large group of people (Khalil 2000) participating in an alliance. Technology complexity indicates that technology cannot work without complementary technology or sophistication of new equipment and its technological characteristics. Novelty means any newly introduced or implemented technology that has an explicit impact on the way a company produces goods or provides services. Technology does not have to be new to the world, only to the company; it is classified as new whenever it is introduced for the first time in a new situation. Appropriate technology means a good match between a technology utilized and the resources required for optimal use (Khalil 2000; Bayona *et al.* 2001; Lai and Chang 2009). Firms consider technical expectations and choose participation in research, post-research technology transfer or even formal agreements with research institutions to develop specific technologies (Harborne and Hendry 2012; Machikita *et al.* 2008; Hsu 2005; Markman *et al.* 2008; Yasuda 2005; Hsu and Chiang 2001). Therefore:

> H1a: The characteristics of technology influence formal agreement practices positively.

> H1b: The characteristics of technology influence social interaction practices positively.

2.1.2 Alliance motivation related to resource access opportunity

Considerations such as the opportunity to access some assets in various types of cooperation and the importance of opportunity reflect an alliance partner's goals (Zhongfeng *et al.* 2009). Assets consist of two elements: tangible assets (i.e., land, plant, equipment, material, and site

specificity) and intangible assets (i.e., brand name, copyright, know-how and patents) (Tsang 1998). Firms have been found to prefer to take advantage of intangible asset transfers through adopted social interaction with their partners (Das and Teng 2000; Wu and Callahan 2005). Moreover, firms maintain combinatory advantages of complementary resources, gravitating toward formal agreements to create new knowledge and share scientific output (Wu and Callahan 2005). Formal agreements can be taken in exchanged asset mechanisms, and enable behaviour and output of cooperation that serves an opportunity to access tangible assets of alliances to be measured (Zhongfeng *et al.* 2009). Therefore:

> H1c: The opportunity to access assets within parties influences formal agreement practices positively.

> H1d: The opportunity to access assets within parties influences social interaction practices positively.

2.1.3 Alliance motivation related to market potential

The market potential issue has been explored in relation to applied technologies for both customers and markets, as well as the possibility of full appropriation of benefits and the ability to sell a new product (Link and Scott 2001). Technology transfer and commercialization of new products from alliance organisations increase the possibility of a greater range of market channels. When firms form alliances to seek market penetration and market share or to nurture relationships, they place greater emphasis on the transfer of technology from their alliance partners (Wu and Callahan 2005). Firms also enhance alliances to protect the value of current competitive resources and skills (Pateli 2009). In this situation, firms are forced to adjust capabilities to meet market demand, and must determine how alliances might assist in developing new products that diverge from existing demand in the time it takes to develop them to market. Organisational competitiveness requires a certain timeframe to increase capacities necessary to develop new technologies (Kassicieh *et al.* 2002; Yasuda 2005).

Therefore, firms adopt formal agreements with partners when they need to react quickly, wishing to gain competitive advantages where time is critical, for example, when the rate of technological change is rapid and determining future competition is difficult. Therefore:

> H1e: The market potential of product output influences formal agreement practices positively.

2.1.4 Alliance motivation related to financial benefit

Financial benefits arising from reducing cost for developing technology, risk of R&D and searching for necessary information on advances in technology are crucial motivations in entering strategic alliances. Financial reasons can include decreasing costs and risks of developing new products (Arora and Gambardella 1990; Veugelers 1997; Tether 2002) and the sharing of capital investments in manufacturing facilities. Here normally the goal is to generate economies of scale or decrease investment costs (Archibugi and Coco 2004; Yasuda 2005); firms enter alliances into which they contribute less money than the expected return (Chen *et al.* 2008; Link and Scott 2001). Partners in alliances formed for these reasons are more committed, and alliance arrangements are less flexible in comparison to others (Arranz and Arroyabe 2008). Therefore:

> H1f: Financial benefits influence formal agreement practices positively.

