

# Network-Based Organizations in the Extended Enterprise Era: The Case of the After-Sales Services Network Configuration and IT-Acceptance

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## ABSTRACT

The extended enterprise has various types of partners in its supply and value chain. It is important to continuously define its strategic dynamisms and mechanisms related to its external environment in which there are inter-organizational collaborations with the partners. The paper questions the evolution and development of a specific type of partners that are the network of after-sales services that continuously indeed knows sustainable development. The after-sales services are services provided to customers after-sales of the products as repair solutions, revisions of spare parts for the customer satisfaction. The results of the study argues about the type of ties among the extended enterprise and these partners presenting quantitative data about different types of managerial dynamisms in an automotive context. The paper also discusses the continuous development of this network in terms of strong and weak ties presenting some theoretical propositions that need to be further developed with respect to co-evolution of the organizations in the network and the extended enterprise.

**Keywords:** *After-sales services, Collaborative environment, Extended enterprise, IT acceptance and computer self-efficacy, Network systems, Small and medium enterprises, Social interactions, Weak and strong ties.*

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### Highlights of this paper

- In this study, the weak and strong ties show the collaborative environment the small and medium enterprises have with the extended enterprise.
- This latter is a new type of organizations depending on collaboration and operational and innovative mechanisms and processes.

## 1. INTRODUCTION

Most researchers provide a definition to the extended enterprise mentioning the importance of IT-integrative systems and open innovation in which collaboration for the new product development -NPD occurs with the external actors, partners, customers and suppliers. However, still further research has to be done on the specific relationships and structure of relationships that needs to be put in place for the functioning of the extended enterprise. The extended enterprise is indeed extending its collaboration with external actors for the purpose of innovation but if a clear map of these relationships and structure of relationships is not in place, the external actors' contribution to the extended enterprise -EE will grow at a very low rate.

Firms must be aware of the existence of potential innovators or innovation in the network of their alliances, in fact multiple alliances are a source of networks resources (Gulati, 1999) that can be knowledge, capabilities or other resources. Each one has the same importance since this type of communication is not authoritative; it doesn't follow a bottom-up direction. Among firms in a network, communication strategies are built in order not to shape the authority of the most important one, since collaboration calls for dialogue and discussion rather than unidirectional information. The paper objective is to question what the best organizational dimension of the extended enterprise and its networks of partners are for the continuous optimization of the processes and what are those processes and mechanisms.

The paper is organized as follows: The second section is composed of a literature review on the extended enterprise, networks systems and embeddedness and communication and information technologies. The research framework deals with the presentation of the objectives of the research that are to demonstrate that there are indeed strong and weak ties and links among the after-sales services enterprises and the extended enterprise and to show through the research method in a quantitative manner that these types of ties have some meanings that is strategic to the sustainable development of the network. Also, the research framework deals with the communication and information technologies issues of these organizations as thus the technology acceptance and solutions to the continuous optimization. The next sections present the results, discussion and implications of the research.

## 2. LITERATURE REVIEW

### 2.1. The Extended Enterprise

Many authors provide a definition to the extended enterprise. Childe (1998) defines the EE as a conceptual business unit or system that consists of a purchasing company and suppliers who collaborate closely in such a way as to maximize the returns to each partner. Jagdev and Browne (1998) consider the EE as the formation of closer coordination in the design, development, costing and coordination of the respective manufacturing schedules of cooperating individual manufacturing enterprises and related suppliers. Vernadet (1996) sees the extended enterprise -EE as a business that primarily outsources its operations to other businesses and that heavily utilizes standards, computer communications, and electronic data exchange.

Finally, he mentioned the markets' issues of the extended enterprise. Since the extended enterprise purpose is to integrate external actors in the NPD process, it is necessary to organize efficiently its environment. Konsynski (1993) argues that there is a need for infrastructures supporting the exchange of information and the coordination

between sellers, buyers and suppliers sometimes managed by an operator, in order to facilitate commercial transactions and sometimes also adding subsidiary services (such as billing or legal services.). Therefore, the adequate relationships and structures of the relationships within the extended enterprise are necessary for innovation and new product development.

