THE COORDINATION MECHANISMS BETWEEN SOFTWARE HOUSES AND CONSULTING COMPANIES FOR INTRODUCTION OF NEW TECHNOLOGIES IN THE ENTERPRISE APPLICATION SOFTWARE BUSINESS ECOSYSTEM IN BRAZIL

FÁBIO NEVES DA ROCHA
Mackenzie Presbyterian University
São Paulo, SP – Brazil
E-mail: fndrocha@yahoo.com

WALTER BATAGLIA
Mackenzie Presbyterian University
São Paulo, SP – Brazil
E-mail: walter.bataglia@mackenzie.br

Abstract

The increasing adoption of enterprise applications software in Brazil has led domestic market to a higher level of maturity on the usage and exploitation of such technology, first among large corporations, and most recently medium and small companies as well. It has attracted much attention in the practitioner literature, especially about the capacity of software houses and consulting companies to coordinate themselves in such a way that makes them capable for bring to the market technological innovation. The paper identifies the coordination mechanisms between three major global consulting companies (two large corporations and one medium company) and one global software house for new technologies introduction, which can be the steppingstone for further research on business ecosystem coordination in the software industry. Also, provide practitioners with more substance for a broader understanding of coordination mechanisms that may feed their corporate planning.

Key words: *coordination mechanisms, enterprise application software, business ecosystem*

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1. Introduction

Enterprise application software is an integrated software package which purpose is to support most of the operations of an organization (Mendes & Escrivão Filho, 2002; Moon, 2007; Pessanha, 2007). It has introduced in the market in the early 1990's, known as Enterprise Resource Planning (ERP), as an evolution of the Material Requirement Planning (MRP) systems created two decades earlier. The enterprise application software comes to life when it is installed in the information technology environment of a firm.

The application software development organizations (software houses, SHs hereafter) are those that create the enterprise application software, and in some cases are responsible for its implementation as well. Nevertheless, in the majority of the cases consulting companies (CCs hereafter) are those in charge of the application software implementation in the customers. The CCs are organizations or business units devoted to consulting services, activities that may involve business processes modeling (management consulting), enterprise application software implementation (implementation consulting), system development, and system maintenance services, all human capital-based activities.

In the enterprise application software business ecosystems there is a practitioners' common assumption that the relationship between SHs and CCs is in such a way that SH defines what is the strategy of introducing its products and/or services in the market, and recruits by contract CCs interested in performing their strategy. One might conclude, then, that innovation diffusion degree is a function of the efficiency of the governance that allows full strategy implementation. However, the relationship between SHs and CCs does not always have this kind of governance; actually the majority of the sales transactions require from both parties a joint work in order to bring a combined value proposition (enterprise application software plus services) that fulfills market requirements or goes even beyond. In other words, they are hybrid organizations (Ménard, 2002, 2006; O. E. Williamson, 1991), where the set of arrangements relies neither on markets nor on hierarchies to coordinate the relationship, especially because their business is fundamentally knowledge-based, where the make or buy decision have other nuances (Conner & Prahalad, 1996).

The SH-CC relationship can be defined as alliance (Gulati, 1998; Gulati & Singh, 1998), having characteristics such as complex services in which human assets play a crucial role, and which association takes advantage of brand names; also there is technology development and transfer (Ménard, 2002), and they are established in loosely coupled networks called business ecosystems (Moore, 1993; Peltoniemi, 2005; P. Williamson & De Meyer, 2012). For Moore (2006), business ecosystem is an organizational form that is peer of classical market and hierarchy. He states that business ecosystems have been surrounded, permeated, and reshaped markets and hierarchies. They have been established to coordinate innovation involving many organizations across multiple markets. They form around visions and ideas, called 'distributed creativity' (Moore, 2006), where the relationship among organizations allow them to volunteer and share, trade and transact, eventually establishing a new, co-evolving economic community. Teece (2009) has an expanded view of

complementary innovation, including not only products and services that complement one another, but also those that are bound together in the way that their value is a function of their use as a single piece. Those complementary innovations are called 'co-specialized assets', and may require for component organizations a deeper interdependence, such as operational integration, for instance.

Moore (2006) defines business ecosystems as "intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community" (p. 33). The notion of community is aligned with the definition made by Baum & Amburgey (2000), as systems functionally integrated of interacting populations. "Organizational communities are composed of populations of organizational forms, which themselves are composed of organizations, which are in turn composed of work groups, and so on" (Baum & Amburgey, 2000, p. 20). P. Williamson & De Meyer (2012) consolidate these two, defining business ecosystems as "loosely coupled networks, similar to the mediaeval 'commons'" (p. 1), which conformation seems to be better able to respond to the demands for complex, integrated solutions.

The business ecosystem model proposed by Moore (2006) is not precise about performance. Iansiti & Richards (2005) have contributed in this area by proposing three key measure areas of ecosystem performance or 'health': 1) robustness, the ability to react to perturbations and disruptions, that eventually produces better financial betas and survival rates; 2) productivity, the ability to produce more within the ecosystem with the same or less input; and 3) innovation or niche creation, the increment of diversity over time. P. Williamson & De Meyer (2012) depict six key factors that impact the ecosystem performance: 1) added value creation, the extra value offered to the end customer over and above the competition's offering; 2) differentiated partner roles structuring, in a way that makes the ecosystem composed by partners that have complementary capabilities and different economies; 3) complementary partner investments *stimulus*, by having the roadmap of the future technology platform on which the ecosystem is built clear- and widely communicated to partners; 4) transaction costs reduction, by the development and sharing of a set of mechanisms (tools, protocols, processes, contracts, etc.) that systematize and codify interaction between components within the ecosystem; 5) structure flexibility, that can evolve in order to facilitate learning and co-learning as the partners interact; and 6) effective value capture mechanisms.