2.1.5 Alliance motivation related to partners' experts

The expertise of the alliance partner is a key factor in the decision to cooperate. Expertise includes a highly educated workforce, skills, intelligence, and the expertise of individuals and of teams of people (Tsang 1998). Firms join alliances that offer sufficiently qualified scientists, engineers and technical staff to perform agreed cooperation projects (Li and Zhong 2003; Wu and Callahan 2005). For motivation concerning expertise, firms expect to gain advantages from the partner's know-how; technology's tacitness is based on experience, and transmitted by demonstration or observation, followed by assimilation by those seeking the knowledge

(Khalil 2000). This is especially the case among academic partners because they offer highly qualified scientific and technological expertise, and undertake research and development technology. Hence, firms learn some skills through interactions between their own staff and the partner's experts. Therefore:

H1g: The expertise of alliance partners influences social interaction practices positively.

2.1.6 Alliance motivation related to partner's management style

Organisational cultures and management systems affect partner interactions in a strategic alliance because partners with different cultures have varying objectives, partner selection processes and cooperative intentions (Tsang 1998; Hung and Tang 2008). Additionally, organisational functions should demonstrate strong support for generating new products (Balachandra and Friar 1997). Firms expect to cooperate with alliance partners that have similar management styles, including culture, structure, rules, procedures and administrative systems. Similarity of goals and operational compatibility between partners enhance outcomes in alliance cooperation (Pateli 2009). Gulati and Singh (1998) indicated that the cost of investment in alliance cooperation decreases as cultural and operational compatibilities increase. Cooperation is based on organisational cultural distance between partners. Previous studies have shown that organisations forced into high-information cultures (e.g., information flow to connect and communicate with alliance members) must expend significant resources in learning how to take interaction with alliance partners, influencing how alliances constitute and evolve in social networks (Hitt *et al.* 2000; Kale *et al.* 2000). Therefore:

H1h: The organisational management style of alliance partners influences social interaction practices positively.

2.2 Execution of cooperation and resulting performance

In this study, a formal agreement is an important component for the execution of alliance cooperation. Formal agreements define responsibilities and cooperation among alliance members. An agreement's content is used to supervise the behaviours of members and is used as a basis for measuring members' behaviour and outputs of alliances such as tracking the type, quality, quantity, price and duration of resources exchanged (Dyer 1997; Zhongfeng *et al.* 2009; Gencturk and Preet 1995). To achieve success in commercializing technology, firms expect alliances to maximise value by integrating resource complementarities. In resource-oriented alliances, firms join projects for both research and sourcing of public information (e.g., licensing, supplier agreements, and outsourcing) to develop needed capabilities. These capabilities develop through both their own and external sourcing (Veugelers and Cassiman 2005; Lee 2010). For example, formal agreements are efficient at organizing and initiating research-intensive activities when members need negotiable and stable investments. More clearly specified requirements and cost-effective mechanisms through formal agreement are preferred for tangible resource exchanges (Narula and Hagedoorn 1999; Dyer and Singh 1998). Moreover, firms take advantage of cooperative know-how by making additional agreements, developing know-how through increasing contractual alliances to form new relationships (Teng and Das 2008; Gulati and Singh 1998).

On the other hand, social interaction among alliances involves adoption of social relationships and reputation mechanisms, regulating and supervising the behaviour of all alliance members indirectly. Firms acknowledge mutual dependence and willingness to work within a partnership (Zhonfeng *et al.* 2009). Previous studies have demonstrated that social interaction is related positively to successful cooperation. Firms cooperate through alliances and contacts, gaining experience that transfers tacit knowledge and technical details (Katz and Martin 1997; Peter *et al.* 1998). This interaction relies on trust between alliance partners, communication, commitment and conflict resolution. The literature emphasises the centrality of

trust in developing long-term alliances (Jennings *et al.* 2000; Parkhe 1998) where social interaction leads to higher mutual trust among alliance members, motivating the transfer of tacit knowledge among members (Das and Teng 2000). Communication between partners is critical for building a successful cooperation; to achieve the benefits of collaboration, effective communication is essential. Commitment suggests future orientation in which partners build relationships that survive unanticipated problems. Some studies proposed that conflict within members affects performance of alliance cooperation; productivity of alliance cooperation decreases, pressure among members increases. Therefore firms are motivated to cooperate, jointly find conflict solutions and handle uncertainty in business environments. High partnership interaction provides the flexibility and adaptability necessary to overcome uncertainties, resolve conflicts and achieve mutually beneficial alliance performances (Mohr and Spekman 1994). Therefore:

H2a: Formal agreement practices influence commercial performance positively.

