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A Multi-Case Study Approach of Interorganizational Information Systems Advantages in the Tunisian Automotive Components Supply Chain

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Abstract

A great deal of controversy exists about the impact of Information technology on the global performance within the supply chain. Many theoretical explanations could be advanced to cover this issue. The present paper discusses this problematic and proposes that the climate of the interorganizational relationships could moderate the advantages of Interorganizational Information systems within the Supply Chain.

The propositions of the study are tested in the automotive components supply chain in the Tunisian context. The methodology adopted is the multi-case study approach within four companies. Results confirm the moderation effect of the climate of IORs on the success of IOS. More precisely, the attributes; interorganizational dependence and interorganizational commitment presented remarkable effects on the performance of the automotive components supply chain. Moreover, the findings generated four configurations based on the dimensions of IOS impact and IORs climate.

Key words: IOS advantages; IORs climate; Supply chain performance; Case studies; Configurations

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INTRODUCTION

The international economic environment is characterized by a continuous emergence of new entrants, globalization, increased economy interdependencies and removal of trade barriers. In the same context, digitalization and new rules of information economy (Shapiro & Varian, 1998) are shifting the way of thinking in management and increasingly shaping business processes, coordination mechanisms roles (Bensaou & Venkatraman, 1995) and interorganizational structure.

Tunisia, trying to be a part of this dynamic economic environment, cooperates with a set of international partners like the African bank of development, the European Union and the United Nations organisms[1]. These collaborative conventions are supported by the World Bank action to raise the growth rate. Else more, the World Bank considers the logistics, packaging, transport, coordinated technologies implementation and other issues as the key success for companies to prosper. It promotes supply chain sensibility in over the world and especially in emergent countries such as Morocco, Algeria or Tunisia. In fact, the Tunisian Government tried to concretize these efforts by different "programs and projects of privatization of essential infrastructure and industries such removing tariffs on imports, easing export restrictions, devaluing the currency, opening the domestic labor market for foreign industries to employ Tunisians as partners in the textile and auto spare parts industries (automotive components)".

Concerning the Tunisian market side, companies are aware of the importance of the cooperative

[1]http://web.worldbank.org

interorganizational relationships (IORs) in the one hand and supply chain-oriented technologies in the other hand in achieving international economic integration. In fact, designing and implementing Interorganizational information systems and maintaining supply chain links play key roles in ensuring collaboration, international environment connections and business processes combination.

The present paper is interested in the above issues and discusses the problematic of the impact of IOS on the global performance of the supply chain. Moreover, it proposes that the climate of the interorganizational relationships could moderate the advantages of Interorganizational Information systems within the Supply Chain.

The propositions of the study are tested in the automotive components supply chain in the Tunisian context. The methodology adopted is the multi-case study approach within a positivist paradigm.

Accordingly, based on a supply chain perspective, the objectives of the paper are dedicated to;

-The identification of the impact of interorganizational on the performance of the automotive components supply chain;

-The identification of the nature of the interaction between the interorganizational relationships climate on the advantages of interorganizational information systems in the automotive components supply chain, and then;

-The identification of the configurations that could characterize the types of supply chain units in the automotive components industry. This classification considers the two axes of the problematic which are; the impact of IOS and the IORs climate attributes.

1. ITERATURE REVIEW: IORS CLIMATE AND IOS ADVANTAGES

Whereas prior studies have examined the benefits of Interorganizational information systems use, little attention has been paid to the mediating role of interorganizational relationships attributes leveraging IOS impact. This section is reserved to flash on some existing works treating this issue and tries to pick up some cited attributes of IORs.

Many perspectives have been advanced to cover the relation between the technology and the structure in general. The literature offers three major theses to explain the nature of the interaction technology-organization. In the present paper we talk about interorganizational information systems and interorganizational relationships since we operate in an interorganizational level of analysis.

In fact, the first thesis stipulates that the use of interorganizational information systems has an impact on the evolution of market structure (Malone, 1987; Clemons & Row, 1993; Holland & Lockett, 1997; Zaheer & Venkatraman, 1994; Bakos & Tracy, 1986).

The second thesis advances that the characteristics of socio-structural interorganizational relationships are an important condition of the impact of IOS (Hart & Saunders (1998), Crook & Kumar (1998), Cooper & Zmud (1990) and Tunnainen (1998)). However, the last thesis reveals that the characteristics of socio-structural interorganizational relationships are an important outcome of the impact of IOS (Tunnainen (1998), Argyris (1999), Venkatraman (1994)). The study holds the second thesis to cover the interaction between the Interorganizational relationships and the IOS use. Many authors have tested this supposition to treat the problematic of the impact of IOS.

In fact, Kumar & al.,(1998) assert that the explanation of IOS role and outcomes within organizations shouldn't be discussed only with technical-economic and socio-political perspectives focusing on the need for a complementary perspective. Hence, they propose a perspective emphasizing on collaboration and cooperation as the key to understanding interaction processes. This perspective introduces a third rationality of information systems in which trust, social capital, and collaborative relationships become the key concepts for interpretation. This problematic issue has been uncovered by several studies such Williams (1997) who claims that advances in the use of interorganizational information systems entail greater interdependence between organizations. Obviously, he adds that the advantages of IOS depend more on trust and cooperation between organizations. Also, Lee & Lim (2003) ascertain that successful partnerships tend to show some behavioral characteristics (e.g., commitment and trust) that help guide the flow and the complex interchange of information between partners which in turn promote the use of IOS. Hu & Sheu (2005) characterize channel climate by two factors; mutual trust and relationship continuity.

Reasoning alike, Hart & Saunders (1997) reveal 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. At the same vein, Powell & Dent-Micallef (1997) advance that electronic data interchange system that only marginally improves performance under ordinary conditions, but produce sustainable advantages when combined with preexisting supplier trust. The same statement has been advanced by Meier (1995) who claims that IORs management is a key guaranty of IOS implementation success. Amami & Brimberg (2004) add the construct of cooperation with trust as leveraging factors of Web-based IOS use. Also, Hart & Saunders (1997) claim that interfirm relations, particularly trust, will gain preeminent importance in the management

of electronic lnkages (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.

Aside, Subramani (2003) studied the issue of the impact of information systems use within supply chain relationships. He found, from 131 suppliers using a Supply Chain Management Systems (SCMS) implemented by one large retailer support, that relationship-specific intangible investments play a mediating role linking SCMS use to benefits. Moreover, Srinivasan & al. (1994) reveal that operational complexity moderate IOS use impact. Also, Barki & Pinsonneault (2003) suggest the influencing role of task complexity on organizational integration which is considered among main advantages of IOS use. They assign a specific coordination mechanism for each type of complexity. Also, Fang & al., (2008) advances that information technology adoption and relationship activities lead to effective interorganizational changes and focuses on the moderating effect of partner characteristics. Clemons & Row (1993) advance that bargaining power could influence IOS use. They demonstrate the critic role of long term cooperative relationships on IT use in the context of outsourcing activity. In addition, Cunningham & Tynan (1993) claim that effective exploitation of IT-supported IORs is emphasized by the focus on partners relationships nature. 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.