Another contribution to the understanding of the business ecosystem dynamics was made by Iansiti & Levien (2004), related to the roles constituents can assume inside the community. The authors have identified three major roles: 1) keystone, the regulators of ecosystem health, responsible for providing a stable and predictable platform on which other ecosystem members can depend, and which removal often leads to catastrophic collapse of the entire system; 2) dominator, powerful constituent that tends to damage the health of the ecosystem by reducing diversity, eliminating competition, limiting consumer choices and stifling innovation, as long as eliminates all other firms in their market, often expanding into new markets which is subsequently dominated or even eliminated; and 3) niche player, responsible for the innovation in products and services. These roles embody diverse points of view on organizational change in the contemporary literature. One of them is what Hannan & Freeman (1984) called rational adaptation theory, stating that the variability is a reflex of changes of strategy and structure of individual organizations in response to environmental changes, threats, and opportunities. Another is related to contingency theories, denoting that structural changes "match organizational structures to technology-environment pairs" (p.

150). A third one can possibly be linked to resource-dependence theories, where structural changes are made in order to mitigate environmental uncertainty (Hannan & Freeman, 1984).

One major challenge SHs and CCs face in their business relationship is to reach an agreement on the content of the value proposition; which consists of a selected bundle of products and/or services that caters to the requirements of a specific customer segment (Osterwalder & Pigneur, 2010). The bundle composition is a result of technical and commercial negotiation between SHs and CCs that involves, for instance, the confrontation of technology options based on each party's own interpretation of the market's requirements *vis-à-vis* their resources and capabilities for fulfilling them. The agreement ultimately establishes the integration of resources and capabilities from both sides that conforms the value proposition, along with necessary *modus operandi* definition that will allow the value proposition delivery. Another challenge is precisely its delivery, where the attributes, attribute performances, and consequences arising from use of the proposed solution (software plus services) should produce planned benefits (Woodruff, 1997) in a timely way, i.e., obtaining the anticipated IT results on time, on budget, on performance and integrated to legacy infrastructure (Barney & Clark, 2007). And, on top of that, there is the risk of opportunistic behavior.

SHs tend to offer innovative, state-of-the art technology. It is related to their resources and capabilities, but more important, it is part of their corporate strategy: SHs pursue the strategy of *product leadership*, where "[the] critical function is the Research, Development and Engineering" (Fleury et al., 2004, p.171), focusing on the technology scale up in order to achieve greater adoption as fast as possible. On their turn, CCs are not committed to bring innovation *per se* to the market. As services companies, their corporate strategy is different from the SHs: they have a *customer-oriented* strategy, where sales and marketing play critical functions driving services development that optimize market's (customers') competitive strategy (Fleury et al., 2004; Stabell & Fjeldstad, 1998). The lack of commitment (by strategy) to innovate is likely to difficult CCs to move towards innovation adoption (Hannan & Freeman, 1984).

The increasing adoption of enterprise applications software since the second half of the 1990s has led the Brazilian market to a higher level of maturity on the usage and exploitation of such technology, especially among large corporations. Most recently, as a consequence of the economic development the country is experiencing, more and more medium and small companies are also joining the adopters group. This phenomenon has attracted much attention in the practitioner literature, especially about the technological trends, such as cloud computing, mobility and applications, big data analytics, and new solution generation (IDC, 2011), along with the challenges SHs and CCs will face for transforming trends into reality (IDC, 2012). In other words, how SHs and CCs coordinate themselves in such a way that makes them capable for building (and eventually deliver) a value proposition imbedded with innovation that will meet (or even exceed) market expectations, while reduces the risk of opportunistic behavior.

The coordination SHs and CCs have to establish between them in order to bring new technologies to the enterprise application software business ecosystem in Brazil seems to be under-investigated (to our knowledge) in scholarly research. In response to this research gap, the paper will report a discovery journey into the business ecosystem in search of the coordination mechanisms between three major CCs (two global, large corporations; and one global, medium company) and one global SH for new technologies introduction. We consider that it will bring starting-point information that might both provide practitioners with more

substance for a broader understanding of coordination mechanisms that may feed their corporate planning, and open an avenue for further research on business ecosystem coordination in the software industry.

By crossing the bridge over the research gap, the reader will have a brief review of the business ecosystem literature (Iansiti & Levien, 2004; Iansiti & Richards, 2005; Moore, 1993, 2006; Peltoniemi, 2005; P. Williamson & De Meyer, 2012), which will set the ambience. The relationship between SHs and CCs, then, will be viewed under the lens of alliances and partnerships (e.g.: Doz et al., 2000; Gulati, 1998; Ménard, 2002, 2006), that allow the reader to identify governance structure (e.g.: Gulati et al., 2009; Gulati & Singh, 1998; Ring & Van de Ven, 1992; O. E. Williamson, 1991), coordination and incentive mechanisms (e.g.: Gulati, Lawrence, & Puranam, 2005; Gulati & Nickerson, 2008; Helfat et al., 2007) and inertia characteristics (e.g.: Doz, 1996; Hannan & Freeman, 1984) in the interactions for new technologies introduction.

2. Conceptual Background

2.1. Alliances and Partnerships: Characteristics, Incentives, Resources and Capabilities

Taking the road open by Coase in 1937 in search of the nature of the firm, scholars have studied the inter-firm buying and selling transactions of production factors, expanding the understanding of firms as *locus* of not only the production itself (transformation of raw material into goods and services) but also of a coordination space of economic agent actions (D. S. Meirelles, 2011). Such coordination, conceived by Coase, can be either made via market or internalized by the firm. The former way utilizes price as coordination mechanism, which utilization implies on costs both related to the intrinsic price definition, and to the negotiation and deal of several contracts. The latter form of coordination, known as hierarchy, occurs when the market alternative is economically less attractive, having an additional advantage as consequence of the reduction of multiple contracts to just one. Any contract has a certain dose of uncertainty because of the difficulty to determine the future state *ex ante*. The longer is the contract term, the higher is the level of uncertainty, especially in contracts related to services (Coase, 1937).

