

Journal of International Logistics and Trade

The Outsourcing Strategic Fit and Partnership Relations in Thai Pharmaceutical Manufacturing

Apithamsoonthorn Sompong^{a*}, Suthiwartnarueput Kamonchanok^b

^a Interdisciplinary Program in Logistics Management, Chulalongkorn University, Thailand

^b Logistics Management Programs, Chulalongkorn University, Thailand

ARTICLE INFO

Article history:

Received 17 April 2017

Accepted 16 June 2017

Keywords:

Partnership model

Strategic fit model

Off-shore outsourcing

Pharmaceuticals

ABSTRACT

Outsourcing is recognized as one of the critical factors for efficient execution of pharmaceutical supply chain management (PSCM), and many pharmaceutical companies engage in international outsourcing of services (IOS) to survive in global highly competitive business. Since the key success factors for both domestic & international alliances are partnership characteristics and strategic fit management, but there is no empirical research on this issue in Thai pharmaceutical partnership offshore outsourcing. Therefore, this survey of Thai and foreign companies, both contract providers (CPs) and contract manufacturers (CMs), seeks to indicate significant relationships among both outsourcing strategic fit and partnership types, including outsourcing performance outcome. This research is two-fold. First, the partnership types (Type I, II, & III), the strategic fit types (low fit, moderate fit, and good fit), and their correlations are analyzed. And second, their outsourcing performance (company revenues and growth rates) are presented. The results showed that the most of the Thai pharmaceutical outsourcing manufacturing are classified as the partnership Type II, as well as the moderate strategic fit, and strongly support the relationship between the two models. Both of the companies' revenue and growth rate could predict the companies' performances outcome for each of partnership and strategic fit types. However, it is not necessary that the most integrative type of partnership, Type III, will be always the best, because it depends also on the strategic fit between each pair of partners as well.

1. Introduction

The business sector leaders and researchers have gradually paid great attention on pharmaceutical industry because of at least 4 reasons: a) being one of the most powerful and successful industry, because of its contributions to the well-being of the humans by providing new medicines to address various diseases and its growth into one of the major sectors in the world (Raja and Sambandan, 2015); b) instead of expansion and extension as in other industries when facing unprecedented both internal and external competition (Palmer and Lyons, 2012), there are, on the contrary, a major consolidations in pharmaceutical industry through mergers and outsourcing (Capo et al., 2014; Davidovic, 2014) the consequences of which can be seen in maximization of its value chain productivity and minimization of its costs (Pricewaterhouse Coopers International Limited, 2008), and more outsourcing of R&D work in the Big pharmaceutical companies (Pandya and Shah, 2013); c) being quite different from other industries in terms of complex and time-consuming, but well-organized, and systematic process (Rahalka, 2012; Shah, 2004), and a multi-function organization and network (Encyclopedia.com, 2015); and d) a great variation of the offshore outsourcing partners' strategic managements have drawn the pharmaceutical researchers' attention to learn more on differences in both contract providers (CPs) and contract manufacturers (CMs)' strategic management (Guennif and Ramani, 2008; Strand,

* Corresponding author: Interdisciplinary Program in Logistics Management, Chulalongkorn University, Bangkok 10330, Thailand
Email: sompong.wang5@gmail.com

2014; Zhang, 2014).

Outsourcing, in brief, is a sourcing activities externally that an organization has internal capability to perform (Harland et al., 2005); and it has been growing at an exponential rate (Heo et al., 2007). As the leading companies foresee the outsourcing as a strategy for managing company complexity, they, thus, have moved from transactional outsourcing to using more strategic outsourcing as a means of achieving competitive success (Kavčič, 2014), the process of which can be looked upon as a strategic move among businesses (Soriano-Meier et al., 2012). In the area of pharmaceutical industry, there are now more and more companies engage in international outsourcing of services (IOS) to survive in global highly competitive business environment (Kedia and Lahiri, 2007). Pharmaceutical outsourcing can be seen in two categories: 1) the big Pharmacies are likely form alliances with other Big Pharmacies to access production capacity and distribution channels in order to commercialize the new drug discovered as well (Bianchi et al., 2011), as a result, most of their contract businesses are established in the market usually specializing on certain parts of the pharmaceutical valued chains. And 2) A widespread transfer of alliances' service functions from developed nations like the U.S., Japan to several foreign destinations as India, China, Philippines, Thailand and etc. because of a considerable benefit from cost reduction, flexibility, technology transfer, fast product development, and expertise acquisition. However, the cost may be an important driver, but it is not the only driver (Lau et al., 2006; Power et al., 2004). The outsourcing expectations are directly linked to the reasons for outsourcing. The findings indicate that the pharmacies know exactly what the needs of their CPs are and thus they try to fulfill all the objectives. Hence, it is not about manufacturing at low cost, but there are other aspects attached to it as well (Lau et al., 2006).

The aforementioned statement suggested that strategic outsourcing is a necessary action for pharmaceutical organizations, Boulaksil and Fransoo (2007) found that in the last few years, a number of researchers have analyzed and explored outsourcing in various industries including pharmacies. Strategic outsourcing also has assumed an increasingly important role in the operations of established as well as emerging pharmaceutical companies (Lowman et al., 2012). Several outsourcing research outcomes indicated that the alliance or partner selection is also a very critical decision in an alliance engagement (Hitt et al., 2000). In conclusion, researchers recognize that the strategic fit is a core concept in normative models of strategy formulation (Hofer and Schendel, 1978; Zajac et al., 2000). While, Zaman and Mavondo (2008) also believed that there must be a certain degree of 'fit' between the alliances or partners, which in turn increases the probability of achieving positive alliance outcomes performance. Research by Kedia and Lahiri (2007) suggested that despite an increase in international outsourcing of services (IOS) to survive in today's highly competitive business, there have not received adequate attention in the scholarly literature. They thus seek to elaborate type of outsourcing partnership model and classified 3 types: tactical, strategic, and transformational using the value propositions and nature of involvement with providers in different ways. For **the first generation outsourcing - tactical partnership model**, operational cost reduction or cost saving and arm' length relationship are a primary drivers in terms of value and involvement respectively for both the companies and their providers, whereas for **the second generation outsourcing -strategic partnership model**, the companies experiences competitive pressure and seek to focus on core competencies advantages (value, rareness, imperfect inimitability and non-substitutability attributes of resources) from their providers, and for **the third generation outsourcing - transformational partnership model**, the matching of three drivers: namely need for risk sharing and flexibility, and business transformation between the partners helps spurred the adoption of this model. They further try to identify factors that may have impacts on the outsourcing partners' continuity, but their attempt was to include those effects that appear to be most relevant in the context of the outsourcing partnerships.

The conversion from an outsourcing relationship to the partnership relationship has been further investigated and made clearer by Ali and Khan (2016) who identify and analyze factors that are important for vendors in conversion of their existing outsourcing relationship to partnership, using a systematic literature review process for the identification of critical success factors (CSFs) from a sample of 111 articles. They further categorized the identified CSFs into five partnership levels based on Capability Maturity Model Integration (CMMI) and the Outsourcing Vendors' Readiness Model. The 5 partnership levels are as follows: 1) **Initial contract** - the first level defined as the purely contractual relationship, or the ordinary outsourcing with no CFS; 2) **Successful contract** - the second level defined as a continuous improvement to make the contractual relation successful, the CFS are effective and timely communication, quality production, success previous projects and cross cultural understanding; 3) **Partnership readiness** - the third level where need for partnership is feeling and readiness is evaluated, CFS are mutual interdependence and shared values, mutual trust, organizational proximity, and bidirectional transfer of knowledge (BTK); 4) **Conversion to partnership** - the fourth level where conversion and implementation has been successfully done, CFS are 3C (coordination, cooperation and collaboration), flexible level agreements, and joint management infrastructure; and 5) **Maturing partnership** - the fifth level with an emphasis on maturing the relationship through continuous management, CFS are long-term commitments, governance and control, access to new technologies, and markets and complementary skills.

Based on the above literature review, the authors then conclude that it is not clear how the strategic outsourcing model converse or transform to the partnership model, and there are no quantitative investigation on the relationship of the factors and outcomes between the strategic outsourcing model and the partnership model. We already learned from Ali and Khan (2016) that the first 3 levels can be considered as the contract outsourcing model whereas the last 2 level

can be regarded as the outsourcing partnership model. What we have learned is quite similar to what Kedia and Lahiri (2007) has highlighted to us that the first generation outsourcing is not a true partnership model, it is only a strategic outsourcing model focusing on collaboration contracts, whereas the second and third generations is a true one. We thus further studied on the papers by Ali and Khan (2016), Festel et al. (2014), Gummerus et al. (2016), Khan and Ali (2015), Kinnula (2006), Lambert et al. (2004), and Lane and Lum (2011) focusing on the similarities and difference between these two models. We have learned that the major reasons or aims for outsourcing are cost savings, free management time, access to specialist expertise, improved quality of service, to achieve flexibility in taking strategic business decision, in house resources unavailability and enhanced financial control, under the obligation of formally written contract; and the success of outsourcing in win-win position can be seen from matching of both internal and external factors between the outsourcer companies (CPO – contract provider organization), and their outsourcing companies, either CRO (contract research organization), CMO (contract manufacturing organization) or CDMO (contract development and manufacturing organization). Whereas, the reasons for the partnership is a continuous and long term mutually beneficial relationship with common goal, mutual trust and shared outcomes, where confidential information concerning future visions, plans and strategies is shared proactively and openly in order to help both parties to emphasis on their capitals in the appropriate direction under agreement; and the success of partnership can be seen from matching of drivers and facilitator between both partners. Our concluding remark is “there would have some relationship between strategic outsourcing model and outsourcing partnership model. Consequently, the researchers therefore set the purpose of this research to study and indicate the significant relationships among both alliance (CPs and CMs) in outsourcing strategic fit model and type, and both partners in partnership types, including outsourcing performance.

