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INTERORGANIZATIONAL RELATIONSHIPS CLIMATE AND INTERORGANIZATIONAL INFORMATION SYSTEMS SUCCESS; A SUPPLY CHAIN PERSPECTIVE

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Abstract

During the last two decades, an increasing amount of attention has been paid by practitioners as well as academics to Interorganizational Information Systems (IOSs) design, deployment and use within supply chains. However, our understanding of the main factors that affect IOSs use and success is hardly complete. Through brief review of coordination mechanisms theory and its related theory such as transaction cost theory (TCT) and Resource Based View (RBV), the paper generates theoretical propositions and attempt to conceptualize a theoretical model which map the role of Interorganizational relationships (IORs) climate attributes in linking IOSs technology and supply success.

The theoretical model encompasses two major causal relations: (1) a direct relation linking IOS use with Supply chain performance (IOS success) and (2) a moderating relation linking IOS success with IORs attributes. Else more, the paper attributes to IORs success climate a set of constructs drawn from the literature review, namely; interorganizational cooperation/ interorganizational coordination, interorganizational trust, interorganizational commitment, and interorganizational dependence.

Keywords: *IOS use, IORs Climate Attributes, Supply Chain Performance*

1 INTRODUCTION

Interorganizational information systems are more and more designed, developed and implemented as coordination mechanisms to manage interorganizational relationships and information flows. As a consequence, the issue of IOS becomes imperative for business enterprises and organizations in general and is increasingly gaining interest in academic circles (Clemons & al., 1993; Johnston & Vitale, 1988; Iacovou & al., 1995; Teo & al., 2003, Amami & Brimberg, 2004).

IOS are increasingly being used by global business firms to enhance their collaboration. Even though that they request tremendous investments, IOS support managerial expectations in term of continuous information flows and tight interorganizational connections (communication). In view of its undeniable success within supply chains, the paper intent is to emphasize the role of coordination mechanisms in interorganizational relationships and the role of IOS in particular. Then we attempt to characterize and conceptualize the impact of IOS on the supply chain.

2 IOS AND COORDINATION MECHANISMS

At the organizational level, coordination mechanisms (communication and control) are fundamental to the study of organizations. Uncertainty (Thompson, 1967) and bounded rationality (Simon, 1958) tend to push organizations to centralize decision-making and create a hierarchy of decision-making. The verticalization helps to match information processing needs and information processing capabilities (Galbraith, 1977).

The dynamic environment, the development of electronic networks and the relative inefficiency of hierarchies make it difficult for firms to successfully compete alone. Across different industries, firms are developing web based supply chain to support their business strategies. The success of these new emerging strategies will depend on the capability of erecting and maintaining new coordination

mechanisms (communication and control) that will reduce uncertainty that arises from these interorganizational relationships.

Granted, one can argue there is no established coordination mechanisms theory that describes and predicts the outcome of interorganizational relationships. However, the theoretical perspective on coordination mechanisms at the organizational level, developed extensively in the literature, can be extended to interorganizational relationships. We can safely assume that they are powerful enough to cover multiple contingencies such as necessity, reciprocity, efficiency, asymmetry, legitimacy, and stability (Oliver, 1990).

Transferring this body of research on interorganizational relationships to the area of supply chain management, one can make a reasonable assumption that interorganizational links change environmental dynamics and the firm's behavior, and consequently, create value to economic actors along the supply chain.

What are the coordination mechanisms that will ensure communication and control among economic actors along the supply chain? Four types of coordination mechanisms (structural mechanisms; socio-political mechanisms; resources mechanisms; and IOS mechanisms) can be used to map interorganizational relationships (Bensaou & Venkatraman, 1995).

With respect to supply chain management, IOS can serve as an enabler and supporter of interorganizational relationships both on an operational and on a strategic level. By allowing rapid information flows at much lower costs, it enables interactive relationships that otherwise might have been desirable but impractical. Where IOS are further developed and more widespread, we would expect to see more business enterprises extend their boundaries and outsource their logistics function rather than performing it internally, and a tendency to use more involved partnership arrangements (with their rich information flows) rather than simpler (and less information intensive) arms-length transactions.

3 IOS AND SUPPLY CHAIN PERFORMANCE

As business enterprises become more and more connected to network of partners and economic actors, the issue of supply chain management and interorganizational information systems (IOS) becomes critical to their operations and strategic activities. Poorly integrated processes, poorly designed coordination mechanisms and the lack of managerial competencies in managing interfacing collaborative decisions lead all to distorted information and its bullwhip effect consequences, inefficiencies along the supply chain

IOS use and diffusion are partly due to an increasingly competitive environment, globalization and commoditization. Business enterprises are seeking to streamline their activities, efficiency and better control mechanisms. They are also seeking to build systems through risk sharing, capitalize on economies of scale and externalize all activities that can be achieved more efficiently by partners and markets. Although IOS play different roles in different supply chain (Lee, 2002), they all designed and used to achieve integration in each supply chain relationship setting and ensure coordination across the range of supply chain relationships (Lee, 2000).