Until recently, scholars have developed the analysis of hierarchy and market mainly as mutual exclusive alternatives of organizations, paying little attention to other modes, that were considered uncommon, unstable and transitory (Gulati, 1998; Ménard, 2006; Ring & Van de Ven, 1992; O. E. Williamson, 1991). The transactions 'in between' the dyadic level became much more common in the 1980s, labeled by O. E. Williamson (1991) as 'hybrids', characterized "by semi-strong incentives, an intermediate degree of administrative apparatus, …semi-strong adaptations of both kinds, and [work out] of a semi-legalistic contract law regime" (p. 281). For Gulati & Singh (1998), hybrids are called 'allies', and any arrangement among them is considered an alliance. In other words, any voluntary cooperative agreement between firms that involve exchange, sharing, or co-development, and can include investments of capital, technology, or firm-specific assets is called alliance (Gulati, 1998; Gulati & Singh, 1998). Todeva & Knoke (2005), after reviewing the literature, have identified 13 basic forms of inter-firm relations, having hierarchy and market as the opposite ends of the list, and 11 hybrid forms in the middle. Ménard (2006) points out that beyond the current heterogeneity of types of hybrids, a growing body of empirical studies has revealed regularities that make hybrids distinctive. The use of pooled resources in joint activities under

inter-firm coordination is one of commonalities. Another is the existence of non-ordinary relational contracting that links activities and resources among partners who simultaneously operate transactions not related to those involved in their coordinated activities. A third characteristic of hybrids is related to competition, because of the complex combination of interdependence and autonomy.

> "Partners [remain] residual claimants in charge of their own decisions in last resort. In that context, competitive pressures have two dimensions. (a) Although they cooperate on some issues, partners also compete against each other. Even bilateral agreements with long-term contracts can be subject to internal competition since strategies of partners remain distinct … (b) Hybrids usually compete with other arrangements, including other hybrids. Indeed, they develop on highly competitive markets in which pooling resource is a way to deal with uncertainties and to survive" (Ménard, 2006, p. 31).

There are many reasons for undertaking alliances. Usually they are formed to create value in a way that the parties alone could not, such as cost, risk, and production facilities sharing, access to determined financial resources, etc. (Gulati & Singh, 1998). For high-tech industries, Hagedoorn (1993) have found that only few motives are truly significant for alliance establishment: Technology complementarity, innovation time-span reduction, and market access and structure influencing. A concise summary of the generic needs of firms when seeking alliance is probably cash, scale, skills, access, or their combinations (Todeva & Knoke, 2005). However, what the firms effectively take out of that relationship depends on their adaptive capacity, both within or across firm boundaries, in order to achieve cooperation (alignment of interests) and coordination (alignment of actions) at lower costs (Gulati et al., 2005; O. E. Williamson, 1991), once performance levels increase when governance costs are lower, *ceteris paribus* (Gulati & Nickerson, 2008).

For Ménard (2006), alliances are an option "when investments among partners are specific enough to generate substantial contractual hazards without justifying integration and its burdens, and when uncertainties are consequential enough to require tighter coordination than what markets can provide" (p. 31). He refers to specific investments as those that create specific assets—especially Teece's (2009) 'co-specialized assets'—that eventually builds a network based on complementarities—what Moore (1998, 2006) calls business ecosystem—where constituents may pool resources, such as human-based assets like technological competencies. In terms of uncertainties, Ménard (2006) considers consequential those that adversely affect one party, caused by two types of problems: 1) input, related to non-observabilities in traded resources or services, difficulties in their coordination, or from market resources not committed to the arrangement; and 2) output, as a result of difficulties in controlling the match between deliverables and the blueprint agreed upon, or lack of flexibility in adapting to a changing demand. Contextualizing to information technology (IT) environment, which includes enterprise application software environment, the output problem can be viewed as a technological uncertainty. From the point of view of the technology supplier, the technological uncertainty is related to the technology adoption by customers (Ring & Van de Ven, 1992); from the customer side, technological uncertainty is the risk that an investment made in IT assets (computer hardware, software, communication infrastructure, etc.) may not meet the planned performance targets in a timely way. The risks include a) implementation difficulties that prevent obtaining anticipated IT results; b) implementation costs higher than planned; c) implementation time longer than planned; d) technical performance below what was planned at the outset of the investment; and e) hardware and software incompatibility (Barney & Clark, 2007).

Alliances are typically governed by neoclassical contracts, those that maintain autonomy of the constituents but express bilaterally dependency to a nontrivial degree (O. E. Williamson, 1991). The neoclassical contract regime facilitates continuity and adaptation, but makes the contract incomplete, requiring "special adaptive mechanisms to effect realignment and restore efficiency when beset by unanticipated disturbances" (p. 272). And there are costs involved, called 'governance costs', related to the draft, negotiation and safeguards of the contract, along with the *ex post* resource consumption generated by maladaptation, haggling, administration and bonding (O. E. Williamson, 1991).

Adaptation requires firm's ability to overcome inertial obstacles. The theory of structural inertia states that existing organizations often find it difficult to change its strategy and structure quickly enough to keep up with the demands of changing and uncertain environments (Baum, 1999). Difficulties to change does not mean, however, total immobility. Hannan & Freeman (1984) point to the relative and dynamic terms the structural inertia should be contextualized: not just the capabilities-environment fitness, but also the multi-environment analysis, because a firm might have high inertia in one environment (or ecosystem) but not in another. However, they state that adaptation paradoxically causes inertia, once firms tend to reproduce their structures when an adaptation is achieved, making them resistant to a subsequent change, which is being enhanced by age and size. Some of the factors associated with structural inertia are internal to organizations, such as sunk costs on capital goods, political coalitions, and what Burgelman & Grove (2007) call 'the rules of the game': "[N]ormative rules based on laws, customs, and administrative principles; technological rules based on available technical solutions; economic rules reflecting existing bargaining power relationships among the industry players (often captured in contracts)" (pp. 965-966), aligned with the tendency to transform past experiences into normative standards (Hannan & Freeman, 1984; Helfat et al., 2007). Doz (1996) analyzes the inertial impact of initial conditions of the alliance, identifying that interdependencies in task structure, differentiated skill bases (complementarities), and clock-speed differences between partners are examples of conditions that make the relationship very inertial and eventually affect the outcomes of the alliance.

2.2. Interdependence

Interdependence among constituents is imbedded in the alliance relationship, in a logic by which partners create value through the interaction with each other (Gulati & Singh, 1998). The degree of interdependence can be classified in three types: 1) pooled, when tasks depend on each other in an additive manner, and the tasks are supported by the whole but render only discrete contribution individually; 2) sequential, when the activities are serially arrayed so that the outputs of one task compose the inputs of another; and 3) reciprocal, when there is simultaneous exchange of outputs among parties (Gulati et al., 2005; Gulati & Singh, 1998). Interdependent relationships often present opportunism, which effects are moderated by levels of trust and of shared interest (Doz et al., 2000).

