
STRATEGIC ALLIANCES IN R&D CONTRACTUAL PROJECT: INTANGIBLE AND TANGIBLE ASPECTS

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Abstract

Purpose: this thesis propose some propositions that can be implemented to increase and speed up research and development processes by using strategic alliance in contractual project based.

Design/methodology/approach: This study conducted an inductive approach used the archival study and literature review to develop proposition, to find the research gap and to develop a model in strategic alliance in R&D contractual project for further research.

Findings: some studies showed one of the ways to improve research and development performance is by forming strategic alliances with other companies. This model was trying to collaborate between the phases in strategic alliances activities and the phases in research and development activities applied in contractual project based. This paper divides strategic alliances into three phases: Pre project phase, Project phase and Post project phase, and in research and development divided into three phases: Partner Selections phase, Innovation phase and Commercialization phase. This model arranged both intangible aspects from perspective of knowledge management theory and tangible aspects from perspective of resources based view theory to make it more comprehensive.

Research limitations/implications: this research only applied in PERTAMINA an Indonesian National Energy Company, the next future research should be conducted to increase the validity and reliability of this model in others companies.

Keywords: Alliances Strategy, Innovation Management, Knowledge Management, and Resources Based View

Paper type: Literature Review

BACKGROUND

There are many studies in alliance strategy especially published in Strategy Management Journal from Collaboration, Licensing, Joint Venture, to Merger and Acquisition. Alliances give a mechanism for all parties in alliance to explore from different perspectives and solve problems together with constructive collaboration (Gray, 1989). Some literature discusses alliance strategy from the perspective of Resources Based View (RBV) and Transaction Cost Economics (TCE) Theory (Williamson, 1991; Ulset, 1996; Conner and Prahalad, 1996; Barney, 1999). Alliances can be also seen from the knowledge based organization theory. Alliances can entail the share of ownership (Lambert, et.al., 1996) or only contractual project, licensing, contract research, and open science and innovation (Markman, et.al., 2008). It establishes mutually dependencies between partners in alliance (Anderson and Narus, 1990). By creating alliance, organization will adapt in uncertainty and environmental changing (Das and Teng, 2001). By the 1990s, practitioners, academics and scholars were able to identify a distinct shift in the nature of business from a basis of exchanges toward a foundation of relationships, exemplified by the increased use of strategic alliances.

There were many studies in alliances strategy focused in alliance stages, the motivation generate alliances, objectives and goals of alliance, outcomes of alliance in organization financial performance but there are rarely focusing on knowledge management before, during and after alliance, and increasing organization competencies and capabilities after alliance in contractual project based.

PROPOSITION DEVELOPMENT

I. Strategic Alliance in Research and Development

Research and development activities become a crucial factor in sustaining company competitive advantages. Many literatures discussed about how is important research and development activities in keeping and supporting company sustainability and growth. The essence of research and development activities is creating added-value and competitiveness for companies. To survive corporations must have a strategy to innovate and successfully commercialize these innovations. These innovation processes can be done by creating significant improvements to existing products in order to maintain or grow market share, or by creating entirely new products that potentially drive new markets (Datta. et.al, 2011). By

creating value in the marketplace, innovation process will become a key in recovery process for company due to the decreasing of their performance. It's mean that innovation process should become commercialized (Touhill. et.al., 2009). It was not appropriate and dangerous to leave next generation to pay for innovation process with no market potential.

Some literatures said that to speed up research and development activities were by conducted strategic alliances among business entities. In recent years management scholars and practitioners have been interested and engaged in research and development strategic partnership (Sorrentino and Garraffo, 2010). Open innovation concepts, introduced by Henry Chesbrough in 2003 in Harvard University become one of the alternatives in conducting research and development activities.

Miles and Snow (2003) divided innovation strategic into four types: Prospectors, Defenders, Analyzers, and Reactors. Prospector strategy when company is seeking to explore new product and market opportunity. They are very aggressive in explore new opportunity and to achieve market leader position. Defenders when company is seeking to maintain a secure niche in a stable product area. They do not explore other opportunity only maintain existing product and market but seek efficiency throughout cost reduction in their value chain. Analyzer strategy when company is seeking to explore new product areas while maintaining stable product areas. At one time, analyzers characterize and exhibit both prospectors and defenders characteristics. Reactor when company is taking action after their competitor launching new product disturbing their current product. I argued that for analyzers and prospectors strategy, companies in developing country needed to develop alliance with company from developed country but for reactors and defenders strategy, companies in developing country can conduct by themselves.