Our research purpose is most likely being the only empirical study on the context of pharmaceutical company. As there are a few literature support that the global pharmaceutical outsourcing manufacturing trends, started from the outsourcing contractual relationship with many outsourcing strategies (Festel et al., 2014), and now goes beyond to the outsourcing partnership (Khan and Ali, 2015), but the two available studies (Ali and Khan, 2016; Kedia and Lahiri, 2007) just only survey the similarity and difference between the status of the two relationship models and identify the critical success factors significant to improve each of the two models at different stages. Given the classification of the outsourcing model based on those two studies, we can, therefore, see the continuity from the strategic outsourcing model to the partnership model in terms of the increasing strength and magnitude of matching levels between the two factors of each model. As a result, the authors attempt to extend further the study of the significant relationships among both alliance (CPs and CMs) in outsourcing strategic fit model and type, and both partners in partnership types, to the comparison of the relationships strength or magnitude between Thai and foreign pharmaceutical companies.

The two reasons underlying our study on the comparison of the relationships between Thai and foreign pharmaceutical companies are as follows: 1) *Extension of Thai pharmaceutical outsourcing business*: Thailand, is one of the potential growth of pharmaceuticals in ASEN countries, with the current industrial situation, even 75 % are local pharmaceutical companies, but around 70% of Thai pharmaceutical markets are lead and controlled by multinational companies (MNC) (Ribbink, 2014). Since all the advanced strategic management has been led by foreign develop countries, and followed by the developing countries, therefore, the outsourcing manufacturing and the relationship between Thai and foreign companies are quite significant and beneficial for the Ministry of Public Health in obtaining the lesson learned for the promotion of the strategic outsourcing to the outsourcing partnership aiming for acceleration of economic growth in the today competing market. And 2) *Promotion and readiness for Thai emerging outsourcing in pharmaceutical business*: The continuous and increasingly seen in the outsourcing of manufacturing, is as a way to reduce operating costs and improve competitiveness. In pharmaceutical industry, the outsourcing is also a very growing and now shifts very fast to emerging countries such as South Korea, Malaysia, India, China, Russia, and Brazil (Festel et al., 2014). The global trends of contractual outsourcing relationship converted to the outsourcing partnership are fast and more (Khan and Ali, 2015; Lambert and Enz, 2017). In outsourcing manufacturing business, one of critical concerned is capacity and demand from CMs and CPs as well. The best vendor selection with capacity balance will enlarge and accelerate this conversion. So, the study of outsourcing relations between business sectors (CPs vs. CMs) and nationalities (Thai vs. foreign) are valuable for Thai pharmaceutical to study health care industries.

However, our main variables consisting of the two internal and external factors (in the strategic outsourcing model), and the two factors of drivers and facilitator factors (in the partnership model) which can be measured as an interval level of measurement; and the variables regarding the strategic outsourcing fit type and the partnership type are categorical variables which can be measured as a 3-value ordinal level of measurement, therefore, our relationship study can be performed only by correlation analysis and association analysis. As a result, the relationship study will be the study of the correlation and/or association between the four factors and the 3 types of the strategic outsourcing fit and the partnership model. Moreover, based on the aforementioned literature above (Ali and Khan, 2016; Festel et al., 2014; Gummerus et al., 2016; Khan and Ali, 2015; Kinnula, 2006; Lambert et al., 2004; and Lane and Lum, 2011), there are additional factors to heighten the quality or to ensure longevity of outsourcing strategic fit and partnerships such as effective and timely communication, cross cultural understanding and cultural distances, trust, organizational proximity, cooperation and collaboration, revenue, and growth. It implies that those additional factors can be moderators that moderate either one of the two model fits or both, and can improve both the drivers and quality of the partnership models. However, they found that the moderating effects of trustworthiness and cultural distance has reinforced the

notion that enabling and promoting drivers of the outsourcing partnerships but do not automatically foster quality partnerships. Moreover, trust/ commitment has been used as one of the internal factor in partnership model. Thus, we study all available moderators except trustworthiness and cultural distance.

With implication from the research purpose and the aforementioned statements, the researchers then conclude that this study attempted to answer the following two research questions concerning the current outsourcing strategic fit and partnership types in Thai pharmaceutical manufacturing business: 1) what are the associations and/or correlations between the CPs vs. CMs alliance companies, in terms of the key factors of the outsourcing strategic fit and partnership types between Thai vs. foreign companies, and between partnership and strategic fit types in this business? And 2) what are the predictors of the companies' performances outcome for each of the outsourcing strategic fit and partnership types? The authors found that there are no Thai research regarding the associations and relations between the outsourcing strategic fit and partnership types in pharmaceutical outsourcing manufacturing, therefore, this study must be definitely beneficial to an improvement of the outsourcing strategic fit and the outsourcing partnership in Thailand.

2. Literature review

Regarding the main focus of this study in terms of the partnership and strategic fit models for outsourcing in Thai pharmaceutical manufacturing, the researchers, therefore presented 3 aspects of the literature review, namely the outsourcing and strategic fit, the outsourcing partnership model, and conversion of the existing outsourcing relationship to outsourcing partnership, the results of which then can be set and drawn as the research framework and hypotheses for this study.

2.1 *The Outsourcing and strategic fit*

In pharmaceutical industry, contract manufacturers can provide a relief valve from market pressures such as patent expiration and the demand for generics, discovering off-label uses for current formulas, pressure to speed up clinical trials, or keeping abreast on the development of new processes (Lad et al., 2012). Since 1980s, Contract research and manufacturing services (CRAMs) had emerged and became one of the fastest growing sectors in pharmaceutical and biotechnology industry. The pharmaceutical market used outsourcing services from low cost providers in the form of contract research organization (CROs) and contract manufacturing organizations (CMOs) (Reddy and Gupta, 2013).

The global contract manufacturing market for the pharmaceutical sector is forecasted to increase at a rate of 8% per year and to exceed \$26 billion by 2011 (Corporate Catalyst India, 2011). There has been an impact that is unique, innovative, and state-of-the-art processes and production technologies, which have been offered by contract manufacturing organizations in 761 scripting the success story of the pharmaceutical industry (Scott, 2006). The manufacturers need to bear in mind the need for huge investments in procuring modern technologies and resorting to new practices if they do not favor outsourcing. Although cost is an important driver (Copestake, 2006; Jiang and Qureshi, 2006; Lau et al., 2006), it is not the only one. In addition to cost and capacity issues, the academic literature also mentions other important factors (i.e. key drivers) that influence organizations to outsource. These include fast cycle development, expertise, technology and performance (Lee et al., 2013). Nowadays, most manufacturing companies attempt to innovative and speed up their value chains by offering new more products and fast services to markets, that cause service based manufacturing is an increasingly popular concept in literature (Baines et al., 2009; Lay et al., 2010; Martinez et al., 2010; Neely, 2008; Smith et al., 2014; Vandermerwe and Rada, 1988; Wilkinson et al., 2009; Zhen, 2012). In this kind of scenario (service based manufacturing), the manufacturer and supplier relationship does not practice by traditional customer- supplier relationship (Festel et al., 2014). The new relationship followed by customer needs to add more values to the product via design, innovation, marketing, and branding, and manufacturing service provider takes responsibility and focuses on the manufacturing response to customization and speed to market. Schönsleben (2007) highlighted the transformation of supply chain with this dynamic character in the customer-supplier relationship into a strategic partnership, according to five characteristics: quality, costs, delivery, flexibility, and co-operation in the supply chain network.

In this recent decade, global pharmaceutical production and consumption are still unevenly dispersed with highly innovative, although imitation, marketing and price competition (Malerba and Orsenigo, 2015). The strategic outsourcing has assumed an increasingly important role in the operations of established as well as emerging pharmaceutical companies (Lowman et al., 2012).

Even with awareness of the great organizational losses associated with their strategic management, the outsourcing strategy continues to grow, and business companies desire to engage in outsourcing. With an understanding of the dimensions of outsourcing success, the outsourcers and their outsourcing companies can better communicate about these dimensions prior to entering into a contract and throughout the outsourcing relationship. Moreover, by increasing the awareness of the multidimensional nature of this complex concept, clients can more effectively measure the success of an outsourcing arrangement. Researchers, at present, embrace a more comprehensive and broader scope of the dimensions of success and employ two-actor models to investigate the factors of success in addition to the overlap bet-

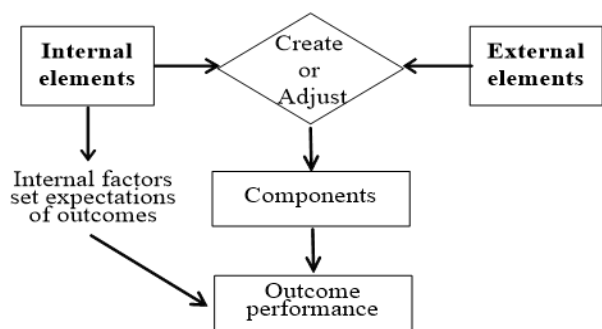


Figure 1. Strategic fit model

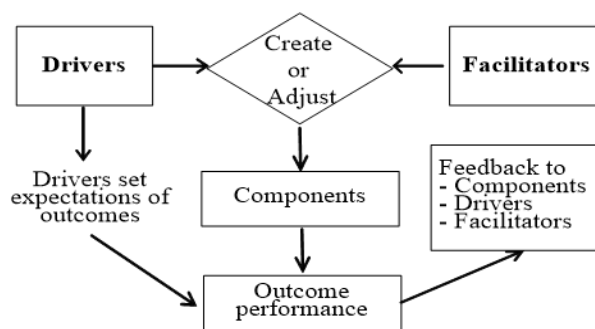


Figure 3. Partnership model
(adapted from Lambert et al. (1996))

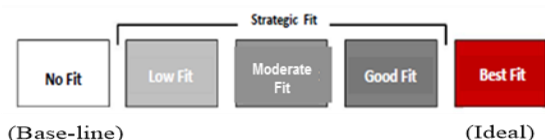


Figure 2. Types of strategic fit

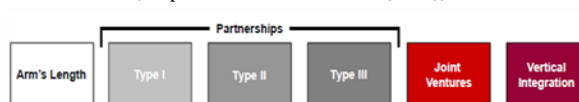


Figure 4. Type of partnership
(adapted from Lambert et al. (1996))

ween the outsourcing pair’s views of success, as well as the trade-offs (Gunasekaran et al., 2015; Schwarz, 2014). At present, more work has been performed to understand the internal and external factors of both the outsourcer companies (CPO – contract provider organization), and their outsourcing companies, either CRO (contract research organization), CMO (contract manufacturing organization) or CDMO (contract development and manufacturing organization) (Gummerus et al., 2016). Due to heightened competitive and uncertain business environment, many companies have formed partners to survive. Researchers argue that the success of alliances/relationships stems from each partner’s ability to fit or match their strategies (Hofer and Schendel, 1978; Zajac et al., 2000).