2.3. Coordination Mechanisms

O. E. Williamson (1991) states that firm's survival depends upon the ability to maintain a complex equilibrium through internal readjustment of processes, by which adaptation is accomplished. "[P]arties that bear a long-term bilateral dependency relation to one another must recognize that incomplete contracts require gapfilling and sometimes get out of alignment. …[I]t is always in the collective interest of autonomous parties to fill gaps,

correct errors, and effect efficient realignment" (p. 278). The complexity of the transaction is directly related to the difficulty and associated costs of making its encapsulation of *ex ante* characteristics and *ex post* adaptation predictions in a contract (Ménard, 2006).

When interdependent parties fail to respond quickly and easily, because of disagreements and self-interested bargaining, maladaptation costs are incurred. Gulati et al. (2005) analyze the adaptive capacity in terms of differentiation and integration. Differentiation refers to the differences across organizational structures of the parties, which increases the responsiveness of the alliance and thus its adaptiveness. Integration is related to the achievement of cooperation (alignment of interests) and coordination (alignment of actions); achieving integration between interdependent parties is necessary in order to respond effectively to change (Gulati et al., 2005).

Coordination problems arise due to the bounded rationality—cognitive limitations of individuals that deny them from possessing identical stocks of knowledge (Conner & Prahalad, 1996), which prevent them to have comprehensive knowledge of how others will behave in situations of interdependence, and how they are interdependent with others (Gulati et al., 2005). Bounded rationality does not necessarily lead to opportunistic behavior. "The parties may have different expectations as to the nature of future gains (or losses), even after each, acting honestly, does its best to explain its reasoning to the others and to understand the alternative positions. Irreducible differences in the individuals' knowledge can lead them to make different judgments or expect different outcomes" (Conner & Prahalad, 1996, p. 483).

2.4. Trust

One important resolution mechanism for coordination problems is trust. It can be defined as an early and voluntary acceptance of a risky investment, when the expectation that another firm can be relied on to fulfill its obligations, to behave in a predictable manner, and to avoid acting opportunistically (Gulati & Sytch, 2008; Zanini, 2007). It can emerge from prior contract, once through ongoing interactions firms learn about each other and develop trust around norms of equity, or knowledge-based trust. The frequency of interaction might strengthen reciprocity, reduce the risk of opportunistic action for short-term gains, and improve robustness of cooperation (Parkhe, 1993; Zanini, 2007). Also, prior contract can promote deterrence-based trust, resulting from considering prior ties as possible hostages, which refrain partners from untrustworthy behavior because of potential sanctions, including alliance dissolution and loss of reputation (Gulati & Singh, 1998). Ring & Van de Ven (1992) state that the ability to rely on trust is inversely proportional to the risk inherent in a transaction, *ceteris paribus*. According to Todeva & Knoke (2005), "[a]s relationship solidified over time, organizational actions grew more integrated and mutually controlled through intertwined operational, strategic, and social mechanisms" (p. 135). In this way, the authors agree that trust can be both an alliance outcome variable and a predictor of alliance success.

2.5. Knowledge

Besides trust, coordination problem resolution requires learning and knowledge sharing. Todeva & Knoke (2005) point out that many organizations attach great value to learning derived from knowledge transfer from partners, whether as a primary goal or as a side benefit of other objectives, such those identified by Hagedoorn (1993) (technology complementarity, reduction on innovation time-span, or access to market). "Organizational learning occurs when a firm acquires, assimilates, and applies new information, knowledge,

and skills that enhance its long-run performance and competitive advantage" (Todeva & Knoke, 2005, p. 137). Therefore, the focus of learning should be directed to particular forms of organizational knowledge that account for the implementation and expansion of its characteristic production actions (Dosi et al., 2002). Also, the learning capacity depends on prior related knowledge that makes firm able to recognize and assimilate new knowledge that matters for its operations (Helfat et al., 2007; Powell et al., 1996). In other words, the learning capacity of a partner depends on the extent to which its knowledge bases overlap to lend a basic compatibility (complementarity), and on the extent to which the partner has developed effective routines of interaction with other partners (Helfat et al., 2007). The learning capacity affects what Helfat et al. (2007) call 'relational capability' of a firm, which is a type of dynamic capability with the capacity to purposefully create, extend, or modify the firm's resource base, augmented to include the resources of its alliance partner.

Knowledge is an asset that, under the perspective of alliances, can be at the same time part of the coordination problem resolution or the problem itself. It depends on the appropriability conditions of the ecosystem, which refer to the possibilities of protecting knowledge from imitation (Bataglia et al., 2011). Weaker appropriability (higher risk of leakage) increases the cost of hybrid contracting as compared with hierarchy (O. E. Williamson, 1991). On the other hand, empirical studies have found that alliance relationships consistently based on trust, respect and friendship, along with integrative conflict resolution mechanisms (able to ensure fairness and procedural justice) have increased both corporate learning and protection of proprietary assets" (Todeva & Knoke, 2005).

2.6. Firm's Value, Value Proposition and Customer Value

Alliance performance eventually impact partners' economic indicators, such as stock prices, profits, productivity, market share, etc. (Helfat et al., 2007; Todeva & Knoke, 2005). In this way, value can be understood as either the advantages appropriated by firms, through unique combination of resources and capabilities, which are heterogeneously distributed in a given ecosystem, rare, imperfectly transferable, not easy replicable, and are able to reduce firms' costs or increase their revenues (Barney, 1991; Barney, Wright, & Ketchen Jr, 2001; Grant, 1991), or advantages created to customers by reduction of their costs or by boosting their performance (Porter, 1998). In other words, the advantages are the surplus carried out to customers as a portion of the net benefits created, called 'customer's value for money' by Peteraf & Barney (2003). For SH and CC, the value creation, both for themselves of for their customers, requires a joint value proposition, "an aggregation, or bundle, of benefits that [they offer] customers" (Osterwalder & Pigneur, 2010, p. 22). The combination of software and services may be innovative and represent a new or disruptive offer, which tends to generate more value. Offerings similar to existing ones should add features and attributes in order to claim for additional value. The SH-CC complementarity in composition of the joint value proposition might evolve to co-specialization (Teece, 2009), when services, for instance, are designed specifically for determined software technology.