H2b: Formal agreement practices influence partnership performance positively.

H2c: Social interaction practices influence commercial performance positively.

H2d: Social interaction practices influence partnership performance positively.

3. Methodology

3.1 *Measure development*

This section explains the development of scales for measuring; alliance motivation (AM)-technology characteristics, access opportunity, market potential, financial benefit, partner's expertise and partner's management style, execution of cooperation (EC)-formal agreement and social interaction, and resulting performance (AP)-commercial performance and partnership performance. To ensure reliability and validity of the model, measurement instruments for all variables were developed based on extensive literature reviews and verified by experts, two pilot tests and various statistical approaches. There were four

processes to the research instrument design. First, literature reviews focused on an overview of relevant literature. This study modified measurements used in other research contexts (*e.g.,* Dong and Glaister 2006; Tether 2002; Teng and Das 2008; Belderbos *et al.* 2004; Lai and Chang 2009; Kang and Kang 2010; Cao 2010). These measures were gathered from research examining various industries and countries.

Second, interviews with experts in the field assisted the generation of constructs and measures. To improve validity, constructs and instruments were discussed with nine experts in the technology commercialization field, practitioners from public and private sectors each with more than 10 years of experience in cooperation with external organisations for the purpose of new product development, business development, R&D and commercializing technology. The investigated areas from practice were required for adding to the items used in extant research.

Third, to validate the instrument, a questionnaire was developed based on the topics discussed above. The questionnaire was back translated and the language was tested using peer reviewers in the area of technology commercialization and alliance cooperation. Two tests were conducted to get feedback and comments from two groups of peer reviewers. Nine reviewers in the first group and six in the second were selected according to their positions and experience. They all had between 10 to 28 years of experiences with decision-making within alliances for commercializing technology.

Finally, two pilot tests helped clean up the purified scale items on the questionnaire. The objectives of the pilots were to check the validity and reliability of the measurement items. Larger values represent stronger support that an attribute measured satisfaction or dissatisfaction of using the Thai food processing industry, the context of this study. Respondents included seventy companies for the first pilot survey and thirty for the second. Participants held senior management positions in various functions, and the questionnaire was

used to collect data on a large scale survey. Respondents scored items using a five-point Likert scale, indicating relative importance from none (1) to very high (5).

3.2 *Data collection*

Questionnaires were distributed to senior executives responsible for decision-making in alliance partners for commercializing technology. They held responsibilities for justifying and evaluating commercial technology development with alliance organisations (*e.g.,* administration, marketing, manufacturing, R&D and new product development). The target sample was selected randomly from a list of food processing companies in Thailand. The list was compiled from the National Science and Technology Development Agency, Federation of Thai Industries, National Innovation Agency, Food Science and Technology Association of Thailand and Department of Industrial Works Ministry of Industry. With more than the acceptable 95% confidence level, 500 questionnaires were distributed to respondents, and 320 valid questionnaires were returned, a response rate of 64%, the characteristics of valid respondents are present in Table I.

TABLE I. HERE

4. Results

4.1 *Reliability and validity measures*

According to Hair *et al.* (2006) and Nunnally and Burnstein (1994), item-total correlations and Cronbach's alpha coefficients should be above 0.3 and 0.7, respectively, to perform reliability calculations. Item-total correlations and Cronbach's alpha coefficients for alliance motivation, execution of cooperation and alliance performance constructs met these criteria. Composite reliability and average variance extracted (AVE) values were well above 0.60 and

0.50, respectively, to confirm reliability of the measurement models (Netemeyer *et al.* 1990). Thus the measurements were sufficiently reliable.