2. UALITATIVE STUDY METHODOLOGY

In the field of information systems, the vision of information technology as a social action is becoming commonly accepted (Kaplan & Duchon, 1988). As a consequence, literature denounced the purely technical aspect of IT process and the need for behavioral techniques discovering the latent variables appeared. At same vein, Lee (1989) presents the notion of Management of information system (MIS) case study as "the examination of a real-world MIS as it actually exists in its natural, real-world setting". Dealing with the above confirmations and for the purpose to contextualize and pick-up the contingencies of the Tunisian context within the automotive supply chain, we decided to adopt a qualitative study with multiple case study approach. The ultimate target of the qualitative study is inherent to test the propositions of the problematic and generate configurations from the contingencies of the industry. These points will be fixed by providing a number of insights about;

The diversity and the extent of IOS used within the studied firms,

-The advantages of the use of Interorganizational information systems;

-The obstacles and the motivations of the Interorganizational Information systems use within the automotive components supply chain;

-The study of the dyad relations between studied firms and their principal clients and investigate the supply chain context, and

-The identification of interfirm relationships climate (verification of the relationships climate characteristics advanced by the research) and its relation with the advantages of the use of interorganizational information systems.

2.1 Multiple Case Study Approach

Among most adopted qualitative methodology in the social science and Information systems research is the **case study** (Yin, 2003, Benbasat & al, 1987). The case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations) (Benbasat & al., 1987; Yin, 1981; Yin, 2003). It emphasizes an interpretative approach that uses data to both pose and resolve research questions (Kaplan & Duchon, 1988). The contribution of the case study can be perceived either on the conception, data collection or data analysis phase depending on the researcher target (Miles & Huberman, 2003).

Moreover, the case study can be employed for a variety of purposes including: description, exploration, prescription, theory building… In fact, Yin (2003) identified three types of case studies, we find: the exploratory, the explanatory, and the descriptive. Also, Stake (1995) advanced three types, which are: "Intrinsic - when the researcher has an interest in the case; Instrumental - when the case is used to understand more than what is obvious to the observer; Collective - when a group of cases is studied".

In the case of the present study, we used collective (multiple case studies) and explanatory case studies for the purpose to explain the pre-supposed causal relations of the research. Also, we tried to describe and explain the investigation context and if it possible, to explore some future perspectives related to Information systems management field.

In fact, we selected the study of a multiple case studies for the aim to increase the chance to cover the majority of the phenomenon. In opposition to this approach, the single case study is used in particular conditions to the case itself as stipulated by Yin (2003); (1) The case is a revelatory case, (2) the case represents a critical case for testing a well-formulated theory, and (3) the case is a unique case. Else more, based on the work of Yin (2003), in the case of a confirmation hypothesis testing (explanation), the researcher has to use the multiple cases approach. However, he associated with the exploration phase of knowledge accrual the possible use of one single case.

Concerning the issue of the number of case studies, we claim that the IS field literature could be relevant for that aim (See table 1). In fact, the number is inherent to the nature of the study and the objectives of the qualitative methodology. Regarding to the explanation nature of the study, we choosed the selection of four cases. In fact, four companies from the automotive components supply chain can give insights about the subject and contextualize the problematic. Also, this choice seems to be coherent with many references of the IS research field.

Table 1
Single/Multiple Case Study(ies) in the IS Field

Authors	Single case study/Multiple Case studies
Mukhpadhyay & al,. (1995)	One single case
Kaplan & Duchon (1988)	One single case (triangulation of methodologies)
Markus (1981)	Multiple case studies (2 cases) (Explanation)
Pyburn (1983)	Multiple case studies (8 cases) (Exploration)
Tarafdar & Vaidya (2006)	Multiple case studies (4 cases)
Silva & al., (2007)	Multiple case studies (5 cases) (Explanation)
Wouters (2004)	Multiple case studies (12 cases)
Bandara (2005)	Multiple case studies (3 cases) (Explanation)
Walsham & kwong Han (1993)	One single case study (Exploration qualitative methodology)
Petkov & al., (2007)	Multiple case studies (3 cases)
Connolly (1996)	Multiple case studies (3 cases)
Olson (1981)	Multiple case studies (2 cases) (Exploration study)
White (1984)	Multiple case studies (2 cases) (Explanation)

In the case of multiple case studies, the choice of sites is a very important step. In fact, Benbasat & al,. (1987) advance that the selection can be done by considering the nature of the topic. The research on the organization level would require site selection based on the characteristics of firms (the industry, the company size, organizational structure and so forth). They added that research in IS field would take into account these IT use while choosing their sites.

Four firms were selected in the automotive industry and in particular automotive components branch, as the sites for this study. The table below exposes the four firms selected to be the subject of the qualitative study investigation;

Table 2
Case Studies designation and descriptions

Denomination	Company name	Entered in production
SIM	SIM (Société Industrielle de Mécanique)	1997
MULTI-PRODUCTS	MULTIPRODUCT-TUNISIE VALEO	2005
VALEO	EMBRAYAGES ET TRANSMISSION TUNISIE	1984
ASK	ASK TUNISIE	2010

The process of the interviews is done respecting to the following points;

-Sending by e-mail a letter of approbation introducing the welling of the researcher to proceed a case study in the concerned site,

-After approbation, the call by phone of companies and each respondents to fix a date for the interview which will be face to face,

-A day before the interview, an e-mail is sent to the interviewer to remind him about the interview and about the subject of the research, and

-At the determined date, the interview is done which lasts between one hour and two hours. It's important to mention that all interviewers accepted to record the conversations.

-After finishing the Interview, the majority of respondents signed in the agreement form to confirm their acceptance to be a part of the current study.

3. SITES PRESENTATION

3.1 Context Description

In general, the supply chain of the automotive industry is composed of equipementiers of 1st, 2nd and 3rd rank, constructers, distributers and finally final clients of the automotive products. In the present study we are working on the up-stream part of the supply chain which is the relationships between 1st, 2nd and 3rd rank equipementiers. The four companies are considered as equipentiers of the automotive components. The products are exported to the European market (Italy and France) and the procurement also is exclusively imported from the European market (Turkey, France, Italy, Romania…). Hence, we are dealing with totally exporter organizations which operate on the export/import of product and raw materials to and from the European market.

Moreover, three of the four companies are subcontractors in the automotive components. In fact, the out-sourcing has gained a large extension in Tunisia

in the last year especially in the automotive industry. In fact R3 stipulates that "The European companies set up in Tunisia for reasons of costs and customs fees. In the other side, there are transportation costs. It must make a compromise between these two aspects to reach the success in Tunisia. In fact, logistics in Tunisia is flexible but it is expensive. Geographically, it's close to Europe, but the transportations cost a 2000 or 3000 euro per delivery. That it's money for the clients."

The case ASKS for example has externalized the majority of its activities in all over the world and especially in China and Tunisia for the reason "to make an advantage in the cost and also in transit possibilities" R2.

In this context we claim that the automotive components providers are in most cases subcontractors. We did not have figures to justify that issue, however, all respondents had confirmed that. The out-sourcing contract has many consequences on the nature of relations between the partners in the supply chain: "In fact, we cannot talk about autonomy in the majority of suppliers and out-sources in Tunisia, I have spent 17 years in this industry and I would say that a very small number of suppliers are autonomous in their productions. Taking the example of Valeo which is an international group established around the world which is considered to be very independent. This is not the case of our company and most other manufacturers who are in most cases subcontractors. R10".

At this stage, we can confirm the importance of the dyad and triad relations between different equipmentiers in the supply chain with a certain degree of non-autonomy. In addition, respondents tried to holistically characterize the automotive components supply chain. Certain words were repeated along the interviews such as: flexibility, agility, environment changes, information in real time, zero stock and innovation.