Adopting the open-innovation processes, the EE is extending its collaborations with its partners, suppliers, and customers. Since the innovation happens across the networks of partners, the EE has to scan the environment to identify the most innovative players and set-up the condition to gather their knowledge. Carlsson (2003) argues that using information and communication technologies -ICTs and knowledge management systems in inter-organizational networks is a potential driver of innovation; however, the path-dependencies and mechanisms are the ones influencing the creation of new processes, adopting new technologies or provide new products and services. When the relationships, among firms, are created for the collaboration on innovation –strategic relationships- and knowledge sharing, Passiante, Fayyumi, Filieri, and Taifi (2007) see that the interdependence and inter-relationship mechanisms occurring are mostly based on inter-organizational communities able to produce new knowledge for the NPD process integration. In fact, many extended enterprise in different in market sectors have reacted to the inter-CoPs concepts; many firms creates inter-organizational communities of practice with different objectives but still focusing on the knowledge sharing and innovation. New knowledge from external actors is a key prerequisite for the development of radical innovation but the understanding of how these are organized and connected with the firm still needs some insights and enhancements.

## *2.2. The Network Systems and Embeddedness*

Ahuja (2000) lists ways how a company could benefit from its network of partners, collaboration and joint projects. The partners of the network have different skills and competences that they bring to the shared projects and an individual firm could benefit from economies of specialization without extra costs. The economies of scale could also be attained, since large research projects generate more knowledge than smaller ones. In addition, the inter-firm linkages are channels for communication not only with partners but with their partners, too (indirect contacts). Managing the network involves using appropriate governance mechanisms, developing inter-firm knowledge sharing routines, making appropriate relationship-specific investments, and initiating necessary changes to the partnership as it evolves while also managing partner expectations (Dyer & Singh, 1998).

Strategic networks (Gulati, 1998; Gulati, Nohria, & Zaheer, 2000) as the strategic alliances, are composed of inter-organizational ties that are based on social, professional and exchange relationships. The increasing importance of alliances has created tremendous needs within firms to develop business units completely dedicated to the management of alliances, becoming more and more strategic for the business of the firms. Moreover, companywide standards and customized tools for multi-alliance management are required by the firms (Hoffmann, 2005). Firms have to take into account that relationships are fundamental for their survival and the NPD development rate, thus their strategy has to consider the critical elements for successful relationship management as trust and commitment, communication and integrative mechanisms, decision making style and company culture (Davis & Speckman, 2007).

Besides, real-time communication provided by computer mediated communication tools, reconfigure the concept of communication and gives new, extended in time and space, possibilities of communication. Through two-way communication each player can become at his turn an active participant of the communication process, having the possibility and the interest to share freely his knowledge. Ahuja (2000) also states that direct ties provide resource-sharing and information-spillover benefits, but indirect ties provide only the latter. More generally, this

finding suggests that the value of a strategy of substituting indirect ties for direct ties will vary significantly across networks. In any network, an analysis of the substantive benefit provided by each kind of tie must be conducted before a network reconfiguration is attempted.

In many networks, indirect ties simultaneously play two different roles vis-a-vis the focal actor. On the one hand, they are resources that extend the actor's reach in the network and improve his or her access to information. Whether direct ties are more productive than indirect ties depends on the context being studied, and the effects of ties, whether direct or indirect, are likely to be contingent on several factors. The nature and content of the ties, the type of outcome being studied, and the broader network structure within which a tie is embedded are all likely to influence the value of a tie. Whether direct ties are more productive than indirect ties depends on the context being studied, and the effects of ties, whether direct or indirect, are likely to be contingent on several factors. The nature and content of the ties, the type of outcome being studied, and the broader network structure within which a tie is embedded are all likely to influence the value of a tie.

Knowledge networking refers to people, resources, and relationships among them who are assembled in order to accumulate and use knowledge primarily by means of knowledge creation and transfer processes, for the purpose of creating value (Seufert, Von Krogh, & Bach, 1999). This concept is more focused on the knowledge sharing according to the context, tacitness and dynamic dimensions of knowledge. This concept was created for the natural development of networking. Virtual networks are efficient structures since information technology -IT systems are necessary instruments to put in place for collaboration, however, it is also important to put in place other components that focus more on knowledge sharing and creation. Therefore, managing knowledge among different actors needs efficient IT-tools, however it also needs mechanisms regarding the social context in which knowledge is created and shared, e.g: organizational culture and relationships between knowledge holders.