SEM was applied to validate and generalize the model (Hair *et al.* 2006). To identify the measurement model, this study made a transition from factor analysis without control over the correspondence between variables and constructs, and this study identified which variables define each construct. The validity of each construct was tested with confirmatory factor analysis (CFA) using maximum likelihood discrimination. CFA was employed for each construct to remove variables with weak loading coefficients less than 0.5, and to confirm a sufficient measurement model. In this analysis, no variable was dropped; all variables expected to measure constructs had high factor loading coefficients with their respective constructs. Multiple goodness of fit indices met criteria for an acceptable model. The chi-square per degree of freedom (χ^2/df) was below 3, and the goodness of fit (GFI), adjusted goodness of fit (AGFI) and comparative fit (CFI) indices for all constructs were above 0.9. Standardized root mean square residual (SRMR) and root mean square error of approximation (RMSEA) values were less than 0.1. Thus, all variables that measured constructs in the structural model demonstrated convergent validity (Hair *et al.* 2006; Kline 1998) as presented in Table II.

TABLE II. HERE

Moreover, in this study, the second-order CFA of AM, EC and AP were conducted. During process of construct validation, the overall fit of all second-order constructs were good (Table III). Moreover, the factor loading coefficient criteria above 0.3 was used as a cut-off point for significance (Hair et al. 2006). No item was dropped due to weak loading coefficient. In every second-order construct, the factor loading coefficients between constructs and their sub-constructs were exceeding the cut-off point at 0.01 of statistical

significant level. Therefore, the statistical results confirmed the validation and generalization of the proposed AM, EC and AP constructs as well as the overall fit of observed data.

<div align="center" style="color:red">TABLE III. HERE</div>

4.2 *Structural relationship model*

Accordingly, the second-order path diagram of the structural model of this study is presented in Figure1. The overall fit of the structural model was reasonably fit for acceptable model, χ^2 /df ratio=0.949 was well below 3, GFI=0.899, AGFI=0.873, CFI= 1.00 were well above required value at 0.9, SRMR=0.051, RMSEA= 0.00 were less than 0.1. Thus, the model fit assessment approach is indicating a fairly good fit.

For the model of this path diagram, with respect to total and direct effect as shown in Table IV, AM had positive maximum total effect and direct effect on EC with path coefficient of 1.116 (p<0.01), while EC by influence of AM affects AP with path coefficient of 0.580 (p<0.01). Moreover, AM also has the positive indirect effect on AP through EC with path coefficient of 0.648 (p=0.036).

<div align="center" style="color:red">FIGURE 1. HERE</div>

<div align="center" style="color:red">TABLE IV. HERE</div>

However, in this study, AM had not significantly positive direct effect on AP with path coefficient of 0.072 (p=0.832). As the above results show, it was reasonable to choose this to investigate the specific relationship among sub-constructs of AM, EC and AP in next step.

The overall structural model fit of this research is presented in Table V. Multiple goodness of fit indices suggested reasonable fit of the model. The chi-square per degree of freedom was below 3 (χ^2/df =0.958). The GFI, AGFI and CFI for the model were above the required value of 0.9 (GFI=0.90, AGFI=0.871, CFI=1.00). The SRMR and RMSEA were less than 0.1 (SRMR=0.044, RMSEA=0.00). Thus model fit indicated a fairly good fit.

TABLE V. HERE

For the results of hypothesis testing, it was found that some alliance motivations positively influence a firm's decision to adopt formal agreements. These include technology characteristics (coefficient=0.958, t=7.538), opportunity to access resources within partners (coefficient=0.178 , t=1.759), market potential of product outputs (coefficient= 0.110, t= 1.977) and financial benefits (coefficient= 0.136, t= 2.439). The results support H1a, H1c, H1e and H1f. Alliance motivations influence a firm's decision to adopt social interactions with alliance partners positively, including technology characteristics(coefficient=0.144 , t=1.645), opportunity to access resources within parties (coefficient=0.401 , t=3.937), personal expertise of alliance partners (coefficient=0.444 , t=5.780) and the organisational management style of alliance partners (coefficient=0.106 , t=1.884). These finding support H1b, H1d, H1g and H1h.

As for hypotheses concerning alliance execution and alliance performance, social interaction influences both commercial and partnership performance positively (coefficient=0.277, t=3.877; coefficient=0.519, t=7.698). Thus H2c and H2d were supported. Formal agreements influence commercial performance positively (coefficient=0.269, t=4.102), supporting H2a. However, the expectation that a firm's adopted formal agreements influence partnership performance was not supported (coefficient=0.006, t=0.101). Therefore the findings did not support H2b.