At the same vein, R10 advances that "The automotive supply chain is characterized by stability. I would say that it has the capability to respond in real time and quickly to sudden changes in our environment and consumer preferences". Also, R3 stipulates that "I would say that the information is still present and even in real time. The links are also very close. I am not speaking of geography but rather virtually. Generally lead times are respected; we had no logistical problems since the information is real". "In our chain, we work with a zero stock and a strategy of "built to order" in some cases to meet the demand of the European market ... we should make real-time reactions. Our job is to meet the demand of the French client.R5".

Hence, in a turbulent environment, the units of the supply chain are opting to innovate and absorb the external changes especially in the production process and in the references of products. Generally, all respondents are agreeing that the supply chain of the automotive industry is considered as a collaborative chain: "We must work together for the good of the company and the group in general. Let's talk about supply chain in general; I would argue the same units as the manufacturer of automobiles must stay connected with equipmentiers so they can provide them with components customized to the nature of the cars." R4. Also, R8 advanced that "our chain is a collaborative channel." Basically, the importance of the communication and the closeness of the interrelationships have a direct relation with the characteristics associated to the automotive supply chain. R4 confirms that issue by saying that "I would argue the same point as the manufacturer of automobiles must stay connected with the equipmentiers so they can provide them with components adapted to the nature of the cars".

3.2 Sites Presentation

In the present section, we intend to describe the sites included in the qualitative study. In the first step, we described the supply chain in general and in the second one we take every company aside. The companies are as following; Multiproducts, Valeo, ASK and SIM. The descriptions of each site are based on the interviews and also on extra- sources of information such as web sites and documents.

A. Case ASK Tunisia (Site1)

The ASK case is a subcontractor of a product exported to a client in Italy. The company has one client and one supplier which is the principal Italian client. The Italian client has externalized the majority of its activities in different sites all over the world. ASK Tunisie is one of the subcontractors specializing in the production of cabling. The process of production of the final product is made exclusively in Tunisia. All the production is made in Tunisia and after that the product is sent towards Italy.

In fact, in a description of the company activity, R2 claims that "We make an out-sourcing contract for an Italian company. The activity of the company is essentially the production of the cabling of antennas. Generally it is a part of the electric and the electronics of the automobile. We insure also the activity of the logistics while trying to optimize the resources we have and the geographical constraints of cost.

It is necessary to satisfy the client. That's the objective of the company.

Regarding to the nature of the activity which we operate, the only customer that we have is the Italian company. The same thing is for the supplier who is also the same."

B. Case Multiproducts (Site 2)

The Multiproducts Company is a subcontractor for a group in Italy. The group produces flexible of brakes. It's a part which facilitates the conduct of the oil. It's a specialist in that and in this domain especially.

R4 says that the company objectives "Insure the realization of the QCDM (quality, cost, delivery time,

and motivation) in the process of production by the collaboration of all the services. We are suppliers of the automotive equipments to other equipmentiers in Italy. In fact the equipmentiers rank 1 deliver directly to the final customer (Ford, Toyota, Renault), however, the rank2 equipmentiers deliver with intermediation…we are rank 2

In our case, we have a single supplier and a single customer. We have a subcontract with an Italian client who is in charge of distributing the product in the Italian market. We are a mono-supplier and customer."

Multiproducts company, as a wide number of equipmentiers in the automotive components industry, has one supplier and one client. This particular situation of out-sourcing concern 3 companies of the sample since this contract is very used in this industry. Basically, the equipmentier procure raw material from the client from Italy in this case and after manufacturing, he export the product to the same client. Hence, we find that the supply chain of this company is very simple and clear. It begins by the Italian company and finish by it. All activity of distribution is out of the charge of Multiproducts site.

C. Case SIM (Site 3)

Its name is "la société industrielle de mécanique SIM". It's a subcontractor of a French company. Also, it has one client and one supplier.

In this concern R7 advances that "Normally we are the supplier of a big French company. Generally we are subcontractors of this activity. Few years ago, this client had made a bankruptcy further to reasons of costs. For that reason, the direction decided to make a strategy of out-sourcing with companies in various countries. They choosed us in Tunisia to represent them. Indeed, the French client is considered at the same time as a supplier and a customer. We procure the used dials and export it renewed to them. The French client has other subcontractors everywhere in France of different activities."

The objectives of the company is usually concentrated on the notion of QCDM which call he compromise between the quality, cost, delivery time and motivation to satisfy the client and respond to the environment changes.

As a summary, the function of the site is especially the renewal of the dials of automobile. They procure and deliver to the same client and this client distribute in the French market. Hence the supply chain of the company is composed essentially of the SIM Company as second rank equipmentier which an indirect relation has intermediated by the transiter with the French client. The flows of raw materials and the final product have mad from the relation in double sense.

D. Case Valeo (Site 4)

The valeo company site is located in Jdaida in Tunis and named as Valeo transmission et embrayage. It exists for 27 years. It's a multi-national associated to the Valeo Group. The Valeo Group has another site that makes another automotive component. We could say that they have their own existence.

R8 advances that "It's a totally offshore site and sincerely we do not incorporate the national market in our projects. We are a French company, we produce and afterward we export. The group has chooses to externalize this activity in Tunisia for reasons of cost. About the departments, we have the general direction, after that we have the responsibles of first level such as the persons in charge of logistic, purchase, human resources, finance, quality, production, projects, security and also the persons in charge of the second level who insure the various tasks of each department…"

About the activity of the company, R8 says that "We offer steering wheels for car as components for automobile exported to the French market. We have our own customers and suppliers. It's not in all cases that our products are delivered to the group in France who in his turn distributes to the French market. We too make us the distribution of a part of our production.)

As the case of all companies, Valeo transmission has one objective is the profit. The respondents evoked the notion of QCDM which refers to the quality, cost, delivery time and the motivation. The optimization of the relation between these concepts could insure the profit of the organization and reach the satisfaction of the French client and the other. In fact, R9 advances that "the global objective of our site and all the sites already is the notion QCDM which is the research for the quality, the cost, the delivery time and the motivation."

4. DATA ANALYSIS AND INTERPRETATIONS

For the purpose to analyze the data collected, we opted for the program **NVIVO 9**. This program has a role of gathering information about the interviews and facilities its analysis with the coding of the key terms. NVIVO is widely used in the field of Marketing and social sciences in general. The input of the program is composed of the content interviews. It's important to mention that the language of the interviews was in French since it's supposed to be the second language of the Interviewers. For that reason, we wrote all the interviews in French and either the input of the program and the analysis of the data. In the phase of the interpretation, we decided to extract citations in French and translate them in the same time to guaranty the original meaning of the interviewers.

The coding of the interviews respects the theoretical suppositions since we are adopting a deductive qualitative methodology (Miles & Huberman, 2003; Thiétart, 2007). Hence, the list of themes composing the phenomena is extracted from the literature review and the conceptual relations between constructs which are;

-A direct relation between the use of IOS and the performance of the supply chain which generates the first principal supposition; "Interorganizational Information Systems have a positive influence on Supply Chain performance."

Based on previous works and literature, the performance of the supply chain has four dimensions; the operational efficiency, the strategic efficiency, the organizational efficiency and the management cost

-A moderation relation between the climate of interorganizational relationships and the success of IOS use; "Interorganizational Relationships Climate has a moderating influence on IOS success."