As business enterprises increase their investments and commitment to an IOS supply chain, there will be an increased need to share information, integrate processes and most likelihood a positive impact on supply chain performance. IOS design, development and use aim primarily to information integration, information sharing, information collaboration, and information synchronization with all partners. Client/vender information integration and information sharing involve the flow of accurate and timely information regarding a partner's resources, and critical information such as forecasted demand, orders status and expected lead time.

Lee & Whang (2000) and Li (2002) showed that increased information sharing can lead to improved supplier order quantity, better inventory allocation decisions, increased velocity and enhanced visibility.

Also, Clemons & al. (1993) claim that IT reduces explicit coordination costs, operations risk and opportunism risk (by improving monitoring and reducing the relationship specific investment). Reekers & Smithson, (1995) add that IT improves information manipulation within the transaction. Other researchers advance that IT promotes a move toward market coordination by reducing coordination costs (EDI increases the number of suppliers and decreases IORs specific investment (Benjamin & al., 1986; Bakos & Brynjolfsson, 1992; Bakos & Treacy, 1986).

At same vein, number of studies on information systems and organization fields reveal the relevant role of IOS use in reinforcing the organizational cooperation and the interorganizational integration. For instance, Iacovou & al., (1995) advances electronic data interchange (EDI) grants to small organizations external opportunities of cooperation with potential partners. Also, IOS support major functions of SCM (supply chain management) through information flow management and partner's coordination (Amami & Brimberg, 2003; Hart & Saunders, 1997; Srinivasan & al., 1994; Kumar & van Dissel, 1996; Subramani, 2003). Hence, EDI and other IOS applications are likely to be among most technologies selected by supply chains managers (Johnston & Vitale, 1988; Amami & Brimberg, 2003). It seems there is evidence that IOS increase supply chain performance outcomes.

Hence:

Proposition 1: Interorganizational Information Systems have a direct influence on the Supply Chain performance

Theories also support the proposition above. In fact, Resource Based View (RBV) (Wernerfelt, 1984) assumes that firms create IT related competitive advantage by assembling IT resources that work together to create organizational capabilities (Bharadwaj, 2000). Ross & al. (1996) divided IS into three *IT assets* which together with *IT processes*⁵ would contribute to business value. These three IT assets were labeled *human assets* (e.g., technical skills, business understanding, problem-solving orientation), *technology assets* (e.g., physical IT assets, technical platforms, databases, architectures, standards) and *relationship assets* (e.g., partnerships with other divisions, client relationships, top management sponsorship, shared risk and responsibility). Also, The Transaction Cost Theory (TCT) (Coase, 1973) is likely to be an important theoretical base to hold up propositions. TCT is considered as most used to explain the impact of IT use at the boundaries of organizations. Based on transaction cost theory, Bakos & Treacy (1986) presented two theoretical links between information technology and competitive advantage, namely;

. *Bounded rationality*: extended bounds of organizational rationality can affect cost of research as well transaction cost. IT can have a direct impact on opportunism, environmental constraints and market exchanges with small firms (sources of transaction costs) by affecting bounded rationality. Hence, IT use reduces contracting and monitoring costs (moderate opportunism), improves generation of alternatives and possibilities (moderating uncertainty and environmental constraints) and affects information asymmetries.

. *Production process* is alike affected by IT use. In fact, IT improves the adaptability of the product, allows the realization of scale economics, and facilitates product differentiation based on unique features. Further, IT allows asset to be less specific and decrease switching costs.

4 IOS AND IORS CLIMATE; A BRIEF LITERATURE REVIEW

Although academics are in agreement when it comes to the positive outcomes of IOS on organization's performance, there remains great debate on the direct influence of information technology and on performance differences (Powell & Dent-Micallef, 1997; Ross & al., 1996; Barney & Arikian, 2001; Wade & Huland, 2004; Barney, 1991). Research in this field is less than convincing, due to the absence of

⁵ Defined as planning ability, cost effective operations and support, and fast delivery (Ross & al., 1996)

models that capture the complexity of the phenomenon on one hand, and to problems of measurement on the other hand.

According to resource-based view, researchers assert that IT and particularly, IOS impact and outcomes depend on complementary resources (supplier relationships). It suggests that resources developed or acquired over long periods of time, that link numerous individuals and technologies, and based on often taken-for-granted intangible relationships within a firm and between a firm and its stakeholders are more likely to be inelastic in supply than resources without these attributes (Barney & Arian, 2001). At same vein, Powell & Dent-Micallef (1997) advance that IT investment in and of itself has no effect on performance in the retail service industry. However, retail firms have gained a competitive advantage when combined with intangible, difficult-to-imitate complementary resources, such as a flexible culture, strategic planning, IT-integration, and supplier relationships. They add that “Complementarity” represents an enhancement of resource value, and arises when a resource produces greater returns in the presence of another resource than it does alone. Despite the great number of complementary resources, supplier relationships⁶ (e.g., trust, participation, commitment...) are singled out as potential factors for the success of IT and especially for EDI technology (Johnston & Vitale, 1988; Powell & Dent-Micallef, 1997; Ross & al., 1996).