5. Discussion

This study examined alliance motives that influence intention and execution of cooperation and performance of strategic alliances using the case of the food processing industry in Thailand. Methods included developing a model to explain cooperation and the resulting performance in practice. The validity of the model was supported, thereby providing additional insights into studies of strategic alliances in emerging economy.

However, the result of our study was different from previous research in this area for four reasons. First, the different mentioned context, most of previous research were conducted in developed economy countries. This study was conducted in Thailand, which is an emerging economy country. Second, the different respondents, previous researches usually studies on high-tech or intensive technological firms with broadly respondents. The respondents in this study were key executive positions with strategic alliance experiences. Third, we studies on the different period of time and various activities of commercializing technologies and developing products in the food processing industry. Last, the different method approach, we adopted multi-methodology in this study.

This study did not confirm all alliance motivation variables that impact execution of cooperating, neither were all execution of cooperation variables impacting alliance performance. Our findings from Thailand differ from previous research which indicated that there are positive relationships between alliance motivations, execution of cooperation and alliance performance. Examples includes some providing evidence consistent with previous research of Ziegelbaver and Farquhar (2004), Lai and Chang (2009), Sakakibara (2002), Das and Teng (2000), Dyer and Singh (1998) and Pateli (2009).

Moreover, although this result complements some existing findings, it contradicts others on specific concerning; Zhongfeng *et al.* (2009), who suggest there is no significant

positive relationship between resource acquisition and social control, and formal/social control and alliance performance. As our finding, this evidence suggests that firms adopted social interaction with alliance partners through expectations of personal expertise and organisation management style. Market potential and financial benefits demonstrated a positive impact on adopted formal agreement practices between firms and alliance partners. Technology characteristics and access opportunities related to a firm's motivations influenced both types of interaction. Execution of cooperation also influenced a firm's alliance performance. Findings suggest a relationship between type of execution and alliance performance; intensive formal agreements impact commercial performance positively, and social interaction practice influence both commercial and partnership performance positively.

A surprising finding was that, while formal agreements showed a positive impact on commercial performance, they had no influence on partnership performance. Although commercial performance showed a positive correlation with partnership performance (r=0.350, p= 0.000), the unclear result of the influence of formal agreement practices on partnership performance indicates a complicated relationship. More intensive study to explore the relationships among adopted formation agreements, social interactions, commercial performance and partnership performance to clarify existent mediating variables is needed.

It is therefore argued that high expectations of technology characteristics that emerge from cooperation, opportunities to access tangible/intangible assets, market potential of products and financial benefits are valuable to creating effective alliances that lead to higher adopted formal agreements or controlling member behaviours. It is found that a firm's behaviour directed toward access to tangible/intangible assets, personal expertise and matching style of organisational management of partners facilitate an optimum cooperation for social interaction or higher transactions among participants. Therefore although technology

characteristics have the greatest influence on formal agreement practices, partner expertise has the biggest impact on social interaction practices. These findings provides more clear evidence to support results from a number of previous studies, including Tsang (1999), Bayona *et al.* (2001), Shah and Swaminathan (2008), Glaister and Buckley (1996) and Saxton (1997).

Other results of this research covers a more comprehensive finding from previous empirical studies by Yasuda (2005), Kale *et al.* (2000), McCutchen and Swamidass (2004) and Sambisivan *et al.* (2011). Exploring how alliance cooperation influences realization of performance of cooperative technology strategies, it is noted that while adoption of formal agreements leads to only commercial performance or profitability and productivity achievement, adoption of social interaction practices leads to both commercial performance and partnership performance; it especially has a prominent influence on developing long-term relationships with alliance partners.

Considering business condition in an emerging economy country such as the Thai context, a number of issues about formal agreement practices emerged. First, Thai firms dislike sharing knowledge with others; they are likely to adopt agreements to engage with a local marketing research company for their own finding and operations. Second, most local Thai firms concentrate on upgrading existing products rather than introducing new products by applying R&D that confirmed by some finding of Suwannaporn and Speece (1998) and Chen and Sewell (1996). Technology suppliers play a major role as a source of advanced process/product technology and technology information in the Thai food processing industry. These firms are only technology users, not a primary source of technology innovation. Technology innovation for processes/products actually depends on suppliers, with firms preferring to buy technology and know-how in the form of machines, franchising, licensing, joint-ventures or acquisitions. Third, competitive strategies of Thai food firms depend largely on expertise in integrative functions, often buying technology and obtaining know-how from

suppliers and consultants. When equipment is purchased and installed, a technology supplier sends experts to help start production. They rely on suppliers for basic research into the properties of various ingredients, processing equipment for product requirements or packaging materials and processing machines necessary for new products. This relationship is characterized by distance between partners. Production alone cannot provide sustainable competitive advantages because competitors acquire similar production technologies easily.