Based on the attributes extracted from the literature review, this construct has four dimensions; the Interorganizational trust, the Interorganizational cooperation, the Interorganizational dependence and the Interorganizational commitment.

These concepts and relations (nodes and classifications) will be associated with their concerned phrases or terms. (The nodes or themes preserved by the research are exposed in Appendix1)

Also, while we are analyzing, we coded the attributes of Interorganizational relationships climate as following; Interorganizational trust (trst), Interorganizational cooperation (coop), interorganizational commitment (comm), Interorganizational dependence (dep). It's important to mention that we tried to reduce the number of nodes to facilitate the analysis and avoided the huge amount of information. For example, the attributes of IORs and the dimensions of IOS use are evoked during the analysis and the interpretations. They are included in the principal concepts inherent to them. All those themes and their associated phrases and terms are centralized in the framework matrix. In fact, the framework matrix presents the themes in the columns and the respondents in the rows. The cells expose the content and the references of each theme associated to respondents.

Also, we related to each respondent a certain notation to differentiate it from the other. This notation will indicate the respondent along the analysis phase (See Appendix 1).

After these steps, we began the analysis and interpretations which are the subject of the present section. The structure of this section will respect the three themes (nodes) composing the interviews. Also, a sub-section was devoted to present the automotive components supply chain and the presentation of each site of the qualitative study. Three other sub-sections concerning IOS use, IOS impact and IORs attributes are presented. The content of each section respects the sub-themes inherent to each axe. Theses sub-sections were introduced in the NVIVO 9 and especially in the framework matrix of the nodes in function of the case nodes (presenting the themes and sub-themes).

4.1 Interorganizational Information Systems Use

All the sites used the interorganizational information systems to perform the transactions and the daily communications between them and the principal client in the Business. The differences between them are the nature of the systems used and the extent and the diversity of use.

4.1.1 Interorganizational Information Systems Used

There are many typologies of interorganizational information systems. Hence, we find different types of IOS in the sites of the study. In fact, Kumar & Van Dissel's classification is widely adopted to configure the use of IOS within organizations. For the reason, we are interested in the sequential Interdependencies based IOS since it concerns supply chain context. In fact, Kumar & Van Dissel (1996) identify the Electronic Data Interchange (EDI) as the most used IOS within Supply Chains. Indeed, two sites are using the application EDI to support the transactions process which are; Valeo transmission and ASK. However, the two other companies use less complicated systems such as shared data base and the Internet services to coordinate with partners.

Based on the typology of Kumar & Van Dissel (1996), we claim that the four case studies could cover two configurations of IOS which are the pooled information resource (SIM and Multiproducts) and the Value/supply chain IOS (Valeo and ASK). The first configuration is associated with a common base which is placed in the pivot organization and daily consulted by the dependent partners or subcontractors. The second configuration is associated with more integrative systems such as the EDI application. In fact, the site 4 and the site 1 use the EDI for the integration of their chain. The use of the EDI is inherent to the use of other internal application to insure the internal and the external integration of the whole chain.

In fact, the Valeo group gives the supplier the choice of using the EDI internet based or the classical EDI for reasons of cost. "According to the EU Directive from 2001, the "Invoicing directive" 2001/115/EC the sending of electronic credit notes is only permitted with the appropriate electronic signature. To comply with the legal regulations in respect of input tax deduction Valeo is working together with the Cross-gate AG located in Munich / Germany to provide a solution for e-invoicing to our suppliers". In particular the site 4 works with these techniques to connect to their suppliers which use the SAP system and the EDI to cover all the supply chain. Also, the site 2 and 3 use the shared data base as a system of management allowing organizing electronic information exchanges between equimentiers and distributors via internet. This system allows them the Passage of the express orders, the passage of the orders of stock, the consultation of the availability of the real-time products, the consultation of catalogue prices, the consultation and management of the list of requests of information and orders.

Concerning the extent and the diversity of use, the respondents confirm that the IOS used are extensively exploited by all the departments of the sites. The Appendix 2 exposes the extent and the diversity of use of each company regarding to the respondents answers;

As a summary, all companies use the IOS to support their coordination with partners and maintain the transactions. We found also that these systems are well exploited in all departments especially for the sites that use the EDI systems. In fact, the use of these technological solutions is inherent to the motivations of manager to perform the organization and the supply chain in general. The following section is dedicated to expose the obstacles and the motivations of the use of IOS in different sites.

4.1.2 Motivations

The motivations of the use of IOS in these sites were related on the operational side of their advantages. In fact, **R9** advances that "the first thing is to provide an electronic "trading" that provides the automation of all the stages of transactions. This concerns the monitoring applications of our invoices, delivery notes, purchase receipts, payment terms, and modes of delivery and return of goods of the supplier or the customer." In addition, **R5** said that "we wanted to really have some internally and externally centralization. We also hope the organization of transactions….the reliability of information, less errors, and less costs along the production process." Either **R3** an **R8** have talked about the transparency of information and the organization of the transaction process.

The strategic side was evoked by the respondents **R3** who stipulates that "We were looking for, transparency, reliability and zero errors, connection, integration and much more ... we have even hoped discovering new markets ....". However, we remarked that the most cited motivations have an operational and organizational aspect.

4.1.3 Obstacles

While implementing the IOS in their organizations, managers face some obstacles which disturb the process of using them. All the respondents were agreeing about that concern and associate these obstacles to different reasons; organizational and technical ones. Concerning the organizational side, respondents have evoked the problem of the resistance to innovations especially with complicated systems as EDI. In fact, **R8** claims that "in the period of the implementation of the SAP and the EDI, we encountered problems of acceptance by the staffs".

Concerning the technical side, **R10** cites that "before the staff had some difficulty working with the new system. Applications have been very difficult at the time, we met technical malfunctions". Also, **R9** advances that it's not easy to handle applications. Our new suppliers find difficult to use applications in early stages". Basically, all respondents mentioned the obstacle of the systems complexity and the difficulty of its use.

It's important to mention that **R7** has talked about the financial obstacles of the implementation itself which is considered very expensive. In fact, he said that "we must not forget that the installation of an EDI for example requires money and we must provide it from our budgets." Also **R2** emphasized the same problems by saying that "we should also say that these systems are expensive for the company during its installation. But it deserves the effort."

If regarding the diverse types of obstacles, respondents advanced that they was temporary by some training on the use of these systems, the technical and organizational obstacles disappeared step by step.

4.2 Interorganizational Relationships Climate Attributes

The nature of the activity of each site makes from the interorganizational relationships as very important thing to survive and to be connected to this turbulent environment. In the present section, we intend to show the importance of the tight and frequent relationships in the sites existence and we will try to extract from the interviews the IORs attributes in the automotive components supply chain.

4.2.1 Importance of IORs in Business

The four sites of the study are totally exporter companies. This could be a reason of the continual and frequent connections between them and their principal client from the other continent. The institution of tight relationships between them could be among prior objectives to the success in long term.

The respondents were not away from this confirmations since they demonstrate the importance the institution and the maintaining of these IORs to a better global performance of the whole company and why not all the supply chain. In fact, **R9** says that "inter-firms relations guarantee a very satisfactory quality, a reduced cost and more motivation and a will to continue the work up to the end with the partners…….. The key of success of our survival is the institution and the preservation of relations with our partners."