The knowledge networks concept look at the relationships between organizational members, and the impact of these social structures on knowledge creation and sharing. The knowledge network is an extension of a community of practice (Brown & Duguid, 1991) that is consisting of networks of people sharing not only practice but also knowledge needs and interests. Magnusson (2004) argues that knowledge networks are communities of practice made up of individuals who virtually practice the same things —a community focused on knowledge. These knowledge communities are important knowledge repositories for firms and contribute to the new knowledge creation (Wenger, McDermott, & Snyder, 2002).

### **3. RESEARCH FRAMEWORK**

The research framework deals with the presentation of the objectives of the research that are to demonstrate that there are indeed strong and weak ties and links among the after-sales services enterprises and the extended enterprise and to show through the research method in a quantitative manner that these types of ties have some meanings that is strategic to the sustainable development of the network. Konsynski (1993) mentioned the business and technology issues in an extended view of the enterprise and provided means to leverage information and control mechanisms to influence behavior in the extended enterprise that encompasses, at least, its buyer and suppliers communities. The issues addressed by Konsynski (1993) first concerned the activities taking place at the boundary of the firm and linking it to its environment, such as information collecting (intelligence) and the analysis of the environment (competitors, new products and technologies, etc.). Thus, firms are losing their traditional connotation (Passiante et al., 2007) since they are blurring their boundaries and adapting an open innovation model (Chesbrough, 2006) where the environment contribute to the extended enterprise -EE NPD process. The boundaryless environment is a source of new ways to compete and cooperate (Davis & Speckman, 2007).

Then, the author addressed the IT-enabled relations between a company, its suppliers, customers, partners, the government and even its competitors. In fact, the adaptation of inter-organizational systems (IOS) did grow for the need to integrate disparate organizations and individuals in the same IT-enabled processes, independently of formal boundaries. The inter-processes, as a set of related activities, independent from the functional boundaries, have the capacity to integrate entire value chains through information technology. Indeed, the main focus of the EE is the integration of the entire value chain independently of organizational boundaries; The value chain integration reduce costs of coordination and create a distributed structure and thus provide a maximum flexibility independently of geographical or organizational boundaries.

Therefore, the nature of the extended enterprise is getting more strategic than transactional. Companies are seeking and measuring more than cost advantage. They are looking for partners that help them move from products to solutions, reducing and making costs variable and increasing speed-to-market. This new type of extended enterprise is based on relationships that are multidimensional; sometimes your partner is both your competitor and your customer. In this process, firms have to take into consideration also the informal linkages (Brown & Duguid, 1991; Wenger & Snyder, 2000) with different players. These weak ties may refer to persons in the firm's or employee's relationship with whom it has less frequent mutual confiding contact. Several studies confirmed that weak ties are important in bringing new information in organizations (Weenig & Midden, 1991; Weenig, 1993; Weenig, 1999). Informal relationships are much more important than formal ones in the innovation process; in fact since they are not rigidly structured they facilitate the communication of ideas and the creativity of people. Formal and informal linkages of strategic alliances or networks refer to social capital of the firm, and can foster the acceleration of innovation generation and the sustained competitive advantage of the firm.

Nevertheless, both in formal or informal linkages the connector is represented by face-to-face or computer mediated communication activities. Moreover, if we consider that every player linked to the firm has an own network of relationships with other suppliers, stakeholders, institutions, it is necessary to create the condition to acquire also the network resources, that often are present but hidden in the environment of the firm. For obtaining this, communication wide capabilities are fundamental to maintain this network of relationships and for gathering the intangible resources possessed by them. There are other aspects of a focal firm's network of ties that can influence its behavior and performance, such as the pattern of direct and indirect ties. Gulati and Gargiulo (1999) show how firms benefit not just from their direct ties, but from the ties of the actors to whom they are connected. Gulati and Lawrence have found considerable differences in performance across supplier ties in the automotive sector. They have identified some of the key facets underlying each tie along with the nature of the commodity being sourced through the tie to play a critical role in explaining these performance differences.