Proposition 1: strategic alliances among business entities can speed up research and development activities in analyzers and prospectors strategy

II. Type of Strategic Alliance

If strategic alliance or collaborative partnership can become an alternative in conducting research and development activities, the question is what type of appropriate collaborative partnership in research and development is. Discussing about strategic alliance in there are two type of alliances the first type is alliances that entail the share of ownership such as Joint Venture, Merger and Acquisition, Joint operation, etc. (Lambert,et.al., 1996).The second type is alliances that not entail the share of ownership such as joint marketing program, project based activities, etc. (Markman,et.al., 2008). Since not all

research and development activities given a result and these activities were fully risky and have more uncertainty aspects it is better to conduct research and activities in the form of project based, it means alliances that not entail the share of ownership can become an appropriate alternative. In this form, each party take a part in project based alliance without the share of ownership, without built a new business entity. At the first each party will discuss their role and responsibility and their rights in this alliance project. The second then they conducted the research and development process. At the end of the process they will manage the invention resulted from the innovation process.

Proposition 2: alliances which does not entail the share of ownership such as project based activities is better for R&D activities

III. Phases in Contractual Project Based Alliance

Because of this research and development based on the project and from the context of project management perspective, we can divide these activities into 3 phases. The first phase is Pre Project phase, the second phase is Project phase and the third phase is Post Project phase. In the Pre Project phase, there are some activities such as prefeasibility study, feasibility study, Front End Engineering Design (FEED) and Detailed Engineering Design (DED). In the Project phase, there are some activities such as Engineering, Procurement and Construction (EPC). In the Post Project phase, there are some activities such as commissioning and maintenance. This thesis adopted 3 phases in the project management and applied these phases in strategic alliance based on contractual project in research and development activities. In Pre Project phase is partner selection phase in which each party make a feasibility study to the project and assessment to potential partners. In Project phase is conducted innovation process and the last Post Project phase is commercialization of innovation result, how we manage both tangible and intangible aspects as a result of innovation process.

Proposition 3: this thesis adopted 3 phases in the project management:

- 1) Pre Project phase is partner selection phase**
- 2) Project phase is conducted innovation process**
- 3) Post Project phase is commercialization of innovation result**

IV. Theoretical Framework

The important thing should be considered in alliance activities especially in research and development are tangible and intangible aspects. In alliance both tangible assets and

intangible assets should be managed well and with the same care (Connell and Voola, 2007). In alliance besides involved the tangible aspects such as financial, equipment and facilities, also involved the intangible aspects such as knowledge and information sharing, experiences and intellectual property rights as a result of invention. Considering research and development activities as activities resulted an intellectual capital. Intangible aspects become important among all phases. In Pre Project phase, research experiences, competencies and capabilities and knowledge become aspect that considered in choosing potential partner. In Project phase, the knowledge and information sharing process to disseminate knowledge and information become important. And in the Post Project phase, knowledge and Intellectual Property Rights (IPR) as a result form strategic alliance process in research and development activities should be managed. There is closed relationship between research and development spending, number of patents and service or product release and further relate to the organization revenue (Datta.et.al, 2011). The valuation of IPR becomes important as a result of alliances. Cost, market, income based approach and innovation turnover can become factors of the valuation of IPR (Lopes, 2011).

There are many theory perspectives in alliance model, some literature discusses alliance strategy from the perspective of Resources Based View (RBV) and Transaction Cost Economics (TCE) Theory (Williamson, 1991; Ulset, 1996; Conner and Prahalad, 1996; Barney, 1999). Alliances can be also seen from the Knowledge Based Organization theory (Sampson, 2004), Capabilities Theory (Odagari, 2003), Game Theory (Collin, 2007), Organization Theory (Geh, 2011), Resources Dependency Theory (Gerwin and Ferris, 2004) and Social Exchange Theory (Ybarra et.al, 1999). Because of this alliance involved both tangible and intangible aspects. We can discuss tangible aspects from the perspective of Resources Based View (RBV) theory and intangible aspects from the perspective of Knowledge Based management theory.