Also, R7 stipulated that "I would say that sure these daily relations present a major importance by rising the global performance of the chain that we are a member……We must be always connected with the environment and it can be reached only with a frequent communication with the main customer and the main supplier…..It is necessary to say that the nature of the regime the company as totally exporter makes that the real time and continuous communication with the French partners becomes more indispensable and important for the continuity of the activity as a whole."

R4 confirms that by citing that "the relational side is very important for the realization of the objectives and the performance in our company. I can consider it at the level 1…..Therefore, the frequent relations with the supplier are of a crucial importance in the well continuity of the business and consequently on the performance in

its totality." **R3** also emphasizes on the importance of maintaining these relationships by adding that "Personally I consider that the institution of good relations with the partners is among the priorities for the survival of the company…..The frequent relations with the supplier are of a crucial importance in the good continuity of the business and consequently on the performance in its entirety."

All other respondents were at the same vein of giving the maintaining of IORs between them and their partners a big importance on the survival of their companies. These relationships have a number of attributes or characteristics to describe them. In fact the following section is dedicated to that point by extracting from the interviews the most cited attributes of IORs in the supply chain.

4.2.2 IORs Climate

We previously demonstrated the importance of the IORs in the Businesses of each company. We are interested actually in the characterization of these relationships based on the interviews of the respondents. In this section, we will distinguish between the sites and their respondents since we will use that classification in later phases of analysis.

The Appendix 3 summarizes the attributes of each dyad relationship regarding to the attributes extracted from the literature. All extracted attributes from the interviews are present in that appendix and will be confirmed or not in each site. Also, we intend to give citations confirming the conclusions presented in the table of attributes. At the end of the work, we will be able to characterize each company in its own to be used in the coming sections.

In Appendix 3, we remark that the climate of interorganizational relationships of the four companies is characterized by a high level of dependence. In fact, all the respondents are agreeing about the presence of that attribute between it and its principal client. Also the commitment is quite dominant in these dyad relations in all sites and regarding to all respondents. However, the interorganizational trust and the interorganizational cooperation are with a different level from one company to another. As a summary and based in respondent's citation and the subjectivity of the researcher, we expose the Appendix 4 which presents a global characterization of the IORs in all sites.

4.3 Perceived Performance of IOS Use

Since we adopt a deductive approach, we predefined the dimensions of the supply chain performance from the beginning. Also, we included in the interviews questions about each dimensions. In fact, the dimensions kept are as following; the operational and strategic impact, organizational aspect and impact on the management cost. Basically, all respondents evoked a number of advantages of the interorganizational information systems within the supply chain of the automotive components. The responses were similar so we decided to gather them in the appendix 5 to give more holistic view of the use of IOS.

In general, the respondents are satisfied of the use of the IOS in their sites. In fact **R1** advances that "I consider that the performance is improved in its entirety…..I am very, very, very satisfied about what it offers us these applications". Also, it's important to mention that the type of the advantages of the IOS use is dependent on the type of the IOS use. In fact, with simple and non sophisticated systems, the most evident advantages are operational and organizational rather than strategic. However, when the applications used are integrative, we talk about strategic, operational and organizational aspects of the impact. These issues are confirmed by the citations of **R3** which stipulates that; "I would say that their impacts are more felt on the organizational and operational side. Considering the simplicity of the systems which we dispose, the strategic impact requires more time and more technological progress…….I have already said that the strategic impact is not really concerned here especially that the used systems are supposed to be simple."

And **R8** who says that: "They (systems) maintain all our activities whether it is administrative, logistic, financial and etc. …The EDI insure the external connection and the SAP insures the management of the various functions within the company. Even more, there are some decisions which have been taken on line."

4.4 IOS Use and the Supply Chain Management

The use of the interorganizational information systems in these sites and all the units of the chain has a certain impact on the functions of the supply chain management (SCM). In fact, all the respondents evoked the notion of the integration of the whole supply chain (clients and suppliers) as the most obvious advantage of the use of IOS. For example **R8** advances that "The EDI application insures more organized management transactions with suppliers and customers. For example the intranet which exists between us and all the sites of the group helps us to centralize the data and to have real-time information. Many of the other functions are maintained by the EDI such as the integration, the connection with the customer, the opening to the market …". Also, **R9** confirms that "that continuous connection insured by all these systems makes of the chain an electronically integrated. The IOS are essentially made to maintain the supply chain and its relations. Thus systematically, all the functions of the management of the supply chain have to be maintained….. The systems which we have insure at the same time; the management of the relations with the customers, with the suppliers and the management of the functions and departments."

In addition, the sites which don't have the EDI application have limited the maintained SCM functions to the simple organization of the informational flows with the suppliers. At the same vein, **R5** advances that "on the management side, I consider that the functions of organization and management of the physical and informational flows are well supported...".

4.5 IOS Use Advantages and IORs Climate

The problematic of the paper supposes the influence of interorganizational relationships climate on IOS advantages use in the supply chain. In fact, the problematic focuses on this issue and proposes that the nature of interorganizational climate enhances and emphasizes IOSs use advantages within the supply chain. It basically plays a moderating role in the effective use of interorganizational information systems. We tested this hypothesis quantitatively and we assess it in a certain way. The qualitative assessment of that proposition is based on the interviews content. Hence, the Appendix 6 summarizes the influence of each attribute on the advantages of the use of Interorganizational information systems. We tried to pick up some citations to support the characterization of the nature of the relationship between the advantages of the IOS and the climate of interorganizational information systems. Each interviewers is treated alone to get more information within the four sites.

Based on the same appendix above, we remark that the climate of interorganizational relationships of the four companies has a positive impact on the use advantages in the automotive supply chain. However, in the present study, we have associated to the climate of IORs a number of attributes to characterize it. Hence, we opted to show the impact of each attribute to facilitate the interpretations of results. In fact, we have remarked in previous section that the IORs climate is highly characterized by a level of interorganizational dependence and commitment. So that, we found that all the respondents are agreeing about the great positive impact of these two attributes in reinforcing the use advantages of the IOS in the supply chain. However, the interorganizational trust and the interorganizational cooperation are with a different level of impact from one company to another. As a summary and based in respondent's citation and the subjectivity of the researcher, we expose the appendix 7 which presents a global impact of IORs attributes on the advantages of the IOS in the different sites.

5. RESULTS AND DISCUSSION

The analysis of the data collected from the case studies could give us some insights about the problematic of the study. However, it's important to list the steps that we have done to extract our remarks. In fact, as a first step, we entered the interviews to the NVIVO 9 program and created the themes and the sub-themes as nodes in the data base. The second step had as aim the affectation of references to each node. For the purpose, we have built the framework matrix which gathered all the references related to each respondent. This matrix helped us to analyze the organized data and to extract the citations that promoted the analysis. The final step which is the content of the present section intends to list the results of the analysis and the interpretations derived from it. The structure of this section respects the hierarchy of the themes evoked in the analysis phase. Hence, we will begin with the use of interorganizational information systems, the advantages of IOS on the performance and the impact of the IORs climate attributes on the advantages of IOS use in different companies.