Thus, our main contention is the emphasis on IOSs outcomes and the climate of the relationships. Indeed, a number of academics (Clemons & al., 1993; Mohr & Spekman, 1994; Pavlou, 2002; Sawaya, 2002; Ritter & Gemunden, 2003; Agi & al., 2005; Lin, 2006) reveal that IORs climate (trust, commitment, coordination...) is considered as a preexisting condition of information systems success. For instance, Hart & Saunders (1997) claim that interfirm relations, particularly trust, will gain preeminent importance in the management of electronic linkages (enabled by electronic data interchange). Also, Williams (1997) advances that IORs varying characteristics are likely to affect the breadth and the depth of effective IOS use between organizations. Moreover, Clemons & Row (1993) advance that bargaining power could influence IOS use. They demonstrate the critical role of long term cooperative relationships on IT use in the context of outsourcing activity. In addition, Zaheer & Vankatraman (1994) found general support for the importance of two constructs; asset specificity and trust, in explaining the degree of electronic integration which is considered among most important advantages of IOS use.

IS resources rarely contribute to a direct influence to sustained competitive advantage (Wade & Huland, 2004). Firms could procure advantage if they develop capabilities over an extended period of time that become embedded in a company and are difficult to trade. In fact, IS resources success does need preexisting supplier relationships (as value, rareness, inimitability, and non-substitutability resources (Barney, 1991)) to persist. This statement joins our second principal proposition which considers “relationships climate” as key moderators that we believe can affect the IS resource-performance relationships?? (Subramani, 2003; Wade & Huland, 2004). ; From this brief literature review, one can derive the following proposition:

Proposition2: Interorganizational Relationships Climate has a moderating influence on IOS success

The literature offers several attributes to the climate of interorganizational relationship. It depends on the perspective adopted by the study. For instance, Mohr & Spekman (1994) elaborated a conceptual model exposing the characteristics of successful interorganizational relationships. They characterized the interorganizational relationships attributes by; commitment, trust, coordination and interdependence. The results of a survey used to test the model indicate that the primary characteristics of partnership success are partnership attributes of commitment, coordination and trust, communication quality and participation, and the conflict resolution technique of joint problem solving. Also, Hart & Saunders (1997) distinguished two attributes of trading partners’ relationships; power and trust. Morgan & Hunt (1994) advanced that successful relationship marketing requires relationship commitment and trust.

⁶ Notations are different such; Business resources (Powell & Dent-Micallef, 1997), IT-business partner relationship (Ross & al, 1996), intangible relationships (Barney & Arian, 2001)...

Other studies in the literature underlined variables to describe the IORs's atmosphere, such as commitment (Anderson & Weitz, 1989; Blankenburg & al., 1999; Ring & Van de Ven; 1994), adaptation (Håkansson & Snehota, 1995; Jones & al., 1997; Jeffries & Reed, 2000) and coordination (Jones & al., 1997). The study will adopt the characterization of Mohr & Spekman (1994). Hence, the attributes adopted are as following; interorganizational trust, interorganizational cooperation, interorganizational coordination, interorganizational commitment and interorganizational dependence.

Hence, the second proposition could be divided into four sub-propositions, namely;

- Proposition 21: Interorganizational trust has a moderating influence on IOS success
- Proposition 22: Interorganizational coordination/cooperation has a moderating influence on IOS success
- Proposition 23: Interorganizational dependence has a moderating influence on IOS success
- Proposition 24: Interorganizational commitment has a moderating influence on IOS success

Propositions above conceptualize and compose the proposed theoretical model of the study (See exhibit below). The conceptual model includes two major causal relations, namely; (1) a direct relation linking IOS use with Supply chain performance (IOS success) and (2) a moderating relation linking IOS success with IORs attributes. Also, we intend to present the attributes of the IORs success climate. Thus, a set of constructs drawn from the literature will be conceptualized. The following sub-sections aim at conceptualizing each of those constructs and then at extracting relevant dimensions.

5 IOS IMPACT AND IORS CLIMATE

5.1 IOS Conceptualization

Supply chain's partners are trying to find solutions to enhance their interorganizational communication channel effectiveness. The development and diffusion of electronic infrastructures helped supply chain partners to streamline their communication channels and improve information integration, information velocity and more critical a better visibility along the supply chain. The rapid IOS technology adoption and use to coordinate the supply chain activities can be viewed in that lens. From a resource based view, IOS is considered as a technology asset ⁷of the firm. It consists of sharable technical platforms and data bases. A strong technology asset is essential for integrating systems and making IT applications cost-effective in their operation and support (Ross & al., 1996).

As defined by Holland (1995), Interorganizational information system application is “the business process which is being supported or enabled by interorganizational information systems”. Also, Bakos (1991) defines Interorganizational information system as “an information system that links one or more firms to their customers or their suppliers and facilitates the exchange of products and services It could be a simple trade exchange system or a more complex cash management one”.