Regarding the strategic fit process, Dess and Lumpkin (2013) asserted that the process involved management of all other internal elements within an organization to ensure that the implementation process was successful. Strategic fit had been conceptualized in various ways. The relationships here were causal ones in which the strategies must match with the external conditions if the firm was to survive and gain a competitive advantage (Porter, 1980, 1985). The strategic fit model could present as Figure 1. Therefore, strategic fit could be one of the major key successful factors for a firm’s success. Waterman (1982) argued that the possibility of successfully executing a strategy depends on the interaction among elements in the McKinsey 7-S framework: strategy, structure, systems, skills, staff, style and shared values. In addition, the congruence among internal organizational elements should be reached if the organization was to achieve competitive advantage (Bae and Lee, 2015; D’Aveni et al., 2004). Hitt et al. (2000), proposed the notion of strategic fit, based on many studies in examining the co-alignment of (a) partner characteristics, (b) alliance relationship management, (c) organizational capabilities and their relationship to (d) alliance success, in selection of an appropriate partner which had been a very critical decision in an alliance engagement.

The strategic fit model (Figure 1) modified from Lambert’s partnership model (2004) using a three by three matrix to prescribe strategic fit type and therefore is subject to the difficulties present with any grid approach. The MPF (meeting process facilitator) needs to be sensitive to the fact that a single point change on either internal or external factors can move a relationship from a moderate fit to a good fit or to a low fit (Figure 2).

2.2 The Outsourcing partnership model

Mentzer et al. (2004) found that partnering between firms is one way to find and maintain competitive advantage. The ability to effectively and efficiently build and maintain tailored business relationships may become a key competency for executives looking for competitive advantage. As an increasing number of businesses are incorporating significant technology-driven components into their service product innovations (Boone, 2000), there is a growing interest in understanding how current technological context, in which a firm’s service product innovation is embedded, influences its behavior and performance. According to the logic of the resource dependence theory (RDT) (Pfeffer, 1982), establishing a collaborative relationship between partners constitutes a bridging strategy. Because organizations are rarely self-sufficient, they enter into collaborative relationships with other organizations to obtain critical resources. Firms often struggle to find a balance between what they must own and what they must acquire, or “source”, through collaboration, partnerships, alliances, joint ventures, and the like (Witzeman et al., 2006).

While the benefits of partnering have been well documented, the pitfalls and dangers have received less attention. Lieb and Randall (1996) suggested that the most serious concerns to shippers in the use of third party providers include

the potential for loss of direct control over logistics activities, uncertainties about the service level to be provided, and questions concerning the true cost of outsourcing. Ackerman (1996) had identified numerous reasons logistics partnerships, in particular, may be "doomed to fail," including a lack of understanding between the parties about the job to be done, over-promising and under-delivering by the seller, deliberate attempts by personnel in the buying firm to make the partnership fail, unprofitability for the seller and subsequent poor service, and no orderly process for separation. Ellram (1990) identified the main factors leading to partnership failure as poor communications, lack of top management support, lack of trust, lack of supplier total quality management programs, poor up-front planning, lack of strategic direction for the partnership, and lack of shared goals. For the most part, these causes of conflict fall into two general categories suggested by Stuart and McCutcheon (1995): (1) a mismatch in perceptions over the appropriate degree of partnering; or (2) improperly executing the partnership building process.

Lambert et al. (1996, 1999) was originally developed the partnership model, using 18 case studies and validated by fitting the model to the same case studies. The model is comprised of four steps: examination of the drivers of partnership, examination of the facilitators of partnership, calibration of the components of partnership, and the measurement of outcomes, as shown in Figure 3.

Partnership in practice requires a repeatable managerial process that will guide the analysis and implementation of appropriate levels of relationship components. For each specific managerial component we have some additional suggestions. Based on our experiences, we would recommend the following changes and adjustments to the management components: planning, joint operating controls, communications, risk and reward sharing, trust and commitment, contract style, scope, and investment (Lambert et al., 2004).

The partnership model uses a three by three matrix to prescribe partnership type and therefore is subject to the difficulties present with any grid approach. The MPF (meeting process facilitator) needs to be sensitive to the fact that a single point change on either drivers or facilitators can move a relationship from a Type II partnership to a Type III or to a Type I (Figure 4). The prescriptions near the intersections of the boxes need to be evaluated with care (Lambert et al. 2004).

2.3 Conversion of the existing outsourcing relationship to outsourcing partnership

Collaborative relationships beyond organizational boundaries are an essential part of today's business. They usually are in the form of joint ventures, strategic alliances, or partnerships (Ali and Khan, 2016). Outsourcing, the strategic use of outside resources to perform activities traditionally handled by internal staff and resources, have received increased attention in management practice around the world over recent decades (Bhattacharya et al., 2013; La Londe and Cooper, 1989). The main reasons for ordinary strategic outsourcing are cost savings, increased flexibility in bidirectional decision making, access to specialist expertise, improved quality of service, free management time when there is lack of resources, and improved financial control (Bocij et al., 2009). But the outsourcing partnership is a business associations between two or more organizations founded upon, openness, mutual trust, shared rewards and risks that produce a competitive benefits, resulting from performing in this association more than that might be attained by the either organization individualistically (Lambert and Enz, 2017; Lambert et al., 2004). Ordinary outsourcing and partnership relationships are different, because, the former relationship is contract agreement between CPs and CMs to provide service or manufacturing for payment, whereas the latter relationship is the superior form of the former one. The main difference between partnership and ordinary outsourcing relationship is that, in partnership relationship the stress is given on trust and achievement of general business goals while in ordinary outsourcing relationship the stress is given on the obligation of formally written contract and on achieving specific business goals (Kinnula, 2006; Lane and Lum, 2011).

In brief, partnership, being a consequence of outsourcing strategic fit, is a flexible, long term relationship established based on sharing of benefits, risks, future goals and visions. In practice only a fruitful outsourcing relationship is eligible to promote to outsourcing partnership where the parties share confidential information about future plans, work together, combine resources, share ownership, risks and benefits and take joint decisions to undertake mutually beneficial business (Ali and Khan, 2016; Khan and Ali, 2015). Therefore, there must be relationships between the key factors of those two outsourcing relations, and associations between the two outsourcing types. In addition, the predictors of the companies' performances outcome for each of partnership types and strategic fit types should be the same set.

To understand the similarities and differences between the outsourcing strategic fit (STF) and partnership (PNS) relationships, the following first research question (with its three sub-questions) and the second one are verbalized.

RQ 1: What are the associations and/or correlations between the business sectors (CPs vs. CMs) in alliance of the two models, and between nationality (Thai vs. foreign) companies, in terms of the key factors in outsourcing STF and PNS process; and between PNS types and STF types in pharmaceutical industrial business?

RQ1.a: What are the outsourcing associations between business sectors and nationalities in terms of matching results between the two factors in each of the STF and PNS models?

RQ1.b: What are the correlation among four factors of STF and PNS?

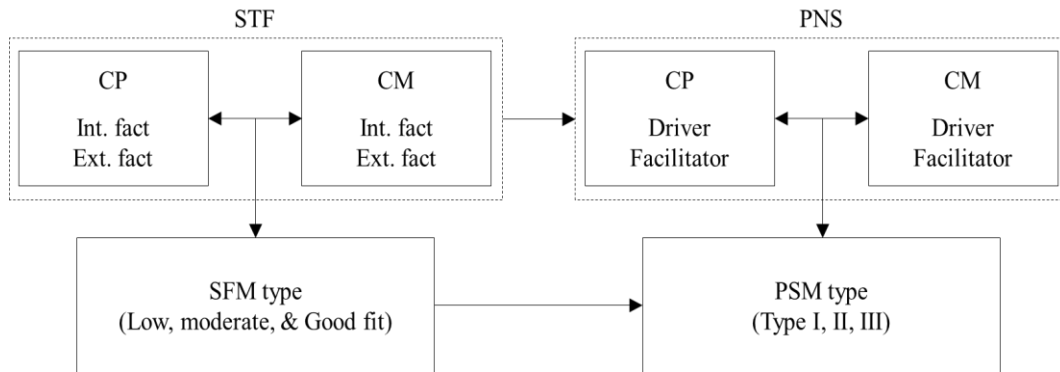
RQ1.c: What are the relationship between STF types and PNS types?

RQ2: What are the predictors of the companies' performances outcome for each of STF and PNS types?