5.1 The Use of Interorganizational Information Systems

The diversity and the extent of IOS used seem to be an important driver to a better global performance. In fact, the EDI Internet-based is widely used by the companies of the automotive components industry. In our sample, we have two companies who use the EDI application to support the external communication. Usually, the ERP or the SAP systems complement the EDI by the integration between the internal and external information exchanges. For that reason all the respondents talked about the informational integration all over the supply chain as the major advantage of the IOS use. Moreover, the two companies use less complicated systems as the Internet or the shared data base to connect with the client. These companies can't really represent a totally integrative sites even though that the communications between and their client is based on IOS. This is explained by the limited covering of the IOS of all the supply chain management functions.

Theoretically, we concluded also that the four case studies could cover two configurations of IOS which are the pooled information resource (SIM and Multiproducts) and the Value/supply chain IOS (Valeo and ASK). The first configuration is associated with a common base which is placed in the pivot organization and daily consulted by the dependent partners or subcontractors. In the second configuration is associated with more integrative systems such as the EDI application. In fact, the site 4 and the site 1 use the EDI for the integration of their chain.

The analysis of the Interviews revealed also a high level of diversity and extent of use of these types of IOS. In fact, all departments use the systems especially in the sites that use the EDI. However, in the sites using the Internet or the shared data base, only the logistics and production departments which exploit the systems in a percent of 100%.

We advance that the nature and the complexity of the systems used could have an impact on the nature of the advantages of its use. Hence, the impact of each type of system is different from a site to another.

5.2 The Impact of IOS on the Supply Chain Performance

As we said before that the nature of the IOS impact differs regarding to the type of systems. At same vein we claim that the differences are related to the level of the supply chain management functions covered by the IS functionalities. For example, the sites using the EDI systems have mentioned much amelioration in the

strategic, operational and organizational levels of the supply chain management. However, the other sites respondents talked especially about ameliorations in the operational and organizational side in the supply chain management functions.

Generally, the advantages of IOS use on the performance of the supply chain concerned the operational, strategic and organizational levels that we cited above. Also, the management of cost is included. In fact, these dimensions are extracted from the literature in previous phases of the research. The performance of the supply chain viewed by the respondents covered all these levels. It's important to mention that the dimensions of the SCP suits those hold by the qualitative methodology. We found the operational and organizational impact, the strategic impact and the management cost. Also, in the end of the interviews analysis, we confirmed the positive impact of the use of IOS on the supply chain performance and its inherent dimensions.

As a summary, concerning the direct relation between the use of Interorganizational information systems, the results seemed to support the impact of IOS on the operational, strategic, and organizational performance and on the cost management. Also, the two dimensions; extent of use and the diversity of use justified a positive impact on the supply chain performance. It's better to inform that the operational and the strategic impacts were the most cited advantages of IOS use.

5.3 The Climate of IORs and the IOS Use Advantages

Concerning the supposed moderating relations between the impact of the IOS use and the attributes of IORs, the results were different. In fact, the results showed that interorganizational trust and interorganizational cooperation attributes had a neuter effect on IOS advantages in the supply chain. This could be explained by contextual reasons as the nature of the contract between them and the number of suppliers and clients of each site.

From another side, interorganizational dependence and interorganizational commitment showed a very strong relation to the intention of use of the IOS and also to the advantages of its use. The respondents used very much the word "obliged" and "committed" in their answers to the themes questions. This could give us an idea of the context of automotive components supply chain in the Tunisia.

5.4 IORs Climate and the IOS Use: Conceptual Configurations

In this paper we discussed the IOS use and in particular the EDI use by some subcontractors in the automotive components industry. Regarding to the analysis, the subcontractors can assess their present situation, and also view the different alternatives for future strategic decisions. It can facilitate the task to the SMEs in the automotive components supply chain to consider the benefits from supplementary IOS links with other partners rather than only with the principal client.

We also presented various options of IOS users in the studied industry;

A subcontractor producing one single product (with a predefined production process) is expected to benefit more from deepening and maintaining the relationship with the principal client. These small enterprises do not have enough technical or financial ways or experience. Thus, supporting possibilities from their principals and the Government would be very important to facilitate the extension of the use of IOS by the SMEs. The complete integration and a virtual network are not considered to be an ultime and feasible target of these subcontractors.

A subcontractor producing mass products (many products with many production processes) and gains more from extending partners numbers, with the use of different types of IOS , and with internal and external integration (with the EDI system in most cases). For a cost running industry it would be the best solution to extend network.

Based on these two classifications of the subcontractors existing in the automotive components supply chain in Tunisia, a conceptual framework could be extracted. It shows that small companies frequently operating as suppliers for larger clients could profit in numerous ways from the use of IOS and in particular the EDI, through more complete business integration with their partners' systems or through extended client base. Our findings demonstrate that the one single partner using IOS in the manner established by their principal and that they don't exploit additional opportunities of IOS use.

The framework distinguishes two major axes which are; the impact of the IOS used and the climate of Interorganizational relationships. Based on the literature, we attribute to them two dimensions for each one. The first concept has two dimensions which are; high impact and low impact. The high impact refers to the positive impact of the use of interorganizational information systems on the performance of the firm. The low impact refers to the negative to neuter impact of interorganizational information systems on the performance of the firm.

The concept of IORs climate has two dimensions which are the transactional relationships and the relational relationships. The transactional relationships refer to "relationships that are adversarial and may be classified by tasks or functions that are not critical to the organization. A transactional perspective would be more impersonal and the duration, while often discrete, can repeat over time" (Whiplle & al, 2010). However, the relational relationships refer to the relations that are more interpersonal, and are likely to operate on a continuous basis. Collaborative relationships involve both economic and social elements (Coviello et al., 2002).

Based on these dimensions we build a matrix which exposes four configurations;

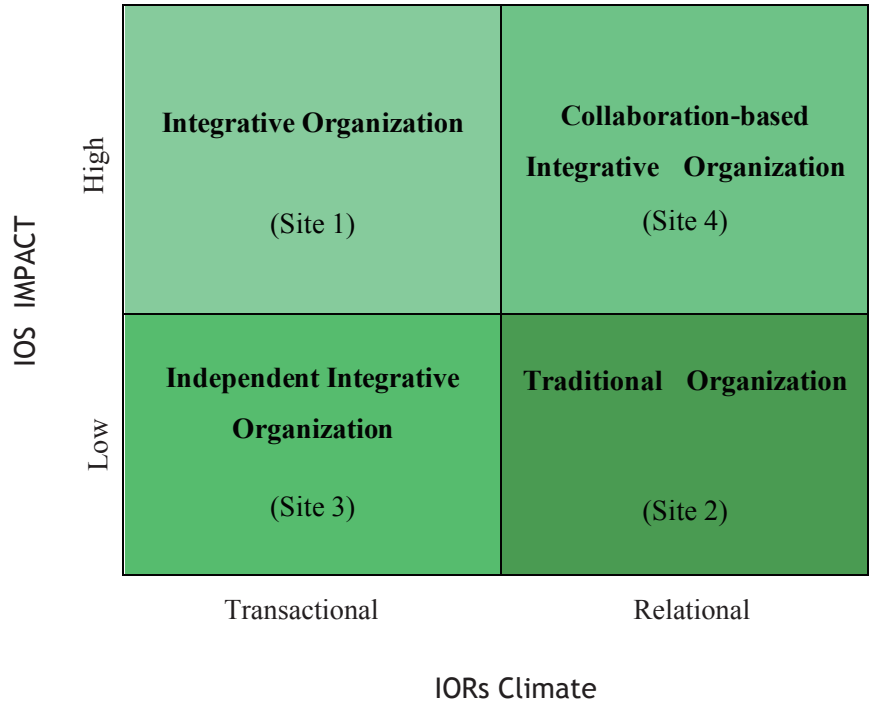
(1) Integrative Organization: For a subcontractor of a complex and particular product, it can be more beneficial to develop the relationships with the existing IOS partners with more deeply shared processes and databases (with complete exchanges integration). The exchanges are likely to be more impersonal and infrequently with partners.

