Interactive

International networks and alliances

ENHANCING PROCESS INNOVATION PERFORMANCE OF IJVS BETWEEN LEADER AND LATECOMER – BRAZILIAN SHIPYARD CASE STUDY

ABSTRACT

Despite the plethora of studies covering international business issues, there is still little empirical research about the transfer of knowledge in alliances of international joint ventures (IJV) type between leader and latecomer firms, especially in Latin American. The purpose of this article is to fill this gap by developing a multiple case study about the transfer of knowledge in IJV alliances constituted by asymmetric technological knowledge partners. This study has the objective to answer the following research *Why IJV in Brazilian shipyards between a leader and a latecomer firm cannot enhance process innovation performance?* The method of investigation is the literature review, documental research, and deep interviews with key people working in three Brazilian shipyards that participate within IJVs.

As Brazil is an emerging economy, the Brazilian shipyards that are entering in the market face technological barriers to achieve competitive level of production. The survival of the IJVs in a highly uncertain and competitive environment depends on the ability to absorb knowledge from alliances with partners who operate on the technological frontier and catch up technologically. As preliminary results show, it can be posit that the low performance of the Brazilian shipyard IJVs is related to low absorptive capacity and poor management structure.

Key-words: latecomer firm; IJV; absorptive capacity; process innovation; management structure

Enhancing Process Innovation Performance of IJVs Between Leader and Latecomer Brazilian Shipyard Case

INTRODUCTION

The international business - IB is a field of research that involves multiple disciplines: business, economy, politics, marketing, sociology etc. One of the most important aspects related to the studies of IB is the motivation of the organization to go abroad. Dunning (1988) pointed out that enterprises go abroad depending on different aspects; location, timing and the level of commitment. This study focuses on Kogut and Zander's (1993) knowledge perspective, specifically on the transfer of knowledge within IJVs.

Despite the plethora of studies covering international business issues, there is still little empirical research about the transfer of knowledge in alliances of international joint ventures (IJV) type between leader and latecomer firms, especially in Latin American. The purpose of this article is to contribute in filling this gap by the development of a multiple case study about the transfer of knowledge within IJV alliances constituted by asymmetric technological partners. In a globalized world, firms from emerging countries face a decision, whether to be a follower or to overtake the leaders and seek for a representative slice of the market. In fact, understanding the catch up process is relevant not only for latecomer firms but also for the firms from developed countries (Kim, 1998).

This study has the objective to answer the following research *Why IJV in Brazilian shipyards between a leader and a latecomer firm cannot enhance process innovation performance?* The method of investigation is the literature review, documental research, and deep interviews with key people working in three Brazilian shipyards that participate within IJVs.

In this research, partnerships are the alliances established between Brazilian shipyards (latecomer) and foreign shipyards (leaders). The latter has the interest in exploring new markets in order to capture knowledge about deep-water drilling units technology. As well as this, the partnership gives the foreign shipyard access to Brazilian characteristics, like culture, infrastructure and logistic chain.

THEORETICAL BACKGROUND

This section contains the main concepts adopted in this article.

Innovation "is the implementation of a new or significantly improved product (or service), process, marketing method or organizational method, according to OECD's Oslo Manual (2005, p.55).

Alliances are "voluntary arrangements between firms, involving the exchange, sharing or co-development of products, technologies or services" (GULATI, 1998, p. 293).

A joint venture occurs when two or more firms pool a portion of their resources within a common legal organization" (KOGUT, 1988, p. 319). Since Kogut (1988), many researchers have studied knowledge transfer process between IJV, as (Inkpen & Beamish, 1997; Park & Ungson, 1997; Shenkar & Li, 1999; Contractor & Lorange, 2002; Simonin, 2004; Park, Mezias, Lee & Han, 2014; Park, Vertinsky & Becerra, 2015). In fact, knowledge is a crucial asset to technological alliances (Teece, 1977; Kogut & Zander, 1993). However, codified and explicit knowledge is not easy for a latecomer firm to absorb. The tacit knowledge is a "black box" and distinctive competencies are necessary to deal with it (Kogut & Zander, 1995). In line with this point of view, Dhanaraj, Lyles, Steensma and Tihanyi (2004) examined the importance of embeddedness for tacit and explicit knowledge transfer in IJVs and concluded that "the relational embeddedness had a stronger impact on tacit knowledge transfer than on explicit knowledge". Another important finding of this study is that: "The foreign parent and the IJV

relationship may have begun as a contractual agreement, but it still can result in a relationship that is close or special. Thus, trust, strong parent–IJV ties, and shared values and systems enhance the transfer of tacit knowledge" (p. 438).