The value proposition is a result of technical and commercial negotiation between SH and CC, involving confrontation of technology options based on each party own interpretation of market's requirements and their fulfillment capabilities. SH tends to offer innovative, state-of-the art technology. Besides capabilities, it is part of its corporate strategy: SH pursues the strategy of product leadership, where "[the] critical function is the Research, Development and Engineering (R&D&E)" (Fleury et al., 2004, p.171), focusing on the technology scale up in order to achieve greater adoption as fast as possible. "[I]n the past, commercial

opportunities or technological problems called for innovations and technological solutions; today, technological solutions are seeking commercial opportunities to trigger, or technological problems to solve" (Gambardella & McGahan, 2010, p. 267).

In turn, CC is not committed to bring innovation *per se*, unless it is already an asset of its knowledge base. As a service company, its corporate strategy is different from SH: it is a customer-oriented strategy, having sales and marketing as critical functions that drive services development for optimizing customers' competitive strategy (and therefore its own) (Fleury et al., 2004). The lack of commitment to innovate by strategy is likely to difficult CC to move towards innovation adoption (Hannan & Freeman, 1984).

Especially for the service business the CC is in, the value creation processes for the firm and for the customer are interdependent. Problem-solving services (Stabell & Fjeldstad, 1998) that reduce technology risk for customers are delivered in a way that a) overcomes implementation difficulties and obtain anticipated IT results; b) keeps implementation costs as planned; c) keeps implementation time as planned; d) achieves technical performance at the level or upper of what was planned at the outset of the investment; and e) assures hardware and software compatibility (Barney & Clark, 2007), along with intellectual capital transfer, eventually will facilitate customer's goals and purposes achievement (Woodruff, 1997), and therefore strengthen CC-customer relationship, enhance CC's reputation, and establish a differentiation in the ecosystem (Barney & Clark, 2007; Barney et al., 2001). The revenue that accounts for getting the job done is the short-term, Porterian value created that only satisfies firm's short-term necessities. The door for sustainable, long-run growth has reputation—"a set of economic and non-economic attributes ascribed to a firm, inferred from the firm's past actions" (Gemser & Wijnberg, 2001, pp.565-566)—as its key.

The value creation for the SH has the same characteristics of the CC's, but having higher emphasis on the Porterian, short-term revenue generation than the long-term, customer relationship-based value generation. SH's interest is at the highest level until the software is sold; after that it is attracted by other sales processes, while the CC's attention is kept high until the software is implemented and starts generating promised benefits to customer. Reputation is highly appreciated by SH as well, but comes through the CC's hands: successful implementations make both service and technology distinctive.

3. Methodological Proceedings

A lack of prior theorizing about a subject makes the exploratory approach an appropriate choice. However, this approach is in general too open, making it difficult to drive problems or questions to a clarification (Collis & Hussy, 2005). In turn, qualitative research is largely used for examination of and reflection on perceptions in order to reach an understanding of social and human phenomena (Collis & Hussy, 2005), but "considers that the views and field practices are different due to various subjective perspectives and social environments related to them" (Flick, 2004, p. 22). We decide, then, to work on a descriptive type of research, that can at the same time narrow the focus, once makes a description of the phenomena behavior (Collis & Hussy, 2005) and keeps the highest fidelity possible on data, since the researchers' role does not disturb significantly the target research environment.

The data was gathered from publicly available information at Internet, company-proprietary documents, and face-to-face, recorded interviews, based on a semi-structured questionnaire containing questions based on the relevant theory. The interviews' content was

transcribed in order to allow us to proceed with data analysis and interpretation. Names of companies and spokespersons were kept in secrecy, according to non-disclosure agreements.

A group of multinational companies was initially selected as target for interviews, once we consider that the business presence in different countries and continents makes their partnership relationships potentially richer in terms of the complexity of the mechanisms that are subject of the paper. Four well-known multinational firms have accepted the invitation to participate in the research, with three high-end CCs that are leaders in consulting services for implementation of enterprise applications software in Brazil, and one SH, also leader in enterprise applications software sales in country. The CC group is composed by two public global management and technology consulting firms, with more than 150,000 people, serving clients in more than 120 countries, with net revenues of more than US$ 20 billion for the 2011 fiscal year; and one private global firm in the business and IT consulting market, with less than 5,000 people, and net revenues less than US$ 500 million for the fiscal year of 2011. The SH is a public global software company, with more than 50,000 people with offices in more than 120 countries, that reached net revenues of more than US$ 15 billion for the 2011 fiscal year. Each of them was represented by its head of line of business that is subject of the research: the public CCs by their partners in charge for Latin American operations; the private CC by the president of the Brazilian operation, and the SH by the vice president of the partnership area in country and by the senior director that is the head of partnerships with CCs in the subsidiary.

3.1. Categorization

After transcription, the data was categorized. The categories were previously defined: incentives for partnering (Gulati & Singh, 1998; Hagedoorn, 1993; Todeva & Knoke, 2005), resources and capabilities (Barney, 1991; Barney et al., 2001; Helfat et al., 2007), interdependence (Doz et al., 2000; Gulati et al., 2005; Gulati & Singh, 1998), coordination (e.g.: Gulati et al., 2005; Gulati & Sytch, 2008; Ring & Van de Ven, 1992; Todeva & Knoke, 2005), trust (Gulati & Nickerson, 2008; Parkhe, 1993; Zanini, 2007), learning (e.g.:Dosi et al., 2002; Doz, 1996; Helfat et al., 2007; Powell et al., 1996), firm's value (e.g.: Barney, 1991; Helfat et al., 2007; Todeva & Knoke, 2005), value proposition (Osterwalder & Pigneur, 2010; Peteraf & Barney, 2003), customer value (Barney & Clark, 2007; Porter, 1998; Woodruff, 1997). The use of predefined categories is one out of two processes of categorization, and when "a system of categories is provided, …the elements are distributed among them in the best possible way" (Bardin, 2007, p. 113).