### *3.1. Research Questions*

- What are the organizational and technological dimensions of the extended enterprise and its networks of partners?
- What is the point of view of the network of partners about these dimensions?
- What are the new challenges and opportunities facing these inter-organizational collaborations?

### *3.2. Research Method*

For the purpose of the research study, we basically follow a qualitative research method however within the research we also use quantitative data analysis for the research purposes and questions. Therefore, we are following a research method focusing on qualitative data but with an integration of quantitative data analysis as well. The

qualitative method has the ability to cope with the needs of a specific context (Johns & Lee-Ross, 1998) and allows the collection of a great deal of information about relatively few people (Veal, 1997). In the research study, we adopt the case study research method since our focus is on contemporary events and behaviours cannot be controlled. The case study research method can be defined as: “an empirical inquiry that investigates contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 1994).

The data collection method, of this case study research, consists in semi-structured interviews with key informants. However, since the researcher has to be cautious about becoming dependent on a key informant (Yin, 1994) thus, relying on other sources of data collection is necessary. Yin (1994) mentions the interviews –as a data collection method- with more structured questions along the line of a formal survey. Such a survey can be designed as a part of a case study (Yin, 1994) and involving both the sampling procedures and the instruments used in regular surveys; thus, quantitative methods can be used within qualitative methods of analysis and thus using surveys for a case study research. Therefore, in our case study analysis we are also using survey and questionnaire techniques for the purpose of the study.

### *3.3. Unit of Analysis*

In this research, we are investigating on the organizational dimension of the extended enterprise. The analysis consists of defining the relationships and structure of the relationships within the extended enterprise. More precisely, we focus our research on the firm and its network of partners in the after sales services sector. The unit of analysis in this research is the relationship among a large manufacturing company and its network of partners and more precisely the collaborative environment among the firm and its after sales services partners –named dealers’ network.

Following are the data collection methods used in a logical manner for the purpose of the research:

- Semi-structured interviews with the firm’s managers responsible of the dealers’ network and the catalysts of the strategic community of expert dealers.
  - Survey dedicated to a significant sample representing the population of the network of dealers
- Criteria for sample selection

In order to select the sample from the population of the network we followed a stratified method. Thus, the managers of the network provided us with the list of the population containing the necessary information about each member and the way in which they are organized in the network. We noticed the existence of very small organizations in the network and decided not to include them in the survey study. Their very small size will not allow them to reflect the relationships and mechanisms; their responses will not be significant for the research purposes. Finally, we selected 10% from the population to ensure the validity of the sample representing the entire population; the survey will provide an overall view of the satisfaction level of the dealers’ network concerning the managerial mechanisms thus the relationships among them and the firm. The respondent is one involved in the managerial mechanisms; therefore, this person is either the technician, or the head of the dealer’s workshop.

- Test the survey

We first administered the questionnaire to a dozen members of the sample. We introduced the survey research and reminded the respondent about the answering instructions and if available we started the interview. Through this test, we could modify the questionnaire according to the understandings of the respondents. Thus, some

questions were rephrased or shortened to provide additional time to the respondent for comments. This test was also useful to determine the exact time elapsed during the survey administration. With the help of the managers responsible of the network we devised the questionnaire dedicated to the sample of the network population. The managers were interested to participate to this activity since the results of the questionnaire would sustain the collaborative environment. In fact, the point of view of the dealers about the after sales services relationships would provide some insights to the managers to sustain the relationships and mechanisms of the collaboration.