There are two main reasons for firms to engage in technological cooperation: technology complementarity and reduction of the innovation timespan premise (HAGEDOORN, 1993). Notwithstanding, is necessary that the follower partner have the ability to absorb the knowledge shared by the leader firm. In this sense, aligned with Kim (1998) statement, absorptive capacity is an essential attribute to enhance latecomer firm knowledge. In fact, empirical and theoretical studies about absorptive capacity, as a critical attribute to enhance innovation performance, has been growing recently and the concept has evolved since Cohen and Levinthal (1990) (MACEDO-SOARES & BARBOZA, 2015).

As Cohen and Levinthal (1990) wrote, absorptive capacity - AC is "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (COHEN & LEVINTHAL, 1990, p. 128). They note that an organization's AC depends on its individuals and of R&D investments, and argue that firms that want to acquire different knowledge should give priority to increase their AC.

Following in the footsteps of Cohen and Levinthal (1990), Lane and Lubatkin (1998) conducted an empirical study with a sample of R&D alliances between pharmaceutical and biotechnology companies. Starting from a perspective that AC is a "learning dyad-level construct" (p.461), and "that the ability of a firm to learn from another firm is jointly determined by the relative characteristics of the student firm and the teacher firm". Lane and Lubatkin (1998) noted that "differences in firms' histories and resources, particularly knowledge, lead each of them to develop a unique set of capabilities to accomplish those activities". A firm's knowledge includes both easily communicated, articulable knowledge, and tacit knowledge.

"The tacit knowledge is difficult to define due to its interconnections with other aspects of the firm such as its processes and social context" (LANE & LUBATKIN, 1998, p. 462).

Lane, Salk and Lyles (2001) conducted an empirical study with Hungarian IJVs. The results revealed that trust between the partners and support provided to the IJV by the foreign partner are associated with performance instead of directly with learning. "Prior knowledge acquired from the foreign partner only influences learning when combined with high levels of current training by that partner. IJV flexibility and training by the foreign partner were associated with learning" (p. 1155).

Considering that this study focuses on IJVs constituted by firms from emerging economies and leaders, three concepts are crucial: *technological capability, latecomer firm and technological catch up.*

Figueiredo (2011) states that technological capability "is a stock of knowledge-based resources, which allow one or more organizations to be able to perform a technological activity and is stored in at least four components: techno-physical systems; organizational and management structure and systems; people; and products and services" (FIGUEIREDO, 2011, p. 21-22).

The latecomer firm "is a fast follower, with catch up as a strategic objective, which operates as an imitator rather than innovator, utilizing various forms of resource leverage" (MATHEWS & CHO, 1999, p. 142), and based on Abramovitz (1988) technological catching up is the effort of the follower firms to build technological capability with the goal of improving their performance.

Bell and Figueiredo (2012) complement this concept by including other important *latecomer* firm characteristics: "(i) the disadvantages about the dislocation from technology sources and advanced markets stressed by Hobday (1995), but also (ii) the existence of an initial

competitive advantage as low costs, as well as (iii) the historically determined, rather than strategically chosen, position of late entrant…" (BELL & FIGUEIREDO, 2012, p. 25).

METHOD

The objective of this study is to understand how the partnership between follower and leader firms enhance their performance. This research is exploratory because it has the main goal of supporting the generation of ideas or formulation of hypothesis (Gil, 1999). The case study research method is adequate when research is in the beginning, and the target is the development of theory (Eisenhardt & Graebner, 2007; Ghauri, 2004). Yin (2014) points out that the case study is ideal when you want to answer questions such as "how" and "why", in a specific context. The phenomenon of study involves many more variables than cases, which reinforce the adoption of the qualitative approach. The unity of analysis is joint ventures (Brazilian latecomer and international leader enterprise from ships and oil & gas units' construction) installed in Brazilian territory.

The analysis of data consists of documenting information and deep interviews with top managers from IJVs and client.

Source of Data

Documented Information

The sources of data are the homepages of the firms that participate in the IJVs; SINAVAL Report (2012); ABDI (2009) and BNDES (2012) sectorial reports.

Interviews

The interviews will be conducted with the top managers from the IJV, top managers from the Contractors and external specialists. After the data collection, the data analysis follow steps based on Schweizer (2005).

Data Treatment

If necessary, the transcriptions will be validating with the interviewees, as suggested by Schweizer (2005). In addition, the interviews in each case will be compared among each other, and triangulating with the specialist interviews. The results will be checked with the documental research in order to identify the pattern of phenomena that characterized each one and finish with a description of each case. The next step is to validate the descriptions with the interviewees. Finally, the analysis of the cases will be compared among each other. As a product of the data treatment, the proposals will be formulated and a conceptual framework will be developed.