Inspired by the methodology of Bardin (2007), there was a decoupling phase for selecting the register unities from the transcription. After that, context units were defined as much as necessary to giving meaning for each register unit. Then, the classification and aggregation processes followed, according to their syntactical/lexical aspects, taking in consideration the predefined categorization and, in addition, the analysis made by Gulati et al. (2005) of the adaptive capacity. Capability, or capacity, is defined as the ability to execute tasks or activities (Helfat et al., 2007), and form a subset of firm's resources that allows the complete exploitation of all other firm's resources and capabilities (Barney et al., 2001). Capacities promote the necessary articulation of selected resources, and the articulation involves complex patterns orchestration between people and between people and other resources (Grant, 1991). Such orchestration, in terms of adaptive capacity, may involve cooperation and coordination mechanisms to perform. The coordination mechanisms, those that can promote alignment of actions according to Gulati et al. (2005), can be typified as

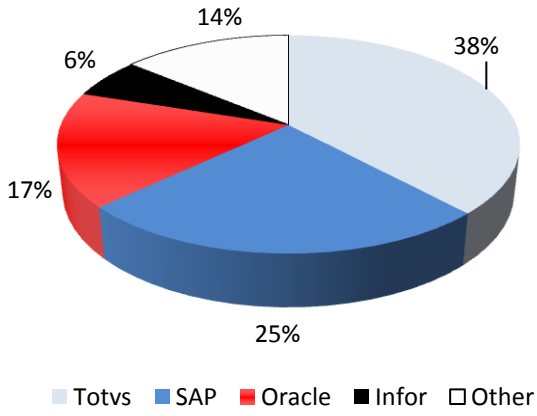
formal and informal. Formal are those mechanisms that have some kind of explicit structuring; informal are the ones which do not have any kind structuring or its structure is tacit and non-standard.

4. Findings

4.1. Business Ecosystem at a Glance

IDC (2010) has reported that the Brazilian enterprise application software market reached more than 1.1 billion reais (733.3 million dollars) in license sale in the first half of 2009, compared with 923.6 million reais (615.7 million dollars) in the same period in 2008. The estimate for the entire year of 2009 is that Brazilian companies have invested more than 2.5 billion reais (1.67 billion dollars) in enterprise application software—an increase of 17% compared to 2008, meaning that the economic crisis has had less impact than expected in Brazil. According to the study, many companies have maintained their investments because they were growing and they needed information technology tools able to support it. IDC (2011) has identified that the top-4 CEO priorities of companies of all sizes are 1) enhance firm's efficiency; 2) enhance monitoring (especially information); 3) risk reduction and control enhancement; and 4) compliance to regulations. Combined, these priorities will accelerate the coming of the so called 'third technology era', that includes cloud computing, mobility and applications, big data analytics, and new solution generation, available to billions of users. The estimate growth of 8.39% (CAGR) until 2013 (IDC, 2010) represents a great challenge to SHs and CCs in their relationship in order to fulfill demands with joint value propositions, requiring, for instance, higher formalization and management of partner-to-partner networking programs, with great emphasis on revenue contributions; and deeper specialization in new areas, such as 'X as a service' and mobility (IDC, 2012).

F. S. Meirelles (2010) has made a research about the information technology resource management in organizations, encompassing enterprise application software. The following graph shows the Brazilian enterprise application software market share (in number of workstations):



Totvs (Bovespa: TOTS3): Brazilian multinational company. http://www.totvs.com

SAP (NYSE: SAP): German multinational company. http://www.sap.com

Oracle (Nasdaq: ORCL) North American Multinational company. http://www.oracle.com

Infor: North American Multinational company. http://www.infor.com

Malerba and Orsenigo (1993) bring the notion of technological environment using the definition of technological regime, which is a combination of opportunity conditions; appropriability conditions; cumulativeness; and knowledge base.

> "The cumulativeness is related to the idea that today's innovations in R&D are the foundation for tomorrow's innovations. The…opportunity [conditions] reflects the ease of innovative activity. These possibilities can be evaluated in relation to the volume of opportunities...the degree of granularity (range of applicability of new knowledge into products, processes, and markets). Appropriability conditions refer to the possibilities of protecting innovations from imitation. Finally, the knowledge base is defined by analyzing two dimensions: degree of tacit knowledge and complexity" (Bataglia et al., 2011, p. 163).

For the case of the enterprise application software industry business in Brazil, the ecosystem's technological regime can be considered as having low appropriability—since the enterprise application software technology is an enabler of best practices in business processes; and high cumulativeness because technology blends a combination of increasing precepts inherent to computer science (languages and programming methodology tied to the current hardware technology) with knowledge of business processes (global and local). The conditions of opportunity are high, given the dynamism in the information technology area and the variations that occur in business processes of organizations due to many reasons, as regulation, technological changes, etc. The knowledge base is characterized by having a great part significantly tacit, related to the knowledge of business processes, as well as having high complexity, bringing together the disciplines of Computer Science, technological idiosyncrasies of products, and knowledge of business processes segmented by industry sectors crossed with markets.

The enterprise application software industry business ecosystem in Brazil has three key components: SHs, CCs and customers. SHs have the keystone role, once they develop and provide the technology around which the entire ecosystem is built (Iansiti & Levien, 2004). Dominators are the larger CCs, summing up to 10% to 15% of the ecosystem population, most of them multinational companies living in many ecosystems simultaneously. Niche players are the smaller CCs, and form the majority of the ecosystem population.

4.2. Data

The relationship between SH and CCs involves exchange, sharing, co-development, and frequently requires and generates firm-specific, co-specialized (Teece, 2009) assets. These attributes characterize the relationship as alliance (Gulati, 1998; Gulati & Singh, 1998). The alliance is governed by neoclassical contracts (O. E. Williamson, 1991), that maintain autonomy of the parties but bind them together in the development of specified business activities, mainly related to the joint value proposition building and execution, which has a strong emphasis on intellectual property protection of *ex ante* partnership assets (such as software codes, documentation, research and competitive information, etc.) and *ex post*, co-specialized assets as outcomes of the partnership, such as the development of specific processes tied to the technology, or even complimentary technology. Those contracts may have additional addendums, in order to provide more details or determine very specific business activities, such as the introduction of a determined technology in a specific geographic territory. These addendums are commonly known as memorandum of understanding, cooperation agreement, or intentions protocol. Definition of pooled resources in joint activities and non-compete instruments can be found in both contracts and addendums, as pointed out by Ménard (2006).