When social interactions take place; some Thai firm owners often emphasize social interactions for achieving integrative outcomes. They evaluate not only sales potential and marketing investments of individual new product, but also potential for additional market value. They evaluate the synergies and complementary nature of products with current technology and marketing capabilities. These behaviours produce complements knowledge in studies of other regions; for example, Fortuin *et al.* (2007) Doz *et al.* (2000), Caffyn (1997), Gulati (1998) and Borsh(1994). In addition, these firms pursue alliances to gain production facilities, expertise and access to distribution channels to eliminate competitors because most local firms lack skilled personnel, and they fail to build their own competencies in the search for appropriate technologies. Our finding also complements some finding of Dyer and Hatch (2006) and Lunnan and Haugland (2008) that firms in USA and others in previous period actually consider strategic alliance issues when developing long-term, products.

6. Conclusion

In this study, a model to examine relationships among alliance motivations, execution of cooperating and alliance performance was proposed and tested using empirical data from 320 strategic alliances in the food processing industry in Thailand, an example of an emerging economy that continues to upgrade industrial technology to be a rising industrial country. Findings reveal the importance of context surrounding strategic alliances in Asian countries.

Studies of other countries with similar contexts could apply the model and results of this study in order to analyse the strengths and weaknesses of current strategic technology practices designed to achieve the industrial competitiveness.

The findings of this study contribute to both theoretical and practical implication. In term of academic contribution, this research can be represented along three dimensions. First, strategic alliance theory, this paper contributes to existing literature on strategic technology alliances by developing set of variable measurements in practices that reflect the business conditions. These developing and testing measurements were used to analyse strategic alliance decision-making, and lays out a fundamental procedure applicable to various model categories, validated through a study in Thailand, an emerging economy country. The measures were proven to be reliable and valid. Secondly, research methodology, this research was based on the systematically multi-methodologies including literature reviews, expert interviews and large-scale survey to develop measurement approach in strategic alliances for commercialising technology practices that facilitate higher quality to understand and research in relevant perspectives in technology management area. Last, context of empirical evidence, the model provides a new direction for studying technological alliances in an emerging economy. This study contributes to clarifying the integrated relationship among three critical components of strategic alliances such as firms' motives, execution of cooperation and alliance performance. With specific model, the data from this study confirmed that not all alliance motivation variables that impact execution of cooperating, neither were all execution of cooperation variables impacting alliance performance. This evidence fills a gap in the literature by empirically testing antecedents of essential contingency variables, and provides deeper insights into the industrial sector's role and conditions in an emerging economy country.

This study also provides some practical contributions into the relationships among alliance motivation, execution of cooperating and alliance performances. For example,

managers using these findings might achieve better outcomes of strategic technology alliances by understanding a partner's expectations, execution of cooperating with partners and outcomes. A clear identification of alliance intentions and negotiations improves strategic alliance planning and resource allocation, and reduces potential conflicts and misunderstandings. It is also important for managers to acknowledge the influence of alliance motivation on adopted execution of cooperation, and to consider implications of individual execution practices on alliance performance.

Some limitations of this study should be noted for future research. First, future research should consider other analytical techniques and decision measures that support efficient alliance management. The interplay of alliance motivation, execution of cooperation and alliance performance that deepens understanding of how alliances can be used for commercialising technology should be further investigated. Second, this study focuses on inter-organisation cooperation, which should be guided to other types of alliances (e.g., firms and university, research institution, etc.). Third, regarding the finding that firm reliance on suppliers provides basic research on ingredients or process technology, it would be interesting to examine whether suppliers are mainly domestic or foreign firms located in Thailand. Fourth, this study used cross-sectional data; further research should apply longitudinal data to investigate alliance evolution in disparate industries.

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