IOS definitions have included many considerations. It's due to the multidimensional aspect of the concept. Johnston & Vitale (1988), for instance, distinguish two characteristics of interorganizational information systems: one technological, the other organizational. Moreover, Song & Farrell (1989) characterize IOS by two dimensions: objectives (Data) and user group (Customers).

Aside, the IOS can be viewed in many ways. They can be set up as one-to-one (a typical buyer–seller system), one-to-many (a marketing or purchasing system), or many-to-many (electronic markets), depending on the interaction patterns between the participants (Bakos, 1991; Hong, 2002). So, we assert the existence of many IOS applications, as; inter-corporate electronic mail systems, electronic data interchange (EDI), systems enabling suppliers and buyers to exchange standardized business documents, and inter-corporate electronic graphics data interchange of engineering documentation (Riggins & al., 1994).

⁷ Or Technology resources (Powell & Dent-Micallef, 1997)

Literature offers a number of essays to the conceptualization of IOS use. Masseti & Zmud’s conceptualization (1996) is considered among most adopted by researchers which identifies four levels or dimensions of IOS use; Breadth (number of EDI partners of a given firm), diversity (number of different types of documents that supported by EDI exchange), volume (the percent of total EDI documents represented by each type of document) and depth.

More recently, Forster & al., (2002) view the IOS use in two levels; Standardized IOS and breadth of IOS. They define IOS breadth as the breadth of different IOS used between organizations. However, standardized IOS is defined by the extent to which standardized formal business documents are exchanged between organizations.

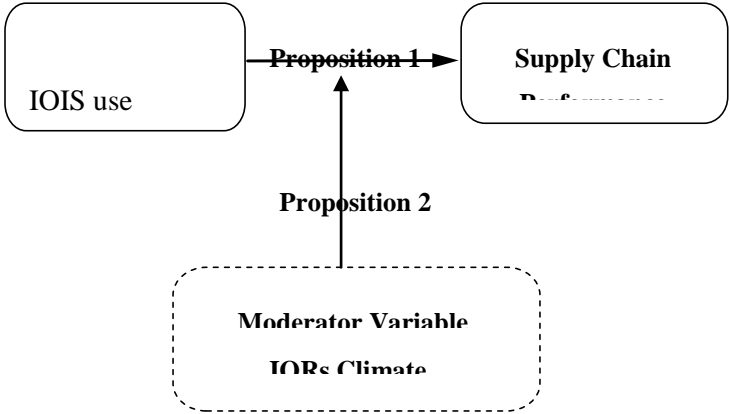


Figure 9 Theoretical Model

In a broader view, Bensaou (1992) considers technological coordination mechanisms as the use of information technology for facilitating interorganizational coordination. He proposes a set of characteristics related to these mechanisms, in instance; intensity of use of electronic linkages, asymmetry, level of electronic integration and the scope of use.

5.2 Supply Chain Performance Conceptualization

The external environment is becoming the next frontier of performance measurement. In following years there is an expectation to focus on interorganizational metrics such as supply chain performance (SCP) measurement (Folan & Browne, 2005). Thus, the concept of supply chain performance has taken new dimensions. In fact, the role of supply chain measures and metrics in the success of an organization cannot be overstated because they affect strategic, tactical and operational planning and control (Gunasekaran & al., 2004). Thus, many academics are interested in establishing a unified basis to supply chain performance assessment (Otto & Kotzab, 2003; Gunasekaran & al., 2004; Chang & al. 2007).

The concept of supply chain performance has taken many dimensions in the literature. In fact, Malone (1988) characterizes organizational performance with three dimensions, namely; production, coordination and flexibility. S. Levi & al. (2002) associate supply chain performance with four perspectives: reliability, reactivity, costs and resources usage. Chang & al. (2007) mentioned five supply chain performance attributes: R&D (Design, technique, Odds, Customization, Innovation), Cost (Price, Quantity, Discount, Decrement, Rush), Quality (Import, On-line, Reliability, Stability), Service (Delivery, Accuracy, Assurance, Stockout), and Response (Regular, Emergency, Volume, Specification, Modification). Moreover, Otto and Kotzab (2003) derived the goals of supply chain management from six perspectives, and described standard problems, solutions and performance metrics. Gunasekaran & al. (2004) distinguish six determinants of performance, namely; order planning and production level improvement, delivery time and procurement improvement, customer's satisfaction improvement, and logistic cost reduction. Whicker & al. (2006) characterized supply chain performance improvement by two factors, namely; cost and time. Chen & Paulraj (2004) distinguished between the supplier performance and the buyer performance to cover the supply chain performance concept. Accordingly,

the supplier performance was measured in terms of quality, cost, flexibility, delivery and prompt response. However, the buyer performance was measured in term of market share, return on investment, present value of the firm, firm's net income, and after-sales profit.

Furthermore, Verma and Pullman (1998) ranked the importance of the supplier attributes of quality, on-time delivery, cost, lead-time and flexibility. Wang & al. (2006) attributed five factors influencing the supply and the supplier selection performance: R &D, cost, quality, service and response. Similarly, Tracey & Tan (2001) developed some supplier selection criteria, including quality, delivery, reliability, performance and price, and assessed the customer's satisfaction based on price, quality, variety and delivery.