2.4 Research framework and hypotheses

Figure 5: The research framework propose the overview of relationships between STF model and PNS model, with separate in to two parts: Part a) the matching of two key factors in each of model, the conversion of STF model to PNS model and STF type to PNS type; and Part b) indicating moderating effects of business sectors, and nationality; and company characteristics, between key factors of two models; and types of two models. There are four research hypotheses regarding the two research questions, as follows:

Part a. The conversion of STF model to PNS model



Part b. Moderating effects in two outsourcing models

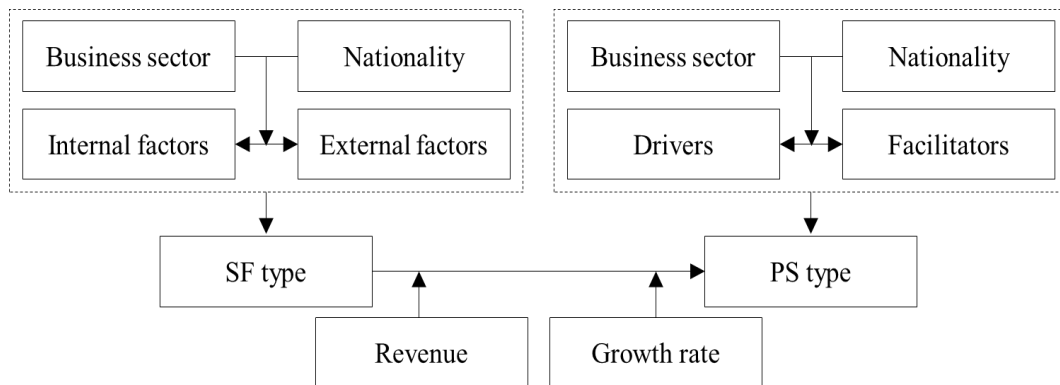


Figure 5. Research framework

Regarding the STF process, the relationships of management of all internal factors must match with the external factors (Dess and Lumpkin, 2013). STF had been conceptualized in which the strategies if the firm was to survive and gain a competitive advantage (Porter, 1980, 1985). The successful of outsourcing came from the selection and decision process for the high similarity and fit with their alliances (Festel et al., 2014). While, PNS model (Lambert et al., 2004) found that (1) the stronger the driver, the more chance of a successful partnership, (2) the more facilitators, the better the chance of successful, (3) the MPF (meeting process facilitator) needs to be sensitive to the fact that a single point change on either drivers or facilitators can move a relationship from one type to another type, and the partnership meeting with sincerely negotiation are the key of success factors of outsourcing, and 4) the appropriate partnership can improve performance of both alliances. It can imply that the success of these two models need the similarity and strong relationship with their alliances.

Based on comparison matrix, (Figure 6) 3x3 driver-facilitator matrix of Lambert's model, the combination of drivers and facilitators determine the level of partnering as: partnership Types I, Type II & type III, with details:

- Type III-PNS indicates partnership from two parties in pattern as: high (H) driver & high facilitator, or high driver & moderate (M) facilitator, or moderate driver & high facilitator (H&H or H&M or M&H)
- Type II-PNS indicates partnership from two parties in patter as: high driver & low (L) facilitator, or moderate driver & moderate facilitator, or low driver & high facilitator (H&L or M&M or L&H)

- Type I-PNS indicates partnership from two parties in patter as: low driver & moderate facilitator, or moderate driver & low facilitator (L&M or M&L)

Facilitator points	Driver points		
	8-11 points	12-15 points	16-24 points
8-11 points	Arm's length	Type I	Type II
12-15 points	Type I	Type II	Type III
16-25 points	Type II	Type III	Type III

Figure 6. 3x3 driver-facilitator matrix

External fit points	Internal fit points		
	8-11 points	12-15 points	16-20 points
8-11 points	No fit	Low fit	Moderate fit
12-15 points	Low fit	Moderate fit	Good fit
16-20 points	Moderate fit	Good fit	Good fit

Figure 7. 3x3 internal f.-external f. matrix

Figure 7 also showed 3x3 internal-external matrix of the STF model, the STF types (low, moderate & good fit) are the results from the combination of Internal factor (Int) vs. External factor (Ext) of two parties, with align the same concept of combination and comparison as PNS model. Both of these outsourcing model indicate higher key factors level, better outsourcing (STF & PNS) types. From aforementioned researches, the theoretical foundation for the research hypotheses 1a and 1b, as follows:

RH 1a: Each of two key factors of STF & PNS are similar between business sectors and nationalities.

RH 1b: The relationship between two of STF's factors and two of PNS's factors are strong.

The conversion from an outsourcing relationship to the partnership relationship has been further investigated and made clearer by Ali and Khan (2016). Lambert et al. (2004), and Lane and Lum (2011) focusing on the similarities and difference between these two models. The success of outsourcing in win-win position can be seen from matching of both internal and external factors between the outsourcer companies and their outsourcing companies. And the appropriate partnership or strategic outsourcing can improve performance of both alliances (Festel et al., 2014; Lambert et al., 2004). So, the theoretical foundation for the research hypotheses 1c and 2 about the relationship between strategic outsourcing model and outsourcing partnership model, and their outsourcing performance, as follows:

RH 1c: There are strong relationships between strategic fit and partnership types.

RH 2: Company revenue and growth rate are the predictors of the companies' performances outcome for each of STF and PNS types.

For the academic implication of these hypotheses, there are in three topics: first, the global pharmaceutical outsourcing manufacturing trends, gradually moved from the outsourcing contractual relationship to outsourcing partnership (Khan and Ali, 2015; Lambert and Enz, 2017). The understanding of current and future trends of outsourcing relationship and changings are key success factors for both business and academic sections; second, uncertainty in market and technology can effectively be overcome through partnerships where partners share information of unexpected events and developments (Verwaal and Hesselms, 2004); and last, most Asian countries, such as China and India, etc. the outsourcing partnerships and research papers are fast growing (Javalgi et al., 2013). Thailand, even is one of the more opportunity with high grow rate of outsourcing pharmaceutical industry, but there are very few of real partnership relations and academic researches, that cause a lot of gaps for study.

3. Data and research method

The survey was constructed during June to September 2016, interviews and questionnaires were completed by multiple respondents from forty-three of Thai and foreign pharmaceutical companies to ensure the data covered a range of the whole industry. This paper attempted to develop an empirically supported partnership model and strategic fit model in outsourcing pharmaceutical manufacturing industry. Likert-type questionnaire items adapted from previously validated studies were completed by senior managers from each company to assess the outsourcing relations between CPs and CMs via the PNS model, STF model and the perceived outcome performance; such as: company revenue, and % growth rate; were considered. The details of the research methods are as follows:

Table 1. Variables and operational definitions

Strategic fit model	Partnership model																																								
<p>1. Internal factor: The strategic factor focuses on the organizational and HRM systems resources and capabilities, which helps to determine the appropriate level of a business outsourcing strategic partner. It consists of 4 variables, all of which are measured using 4-item, Likert’s 5-point rating scale. The factor scores range between 4-20 points, and have been grouped into four categories of 4-7, 8-11, 12-15, and 16-20. The definitions of those 4 variables are as follows: <i>1.1 Trust / Commitment:</i> Loyalty to each other, loyalty to the partnership, and a long-term focus are all the elements. <i>1.2 Innovation Transfer:</i> The new know-how or technology sharing or passing through to the partners. <i>1.3 Winning Relationship:</i> A win-win proposition for both sides: e.g. buyer & seller, outsourcer & outsourcing company. <i>1.4 Financial Investment:</i> Firm’s sharing financial resource across the relationship can strengthen a partnership.</p>	<p>1. Driver: The strategic factor identifies the compelling reasons to partner and influence outcome; resulting in a competitive advantage, which helps to determine the appropriate level of a business relationship. It consists of 4+1 variables, all of which are measured using 4-item, 5-point Likert’s rating scale questionnaire. The driver scores range between 4-24 points, and have been grouped into four categories of 4-7, 8-11, 12-15, and 16-24 (a combed categories of 16-19, and 20-24). The definitions of those 5 variables are as follows: <i>1.1 Asset/cost efficiency:</i> Potential management for better utilization of asset and/or for cost reductions in e.g. transportation, packaging, or product cost. <i>1.2 Customer service:</i> Integrating activities leading to customer’s service improvement: e.g. reduced inventory. <i>1.3 Market Advantage:</i> A stronger integration between two organizations to enhance the organization’s marketing mix, or to ease entry into new markets, etc. <i>1.4 Profit stability/growth:</i> Strengthening of relationship which improve or enhance profitability: e.g. long-term volume & price commitments, reduce sales variability. <i>1.5 Motivation strength to partners:</i> The advantage is either sustainable competitive advantage or it allow matching benchmark standard.</p>																																								
<p>2. External factor: The strategic factor relate to programs, activities and strategies that the organization develops to respond to the external environment. External factor consists of 4 variables, all of which are measured using 4-items Likert’s 5-point scale questionnaire. The external score computed a summation of 4 variables, ranging from 4-20 points, which have been grouped into four categories of 4-7, 8-11, 12-15, and 16-20, in order to construct the internal-external fit’s matrix. The definitions of those 4 variables are as follows: <i>2.1 Market Uncertainty:</i> The lack of market certainty. A state of having limited knowledge where it is impossible to exactly describe the existing state, a future outcome, or more than one possible outcome. <i>2.2 Dynamic Shifts:</i> The external factors or environment that fast changing and impacted to business. <i>2.3 Patent/Tax/Regulation:</i> Number and expiration drug patents, government tax and other regulations ex: GMP, PIC/s that impacted to industry. <i>2.4 Risk Control/Management:</i> The risk is the possibility that an event will occur and adversely affect the achievement of an objective. Therefore, risk itself has the uncertainty.</p>	<p>2. Facilitator: The strategic supporting environmental factors that enhance partnership growth and relationship maintenance of the two firms that will help or hinder the partnership development process. There are 4 major + 5 additional variables, all of which are measured using 4-items Likert’s 5-point scale questionnaire. The facilitator score computed a summation of 4+5 variables, ranging from 4-25 points, which have been grouped into four categories of 4-7, 8-11, 12-15, and 16-25 (notice that this category is a combined score of the last two categories). The definitions of those 5 variables are as follows: <i>2.1 Corporate compatibility:</i> The cultures and business objectives of the two firms must mesh. They do not have to identical, but they cannot clash. <i>2.2 Managerial philosophy:</i> Such things as organizational structure, attitude toward employee empowerment. The relative importance of teamwork and the commitment to continuous improvement. <i>2.3 Mutuality:</i> A willingness to develop joint goals, share sensitive information, and take a long-term perspective. <i>2.4 Symmetry:</i> The probability for success is enhanced when the partners are demographically similar. <i>2.5 Additional facilitator:</i> The five situation-specific factors that enhance and strengthen the relationship between CPs and CMs, namely: a) Shared competitor, b) Close proximity, c) Exclusivity, d) Prior history, and e) Shared supplier. Each of the five factors is measured as a bonus points using two choices (yes or no) question.</p>																																								
<p>3. STF type: The organization’s matching degree level in its resources and capabilities with the opportunities in the external environment. A calibration of the strategic fit using 3x3 internal-external fit matrix (as modified from the partnership relation calibration). Notice that the lowest category is omitted because it combination identifies “no fit” which cannot be treated as strategic fit type. Consequently, the 3X3 internal and external factor matrix yields three types of strategic fit as the following description: <i>3.1 Low fit:</i> The strategic fit with moderate level of either internal or external scores, indicating limited basis of both or either organization’s resources and capabilities as well as its external environment factors. <i>3.2 Moderate fit:</i> The strategic fit of two alliance companies which have both or either the internal and external factors above moderate to high level. The type of fit indicates quite a big efforts in the organization’s internal functions, to obtain similar agreement. <i>3.3 Good fit:</i> The strategic fit relation of two companies with either one or both of them have approximately equality of internal and/or external factors at high level.</p> <table border="1" data-bbox="172 1805 788 1928"> <thead> <tr> <th>External fit points</th> <th colspan="3">Internal fit points</th> </tr> <tr> <th></th> <th>8-11 points</th> <th>12-15 points</th> <th>16-20 points</th> </tr> </thead> <tbody> <tr> <th>8-11 points</th> <td>No fit</td> <td>Low fit</td> <td>Moderate fit</td> </tr> <tr> <th>12-15 points</th> <td>Low fit</td> <td>Moderate fit</td> <td>Good fit</td> </tr> <tr> <th>16-20 points</th> <td>Moderate fit</td> <td>Good fit</td> <td>Good fit</td> </tr> </tbody> </table>	External fit points	Internal fit points				8-11 points	12-15 points	16-20 points	8-11 points	No fit	Low fit	Moderate fit	12-15 points	Low fit	Moderate fit	Good fit	16-20 points	Moderate fit	Good fit	Good fit	<p>3. PNS type: A calibration result of the partnership components using 3x3 driver-facilitator matrix. Notice that the lowest category of driver and facilitator (4-7) are omitted, because the combination of the lowest categories is identified as “an arm’s-length relationship” which cannot be treated as a partnership type; whereas the highest category of driver (20-24) and facilitator (20-25) are included in the category next to the highest one. Consequently, the 3x3 driver-facilitator matrix , resulted in three types of partnership as the following description: <i>3.1 Type I partnership:</i> The partnership with limited basis, coordination and joint planning are low and rare, or shot-term focus. Most of the time, this type involves with single department or function in each party. <i>3.2 Type II partnership:</i> The relationships between parties involve more than just coordination. The relationships are rather long-term. And multiple departments, divisions, or functions in each party are engaged in the partnership. <i>3.3 Type III partnership:</i> The parties share “substantial level of operational integration” and whole organization were included. Typically, there is no end date for this type.</p> <table border="1" data-bbox="826 1805 1426 1928"> <thead> <tr> <th>Facilitator points</th> <th colspan="3">Driver points</th> </tr> <tr> <th></th> <th>8-11 points</th> <th>12-15 points</th> <th>16-24 points</th> </tr> </thead> <tbody> <tr> <th>8-11 points</th> <td>Arm’s length</td> <td>Type I</td> <td>Type II</td> </tr> <tr> <th>12-15 points</th> <td>Type I</td> <td>Type II</td> <td>Type III</td> </tr> <tr> <th>16-25 points</th> <td>Type II</td> <td>Type III</td> <td>Type III</td> </tr> </tbody> </table>	Facilitator points	Driver points				8-11 points	12-15 points	16-24 points	8-11 points	Arm’s length	Type I	Type II	12-15 points	Type I	Type II	Type III	16-25 points	Type II	Type III	Type III
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<p>5. Outsourcing outcomes: Outcomes measure the extent to which each firm achieves its target. Appropriately established and effectively managed, should improve performance for both parties, ex: Revenue, % Growth rate, etc.</p>																																									

3.1 Research variables

The variables in this research were followed and applied from PNS model (Lambert et al., 2004) and STF model (Ekwutosi, 2014), as shown in Table 1. The principle variables consisted of 4-indicator internal and 4-indicator external factors measuring SFT outsourcing model; and another two set of 4-indicator factors measuring the driver, and facilitator factor with one additional indicator for each factor in the PNS model. The two sets of the total summated scale scores can be interpreted as the types of PNS and STF results, which will be compared with expected PNS type, expected STF type and each outcome performance as well.

3.2 Research instruments

In order to summarize the outsourcing manufacturing outcomes based on the PNS model and the outsourcing STF model, and identify the PNS type and STF type using empirical study, the structure interviewed questionnaire and the telephone interview schedule were designed. Firstly, the interviewed questionnaire was chosen in this study because it was a better choice in terms of measuring attitudes, perceptions and understandings of the participants in a limited period of time (Cohen et al., 2011). Modifications to the original survey instruments measuring the two factors for the PNS model (Lambert et al., 2004) and another two factors for the outsourcing STF model (Saxton, 1997) were made to meet the purposes of this present study. The questionnaire was comprised of twenty-nine items altogether. The first part consisted of six questions which were designed to collect background information of the respondents. The second part consists of Likert-scale scenarios which were designed to examine PNS types and STF types understanding of outsourcing in pharmaceutical business. The third part of the questionnaire was comprised of one open-ended question that was intended to collect more comments and/or environment impacted to the research. The modified questionnaire was approved by three pharmaceutical experts (inter-rater agreement or Cohen’s kappa = 0.862 %) and had Cronbach’s alpha reliability of .846 as compared to 0.960 of the Lambert’s original one. And secondly, the telephone interview schedule was constructed asking for the respondents’ revenue, annual growth rate, investment and profit in range, one month after the interview questionnaire, in order to obtain the valid information without the contaminating effect of the questionnaire responses. However, the respondents declined to give the information, and finally, we got only 2 variables of company revenue, and % growth rate to be used in this study.

3.3 Research survey

The total research population of Thai pharmaceutical outsourcing manufacturing in our study are very few, they are only 95 companies (N1 = 63 CPs & N2 = 32 CMs), which match with our specification and following criteria: 1) only private sector, Thai and foreign pharmaceutical companies, located in Bangkok Metropolitan area. 2) the pharmaceutical companies must conduct outsourcing business, either CPs or CMs, 3) both partner companies must have either a branch office or factory located in Bangkok Metropolitan area, 4) All CMs are modern medicine GMP compliance manufacturers under Thai FDA approval.

The researchers use t-test, correlation, cross tabulation, and fisher’s exact test with 3 independent variables / G* Power program estimate sample size of these three statistic using $\alpha = 0.05$, large effect size allocation ratio $N2/N1 = 1.97$, and obtain sample size of 46, 67 and 49 respectively. So, the estimate sample size in this study are 67. However, our actual sample have only 43 companies (=64% of 67) that be willing and consent to participate in this research survey. All sample are available of more than three times for recollection of data from these companies, who didn’t grant the permission for our interview appointment in the first two times.

The survey was constructed during June to September 2016, most of participants were manager level, and all participants had a minimum 6 years of experience in the industry in order to be able to decide and share the correct and valuable data.

All of the sampled pharmaceutical companies agreed to respond to the questionnaires given their choice of choosing only one of their best Thai and/or foreign outsourcing partners. Consequently, as the sampled companies could choose either one (Thai or foreign) or two (Thai and foreign) outsourcing partners, there were 67 pairs of outsourcing partners, all of which were classified into 4 relation types of 1. CP-T vs. CM-T (n = 13), 2. CP-F vs. CM-T (n = 18), 3. CP-T vs. CM-F (n = 9), and 4. CP-F vs. CM-F (n = 27), as shown in Figure 8, where the data from all 67 pairs were analyzed using both the partnership and the strategic fit models.

Type-Nationality (CP, CM) – (T, F, All)	CM-T (n = 9)	CM-F (n = 3)	CM-All (n = 12)
CP-T (n = 6)	1. CP-T vs. CM-T (n = 13)	3. CP-T vs. CM-F (n = 9)	CP-T vs. CM-All (n = 22)
CP-F (n = 25)	2. CP-F vs. CM-T (n = 18)	4. CP-F vs. CM-F (n = 27)	CP-F vs. CM-All (n = 45)
CP-All (n = 31)	CP-All vs. CM-T (n = 31)	CP-All vs. CM-F (n = 36)	CP-All vs. CM-All (n = 67)

Figure 8. Research sample

During our survey data collection, another problem arrived as almost all of the alliance CP & CM pairs decline to provide an interview from both alliance companies, and willing to offer their perceived data of their alliances with a guarantee of data reliability. As a result, we obtained only 2 pairs of real data and 65 pairs of perceived alliance data. Although, the above data analysis indicated highly reliable data from measuring CPs or CMs data with their perceived alliance data, the researchers recognized that our data still have limitations as compared to the real data collection from each of the alliance companies. Therefore, our research findings should be confident under this limitation as well, and further analysis should be done in the future.

The researchers, therefore, have attempted to collect real data from the CPs or CMs alliances, the available results of which consisted of only 14 pairs. The perceived data from the initial data file, thus can be consequently compared with the real data from each pair alliance using t-test (matched pair). The analysis results, shown in Table 2 as have indicated that the four comparisons (pairs number 1, 2, 4, and 5) of the internal, external, driver and facilitator factors, between the real data vs. their perceived data, has no significant difference between the alliance pairs with the t-values of 0.234, -0.414, -0.179 and -1.000 with the associated p-values of 0.818, 0.686, 0.861, and 0.336 respectively. Whereas the analysis results comparing the strategic fit type and the partnership type between the real data vs. their perceived data (pairs number 3 and 6), indicated that the pair different means are equal, and consequently the correlation and the matched pair t-tests cannot be computed.