(2) Independent integrative Organization: For a smaller company with more scarce resources it might be necessary to consider the internal integration.

(3) Collaboration based integrative Organization: For a producer of a bulk product, more benefits can be gained from IOS use by developing the breadth of value chain integration (towards high value chain integration), as the same procedures are more easily copied for use with other partners as well.

(4) Traditional Organization: For small businesses with less complex products. These firms with scarce resources have the benefit of deepening the relationships with the principal client. Generally, they use very traditional systems of integration such as the Internet services or the phone. Usually, the exchanges are based on a long term and trust-based interorganizational relationships with the principal client.

Based on the empirical findings, not all the sites are completely integrating their processes to their virtual supply chain. The designation of the sites to the configurations of the matrix was based on the description of each one and also on the degree of "integration with partner's business processes".



CONCLUSION

The analysis of the case studies has generated some conclusions that could be relevant to the problematic of the paper. In fact, the paper was interested in the relation between the climate of interorganizational relationships and the effective use of interorganizational information systems. We found that; (1) the results seemed to support the impact of IOS on the operational, strategic, and organizational performance and on the cost management. Also, the two dimensions; extent of use and the diversity of use justified a positive impact on the supply chain performance. It's better to inform that the operational and the strategic impacts were the most cited advantages of IOS use, and (2) concerning the moderation influence between IORs and IOS use, the results confirm that interorganizational dependence and interorganizational commitment showed a very strong relation to the use of the IOS and also to the advantages of its use.

Based on these results, the paper presents theoretical, managerial and methodological contributions. The theoretical contribution is the proposition and the verification of an integrative model that presents a direct relation between the use of IOS and the performance of the supply chain. Else more, a moderating relation of the success of IOS and the climate of IORs is exposed. Hence, a context oriented approach is justified to promote the different studies on the IS impact.

On the managerial side, regarding to the analysis, the subcontractors can assess their present situation, and also view the different alternatives for future strategic

decisions. It can facilitate the task to the SMEs in the automotive components supply chain to consider the benefits from supplementary IOS links with other partners rather than only with the principal client. On the methodological side, the study tried to explore some configurations that could characterize the automotive components supply chain. Hence, we have generated a matrix based on two dimensions; the impact of the IOS and the climate of IORs.

The limits of the paper are related to some methodological issues. In fact, we claim that the number of the case studies was not enough to explore all the configurations of the context. Also, we advance that the contingencies of the Tunisian context had made from the study as a particular case especially with the dependent nature of the variable between the use of IOS and the SC performance. This couldn't justify the relational aspect of IOS use advantages promotion and the precise detection of all facets of the phenomena.

Some future insights could be advanced at this stage. In fact, a comparative study with other context (the European context) could be fruitful if we aim to cover other configurations and avoid contingencies imperfections. Else more, the results of the study did not demonstrate the relational perspective of the use IOS in supply chains. We recommend operating the same problematic within dyad relationships characterized by trust-based connections and with more innovation open-industries.

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APPENDIX:

Appendix 1: Respondent's Specification and Themes of the Analysis

Notations in the programm	Notations in the analysis
R10 valeo transmission(logistic in charge)	R10
R2 ASK (quality systems in charge)	R2
R1 ASK (administration and finance in charge)	R1
R3 multiproducts (administration in charge)	R3
R4 multiproducts (production and logistic in charge)	R4
R5 SIM (Finance and administration director)	R5
R6 SIM (lnformaticien)	R6
R7 SIM (logistic director)	R7
R8 valeo transmission(humain resources)	R8
R9 valeo transmission(informatic agent)	R9

Themes	Sub-themes composing themes
Automotive supply chain description	automotive supply chain Site 1(ASK) Site 2 (Multiproducts) Site 3(SIM) Site 4(Valeo)
Innovation	

To be continued

Continued

Themes	Sub-themes composing themes
IORs Climate and IOS use advantages	Site 1(ASK) Site 2 (Multiproducts) Site 3(SIM) Site 4(Valeo)
IORs Climate descriptions	Importance Site 1(ASK) Site 2 (Multiproducts) Site 3(SIM) Site 4(Valeo)
IOS use advantages	Management cost Operational and strategic impact organizational impact
IOS used in the sites	Motivations Obstacles of use Site 1(ASK) Site 2 (Multiproducts) Site 3(SIM) Site 4(Valeo)
IS and the supply chain management	

Appendix 2: Diversity and Extent of the IOS Used

Sites	Respondents	Extent of use	Diversity of use	Citations
valeo transmission	R10	All the departments	+	"They are widely used… Sincerely all departments use it…."
ASK	R2	All the departments	+	"These systems are used almost every day and at any time….All offices use them in the company."
ASK	R1	All the departments	+	"These applications are used at 100% and fully exploited by the company…. In almost all departments operate these applications. May be the extent of use varies from one service to another."
multiproducts	R3	Logistics and production departments	+/-	"I would say they are used 100%..... I admit that we are not very advanced use of perspective in our business SIIO"
multiproducts	R4	Logistics and production departments	+/-	"These systems are actually used. We do this every day for weeks. The logistics department that uses the most all systems we a. given the nature of the functions of this department, he is most concerned with external communication with the Italian customer."
SIM	R5	All the departments	+	"In fact the whole company uses these systems and to conduct daily transactions. It is generally the administration and logistics services that are using most frequently these systems…"
SIM	R6	All the departments	+	"These systems are used properly and with a full exploitation… Essentially this is the direction that most concerned the use of these systems"
SIM	R7	All the departments	+	"These applications are used at 100% and fully exploited by the company…."
valeo transmission	R8	All the departments	+	"I would say they are used in full capacity features… All the departments are concerned with the use of these systems."
valeo transmission	R9	All the departments	+	"The percent of use is 100% I guess…. Indeed, all positions."