The literature mentions others dimensions to performance such as; flexibility, responsiveness, competitive versatility, resources, output, coordination, reliability, reactivity, costs... The selection of SCP dimensions depends on the nature of industry and activity concerned.

The paper is interested in the impact of IOS on SCP. Moreover, we focus on benefits drawn from the use of electronic solutions and precisely on *"the improvements undertaken to supply chain business processes after IOS use"*.

6 IORS CLIMATE ATTRIBUTES

6.1 Interorganizational Trust

The issue of interorganizational trust is likely to be a relevant field of study attracting recent researchers (Zaheer & al, 1998; Lane, 1998; Zaheer & Venkatraman, 1995; Sydow, 1998; Zaheer & Haris, 2006; Gulati & Nickerson, 2007).

6.1.1 Definitions

Pavlou & al., (2003) define interorganizational trust as "one organization's (trustor's) belief that the other party (trustee) in the exchange relationship will behave in accordance with the trustor's confident expectations". Gulati & Nickerson (2007) refer to interorganizational trust as "trust arising out of past interactions or the institutional environment that existed prior to the focal exchange".

Aside, Zaheer et al. (1998) define interpersonal trust as "the extent of a boundary-spanning agent's trust in her counterpart in the partner organization". They further define interorganizational trust as "the extent of trust placed in the partner organization by the members of a focal organization".

Zaheer et al. (1998) noted that interpersonal and inter-organizational trust are related but different constructs. In fact, interpersonal and inter-organizational trust may develop and impact each other simultaneously or so, that either one develops first and impacts the other.

In the present paper we are interested in "interorganizational trust". Besides, we suppose the distinction between the dispositional trust and interorganizational trust as it recognized by Zaheer & al., (1998). In fact, whereas dispositional trust is an individual trait reflecting expectancies about the trustworthiness of others in general, relational forms of trust pertain specifically to the counterpart in the dyad. Moreover, relational (Within an interorganizational relationship) trust is likely to be based on experience and interaction with a particular exchange partner.

6.1.2 Dimensions

Literature is likely to be abundant about the issue of trust conceptualization, depending on whether perspective is devoted to define trust. The literature has depicted trust as a multi-dimensional construct including reliability, integrity, competence, honesty, fairness, responsibility, helpfulness, and confidence (Moorman et al., 1993; Morgan and Hunt, 1994).

For instance, Zaheer & al., (1998) and Zaheer & Venkatraman (1995) reveal that trust can be expressed in three different forms; cognitive, behavioral and emotional. More precisely, Perrone & al., (2003) conceptualize trust in terms of three core components, namely; Reliability, predictability, and fairness. Moreover, Pavlou (2002) suggests two dimensions of interorganizational trust in buyer–seller relationships; credibility and benevolence. Johnston & al., (2004) added to the benevolence, the supplier’s perception of buyer’s dependability.

In addition, Pavlou & al., (2003) propose three dimensions of interorganizational trust; competence⁸, credibility, and benevolence. Morgan & Hunt (1994) conceptualize trust in term of three dimensions; communication, shared values and opportunistic behavior. According to Mayer & al (1995), trust is conceptualized in three dimensions, namely; benevolence, integrity and ability. Within a set of factors drawn from literature, those factors explain a major portion of trustworthiness. In fact, benevolence is the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive.

The relationship between integrity and trust involves the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable. Ability is that group of skills, competencies, and characteristics that enable a party to have influence within some specific domain.

6.1.3 Interorganizational Trust and IOS Success

Given the uncertainty characterizing on line exchange relationships, studies claim the importance of interorganizational trust built between online trading partners.

In fact, Pavlou (2002) and Pavlou & al., (2003) demonstrate in their studies the influence of interorganizational trust (buyers' trust in sellers) on transaction success in B2B marketplaces. Moreover, they argue how *institution-based trust*⁹ can facilitates the formation of interorganizational trust in online marketplaces. At the same vein, Ba & Pavlou, (2002) state that trust formation would encounter uncertainty (or information asymmetry) and opportunistic behavior in electronic market places. They mainly examine the extent to which trust can be induced by proper feedback mechanisms in electronic markets.

Moreover, Wehmeyer & al., (2001) discuss in their work the *trust building potential of inter-firm coordination roles as organizational means in virtual organizations*. They found that, in the context of virtual organizations, trust is presumed to be a factor necessary for the success of any business relationship. Dyer & Chu (2003) found that perceived trustworthiness reduces transaction costs and is correlated with greater information sharing in supplier-buyer relationship.

Also, Hart & Saunders (1997) revealed that trust plays an important role in EDI use for two reasons; (1) it encourages firms to make investments necessary for electronic information exchange and (2) it discourages opportunistic behavior which would clearly reduce the opportunity for greater information sharing over time.