Table 2. Comparison of the strategic fit factors and type means of the real CPs or CMs with their alliances using t-test (matched pair)

Pair no.	Variable pair	Mean	Std. dev.	Std. error mean	Corr.	Sig.	Paired differences					
							Mean	S.D.	Std. error mean	t	d.f.	Sig. (2-tailed)
1	SumIn	14.143	1.994	0.533	0.853	0.000	0.071	1.141	0.305	0.234	13	0.818
	pSumIn	14.071	2.165	0.579								
2	SumEX	13.786	1.626	0.434	0.760	0.002	-0.143	1.292	0.345	-0.414	13	0.686
	pSumEx	13.929	1.979	0.529								
3	STFtype	3.214	0.579	0.155	The correlation and t cannot be computed because the standard error of the difference is 0.							
	pSTFtype	3.214	0.579	0.155								
4	SumDri	14.071	2.269	0.606	0.802	0.001	-0.071	1.492	0.399	-0.179	13	0.861
	pSumDri	14.143	2.445	0.653								
5	SumFac	15.357	1.906	0.509	0.879	0.000	-0.286	1.069	0.286	-1.000	13	0.336
	pSumFac	15.643	2.240	0.599								
6	PNStype	3.214	0.426	0.114	The correlation and t cannot be computed because the standard error of the difference is 0.							
	pPNStype	3.214	0.426	0.114								

Table 3. Means, standard deviations, and correlation coefficient between the strategic fit and partnership factors and types of strategic fit and partnership models

		1	2	3	4	5	6	7	8	9	10	11	12
1	SumIn	1.000											
2	SumEX	0.888	1.000										
3	STFtype	0.837	0.788	1.000									
4	SumDri	0.592	0.526	0.690	1.000								
5	SumFac	0.795	0.722	0.762	0.776	1.000							
6	PNStype	0.776	0.738	0.736	0.699	0.846	1.000						
7	pSumIn	0.853	0.748	0.846	0.563	0.702	0.817	1.000					
8	pSumEx	0.724	0.760	0.820	0.515	0.578	0.750	0.881	1.000				
9	pSTFtype	0.837	0.788	1.000	0.690	0.762	0.736	0.846	0.820	1.000			
10	pSumDri	0.532	0.511	0.738	0.802	0.830	0.707	0.536	0.495	0.738	1.000		
11	pSumFac	0.684	0.611	0.775	0.792	0.879	0.893	0.720	0.618	0.775	0.853	1.000	
12	pPNStype	0.776	0.738	0.736	0.699	0.846	1.000	0.817	0.750	0.736	0.707	0.893	1.000
	Mean	14.143	13.786	3.214	14.071	15.357	3.214	14.071	13.929	3.214	14.143	15.643	3.214
	S.D.	1.994	1.626	0.579	2.269	1.906	0.426	2.165	1.979	0.579	2.445	2.240	0.426

Note: $r \geq .792, p < .001$; $r \leq .530, p > .05$

In their further analysis, the researchers estimate the correlation between the 4 factors of strategic fit and partnership models, from both the real and perceived data set, then estimate the correlation matrix to test the significance of all pairs of real data and perceived data. They expect that all correlation coefficients between the real and perceived data should be highly correlated which support that the 14 pairs of collected data, even of their single source, are reliable. The analysis results are in accordance with our expectation as can be seen in Table 3. It is noteworthy to indicate that the real data and the perceived data of the 4 factors in strategic fit and partnership models are highly significantly correlated at 0.760 – 0.879; whereas the real data and the perceived data of the strategic fit and partnership types are perfectly

correlated.

3.4 Statistical analysis

The research data were analyzed by SPSS version 17, using frequency distribution and descriptive statistics of all principle variables, then the data were further analyzed in order to compare the differences in means of those factors measuring PNS type, and STF type, using t-test, between business sector (CMs vs. CPs), and nationality (Thai vs. foreign). Next the PNS type and the STF type were calibrated and analyzed to clarify the associations between business sector and nationality using correlation analysis. Then, the cross tabulation between PNS type and the STF type was obtained. One of the limitations is the small sample size, the researchers use Fisher's exact test and Somers'd correlation in this study.

Those three steps of analyses were conducted in order to answer the first research question. Regarding the second research question the cross tabulations between two predictors (company revenue and % growth rate) and the PNS type and the STF type were conducted in order to clarify which one was the best predictor. The reason underlining the analysis choice was due to the categorical measure of both two predictors and the PNS and STF outcomes.

4. Research findings

In this section, our research findings from data analysis results were presented in accord with the two research questions, with the preliminary data analysis regarding the respondents' characteristics at the beginning as follows:

4.1 Preliminary analysis: Respondents' characteristics

The four topics of the respondents' data were presented. Firstly, all 43 pharmaceutical companies consisted of 31 (72.09%) CPs, and 12 (27.91%) CMs, and consisted of 15 (34.88%) Thai companies, and 28 (65.12%) foreign companies, classified further into 10 (23.26%) US, 10 (23.26%) EU, and 8 (18.60%) Japan. Classification in business sector together with nationality resulted in four groups, revealing that most of pharmaceutical companies were 25 (58.14%) CP-F, next were 9 (20.93%) CM-T, 6 (13.95%) CP-T, and 3 (6.98%) CM-F respectively. According to the outsourcing partners' nationality, 24 (55.81%) pharmaceutical companies had both Thai and foreign partners, 16 (37.21%) had entirely foreign partner, and 3 (6.98%) companies had only Thai partner in their outsourcing manufacturing business. Regarding the respondent personal data, there were 30 (69.77%) of respondents worked at manager level, and their working experiences in pharmaceutical business were reported in ranges as follows; 4 (9.30%) were 6-10 years, 25 (58.14%) were 11-20 years, and 14 (32.56%) worked > 20 years.

Table 4. Independent samples t-test results

Variable	Studied groups	Results of the four factors- means differences between CP and CM								
		n	Mean	S.D.	Levene's test for equality of variances		t-test for equality of means			Conclusion
					F	Sig.	t	d.f.	P	
Driver	CP	45	15.760	2.385	F	0.458	1.392	65.000	0.169	No different
	CM	22	14.820	2.970	Sig.	0.501				
Facilitator	CP	45	16.360	2.376	F	0.442	0.531	65.000	0.597	No different
	CM	22	16.000	2.944	Sig.	0.509				
Internal factor	CP	45	14.800	1.961	F	0.285	1.211	65.000	0.230	No different
	CM	22	14.180	1.967	Sig.	0.595				
External factor	CP	45	13.910	1.905	F	0.053	1.364	65.000	0.177	No different
	CM	22	13.230	1.974	Sig.	0.819				

Variable	Studied groups	Results of the four factors- means differences between Thai and foreign								
		n	Mean	S.D.	Levene's test for equality of variances		t-test for equality of means			Conclusion
					F	Sig.	t	d.f.	p	
Driver	Thai	26	14.460	2.518	F	0.770	-2.568	65.000	0.013	Significant different
	Foreign	41	16.070	2.494	Sig.	0.384				
Facilitator	Thai	26	15.460	2.353	F	3.994	-2.070	57.080	0.043	Significant different
	Foreign	41	16.730	2.589	Sig.	0.050				
Internal factor	Thai	26	13.460	1.363	F	6.856	-4.555	64.419	0.000	Significant different
	Foreign	41	15.320	1.968	Sig.	0.011				
External factor	Thailand	26	12.650	1.198	F	19.221	-4.257	64.696	0.000	Significant different
	Foreign	41	14.340	2.045	Sig.	0.000				

4.2 Data analysis results regarding the first research question

To answer the first research question concerning the associations and/or correlations between the CPs vs. CMs, between Thai vs. foreign companies, and between PNS and SFT types in Thai outsourcing pharmaceutical manufacturing business, the researchers present the data analysis results in three parts: outsourcing associations, correlations and cross-tabulation data analyses as follows:

4.2.1 Outsourcing associations between business sectors and nationalities

The analysis results, aiming to study matching of the two factors means of each of the two factors of STF and PNS models, revealed that a) 4 mean difference pairs are not rejected as expected, indicating that there were no significant differences in the four factors means of PNS and STF models between the CPs vs. CMs (t-statistics = 1.392, .531, 1.211, 1.364, at degrees of freedom = 65). On the contrary, the analysis results, b) study of Thai and foreign countries, indicated that all four null hypothesis are rejected (t-statistics = -2.568, -2.070, -4.555, -4.257, at degrees of freedom = 65), as shown in Table 4 implying that the Thai pharmaceutical companies had significantly smaller means of the four factors as compared to the foreign outsourcing partners.

The analysis results indicate that while there are matching between each of the two factors means in both the STF model and the PNS model, between business sector (CP & CM) no any significantly difference, but they significantly difference between company nationalities (Thai & foreign). In sum, the analysis results supported our first research hypothesis (RH 1a) and further signified a comparative analysis between the Thai and foreign companies.

4.2.2 Correlations between key factors of the partnership and strategic fit types and moderating effect

In order to clarify the relationship between business sectors and nationalities using correlation analysis between the two of PNS factors (driver and facilitator) and two of STF factors (internal and external factors), the correlation matrix, with the factor means and standard deviations, was obtained as shown in Table 5. The analysis results indicated that the overall means and standard deviations (in part of total correlation) of the internal factor (14.600 and 1.970) and external factor (13.690 and 1.940) were lower than those of driver (15.400 and 2.680) and facilitator (16.240 and 2.559) as our expectation.