Proposition 4: because of this alliance involved both tangible and intangible aspects. We can discuss tangible aspects from the perspective of Resources Based View (RBV) theory and intangible aspects from the perspective of Knowledge Based Management theory

V. Knowledge Management

V.1. Knowledge Management in Alliances

Pre Project and Partner Selection Phase

In this phase, the important issue is how we select our potential partner to join in a strategic alliance based on contractual research and development activities. Partner selection is one factor to get success in strategic alliances (Hitt. et.al, 2000). Focusing or giving more attention on partner knowledge which can become complementary of our knowledge and skills is important. In strategic alliances knowledge asymmetries seem to have positive impact but information and learning asymmetries seem to have a negative impact on the stability of alliance (Cimon, 2004). Knowledge asymmetries in alliance between partner in developing countries and partner in developed countries are beneficial to both partners (Beamish, 1987). Strategic alliances between organization from developed countries and organizations from developing countries will be beneficial in knowledge complementary to both organizations.

Knowledge aspects related with experiences in research field and, competencies and capabilities in research field. Experiences, competencies and capabilities can be in the same field or can be in different field as long as it can become a complementary for our organization development and it can speed up the improving of our knowledge. Organization research and development capability is the most crucial factor for decision making on commercialization strategy (Lin. et.al, 2010). Complementary skill in alliances arise skill distribution (Dyer and Singh, 1998; Doz and Hamel, 1998). Knowledge such as experience, competencies and capabilities among strategic alliance members has rarely uncovered in contractual project based. Prior experience in the same knowledge domain has an effect to absorptive capacity (Cohen and Levintal, 1990). Organization with prior experience in a knowledge domain will have a familiarity and comfort in that's field and the transferability of knowledge become easier. Significant differentials in knowledge and skills between partners in alliance will make a barrier in learning process (Baughn.et.al, 1997) and if the skills and knowledge gaps very great the learning process become impossible. Choosing appropriate partners based on their experiences is become crucial to maximize the learning process and knowledge transfer.

Besides research experiences, and research competencies and capabilities, organizations research habits and culture is rarely viewed as another variable in developing strategic alliances especially in contractual research and development program. This thesis put research habits and culture become one of indicators in partner selection process.

Proposition 5a: knowledge as an intangible aspect in strategic alliance process will become a significant factor influencing a partner selection process

V.2. Knowledge Management System in Alliances

Project and Innovation Phase

From the technological perspectives, information and communication technologies can be instrumental to Knowledge Management process and catalyze qualified innovation. Knowledge as a result of strategic alliance in research and development activities should be managed well, so the increasing of competencies and capabilities among strategic alliance members will be increasing. That is the reason why we put this variable in this thesis as one of important issues that should be covered.

Technology is the hand maiden of knowledge management theory and practice. Adopting computer technology provided the tools to advance the managerial tasks of planning, measuring, evaluating, and controlling organizational performance. Even though technology is important but technology alone will not ensure the success of a knowledge management programs, human support is needed that knowledge and information is useful with high quality. The vision to use it in new ways was needed. That was what we concluded to apply as well to computer technology in recent years as electronic data processing was transformed into management information systems. Today, computers become more than data processing, but as technology advanced. Data could distributed through networks, interactive systems could be designed for users to access database as decision support systems, and groups could work together to make decisions (Liebowitz, 1999). Managers who were able to maximize their abilities to handle and to manage information and knowledge generated or created by all stages in alliances processes will get successfully. Company who made research and development alliances can observe, learn and internalize the know-how of their strategic partners (Parise and Sasson, 2002). Further, the ability in managing organization information and knowledge will differentiate successful among organizations and become a key factors of successful in alliances processes. Even though it is very difficult and challenging this factor will generate the stability of alliance and become a barrier to the faulty of alliance processes. Knowledge asymmetries have a positive impact but, information and learning asymmetries have a negative impact on the alliance stability (Cimon, 2004).