The differences of the 'corporate DNA' between SH and CC—the former is product-centric; the latter is customer-centric, as cited by Fleury et al. (2004) and Stabell & Fjeldstad (1998)—are not prominent as one might suppose. The faster delivery of innovation cited by Hagedoorn (1993), even when the customers are not demanding them (Gambardella &

McGahan, 2010) are being embraced by the CCs. However, it is not because they have changed their 'DNA'; it is because competition became fierce and innovation means differentiation over competitors, as can be perceived in CCs' words:

> "For me it's clear: the too-low price of some competitors, sometimes using tax models that are allowed in Brazil, but we are not allowed to apply [because of global corporate rules], make competitors more affordable than us. I call it predatory competition that erodes margin all over the chain"

> "You must always look at the cutting edge, always on the search for innovation. It requires more knowledge, better train your team to get a differentiation…"

In this way, the mechanisms point toward the innovation delivery direction, paying less attention to the opportunism avoidance. Besides cooperation, the partnership contract also plays important role for coordination: It provides the major guidance for bringing SH's technology to the ecosystem. Joint development plan is another very representative formal mechanism. It is a simplified business plan in which CCs commit efforts to bring defined technology to a customer or a set of customers in a given industry sector or geographic territory, therefore dwarfing the technology introduction uncertainty cited by Ring & Van de Ven (1992). Joint development plans are commonly followed by knowledge transfer mechanisms that aim to provide CCs with the technical and competitive knowledge about the technology to be brought to the ecosystem. Knowledge transfer is key (Dosi et al., 2002; Helfat et al., 2007; Powell et al., 1996; Todeva & Knoke, 2005) both for the building of a consistent joint value proposition and for the technological risk mitigation (Barney & Clark, 2007), or, more broadly, output uncertainty reduction (Ménard, 2006). There are three formal mechanisms that promote knowledge transfer: 1) training contracts, that are investment commitments usually subsidized by SH; 2) programmatic knowledge transfer, composed by training sessions related to determined technologies, business processes, or even partners' knowledge; and 3) strategy communication, that is the disclosure of the technology development roadmap, giving general understanding of determined follow-on technologies, positioning, and their trends, as commented by SH:

> "The software house has …another very important [coordination mechanism] that is the communication of its strategies. …It is fundamental for the long-term relationship proposed by the firms [to theirselves]. A clear communication of the strategy is a strong agglutinating of the ecosystem because it generates trust in the long run …necessary to stay in the business"

Because the strategy communication mechanism gives CCs information and knowledge about the future technology platform on which the ecosystem is built, it can stimulate CCs investments (P. Williamson & De Meyer, 2012).

Similarly to partnership contracts, the classification—or ranking—of CCs upon certain attributes affects at the same time cooperation and coordination, reinforcing the former and directing the latter. Those attributes include the capacity to deliver innovation.

In spite of its informal nature, trust is a very important coordination mechanism. The competition among CCs tends to reinforce the ties—and therefore the mutual trust—of each CC with SH, once CCs are in constant search for innovation to deliver. From the SH's point-of-view, trust is twofold: It has a (already commented) strategic characteristic of the long-term perspective of the partnership, and it also has a business characteristic, related to each business transaction, that eventually is built after successful experiences with a certain number of transactions, in accordance to Parkhe (1993) and Zanini (2007). An interesting point is that SH does not have expectation on a 100% trust between parties in order to transact:

> "[Trust] should not be full for the cooperation to succeed. …Probably none of [the transactions] …has total [mutual] trust; none of them has a full alignment of interests; but all together generate an institutional trust between the firms"

Besides trust, the other informal coordination mechanism is *ad hoc* interaction. It is established around a business opportunity jointly pursued. The circumstances of the opportunity give shape to the mechanism, determining scope, depth and width of the knowledge to be exchanged in order to compose the value proposition. Figure 1 shows the mechanisms of coordination:

Figure 1 – Coordination Mechanisms

Type	Mechanism	Description
Formal	Partnership contract	Neoclassical contract instrument
	Joint development plans	Structured common business plan
	Training contracts	Training investment commitment
	Programmatic knowledge transfer	Structured knowledge exchange
	Strategy communication	Disclosure of medium- and long-term developments and tendencies
	Ranking	Qualification and classification
Informal	Trust	History of past successful transactions; reputation
	Ad hoc interactions	Non-structured knowledge exchange driven by business opportunity

Source: elaborated by authors

5. Discussion

Innovation generates economic development. Dosi et al. (2002) pointed the incredible number of new products and services we have today that simply did not exist five years ago. SHs believe their innovations can contribute to economic development by making organizations more productive, better managed, more sustainable, more innovative, through the use of their software technology. CCs have the same perspective about their services. However, none of them, alone, can make their value propositions (thus their organizations) successful. The alliance (Gulati, 1998; Gulati & Singh, 1998) seems to be a logical, perfect link that unites complementary resources and capabilities of SHs and CCs towards a broader, combined value proposition. The business' very nature of the two types of organizations (products for SHs, and services for CCs (Stabell & Fjeldstad, 1998)) that tends to drive them to distinct business strategies (product leadership for SHs, and customer orientation for CCs (Fleury et al., 2004)) at different paces (Doz, 1996) is not, currently, making them resistant to an alignment. Not even the high level of sequential interdependence (Gulati et al., 2005; Gulati & Singh, 1998) intrinsic to the alliance format—which transactions require from both parties a joint work in order to bring a combined value proposition (enterprise application software plus implementation services)—represents a practical incentive for opportunistic behavior and thus makes alignment more difficult. The competition among CCs is being a major compelling force for their adaptation. Smaller CCs are pushing large, multinational CCs to differentiate themselves, causing a rupture in their inertial state (Baum, 1999; Hannan & Freeman, 1984; Helfat et al., 2007). The phenomenon is caused by a combination of commoditization of implementation services related to the enterprise applications more widely adopted (best practices widely disseminated) with talent scarcity skilled on new enterprise applications (e.g.: cloud computing, mobility and applications, big data analytics (IDC, 2011)). It seems to ease the keystone role of SH for coordinating transactions with CCs, because the mechanisms are straightforward in the innovation delivery direction. Instead of

opportunism, the main concern of the majority of coordination mechanisms is knowledge: what kind of knowledge to be transferred (programmatic knowledge transfer; strategy communication), ways of transfer (programmatic knowledge transfer; *ad hoc* interactions), knowledge transfer commitment and funding (training contracts). The remaining mechanisms give structure for the coordination (partnership contract; joint development plans) and adequate ambience (trust).