Five correlation coefficients were highly significant at .01 with the two largest ones between driver & facilitator (.863), and internal & external factors (.716). The remaining of coefficients indicated the low relationship between PNS factors and STF factors (.290 -.356). The analysis result thus implied the similarity between the outsourcing partnership and the strategic fit of pharmaceutical companies, and further indicated that the pharmaceutical companies must improve the strategic fit scores in order to transform the outsourcing alliances to the partnership model. In sum, the analysis results supported our second research hypothesis (RH 1b) and consequently require further analysis for testing our third research hypothesis

Table 5. The correlation matrix between key factors of the partnership and strategic fit types

n = 67	Classified on nationality (Foreign, Thai, Total)											
	F				T				Total			
	1	2	3	4	1	2	3	4	1	2	3	4
1. Driver	1.000	-	-	-	1.000	-	-	-	1.000	-	-	-
2. Facilitator	0.855**	1.000	-	-	0.859**	1.000	-	-	0.863**	1.000	-	-
3. Internal F	0.408**	0.424**	1.000	-	0.123	0.069	1.000	-	0.344*	0.356**	1.000	-
4. External F	0.284	0.301	0.656**	1.000	0.061	0.087	0.616**	1.000	0.290*	0.317**	0.716**	1.000
Mean	16.070	16.730	15.320	14.340	14.350	15.460	13.460	12.650	15.400	16.240	14.600	13.690
S.D.	2.494	2.589	1.968	2.045	2.667	2.353	1.363	1.198	2.680	2.559	1.970	1.940
$r_i'(dri, fac)=1.293, r_i'(dri, fac)=1.274, z=1.075, p=.142$						$r_i'(in, ex)=.717, r_i'(in, ex)=.784, z=.388, p=.348$						
n = 67	Classified on business sector (CP, CM, Total)											
	CP				CM				Total			
	1	2	3	4	1	2	3	4	1	2	3	4
1. Driver	1.000	-	-	-	1.000	-	-	-	1.000	-	-	-
2. Facilitator	0.826**	1.000	-	-	0.923**	1.000	-	-	0.863**	1.000	-	-
3. Internal F	0.261	0.318*	1.000	-	0.434*	0.411	1.000	-	0.344**	0.356**	1.000	-
4. External F	0.120	0.163	0.652**	1.000	0.496*	0.557**	0.823**	1.000	0.290*	0.317**	0.716**	1.000
Mean	15.760	16.360	14.800	13.910	14.680	16.000	14.180	13.230	15.400	16.240	14.600	13.690
S.D.	2.385	2.376	1.961	1.905	3.138	2.944	1.967	1.974	2.680	2.559	1.970	1.940
$r_{cp}'(dri, fac)=1.172, r_{cm}'(dri, fac)=1.683, z=2.551, p=.005$						$r_{cp}'(in, ex)=.775, r_{cm}'(in, ex)=1.172, z=2.245, p=.012$						

Note: *p < 0.05; ** p < 0.01

For more studies, by testing company nationality (Thai vs. foreign), and business sector (CP vs. CM) as the

moderators, whether there are any effects on the correlations between key factors of PNS and STF types, or not? Testing differences between two independent correlations, given $\rho \neq 0$, using Fisher's transformation of r into r' , based on $r' = 0.5 \ln(1+r/1-r)$, and standard error of $r' = \sqrt{n-3}$; we can test the null hypotheses that $\rho_1 = \rho_2$ using the formula as $z = \frac{r'_1 - r'_2}{\sqrt{1/n_{1-3} + 1/n_{2-3}}}$.

The researchers test for the difference between two independent, calculated for the z-value, and find for p-value for decision. The analysis results, Table 5, separated in 2 groups: a) classified on nationality (Foreign, Thai, Total) revealed that all 2 null hypotheses of the correlation difference tests are not rejected as expected, indicating that there were no significant effects from nationality to the correlation between PNS and STF models (z & p-statistics for driver/facilitator = 1.075, .142, and z & p-statistics for internal f / external f = .388, .348). And, b) classified on business sector (CP, CM, Total), the analysis results indicated that two null hypothesis are rejected (z & p-statistics for driver/facilitator = 2.551, .005, and z & p-statistics for internal f / external f = .2.245, .012), indicating that there were have significant of moderating effects from business sector to the correlation between PNS and STF models.

4.2.3 Cross-tabulation of partnership and strategic fit types

This analysis focused on the cross classification of the PNS types and the STF management types using cross-tabulation or contingency table because the measurement levels of the two model types were ordinal level. We used strategic types as the column variable with the partnership types or the future aim in outsourcing, as the row variables with percentage down calculation and cross comparison. Based on our third research hypothesis, we expected to get the majority outsourcing pairs currently being in a moderate, and good fit strategic type, but they should be, in the future, in type II and III partnership type respectively.

Table 6 showed that the statistically significant analysis results of all 67 pairs' pharmaceutical outsourcing types were in in accord with our expectation. The majority 42 (93.333% of 45) moderate strategic fit type companies would still be in Type II partnership type, and the failure 3 (13.636 % of 22) good fit strategic type failed to reach their target type III partnership, the results of which contrasting to the majority 19 (86.364 % of 22) of good strategic fit type companies that could maintain or made progress in the Type III partnership. This analysis results supported our third research hypothesis (RH 1c).

4.3 Data analysis results regarding the second research question

These analysis results had answered the second question concerning the predictors of the companies' performances outcome form each of partnership types and strategic fit types. Using the cross tabulations between two predictors: 1) company revenue in Y 2015 (separated in two groups: < 1000, and > 1000 MB) and 2) % growth rate of Y 2015 (separated in two groups: < 8.2%, and > 8.2%), and the partnership type & the strategic fit type were conducted in order to clarify which one was the best predictor. The reason underlining the analysis choice was depend on the categorical measure of both two predictors and the partnership and strategic fit outcomes. The analysis results were presented as follows:

Table 6. The 2x2 cross-tabulation for all 67 outsourcing pairs

Partnership type	Strategic fit type		Total	Analysis results			
	Moderate	Good fit		Value	d.f.	Sig.	
Type II	42 (93.333 %)	3 (13.636 %)	45 (67.164 %)	Pearson	42.556 ^a	1	0.000
Type III	3 (6.667 %)	19 (86.364 %)	22 (32.836 %)	Fisher's	-	-	0.000
Total count (% of total)	45 (100.000 %)	22 (100.000%)	67 (100.000%)	Somers' d	0.797	-	0.000

^a 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.22

^b Computed only for a 2x2 table

Table 7. The 2x2 cross tabulation between partnership and strategic fit type classified based on two groups of revenue

Predictor		Strategic fit type		Total	Analysis results				
		Moderate fit	Good fit		Value	d.f.	Sig.		
Revenue < 1000 n = 37	Partnership	Type II	27 (96.429%)	3 (33.333%)	30 (81.081%)	Pearson	17.676 ^a	1	0.000
		Type III	1 (3.571%)	6 (66.667%)	7 (18.919%)	Fisher's	-	-	0.000
	Total	28 (100.000%)	9 (100.000%)	37 (100.000%)	Somers' d	0.631	-	0.002	
Revenue ≥ 1000 n = 30	Partnership	Type II	15 (88.235%)	0 (0.000%)	15 (50.000%)	Pearson	22.941 ^b	1	0.000
		Type III	2 (11.765%)	13 (100.000%)	15 (50.000%)	Fisher's	-	-	0.000
	Total	17 (100.000%)	13 (100.000%)	30 (100.000%)	Somers' d	0.882	-	0.002	

a: 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.70.

b: 1 cells (25.0%) have expected count less than 5. The minimum expected count is 6.50.

4.3.1 Revenue performance evaluation between partnership and strategic fit types

Table 7 showed the analysis results comparing the outsourcing type relation between 2 groups of revenue as follows: (1) The low revenue companies (< 1000 MB in Y2015), there were 27 (96.429% of 28) moderate strategic fit type ones would still be in partnership Type II, and the failure 3 (33.333 % of 9) good fit strategic type failed to reach their target Type III partnership. The result of which contrasting to the rest 6 (66.667 % of 9) good strategic fit type companies that could maintain or made progress in the partnership Type III. (2) The high revenue companies (> 1000 MB), there were 15 (88.235% of 17) moderate strategic fit type companies would still be in Type II partnership, the result of which contrasting to 13 (100.000 % of 13) of good strategic fit type companies that could maintain or made progress in the partnership Type III.

The analysis results also aiming to study whether company revenue is a moderator having effect on the relationship between STF type and PNS type, indicated of the group#1 (Revenue <1000 MB), there are 96.429% of company which are moderate fit type could transform to be in PNS-Type II, only 3.571% of companies can't ship to good fit type. 66.667% of good fit type are in PNS-Type III. Pearson value = 17.676, d.f. =1, sig. =.000, Fisher's exact Sig. = .000, and Somers'd value (with PNS type dependent) is .631, we can interpret that the relationship of these two models are moderately significant with the first group of revenue. For the group#2 (Revenue >1000 MB), also same concept to analyze, with Pearson value = 22.941, d.f. =1, sig. =.000, Fisher's exact Sig. = .000, and Somers'd value (with PNS type dependent) is .882, we can interpret that the relationship of these two models are highly significant with the second group of revenue. This analysis results supported our last research hypothesis (RH 2). However, this analysis result ought to be further analyzed with several predictors in order to clarify this study.

4.3.2 Growth rate performance evaluation between partnership and strategic fit types

Table 8 showed the analysis results comparing the outsourcing type relation between 2 groups of company growth rate as follows: (1) The low% growth rate companies (< 8.2% in Y2015), there were 25 (96.154% of 26) moderate strategic fit type ones would still be in type II partnership, and no failure of good fit type failed to reach their target partnership Type III. The result of which contrasting to the rest 8(100.000 % of 8) good strategic fit type companies that could maintain or made progress in the partnership Type III. (2) The high % growth rate companies (> 8.2% MB), there were 17 (89.474% of 19) moderate fit type companies would still be in Type II partnership, and the failure 3 (21.429% of 14) of good fit type failed to reach their target type III partnership. The result of which contrasting to 11 (78.571 % of 14) of good fit type companies that could maintain or made progress in the partnership Type III.