Information System (IT) becomes a crucial issue in managing and disseminating information and knowledge among all members in organization. Knowledge creation and

sharing in an alliance is a social activity, it requires a social relationship among partners (Parise and Sasson, 2002). The sharing knowledge forum is one way to disseminating information and knowledge. Communities of practice and implementation (CoPI) is becoming very interesting in order to generate or to develop an active participated by all members. CoPI functions are sharing the hard and soft knowledge (Hildreth and Kimble, 2002). Communities of practice allow for the sharing personal experiences, information and tacit knowledge. Hard knowledge refers to the tasks the members of the CoPI perform and soft knowledge refers to knowledge developed through socialization and interaction between CoPI members. Knowledge sharing and forum process includes knowledge diffusion, knowledge adoption and knowledge utilization (Transfield et al., 2004). Limited face to face communication between alliance partners complicates alliance and the sharing knowledge process (Gibson and Gibbs, 2006). Knowledge sharing and forum will lead to less partner protectiveness. Partner protectiveness is negatively related to knowledge transfer (Simonin, 1999). Knowledge sharing and forum will lead to trust developed among partners and has become a central concept in learning inter-organizational collaboration (Lane and Bachman, 1998). Trust is the foundation of an alliance effort (Arino et al., 2001). There are linkage between trust and performance in alliances and have been validated by systematic research effort (Luo, 2002).

Proposition 5b: knowledge management systems as an intangible aspect in strategic alliance process will influence transfer knowledge and disseminate technology

V.3. Knowledge and IPR (Intellectual Property Rights) in Alliances

Post Project and Commercialization Phase

Finally, during the post project phase, evaluation of the full range of impacts both positive and negative of strategic alliance is realized. Formative evaluation provides information about an alliance's implementation that can be used to refine the alliance. Alliance impact and outcomes can be measured using summative evaluation. It can be justified that the alliance should be continued, restructured, or terminated (Rossi et al., 2004). The organization learning perspective of strategic alliance emphasizes on how value is created through the enhancement of partner skill and capabilities (Gulati et al., 2000)

Knowledge and Intellectual Property Rights (IPR) as a result form strategic alliance process in research and development activities should be managed. There is closed relationship between research and development spending, number of patents and service or

product release and further relate to the organization revenue (Datta.et.al, 2011). The valuation of IPR becomes important as a result of alliances. Cost, market, income based approach and innovation turnover can becomes factors of the valuation of IPR (Lopes, 2011). The preservation of intellectual property rights over innovation process is the most significant risk. In order to prevent that risk, clear intellectual property rights sharing guidelines need to specified and defined by organizations to any intellectual property discoveries.

Many organization developed competencies and capabilities as well as they gain experiences in alliances (Townsend, 2003). The alliances allow concentration on specific activities of the value chain consistent with the firm's capabilities; synergy permits the combination of capabilities obtaining a total value greater than if the capabilities were used separately; while joined efforts can affect market position, technology development, or access to key resources. Research and development collaborations will cause an inflow and outflow of knowledge simultaneously as they involve (Chesbrough, 2006; Enkel.et.al., 2009; Bogers, 2011). Organizations which have more experiences will lead to higher absorptive capacity to maximize benefit from alliance (Simonin, 1999). Absorptive capacity, the ability of organization to evaluate, assimilate and use outside knowledge (Cohen and Levinthal, 1990), is the factor related to knowledge transfer (Khamseh and Jolly, 2008), and causing the increasing of competencies and capabilities of organization or increasing the intellectual capital (Gulati, 1998).

The management of the intellectual property rights sharing related with the licensing strategy to generate financial outcome of alliances is an important sources key of competitive advantages. There are lacking of literature in managing and valuing intellectual property right as the outcome of strategic alliance process especially in contractual project based research and development. This thesis put that point as one of indicators should be managed by organizations who conducted alliances.