The questions of the survey were constructed based on the satisfaction parameters of the mechanisms; the validity and reliability of data results also depend on the measurement items used in the study. The satisfaction parameters are different from one mechanism to the other –according to their role and context- and sometimes similar, and the mechanisms are categorized into three types, therefore, we created satisfaction parameters for each type of mechanisms -Table 1:

**Table 1.** The satisfaction characteristics of the constructs and items of the dealers' network survey.

<b>Managerial mechanisms(the constructs)</b>	<b>Parameters for the evaluation of the dealers satisfaction</b>
IT-based	Perceived usefulness (PU) Perceived ease of use (PEU) Use of internet Use of email Use of chat
Face to face-based	Quality Personal support Perceived usefulness
Professional trainings	Efficiency Quality Expertise of trainers

- The IT-based managerial mechanisms

Concerning the IT-based mechanisms, we formulated questions to investigate on the perceived usefulness of the mechanism and the ease of use of the supporting IT-tools and systems. It is important to know if the mechanisms are considered as useful and if the IT-tools and systems are easy to use by the dealers or not. For example, in extreme cases, if a mechanism is very useful, this means that the right mechanism is put in place leading to an optimal relationship thus, high economic performance, otherwise, the firm has to reengineer the mechanism and investigate on how to do it right. And if an IT-tool is perceived as very easy to use for the mechanism, it means that the firm has provided the right instrument suitable to the needs of the dealers after sales services, thus the relationship is optimal, otherwise, the firm has to investigate on the improvements to make to the IT-tools to satisfy the dealers after sales services activities, thus optimize economic performance.

- The face to face-based managerial mechanisms

Concerning the face to face-based mechanisms, we formulated questions based on the quality and perceived usefulness of the mechanisms and personal support provided by the firm to the dealers' network. We investigated on the point of view of the dealers about the quality and usefulness of the mechanisms and also since these managerial ties are face to face-based -a real interaction, we questioned about the personal support provided by the firm. If a mechanism is very useful and of high quality, it means that the firm has provided the right mechanism for the after sales service –trusted-based long-term collaboration, otherwise the firm has to investigate on the method to improve the social interactions among the firm and the dealers and reengineer the entire mechanism accordingly.

- The Professional trainings

Concerning the professional training, we formulated questions based on the perceived efficiency and quality of the trainings and the expertise of the trainers. We investigated on the point of view of the dealers concerning the quality and the capacity of the professional trainings in developing their own after sales services capacities and on the point of view of the dealers on the expertise of the trainers during the professional trainings. For example, if the satisfaction level about the quality and efficiency of the trainings is high, and the expertise of the trainers is high, it means that the firm provides the right trainings to the dealers according to their needs in the after sales services activities, otherwise, it is obvious that the firm has to restructure and reorganize the content, processes of the trainings and improve the trainings' skills of the trainers.

#### 4. RESULTS

##### 4.1. The Survey's Sample Population

In order to select the sample from the population of the network we followed a stratified method. According to the dealers' network members' sub-characteristics—brands, areas and size- [Table 2](#), we selected 10% from the population thus the sample represented 234 respondents to the survey. From the 234 respondents, some questionnaires were containing the 'no answer' questions. These latter were regarding the personal support in the face to face interactions. We suppose that the respondents did not dare providing their opinion about the personal support of the face to face interactions in case a misunderstanding occurs among them and the personal support.

**Table 2.** Descriptive data about the 10% sample of the survey population.

Brands Size	Brand A		Brand B		Brand C		Total
	Medium	Small	Medium	Small	Medium	Small	
Area 1	9	31	4	5	4	7	60
Area 2	7	33	4	4	3	4	55
Area 3	7	35	4	7	3	6	62
Area 4	6	33	4	5	3	6	57
Total by Size	29	132	16	21	13	23	234
Total by Brand	161		37		36		
Total medium	58		Total small		176		

The 'no answer' questions were considered as inappropriate for the analysis and missing data. Therefore, following [Hair, Anderson, Tatham, and Black \(1998\)](#) the responses with missing data were deleted from the next steps of the analysis and we reached at the end a total of usable responses of 227 interviews that can still be considered as 10% from the population.

##### 4.2. Validity Testing

Concerning the validity of our items, we first see if the items can be loaded on their constructs then we investigate on the loading of the items on their constructs. We use the Kaiser-Meyer Olkin's Measure of Sampling Adequacy test and Bartlett's test of Sphericity- [Table 3](#) to assess the suitability of the survey data for factor analysis.