THE RESEARCH CASES

The discovery of huge oil sources in the "pre-salt" marine layer gave way for the rebirth of the shipyard industry opening up an opportunity for the Brazilian supply chain. However, the complexity, the diversification of technologies and the globalization of markets amplified the environmental uncertainties. In order to minimize risks, enterprises are working together around the world. Therefore, Brazilian shipyards, as latecomer firms, are making strategic alliances with partners operating at the technological frontier with the proposition to innovate and achieve internationally competitive standards.

The shipbuilding industry have a slow technological product innovation, is most afford to process innovation (DORES et al., 2012) and the installation of a shipyard requires the investment of billions of dollars. Due to the nature of the shipbuilding process, it is necessary to obtain several Government licenses, as the activity can affect upon the environment in different ways. Brazil has a total of 47 shipyards, 21 in the state of Rio de Janeiro (44.6%), 7 in São Paulo (15%) and 19 (40.4%) in the other 8 states (SINAVAL, 2012).

In the beginning of the year 2000, the Brazilian Government decided to invest in the shipbuilding industry. Maua-Jurong (see http://www.mauajurong.com.br/pag/historico

accessed on March 18, 2015) and Brasfels (<http://www.keppelom.com/en/content.aspx?sid=2771> accessed on March 18, 2015) originated from partnerships between Brazilian and Singaporean companies.

During the first decade of the second Millennium, stimulated by the low steel prices, others shipyard groups invested in several Brazilian States. The most important, due to the capacity, was EAS, which started to operate in 2005. This shipyard was conceived as an IJV between Korean Samsung Heavy Industry, which entered as the technological partner (providing the design and equipment), and a Brazilian consortium composed by Queiroz Galvão and Camargo Correa. However, the contract was broken in 2010. In 2012, the Brazilian consortium constituted an IJV with Iskawagima Heavy Industries, a Japanese firm (http://www.estaleiroatlanticosul.com.br accessed on March 18, 2015). We choose the three IJVs cited above as our cases. Figure 1 contains a description of each IJV.

Following Eisenhardt (1989), the cases constitute a theoretical sample in order to fit the study purpose of developing a theory and to reach an analytical generalization by the end of the study. They present various aspects that are similar with others in the industry and different aspects among each other. Among similarities, they have large production capacity when compared with other Brazilian shipyards; they construct oil & gas offshore units besides ships, which involves more complex construction processes. On the contrary, among the dissimilarities, the geographic localization and period of installation (the third IJV built more than ten years later than the other two).

PRELIMINARY FINDINGS

This study is based on the argument that absorptive capacity and management structure are essential for the firms to improve their technological capability. As presented in the

theoretical background R&D investment and continuous training are proxies of absorptive capacity.

The preliminary findings are based on the Reports from ABDI and BNDES. Both Reports point out that the productivity of the Brazilian shipyards are low when compared with their Asian counterparts.

The propositions that will be checked during the interviews and by the analysis of the shipyards documents are presented in the following sequence.

R&D Investment

The Associação Brasileira de Desenvolvimento Industrial (ABDI) in 2009 produced a Report with the aim of identifying how Brazilian shipyards accumulate knowledge to carry out technological innovation. The Report shows that the productivity indicators have no strong evolution (DE NEGRI et al., 2009).

The scale of production, the performance in the global market and new technologies are barriers to new entrants (DE NEGRI et al., 2009). For the authors there is a particularly important weakness in the mechanisms of financing R&D activities amongst Brazilian companies and universities. Moreover, all countries that have become leaders in the naval construction industry have research centers and laboratories set up especially to meet naval production (DE NEGRI et al., 2009, p. 67).

The Banco Nacional de Desenvolvimento – BNDES (2012) Report states that there is a gap between Brazilian and leader companies related to process technology and management.

According to Kim (1998), absorptive capacity is crucial for innovation performance. Furthermore, Cohen and Levinthal (1990) considered R&D investments as a proxy for AC. Moreover, Figueiredo (2011) points out that to catch up to the leader firm, the latecomer must make a big effort. Therefore, the first proposition:

Proposition 1a: High level of internal R&D investments at the IJV implies high capacity to improve process innovation. As a consequence, a low level of internal R&D investment implies a low process innovation performance.

Continuous training

According to the BNDES report, studies conducted by consultants indicated that the learning curve of the Brazilian shipbuilding industry has a slope of 85%. This means that every time the accumulated production doubles, there is a 15% reduction in work consumption. The slope of the curve of the Asian countries is about 70% (DORES et al., 2012). In fact, Brazilian shipyards (IJV) have lower productivity indexes when compared with the leader partner in Asia (De Negri et al., 2009). Reinforcing this idea, according to ABEMI (2011), even well managed Brazilian industrial construction companies waste around a third of direct resources during the construction process, mainly due to rework, waiting times for sequencing, error of tasks or lack of documents, materials, tools and equipment. The authors address the lack of training/skills of the workforce as the main cause of this situation. This data can be considered as representative of the Brazilian shipbuilding segment because the firms observed in ABEMI's book are the same that operate shipyards. Furthermore, according to an interviewee: "There is a high turnover in labor force. As the volume of orders can vary broadly there is no retention labor policy. In general, the managers prefer to deal with a high turnover despite losing some acquired knowledge." (ABEMI, 2011).