Proposition 5c: knowledge and intellectual property rights as an intangible aspect resulting from strategic alliance process will become factor to be evaluated and managed

VI. Resources Based View

IV.1. Resources in Alliances

Pre Project and Partner Selection Phase

Strategic alliances have become an alternative and highly famous strategy for entry into international markets (Osborn and Hagedoorn, 1997). Even strategic alliances have

increasingly important, but some dissatisfaction and failure in strategic alliances has been occurred and reported. The gap or differences between relative actual outcome and the expectation have been reported (Madhok and Tallman, 1998). After the organizations decide to arrange alliances, the selection of appropriate partner is the next critical decision process (Hitt.et.al, 1995). Appropriate partner selection is a key to get success in strategic alliance process. In alliances, organization decides, with whom they would engaged a partner not because they have the same resources, but because they have complementary resources (Wohlstetter.et.al, 2005). Waddock (1989), alliances conducted with the partner, which has complementary needs and assets, and has the same goals and vision. Asset specificity by vertical integration will reduce the transaction cost economy (Williamson, 1991). Resources based perspectives help explains why organizations select their alliance partners (Barkema.et.al, 1996).

A combination between partners from emerging and developed markets became one of alternatives. Organizations or firms from emerging markets have some motivations and emphasizing on gaining and applying to new technologies to produce products, financial assets, managerial capabilities, and willingness to share expertise. And another sided, organizations or firms from developed markets have some motivations and emphasizing on gaining and applying markets knowledge and access, and unique competencies (Hitt.et.al, 2000).

Initiation phase in strategic alliance consist of four internal conditions; a champion, complementary need and assets, compatible goals, and trust (Wohlstetter.et.al, 2005). Companies believed that with conducting alliance strategy they will have an opportunity to pool and exchange their resources (Wohlstetter.et.al, 2005). These resources include technology, information, financial, materials and human. Strategic alliances can improve resources efficiency (Cunningham and Rivera, 2001; Gerwin and Ferris, 2004).

According to Spillet (1999) and Austin (2000) organizations initiate strategic alliances to achieve compatible goals which not identical, but more or less almost similar or mutually beneficial. Compatible goals and mission become important as well as complementary needs and assets (Kanter, 1994; Das and Teng, 1998, Spillett, 1999; Austin, 2000). It becomes organization prerequisite formed alliances with partners who have similar beliefs, values and approaches to solved problem (Waddock, 1989). Increasing efficiency and productivity was one of goals for organization when they formed alliances (Robertson 1998 and Waide, 1999).

Alliance is designed to allow partners to share risk and resources, and obtain access to international markets. Companies engaged an alliance process because they want to share

their risk with another companies. Risk sharing becomes one of important issues in initiated phase of alliance strategy. This thesis focuses on complementary needs and assets, specific goals and objectives, and risk sharing as indicators in pre project phase.

Proposition 6a: resources as a tangible aspect in strategic alliance process will become a significant factor influencing a partner selection process

VI.2. Organization Structure in Alliances

Project and Innovation Phase

Knowledge asymmetries in alliance between partner in developing countries and partner in developed countries are beneficial to both partners (Beamish, 1987). In my opinion what Beamish (1987) said in practical was not so simple like that. Strategic alliance not automatically will transfer knowledge and disseminate technology. We have to design a good organization structure to achieve that was alliance aiming. Disseminating technology and knowledge from developed country and developing country can be realized if organization structure in partnership was well designed. In today's dynamics business competitive, organizations are pursuing alliances especially mergers and acquisitions as their primary growth strategy included in research and development activities. According to Slowinski.et.al (2000) there are four areas that organizations should give emphasizes in integrating research and development organizations. The four areas are: transition teams, leadership, and creating the new organizational structure; managing employees through change retention and rationalization; developing a communications strategy; and managing the intellectual asset portfolio.

The one issue in contractual project based alliance is about the decision making authority. The decision making can be done by the project leader or can be done by consensus. One of the key elements in a successful alliance is the formation of organizational structure (Slowinski.et.al, 2000). Internal consensus strongly encouraged to implement during the construction of team. Developing good governance structure will facilitate the decision making process (Waddock, 1989 and Wohlstetter.et.al, 2005). Operation phase consist of the creation of governance structures to guide decision making, communications mechanism to facilitate information flow and effective leadership (Wohlstetter.et.al, 2005). Some evidences showed that there was strong relationship between performance and organization structure (Davidson, 1983). Organizational structure (OS) and support mechanism impact the commercialization of innovation (Chiu and Chang, 2009). Further, inappropriate structures between members of alliance will lead it difficult to develop procedures and processes.