+: extensive, +/-: moderated

Appendix 3: IORs Attributes Descriptions

[2]Sites	Respondents	Intr. trst	Intr. comm	Intr. dep	Intr. coop	Citations
ASK	R2	+	+	++	+/-	"I would say that we depend on the satisfaction of the Italian customer. We are obliged to satisfy the very specific terms concerning the costs and the quality." "Yes, there is some trust between us and the main customer because we know that the conflicts are just blocking the good function of the business."
ASK	R1	+/-	++	++	+/-	"The activity of the company is limited in following the rules and the requirements of the Italian customer." "Yes it is true that we are partners but above all we are subcontractors who have terms of contract which must be satisfied. We are obliged to make what we have to make" "As regards the cooperation and the trust, they are there but just to promote the relation" "We are undertaken to produce an article"
multiproducts	R3	+/-	++	++	+/-	"The trust is always there to eliminate the conflicts but I don't think that it has a big effect on the business of tomorrow." "We are committed to respect some requirements for the purpose to insure our survival." "Yes, we are of good partner since long time but there is a certain balance of power between us."
multiproducts	R4	-	++	++	+/-	"Because we are depend on Italy, we must be updated by certain points" "You know that we cooperate with a single client and within this relation we are good partners." "Everything is in position as long as we are commited to conclude the terms of the out-sourcing contract." "I think that the trust has no place between us. The business does not look for the trust but for the seriousness and for the commitment"
SIM	R5	-	++	++	+	"We depend on the French company" "I repeated that when we are subcontractors then we are obliged to communicate" "We can not speak about rivalry between us and the main customer because it is not the case. About trust either, because we do not even see each other. I can say that the cooperation is there."
SIM	R6	-	++	++	+	"We see each other very dependent." "We are very respectful with the French company" "The relation is framed by a contract." "Any other extension of the relation has no connection with the business."
SIM	R7	-	++	++	+/-	"Given that we are subcontractors, we see our self very dependent on them in terms of products characteristics " "The nature of the activity and the mode of work oblige us to forget sometimes the relational aspects of the contacts. We must be sincere and serious at the same time." "I am a rational person and I so behave in my business. I want the quality, the cost, the delivery deadline and all this must be present in a well drafted contract."
valeo transmission	R8	++	++	++	+/-	"I would say that a kind of partnership and of trust which were established between us. At the same time we are committed to satisfy the demand of the customer and if no he has the choice between other suppliers."
valeo transmission	R9	+	++	++	-	"The characteristics of the relations with our partners have a position of power from our site with regard to them. Generally, we are always who demand the conditions and the characteristics of the contract with our suppliers." "Concerning the customers we are committed to satisfy the terms of the contract concluded between us" "I can say that there is a certain trust and a friendship but that will be within the limits of the profession and the conditions of the work"
valeo transmission	R1	++	+	++	+/-	"The suppliers are partners rather than suppliers" "A relation of trust and cooperation which was established between us for a long time" "We are dependent with our suppliers and they are dependent on us. We work with them since a long time. It is necessary to say that this dependence is not as strong as they can dictate us our work."

(++): very present (+): present, (+/-): present with moderation; (-): not present

Appendix 4: IORs Attributes Descriptions Per Site

Sites	Intr. trst	Intr. comm	Intr. dep	Intr. coop
ASK	+/-	++	++	+/-
SIM	-	++	++	+/-
Multiproducts	+/-	++	++	+/-
Valeo transmission	++	++	+	+/-

(++): very present (+): present, (+/-): present with moderation; (-): not present

Appendix 5: IOS Use Advantages Within the Sites

Impact on SC performance	Description
Operational and Strategic Impact	Respectful of commitments towards meeting set objectives
	It promotes the creation of new markets
	Opportunities of extension and openness to the international Business
	It guaranties the traceability of orders and requests of information by all partners
	It gives daily updated reports which save time
	Zero errors of treatment of information
Organizational impact	It promotes the logistics (lead time and quantity)
	It promotes the respect of scheduling
	It guaranties a better communication with the principal client
	It guaranties the collaboration with partner
	It promotes the second and the third-party logistics
	Traceability of the orders and the requests of information
Management Cost	It guaranties the transparency of the costs systems
	The costs of communication is reduced
	The cost of employment are reduced (not all respondents are agree about that)

Appendix 6: IORs Climate and IOS Impact

Sites	Respondents	Intr. trst	Intr. comm	Intr. dep	Intr. coop	Citations
ASK	R2	-	++	++	-	"if we have no initiative to implant these systems, we risk losing all the affair of out-sourcing... When we are sincerely committed to satisfy the contract that we concluded, we are obliged to follow them… I think that I am going to give it (the relation) a positive relation because we cannot work with a customer who uses an EDI application without that we even use it. Thus when there is a certain relation of commitment the effect is positive. When there is a reliable relation with certain autonomy which is not the case of our company, I don't think that it would have the same effect…"
ASK	R1	-	++	++	-	"Yes I can say that it is a positive relation. If the relations are good that could maintain the right use of the technological applications" "As I said, we are obliged to follow the rules of our main customer. He uses the EDI system and the ERP system. How can we be subcontractors without being compatible in terms of technological applications…. "The trust really has no effect here. As I have already said, the trust concerned to support the relation"

To be continued

Continued

Sites	Respondents	Intr. trst	Intr. comm	Intr. dep	Intr. coop	Citations
multiproducts	R3	-	++	++	-	"Nowadays, we really have no choice to use or not these technologies. We are obliged to use these applications to be always there. The nature of the relations inter-firms is very important if we fixed the strategic or technological changes. The success of these applications has a direct connection with the degree of dependence and commitment of the partners. The decision is always in them but of most hardly. We are followers, regrettably. We depend on them and have to respect their business requirements."
multiproducts	R4	-	++	++	+	"This has a good influence on our intentions to use certain technological systems or even administrative systems. If we had certain degree of autonomy, we shall have some autonomy in the decision-making. In our case, we are obliged to use the systems of the Italian customer whom we work for him. But if you want a direct answer for this question, I would say that the nature of relation between us and the customer has a direct relation with the performance of the SIIO in the group generally. The cooperation and the commitment which we have with him oblige us to use and indeed to implant their systems."
SIM	R5		++	++		"When the relations are dependent I think that it helped so much the good simulation of these technologies among the partners. For example in our case, we are obliged to use them with the main customer to facilitate the communication Personally, I consider that the climate of the inter-firms relations has a positive effect on the good use of the SIIO."
SIM	R6	+	++	++	+	"As regards to the climate of the IORs on the success of these applications, I can say that it is necessary to have a minimum of respect and trust to manage all activity and also the means to reach it as the implementation of certain systems of communication. The cooperation that was established between us also has certain effect on the advantages of the use of these systems … The good relation with the French customer guarantees a best use of these systems to support this relation."
SIM	R7	-	++	+	-	"I consider that when we operate with a customer who is technologically sophisticated, we are obliged to have similar systems. And even when I choose certain supplier, we are going to oblige him to have a minimum of our standards. This is in the case of a good long-term relation sure otherwise that we are obliged to eliminate this supplier. When he has a certain respect for the terms of the contract between both parts, the good use of these systems will be more remarkable."
valeo transmission	R8	-	++	++	-	"The use of the systems EDI and SAP that I consider them complementary is sometimes considered as acceptance condition to continue the business with certain suppliers. Normally, we do work with suppliers or customers who use systems compatible with our systems. They are obliged to use them. I mean if the inter-organizational relations are very deep and connected, we guarantee the acceptance of the obligations."
valeo transmission	R9	-	++	++	-	"There are certain suppliers who were eliminated from our choices because they do not even intend to adopt sophisticated.applications when there is certain relational aspect, things will be more flexible and more evident but I do not see very closely the impact The nature of the relations has a positive effect in the use of the SIIO in our case."
valeo transmission	R10	-	++	++	-	"I consider that the climate of the relations inter-firms has a big importance in the use of the information systems which we have. We can say that because we knew that he depends on us and on our acceptance….. Also, our customer Renault demands the use of these systems to us so that we can work with him. the trust and the good relations do not make affairs. It's resources which can make that."

(++): great positive impact (+):positive impact; (-):neuter impact

Appendix 7: IORs Climate and IOS Use Advantages

Sites	Intr. trst	Intr. comm	Intr. dep	Intr. coop
ASK	-	++	++	-
SIM	-	++	+	-
Multiproducts	-	++	+	+/-
Valeo transmission	-	++	++	-

(++): great positive impact (+): positive impact; (-): neuter impact