6.2 Interorganizational Cooperation

The concept of interorganizational cooperation is viewed mostly as coordinated activities between organizations. In fact, Bensaou (1992) asserts that one of the most outcomes of cooperation in an organizational setting is the effective coordination. He supports the idea that cooperation is a prerequisite of effective coordination. Further, Liu & al., (2007) reveal that cooperation leads to the stability of the relationship- *prerequisite for the economic rewards that come with cooperation and partnership*. This would be more apparent if we flash on some existing definitions drawn from the literature;

⁸ Competence refers to the capacity to fulfill promises and contracts.

⁹ Basically, institution-based trust suggests that an organization believes that impersonal structures are in place to support the likelihood of transaction success. (Pavlou, 2002)

Cooperation is viewed as *“an effort to increase resource utilization and value through higher explicit coordination of economic activities, that is, integration of operations”* (Clemons & al, 1993). Also, Anderson and Narus, (1990) view Cooperation as *“similar or complementary coordinated actions taken by firms in interdependent relationships to achieve mutual outcomes or singular outcomes with expected reciprocation over time”*. Moreover, Blankenburg & al., (1996) refer to cooperation in business relationships as *“primarily an informal process of coordinated action between two firms”*.

6.2.1 Theoretical Background and Conceptualization

The study of interorganizational cooperation is related to the purview of interorganizational analysis. In fact, Claro & al., (2003) assert that relational governance relies on cooperation not only market and power. Also, Williams, (2005) demonstrates the influence existing between cooperation and the structure¹⁰ of an Interorganizational network (ION).

A number of researchers attempted to explain the “phenomenon” of interorganizational cooperation in terms of; typology, motivators, benefits, context... For instance, Schermerhorn (1975) identifies key motivators to establish interorganizational cooperation; i.e., resources scarcity, positive value of cooperating (perceived value) and powerful extra-organizational force demands (coercive pressures). He adds that cooperation arises exclusively in a coalitional and federative context of organizational interdependency. Moreover, cooperation evolves in the context of reciprocity which is a robust strategy that can thrive in a variegated environment (Axelrod & Hamilton, 1981).

Aside, based on commitment-trust approach, Morgan & Hunt (1994) suggest that cooperation requires *“the two parties in a relationship to participate actively to achieve mutual benefits and that cooperation promotes success in the relationship”*. Many other studies suppose a tight link between interorganizational cooperation and interorganizational relationships success (Benson, 1975; Håkansson & Snehota, 1995; Blankenburg & al., 1996; Williams, 2005). In fact, Johnston & al., (2004) presented the outcomes of cooperation within buyer-seller relationship in two major perspectives; namely; buying firm’s satisfaction with the supplier relationship and buyer’s assessment of relationship’s performance (several suppliers perspectives on one buyer performance). Besides, S. Levi & al., (2002) claim that cooperative relations could minimize the Bullwip effect¹¹ by information centralization and joint inventory management. They add that the variability on demand could be eliminated by engaged in any of a number of strategic partnerships.

6.3 Interorganizational Coordination

The notion of interorganizational coordination is not a recent construct since it was evoked with the first need of organization to deal with its environment. In fact, Hall & al., (1977) define it as *“the extent to which organizations attempt to ensure that their activities take into account those of other organizations”*. Besides, transaction cost theory introduces the notion of coordination cost as the base to comparative costs between decision to make or to buy.

Basically, interorganizational coordination is related to information and precisely to information processing. Following definitions support this statement and focus on coordination context;

By coordination, we indicate *“the information processing necessary to determine the design, price, quantity, delivery schedule, and other similar factors for products transferred between adjacent steps on a value-added chain”* (Benjamin & al., 1986). Malone (1988) defines coordination as *the additional information processing performed when multiple, connected actors pursue goals that a single actor pursuing the same goals would not perform*. He adds that coordination implies the following

¹⁰ The relationships that exist between the organizations comprising an Interorganizational network (ION) that are properties of the ION itself such as the distribution of resources and the existence of control mechanisms.

¹¹ Bullwip effect is defined as *“the increase of the variability as we travel up in the supply chain (Retailer, wholesaler, distributor, and factory)”*. (S. Levi & al., 2002)

components: (1) a set of (two or more) *actors*, (2) who perform *tasks*, (3) in order to achieve *goals*. If relationship coordination is successful, the process may lead to extension of the relationship taking place (Blankenburg & al., 1996).

6.3.1 Interorganizational coordination/cooperation Conceptualization

Dimensions

From a conceptual point of view, interorganizational cooperation is tightly related to interorganizational coordination. However, some theorists have considered these concepts to be analytically distinct, stating that coordination involve deliberate adjustment and collective goals, whereas cooperation does not (Alter, 1990). The present paper supposes similarity of the two constructs and uses them interchangeably. As a consequence, we suppose that coordination dimensions reflect, without bias, cooperation dimensions. This sub-section is concerned about the two constructs and gives a flash on some existing operationalizations;

Litwak & Rothman, (1970) reveal that coordination between organizations is a function of; The degree and type of organizational interdependence, The organizational awareness of interdependence, The number of organizations involved, The extent to which linkages deal with uniform or non-uniform events, The resource organization has to commit to interorganizational linkages and, The type of organization.