Complex alliances structure with several parties has more formalized organization comparing with simple alliances has un-formalized structure (Wohlstetter.et.al, 2005). The organizational structure consists of the degree of specialization, decentralization, formalization and socialization positively affects the commercialization process in an organization (Chiu and Chang, 2009).

Building successful innovation commercialization teams requires a deep understanding of some factors contribute to that successful. Such factors are complex. The improvement of team building process will improve the process of commercializing a technology. A successful technology transfer or successful commercialization requires a complete team of key organizations and a complete set of individuals (Large, et.al. 2000). Partner roles should be defined at the first and formal role was should formally established between partners (Sorrentino and Garraffo, 2010).

Communication mechanism becomes important in alliances and some organization should arrange regular meetings. Establishing communication processes became challenging and difficult in coordinating information in complex alliances (Wohlstetter.et.al, 2005).This thesis focus on team building processes, partner roles, and open communication as indicators in project phase.

Proposition 6b: organization structure as a tangible aspect in strategic alliance process will influence transfer knowledge and disseminate technology

VI.3. Revenue Generated form Alliances

Post Project and Commercialization Phase

Measuring the achievement of strategic alliance can be through by learning outcomes, measurement of perceived profitability, efficiency, client satisfaction and project quality (Sarkar, et.al., 2001). Input output efficiency is a parameter to measure commercialization of innovation (Chiu and Chang, 2009). Although there are some studies in measuring alliance performance or outcome but different dimension of alliance motives makes it difficult to develop performance measurement (Townsend, 2003). Even some studies have underlined the failures rates of research partnerships due to the complexity arise (Dacin et.al, 1997; Inkpen and Ross, 2001) but some literature also showed the increasing of organization performance resulted by partnerships. According to Serapio and Cascio (1996), there are six factors explained why alliances end; the alliance is not successful, differences between partners, breach of agreement, changing strategic goals, financial reasons and achievement of the original alliance goal. Alliance experience has a positive impact and could benefits on

Research and Development productivity (Sorrentino and Garraffo, 2010). The income based approach is one method to measure the true return of innovation (Lopes, 2011), even the company formed Research and Development alliance cannot reach short-term financial returns (Parise and Sasson, 2002).

Practical evidence shows that commercialization outcomes are enhanced when organization adopted licensing strategy to their innovation result especially licensing in technology. Organization pursuing both internal commercialization strategy by developing their products and services into the final and commercialized them to the market, and also pursuing external commercialization strategy by licensing technology of the products to another organization with some compensation (Rivette and Kline, 2000; Lichtenthaler, 2005).

Revenue and profit generated by alliance should be distributed proportionally to all partners. It's very important to measure, at the first time when we arrange the alliance avoiding the conflict at the end of the project, and to distribute revenue and profit generated by alliance proportionally based on their contribution to the project. It is also important to manage the stability of alliance and to keep the potential alliance in next project or future with current partners. Commonly, the distribution of revenue and profit has very close relation with the ownership of Intellectual property Rights (IPR) generated by the project. This thesis focus on profit generated by commercialization, profit share due to IPR ownership, and licensing IPR as indicators in post project phase because that some aspects were rarely discussed in some literature.

Proposition 6c: revenue as a tangible aspect in strategic alliance process generated from commercialization of invention and intellectual property rights will become factor to be evaluated and managed

CONCLUSION

Company can develop their research and development organization with arranging the alliance model in research and development contractual project based. Further, in theoretical perspective, it will need study combining between strategic alliance phase, and research and development phase with knowledge management as intangible aspects and resources as tangible aspects in research and development contractual project activities. This model view from the perspective of knowledge management theory and resources based view theory. In practical perspective, the purpose of this study was introduces model that can be adopted in forming an effective Research and Development activities not only by PERTAMINA

(Indonesian National Energy Company) but also other organization, to increase and speed up their research and development processes by forming strategic alliances with other companies.

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