**Table 3.** KMO and Bartlett's test of the survey items.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.709
Bartlett's Test of Sphericity	Approx. Chi-Square	1203.065
	df	55
	Sig.	0



The Kaiser-Meyer Olkin's Measure of Sampling Adequacy test shows the proportion of variance in the variables which is common variance, the significance level of this test gives the results. We notice that the test produced a high value of 0.709. And the significance level should be less than 0.05 which is the case of these items. Therefore, the data are suitable for data analysis.

4.3. Content Validity

Following Straub (1989) that experts who are familiar with the phenomena should review the instruments to ensure content validity. The survey questionnaire was devised with the managers responsible of the network of dealers and later a test of the questionnaire was done by interviewing a dozen members of the dealers' network; they provided valuable insights on the instrument regarding wording, clarity, ambiguity of questions and understanding.

4.4. Construct Validity

Construct validity is on the basis of the integration of any evidence that bears on the interpretation or meaning of the test scores (Messick, 1995). Since the size of our survey sample is significant, we adopted a classical approach for establishing instrument validation, specifically factor analysis method. Factor analysis helps the researcher to determine whether a certain set of items do or do not constitute a construct (Straub, 1989). However, items with high loadings on multiple of the unrotated components are frequently seen, which can make interpretation challenging. In this case, it is helpful to examine a rotated solution; each number represents the correlation between the item and the rotated factor. These correlations can help formulate an interpretation of the factors or components.

Table 4. Factor loadings of the survey parameters.

	Component		
	1	2	3
PU_ITs	0.894	0.082	0.099
PEU_ITs	0.845	0.148	0.132
Quality_facetoface	0.749	0.389	0.098
Personal support	0.501	-0.065	0.014
PU_facetoface	0.638	0.472	0.144
Efficiency_trainee	-0.022	0.887	0.147
Quality of trainings	0.204	0.73	-0.008
Expertise of trainers	0.147	0.826	0.091
Internet use	0.164	0.185	0.829
Email use	-0.039	0.178	0.882
Chat use	0.152	-0.089	0.684

Therefore, we performed the principal component factor loading with the rotation technique Varimax with Kaiser normalization rotation technique, and eigenvalue rule (Eigenvalue greater than 1) to determine the factor expressed by items. The factor loadings of the survey items –satisfaction parameters, show the construct validity of the items since they load strongly on their associated items- Table 4. The factor loadings are high and ranging from 0.638 and 0.894. We had one low factor loading with a value of 0.501 and dropped it from further analysis; it represents the personal support satisfaction parameter. In fact, we already mentioned that we had some issues related to the personal support satisfaction parameter; we supposed that the respondents did not dare providing their opinion about the personal support of the face to face interactions in case a misunderstanding occurs among them and the personal support.

We also noticed that the satisfaction parameters of the IT-based and face to face mechanisms load on the same component and that the ones of the dealers' e-readiness (Internet, email and chat) load on another component. These factor loadings do not change the validity of the data since the IT-based and face to face-based mechanisms are both mechanisms used for the same purpose which is the interactions among the dealers' network and the firm for the after sales services activities; these mechanisms are both processes and procedures sustaining the relationships among the firm and the dealers' network for the after sales services activities but with different supports –IT-based and face to face-based.

**Table 5.** Reliability statistics for the survey items.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0.763	0.820	10

#### 4.5. Reliability Testing

In order to examine the reliability of the items, we use the cronbach's alpha. It shows the internal consistency of the items in a measurement scale- Table 5. A high value alpha coefficient means that the items are highly inter-correlated with each others and reliable for further analysis. The accepted limit is alpha 0.70, and our data have a cronbach's alpha of 0.763, therefore, data are reliable for further analysis. Therefore, through the reliability and validity testing, we could check the validity of the survey data collected and thus make further analysis.