Johnston & al., (2004) focus on the behavioral aspect of cooperative relationships and extract three dimensions of buyer-supplier cooperation. These behaviors are the use of joint responsibility for common operational tasks, undertaking shared planning activities and being flexible and responsive with respect to changes in demands placed upon the relationship's requirements

Also, Heide & Miner (1992) present four dimensions of interorganizational cooperation: flexibility, information exchange, shared problem solving, and restraint in use of power.

Interorganizational coordination/cooperation and IT

The problem of coordination is in essence a problem of information (Forster & al., 2002). As a consequence, the use of information technology across boundaries has become as a new coordination mechanism capable of changing the way organizations are organized and their nature of governance (Benjamin & al, 1986; Bensaou, 1992; Forster & al., 2002). In fact, Malone (1988) labels it as "coordination technology" referring to "any use of technology, especially computer and communications technology, to help people coordinate their activities".

From another perspective, some studies uncover the key role of coordination structure in supporting Information technology adoption. In fact Bensaou (1992) confirms that interorganizational coordination is an effective phenomenon leveraging IT capabilities. Moreover, Forster & al., (2002) argue that even though that Information technology enhances significantly firm coordination capabilities, the character of interorganizational relationships (effective coordination) might moderate the impact of IOS.

6.4 Interorganizational Dependence

The literature draws multiple notations of the term such; "*interorganizational dependence*", "*organizational interdependence*", "*dependence*", *strategic interdependence*.... Though, definitions have basically the same orientations;

Gulati (1995) defines "*Strategic interdependence*" between organizations as "*a situation in which one organization has resources or capabilities beneficial to but not possessed by the other*". Pfeffer & Salancik (1978) reveal that "*Interdependence exists when-ever one actor does not entirely control all of the conditions necessary for the achievement of an action or for obtaining the outcome desired from the action*".

6.4.1 Conceptual Foundation

From a theoretical point of view, Pfeffer (1972) argues that interorganizational influence arises from conditions of asymmetric interdependence between organizations. He adds that when organizations are interdependent, because of resource exchange, this could lead to interorganizational influence. Mindlin & Aldrich (1975) also affirmed that organization is dependent on other organizations that control resources and markets necessary to ensure its survival.

Organizational interdependence is considered as a stimulus for coordination and cooperation (Ouchi, 1980; Gulati & Gargiulo, 1999) (for instance; Joint ventures and mergers) and has great implications for exchange relationships (Gundlach & Cadotte, 1994). Hart & Saunders (1997) and Anderson & Narus (1990) reveal that dependence and its use to leverage changes is among sources of power in dyad relationship between buyer and seller.

Many researchers view the concept of power in terms of dependence (Anderson & Weitz, 1989; Emerson, 1962). Emerson's definition (1962) could offer a clear explanation about this concern;

He defines "*dependence of an actor, A (an individual, group, or organization) on another actor, B, as directly proportional to A's motivational investment in goals mediated by B, and inversely proportional to the availability of those goals to A outside of the A-B relation.*" *The dependence of A on B provides the basis for B's power over A, since B controls the resources that A needs. To the extent that A cannot do without the resources, and is unable to obtain them elsewhere, A is dependent upon B*".

6.4.2 Interdependence and IOS

As a summary, we conclude that dependence between partners is a source of power and it has an interorganizational influence (Emerson, 1962; Anderson & Narus, 1990; Anderson & Narus, 1984). Thus, organizations could use politics and tactics to execute decisions such information systems adoption (Amami, 2003). In fact, several studies support the idea that the buyer can use power to influence a supplier's decision in favor of the decision of adopting EDI system (Iacovou & al., 1995; Hart & Saunders, 1997). As suggested by these studies, we assume that buyer's power expressed by the share of sales revenue that the supplier gets from the buyer positively influences the supplier's decision to adopt EDI.

6.5 Interorganizational Commitment

The literature distinguishes between organizational and interorganizational commitment. In fact, Hunt & al., (1985) define organizational commitment as "*an individual's psychological bond to either the job, the career, or the organization*". Moreover, organizational commitment takes the same designations as other concepts presented in the literature, such as; organizational involvement or organizational identification (Angle & Perry, 1981). It basically concerns the intraorganizational aspect of commitment between the organization and the employees.

The present paper focuses on interorganizational commitment in the way of the fact that treats an interfirm exchange environment. In fact, interorganizational commitment is created through recurrent cooperative interaction which promotes the preservation of the relationship (Kaufmann & Stern, 1988; Zaheer & Venkatraman; 1995). Under this context, partners, generally, are willing to sustain exchanges and commit to the relation. In fact, commitment refers to the presence of "*an implicit or explicit pledge of relational continuity between exchange partners*" (Mohr & Nevin, 1990). The literature presents other definitions that justify this statement;

Bensaou & Venkatraman, (1995) assert that commitment is the « *Extent to which there exists an equal sharing between the two firms of risks, burden, and benefits* ». Morgan & Hunt (1994) define relationship commitment as "*an exchange partner believing that ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that's the committed party believes the relationship is worth working on to ensure that endures indefinitely*". Moreover, Moorman & al., (1992) present commitment to the relationship as "*an enduring desire to maintain a valued relationship*". Also, the

commitment is defined as "*channel member's intention to continue the relationship*" (Anderson and Weitz, 1989). More recently, Anderson & Weitz (1992) refer to commitment to a relationship as "*a desire to develop a stable relationship, a willingness to make short-term sacrifices to maintain the relationship, and a confidence in the stability of the relationship*". Kim & Frazier, (1997) present Commitment as the strength of a firm's business ties with its channel members.