Table 8. The 2x2 cross tabulation between partnership and strategic fit type classified based on two groups of Revenue

Predictor			Strategic fit type		Total	Analysis results			
			Moderate fit	Good fit		Value	d.f.	Sig.	
Growth R < 8.2% n = 34	Partnership	Type II	25 (96.154%)	0 (0.000%)	25 (73.529%)	Pearson	29.060 ^a	1	0.000
		Type III	1 (3.846%)	8 (100.000%)	9 (26.471%)	Fisher's			0.000
	Total		26 (100.000%)	8 (100.000%)	34 (100.000%)	Somers' d	0.962		0.002
Growth R ≥ 8.2% n = 33	Partnership	Type II	17 (89.474%)	3 (21.429%)	20 (60.606%)	Pearson	15.632 ^b	1	0.000
		Type III	2 (10.526%)	11 (78.571%)	13 (39.394%)	Fisher's			0.000
	Total		19 (100.000%)	14 (100.000%)	33 (100.000%)	Somers' d	0.680		0.002

^a 1 cell (25.0%) has expected count less than 5. The minimum expected count is 2.12.

^b 1 cell (25.0%) has expected count less than 5. The minimum expected count is 5.52.

The analysis results also aiming to study whether company growth rate is a moderator having effect on the relationship between STF type and PNS type, indicated of the group#1 (% Growth rate < 8.2), there are 96.154% of company which are moderate fit type could transform to be in PNS-Type II, only 3.846% of companies can't ship to good fit type, and 100.000 % of good fit type are in PNS-Type III. Pearson value = 29.060, d.f. =1, sig. =.000, Fisher's exact Sig. = .000, and Somers'd value (with PNS type dependent) is .962, we can interpret that the relationship of these two models are highly significant with the first group of growth rate. For the group#2 (% Growth rate > 8.2), also same concept to analyze, with Pearson value = 15.632, d.f. =1, sig. =.000, Fisher's exact Sig. =.000, and Somers'd value (with PNS type dependent) is .680, we can interpret that the relationship of these two models are moderately significant with the second group of growth rate. This analysis results also supported our last research hypothesis (RH 2) as well. However, this analysis result ought to be further analyzed with several predictors in order to clarify this study.

Our brief analysis results on testing the four research hypotheses regarding the two research questions supported almost of our expected research hypotheses. Firstly, there were both associations and correlations between the CPs vs. CMs alliance companies, between Thai vs. foreign companies, and between partnership types and strategic fit types in pharmaceutical companies in Thailand, the results of which strongly support the relationship between the two models, especially the transfer from outsourcing strategic pair to the expected partnership alliance in the future. And secondly, both of the companies' revenue and growth rate could predict the companies' performances outcome for each of

partnership types and strategic fit types. It was quite noteworthy that only the pharmaceutical companies with the highest revenue and growth rate could have good fit type and transfer to the Type III partnership in the future, whereas only the companies with high revenue and growth rate could have moderate strategic type and only a few of them could transfer to the Type III partnership. Our analysis results had thus shed some light on the prediction of the outsourcing strategic fit and partnership models.

5. Discussions and Recommendations

This study, an empirical survey of the Thai outsourcing CPs and CMs pharmaceutical manufacturing companies regarding the partnership and strategic fit model based supply chain management, and their outcomes performance had confirmed our expectations. Firstly, there was no significant difference in the 4 factor means (driver, facilitator, internal and external factors) of the partnership and strategic fit models between CPs and CMs. On the contrary, there were significant differences between Thai and foreign companies. Secondly, the significantly high correlations between the two factors measuring the partnership success (drivers and facilitators) and the strategic fit success (internal and external factors), where the partnership correlations were higher than the strategic fit correlations, indicated a better congruencies in the partnership than the strategic fit success. The results showed that strategic fit was strongly associated with the partnership fit, signifying the great efforts had been made by the CPs and CMs toward their agreements in strategic management in order to accomplish their targeting outsourcing success, and the expected partnership success (Festel et al., 2014; Lambert et al., 1996; Piltan and Sowlati, 2016; Schwarz, 2014). Whereas the big differences in means across the Thai and foreign pharmaceutical companies revealed significance higher alliance performance for the foreign companies as compared to those of the Thai companies which already known from the past research. For example, Javalgi et al. (2013); Kedia and Lahiri (2007) had shown that the long-term nature of strategic partnership provided the CMs for gradually learning to be able to utilize their deep involvement with their CPs in developing their best resources and capabilities and drivers which had indeed spurred the adoption of transferring the outsourcing strategic to partnership alliance. Therefore, in order to achieve successful transformation through outsourcing, the pharmaceutical company executives must “go beyond ‘making deals’ and instead design their active business models that would work for their expected target,” in other words, those executives could not achieve their expected sustaining outsourcing services without a continuous development of their strategic management. Moreover, the foreign companies’ advantages over the Thai companies reflects the Thai companies’ inability to strengthen their key outsourcing factors led to subsequent inability to compete with the foreign companies. As three of the four factors consist of the companies’ internal factors, their drivers and facilitators, whereas the fourth factor concerns with the external elements such as the strict government drug regulation and time consuming process of getting permission, cultural clashes, poor communication and high turnover, therefore, without the extensive government support for the fourth factor, the Thai companies could not achieve their target partnership alliance with their upgrade of the other three factors.

There was a noteworthy finding concerning correlation analysis, which was not quite contradicted to our expectations. It was the significantly high correlations of the two factors measuring the partnership success (drivers and facilitators) versus the two factors measuring the strategic fit success (internal and external factors), where the partnership correlations were higher than the strategic fit correlations, indicated a better congruencies in the partnership than the strategic fit success. The explanation of those findings just confirmed the fact that whereas the partnership model focused on the partners’ driver and facilitators factors, representing their intentions, motivations, and expectations, to achieve the common win-win agreement (Lambert et al. 1996, 2004), on the contrary, the strategic fit model focused on the alliances’ internal and external factors representing the indicators for each of the alliance to seek and look for the one with their best strategic fit success (Hitt, 2000; Hofer and Schendel, 1978; Javalgi et al., 2013; Zajac et al., 2000).

Moreover, our survey presented the cross-tabulation analyses, indicating interesting correlations between the partnership and the strategic fit types of the 67 pharmaceutical pairs. The findings revealed that the 43 pharmaceutical companies in Thailand were classified either as the low (7.5 %), moderate (59.7 %), and good (32.8 %) strategic fit type or the Type II (67.2%), and the type III (32.8%) partnership. Comparing across the two outsourcing models showed that most of the moderate fit type companies (92.8%) were likely remain into the Type II partnership, and most of those good strategic fit type companies (86.36 %) would be expected to be into the Type III partnership. The survey results, thus confirmed our findings of quite a big differences between the available target-aimed partnership factors and the existing strategic fit factors which the companies must working hard to achieve. Considering the feasibility of the transformation into the partnership alliance, Thailand pharmaceutical companies seemed, not only to be handicapped, comparing with Asian countries, because of partly the Government strict regulations and time consuming process to get the official permission (TIR, 2015), but also the their transformation ability from internal factors to both driver and facilitators to achieve their transformation target (Khan and Ali, 2015; Lee, 2013; Moe et al., 2014). The solutions of these arguments thus require further research in terms of in depth cases study.

Finally, our second research question investigation showed that both of the outsourcing fit and strategic fit efforts

and success could be predicted by two and existing factors of the companies' open characteristics data, with revenue as a better predictor as compared to the growth rate. These results were quite obvious because of the great variation in revenue as compared to the growth rate. However, our findings just confirmed the limitation concerning difficulty in acquiring open data source from the pharmaceutical companies in Thailand, the content of which further suggested the case study design from a specific company instead of the survey as in the research conducted by Kinnula (2005).

Similarly to most empirical research study, this study had at least two limitations. Firstly, the notion of confidential data: most of the pharmaceutical companies in Thailand were reluctant to participate and share their strategic outsourcing data because of high competition, and consequently, our empirical data obtained from each company were only the data from only one of their chosen alliance without identification. Although we had tried to prove that our data were reliable by examine the relationship between the available perceived data from CPs & CMs and the real data from each of the alliance companies, we still had a limitation that was not possible to study how they decide to choose their best alliance partners. Secondly, there were only 2 public available predictors for our predictions of the strategic fit and partnership success, which was not possible to yield any complete fact of prediction in our study. These limitations should be aware for any researchers who would like to carry on their further researches along this line.

6. Conclusions

This study shed some light on the significant relationships among both partnership types and strategic fit types, including outsourcing performance and yielded some valuable recommendation as follows: firstly, the Thai Government should extend their supports under the establishment of an ASEAN Community by 2015 in every field of economic industry especially the pharmaceutical industry for the company to compete with the ASEAN neighbor nations on the feasible relaxed regulations and laws in addition to improving the time consuming process to get the official permission. Secondly, the Thai pharmaceutical companies will be able to effectively compete with the foreign companies provided that the Government helps supporting the cooperation between the Thai research universities and the pharmaceutical companies to develop their capacities on R&D for pharmaceutical drug development. Thirdly, there should be a continuing research similar to our survey using AHP analysis (Ersan and Hayder, 2012; Saaty and Tran, 2007) to get the weight mean of the four key multi-indicators factors, in order to obtain more accurate result. Moreover, the outsourcing partnership relations are expand and popular not only in pharmaceutical industry, but also in many industries such as: airline (Hsu and Liou, 2013), financial industry (Blumenberg et al., 2009), etc. Finally, as this paper revealed roughly the fact concerning with the partnership and strategic fit model based supply chain management, and their outcomes performance, our recommendation for further research are an ex-post facto, comparative case study research of the success and failure companies in order to trace longitudinally the partnership and strategic fit model based supply chain management, and the comparative case study, using scenarios, between the successful and the failure companies. We are confident that these further research papers will clarify and help extending the guideline for the pharmaceutical companies in Thailand transforming their outsourcing strategic fit model to their expected partnership model.

Our study limitations were caused by the unavailable public data pertaining to the pharmaceutical companies, the confidentiality of their precious indication of the four key factors of the partnership and the strategic fit models. The solution could be an ex-post facto, comparative case study research of the success and failure companies in order to trace longitudinally the identification of the strategic fit and the partnership model types periodically over time.

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