Once the majority of coordination mechanisms is related to knowledge, one can conclude that one major challenge for an effective coordination is the appropriability condition of the ecosystem. However, it should be viewed in a slightly different perspective from Bataglia et al. (2011), Malerba & Orsenigo (1993), and O. E. Williamson (1991): It is related to talent retention instead of imitation. One of the most prominent characteristic of the SH-CC relationship is the presence of complex service transactions in which human assets (especially business and technical knowledge) play a crucial role. These assets take long time and consume significant amount of investments to be built. Therefore, the risk of leakage, or in other words, the loss of talent might go beyond imitation: At the extreme it might prevent firm from continue to work with (and profit from) determined technology that makes it different from the crowd. Before getting there, the loss of talent has probably eroded CC's capacity to mitigate technology risk (Barney & Clark, 2007), producing implementations that do not promote the full achievement of promised benefits (Ménard, 2006), so adversely impacting customer value (Woodruff, 1997). As a consequence, it may cause reputation damage (Gemser & Wijnberg, 2001) for both CC and SH, which in turn increase the technological uncertainty in terms of future adoption (Ring & Van de Ven, 1992). Some CCs comments on talent retention challenge express their concern:

> "This is one of the most difficult tasks we have to manage, especially when we know about the difficulty and scarcity of quality resources"

> "Companies like ours depend heavily on people, knowledge, and commitment. Having the market in search for talents, our challenge is to retain talent, and keep them always motivated and always learning"

The difficulty on talent retention might be related to the consistent growth of the technology adoption (IDC, 2010) at higher rates than the growth of the consultants base (knowledge coverage and number of professionals), combined with the idiosyncrasies of the Brazilian labor law, which eventually incentive talents to leave CCs and fund 'one-person corporations', to be contracted by CCs per job. As noticed by SH:

> "…A major obstacle to achieve effective cooperation is the legal landmark of labor relations. [It] ends up incentivizing an opportunistic relationship between the contractor and the firm; ends up generating volatility on labor supply; and a [lack of] structuring of the services firm in the long run"

Another significant coordination challenge is related to one of the hybrids characteristics mentioned by Ménard (2006): competition. Or, more specifically, 'coopetition', a neologism created to qualify the situation where firms cooperate and compete simultaneously (Preiss et al., 1996). It occurs because of the business portfolios overlap. Large multinational CCs commonly live in more than one ecosystem and have, for instance, relationship with different SHs that are competitors among them. Biggest CCs, as companies, can also be SHs on their own, offering complementary and even competitive software applications, along with other types of technology (hardware, databases, communication, etc.). The extension of the portfolio overlap between CC and SH tends to determine the level of the conflict, making the mechanisms that give structure for the coordination (partnership

contract, notably its addendums; joint development plans) enhanced with anti-opportunism content as the level highs. On the other hand, as trust is built through the frequency of transactions (Parkhe, 1993; Zanini, 2007), the perception of opportunism risk diminishes (Doz et al., 2000), and tends to diminish anti-opportunism apparatus.

6. Conclusion and Research Agenda

This exploratory paper shed light on the mechanisms that allow the coordination of SH and CCs in order to both build (and eventually deliver) a value proposition imbedded with innovation capable to meet (or even exceed) customer expectations, and inhibit opportunistic behavior. The coordination mechanisms were identified and put in the perspective of the enterprise application software business ecosystem in Brazil, which is the *locus* of the transactions between SH and CCs. That contextualization allowed us to offer contributions to both academics and practitioners. For researchers, this paper provides explicitness of the formal and informal coordination mechanisms characteristics and their implications in their business environment (business ecosystem), which opens an avenue for further research in order to understand, for instance, coordination dynamics, effectiveness and restrictions, requirements, etc. Another outcome that we want to highlight is the behavior of the CCs when facing competition among them. It represents a counterpoint in relation to literature, notably Stabell & Fjeldstad (1998) and Fleury et al. (2004) that were used as part of the conceptual ballasting. The formers have made a definition of 'value shops' as "firms that …rely on an *intensive* technology …to solve a customer or client problem" (p. 420), in which CCs fit perfectly. Aligned with them, Fleury et al. (2004) have stated that service companies pursue customer-oriented strategy, oriented to drive services development that fulfill customers' requirements. However, in search of differentiation, some CCs adopt the strategy of product leadership, focusing on a faster adoption of technology that may or may not address customers' perceived requirements. It seems that the alignment of strategies is an influence for moderating opportunism risk, once the coordination mechanisms used by SH and CCs are mostly knowledge-focused, instead of opportunism-focused. It should be another research interest area.

It is easy to find in the practitioners' literature statements pointing that people are firm's most important assets. Nevertheless, only few of them link people to concrete firm's interests. Besides the explicitness of the coordination mechanisms, this paper can benefit managers with the understanding of the instrumental role skilled talents play in the value generation process, along with the criticality of the knowledge process management, which seems to be the fuel of the value generation in that kind of business ecosystem. On top of that, the paper brings out trust—a theme that is seldom found in the practitioners' literature—under a management perspective: It was identified as one of the coordination mechanisms, responsible for setting the adequate ambience for transactions to occur.

Despite the interesting findings, there are at least two important limitations of the research to be considered: The small number of companies that have participated, and their scope (global multinational, predominantly large companies). Both can potentially pose a risk of some kind of bias.

7. Acknowledgement

Authors thank FAPESP (São Paulo State Research Foundation), CNPq (National Council for Scientific and Technological Development) and Mackpesquisa (Mackenzie Presbyterian University Research Fund) by the financing support for the development of this work.

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