The construct of commitment has been conceptualized in several manners (Kim & Frazier, 1997), for example; desire to continue the relationship and willingness to make short term sacrifices (Anderson and Weitz, 1992; Mohr & Nevin, 1990), confidence in the stability of the relationship (Anderson and Weitz, 1992), importance of the relationship (Morgan and Hunt, 1994), idiosyncratic investment (Gundlach & al., 1995)... It depends on how commitment is viewed. In fact, Brown & al., (1995) assert that commitment can be purely economic, extrinsic and short living. On the other hand, commitment may be based on non-economic or intrinsic conditions such as "*the identification with another party or the internalization of similar values*" which is long term enduring.

More accurately, Morgan & Hunt (1994) conceptualize the relationship commitment by three dimensions; in occurrence; (1) relationship termination cost, (2) relationship benefits and (3) shared values. Geyskens & al., (1996) consider the two type of relationship commitment to its operationalizations. In fact the two types of commitment that may characterize interfirm relationships are as following;

Affective commitment expresses the extent to which channel members *like* to maintain their relationship with specific partners.

Calculative commitment measures the degree to which channel members experience the *need* to maintain a relationship. This type deals with a calculation of costs and benefits of the relationship.

They add that the measurement of intention to continue a relationship without consideration of the underlying motivation could hide the effect of other factors (such trust and interdependence). Also, Gundlach & al., (1995) adopted a multi-components approach to conceptualize commitment by considering three components to commitment, namely; the instrumental component, the attitudinal component and the temporal dimension. In fact, Instrumental commitment exists in relationships which are based solely on economic or extrinsic needs, and where parties provide input so as to create a self-interest stake in the relationship. The attitudinal component represents a continuing intent by parties with some normative or affective attachment, towards the sustenance of an enduring long-term relationship. Finally, temporal commitment represents the essence of long-term relational commitment, where parties become more deeply involved in the relation hip, and is characterized by its enduring and long-term nature. The multi-components approach has been used by a number of researchers to measure commitment (e.g.; Kim & Frazier, 1997; Brown & al., 1995).

From another point a view, Cohen (2007) has advanced some limitations to the adoption of the multi-components approach (instrumental, behavioral and continuance components) for the conceptualization of commitment. In fact he proposed a model to conceptualize commitment including two major dimensions, namely; the timing of commitment and the bases of commitment. The timing of commitment distinguishes between commitment propensity, which develops before entry into the organization and organizational commitment, which develops after entry into the organization. The second dimension, the bases of commitment, makes a distinction between commitment based on instrumental considerations and commitment based on psychological attachment.

In this paper, interorganizational commitment is conceptualized similarly to that of Morgan and Hunt (1994) and others using a single dimension focusing on the effort and intention of the buyer to continue the relationship in the future.

7 CONCLUSION

While external environment and alliance partnerships are becoming more complex, managers should consider appropriate partners to enhance the efficiency and performance of supply chain management as well as to gain potential competitive advantages (Chang & al., 2007). In addition, due to increasing global competition, many organizations are aware about the benefits of electronic network conceptualization, development and use in supporting their extended organizational environment. Thus, they set electronic infrastructure to carry out physical, informational and financial flows along the supply chain in order to build, develop and maintain smooth interorganizational relationships and consequently enhance supply chain performance.

First, the paper focused on these issues and generated a set of propositions supported by an extended review of the literature. Then a conceptual model that links IOS technology to supply chain performance moderated by IORs climate attributes.

Second, the study identified, documented, conceptualized and discussed IORs attributes that characterize the climate of interorganizational relationships. Attributes such as interorganizational trust, interorganizational cooperation, interorganizational coordination, interorganizational commitment and interorganizational dependence seem to moderate relationships between IOS and supply chain performance.

In future study we intend to use methodological pluralism (or triangulation) to empirically verify our claims highlighted in our conceptual model. Our main contention is, despite decades of process reengineering breakthroughs and state of the art technology deployment, The triple –A supply chain (Lee, 2004) remains elusive. Supply chain performance seems to be about building and maintaining relationships. In this view people talent who are the main architect of building those relationships is a key asset. Therefore, supply chain performance depends much more on relationships climate developed and nurtured by talented people, not on technology. This is truer especially as the environment is increasingly more volatile and complex.

Granted, technology -hardware and software- is without doubt crucial in linking and managing supply chain. But technology is just an enabler and the real differences in supply chain performance is how talented people use it build relationships that facilitate information integration, increase velocity and ensure visibility paving the way for The Triple-A Supply Chain (Lee, 2004).

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