All the above information corroborates with the conclusion that the IJV of the cases do not invest in continuous training. It can be inferred by the work of Lane et al. (2001) that continuous training is a proxy for AC.

Proposition 1b: High level of investment in continuous training in the IJV implies high capacity to improve process innovation. As a consequence, low level of investment in continuous training implies low process innovation performance.

Management structure

About 76% of productivity problems comes from senior management practices and planning (ABEMI, 2011). In addition, both reports (BNDES, 2012 and ABDI, 2009) mention that there is a lack of robustness in planning activities in the Brazilian construction industry.

Furthermore, an interviewee, stated that the Brazilian firms underestimate the importance of enhanced management skills, in detriment of acquiring new machinery and equipment.

Figueiredo (2011) states that management structure is one of the components of the technological capacity of the firms. Improving technological capacity is associated to the ability of understanding the configuration processes and equipment brought in by the leader.

Proposition 2: High level of management structure in the IJV partners implies high capacity to improve process innovation. As a consequence, low level of management structure in the IJV implies low process innovation performance.

DISCUSSION AND PRELIMINARY CONCLUSION

Fig. 2 contains framework which summarizes the above propositions.

As preliminary findings show there is evidence that the lack of AC is responsible for the low performance in productivity in Brazilian shipyard IJVs compared with the leading companies operating in Asia.

In addition, this study indicates that weak management structure is another reason for bad performance. Moreover, at the stage of this research, there was no evidence that the Brazilian shipbuilding industry on the path to making a technological catch up and enhancement of performance.

In respect to the leader companies, even with low productivity, Mauá-Jurong and Brasfels IJVs have existed for more than ten years. This is an indication that the IJVs have some advantage over the leader firms. This evidence could be an object of further studies.

This article is a preliminary report about an empirical research. The next step is to conduct interviews with IJVs managers and experts in order to continue the cases studies, make the triangulation and confirm the propositions.

The contribution of this research is to fill the gap of little empirical studies relating IJVs constituted by Brazilian firms with regard to the importance of absorptive capacity, which allows follower firms to get knowledge from leader companies in order to enhance process innovation performance.

Further researches can confirm the propositions in IJVs of other Brazilian shipyards as in other industries. Another suggestion is, from the propositions, to generate hypothesis and test them statistically.

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Joint-venture name	**Brazilian Partner**	**Foreign Partner**	**Location**	**Year of Agreement**	**Process capacity steel ton/year**
Brasfels	Pem Setal	Keppel Fels (Singapore)	Rio de Janeiro State/Angra dos Reis	2000	50
Maua-Jurong	Mauá	Jurong (Singapore)	Rio de Janeiro State/Rio de Janeiro	2000	36
Atlântico Sul (EAS)	Queiroz Galvão/Camargo Corrêa	IHI (Japan)	Pernambuco State/Suape	2012*	160

FIGURE 1: Basic description of the cases

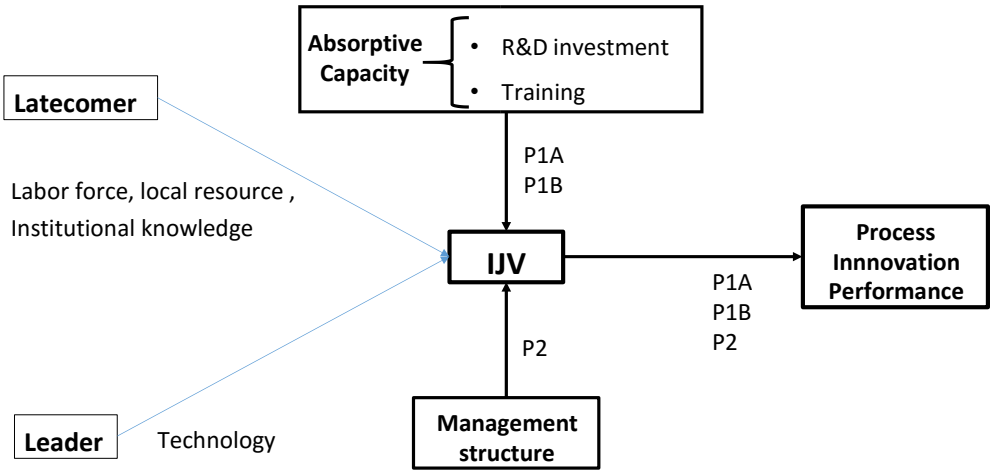

FIGURE 2: Framework of Propositions