**Table 6.** Descriptive statistics for the survey items; Measurement scale 1-10, low-high satisfaction.

The constructs	N	Minimum	Maximum	Mean	Std. Deviation
PU_ITs	227	4	9	6.77	1.044
PEU_ITs	227	4	10	7.05	1.154
Quality_facetoface	227	4	10	7.01	1.227
PU_facetoface	227	3	10	6.95	1.265
Efficiency_training	227	2	10	7.74	1.439
Quality_training	227	1	10	7.28	1.760
Expertise_trainers	227	4	10	8.26	1.410
Internet use	227	1	10	7.76	1.734
Email use	227	1	10	7.39	2.258
Chat use	227	1	10	5.13	3.115

## 5. DATA ANALYSIS AND RESULTS

The means (M) and standard deviations (STD) reported are representing the results of the survey Table 6. The mean values are ranging from 6.77 to 8.26 –except the chat use that has a value of 5.13. The measurement scale, consisting of a vote from 1 to 10 representing the low and high satisfaction, shows that the values from 6.77 to 8.26 range from a good to a very good satisfaction level of the dealers about the managerial mechanisms. Concerning the IT-based mechanisms, the perceived usefulness (PU\_ITs) (M = 6.77; STD = 1.044) represents a good value. In fact, it means that the IT-based mechanisms are considered as good and that they are useful for the collaborative environment. Besides, the perceived ease of use of the IT-tools and systems (PEU\_ITs) (M = 7.05; STD = 1.54) is considered as a good tool satisfying the needs of the dealers. As stated by a dealer during the interviews, *'without the IT-tools and systems, we cannot provide the after sales services'*. However, the firm has to investigate continuously on the development of the mechanisms and IT-tools and systems used in order to reach a complete satisfaction of the dealers about the IT-based mechanisms. Concerning the use of internet, emails and chat, we notice that most dealers do not use the chat (M = 5.13; STD = 3.115), however, some use it frequently for the after sales services; they are medium-sized dealers. Whereas the internet (M = 7.76; STD = 1.734), and email (M = 7.39; STD = 2.258)

are frequently used, however, there are many dealers that do not use them; they are small-sized dealers. As stated by a dealer during the interviews, *'if I have time and the internet connection is active, I send emails to the firm for the after sales services'*. Therefore, the medium-sized dealers are aware of the importance of ICTs in costs reductions and fast communication, whereas for the small-sized dealers, the firm has to initiate a campaign of awareness concerning the ICTs usage. For the face to face-based mechanisms, we notice that the quality ( $M = 7.01$ ;  $STD = 1.227$ ), and the perceived usefulness ( $M = 6.95$ ;  $STD = 1.265$ ), are good, therefore, the mechanisms contribute to the trust-based collaboration development among the firm and dealers' network. As stated by a dealer during the interviews, *'the personal support is necessary for our relationships with the firm'*. However, the firm still has to investigate on the method to improve the social interactions among the firm and the dealers and reengineer the mechanisms for that.

Finally, concerning the professional trainings, the efficiency ( $M = 7.74$ ;  $STD = 1.439$ ), and quality ( $M = 7.28$ ;  $STD = 1.76$ ) of the trainings are considered as satisfying and thus, the expertise of the trainers ( $M = 8.26$ ;  $STD = 1.410$ ) is also considered as efficient. As stated by a dealer during the interviews, *'when I go to the professional trainings, I learn many new issues I did not know before'*. Therefore, the firm provides the right trainings to the dealers according to their needs in the after sales services activities, however, the firm continuously has to restructure and reorganize the content, processes of the trainings and improve the trainings' skills of the trainers according to the changes in products and after sales services activities.

## 6. CONCLUSIONS

From the interviews with the dealers' network managers, we could investigate on the managerial ties existing among the firm and the dealers' network. We discovered then that the managerial ties are of three types, IT-based, face to face-based and professional trainings. Furthermore, we administered a survey questionnaire, devised with the help of the managers, dedicated to a sample from the dealers' network population. We concluded from the survey that the managerial ties are considered by the network of dealers as important and efficiently orchestrated for the benefit of both the firm and the dealers' network. The managerial mechanisms, among the firm and the dealers' network, create a collaborative environment in which the firm and the dealers collaborate for the after sales services activities and therefore this has success factors and challenges. Concerning the success factors, the dealers are all from the same country which facilitates communication and avoid possible misunderstandings that might occur generally as a result of different cultures, and more specifically as a result of different work processes, different languages, and/or different types of leadership (Wenger et al., 2002). In fact, belonging to different enterprises and being geographically dispersed in their nation did not create any major obstacle to the on-going activities of the collaborative environment since they have the same culture, the same work processes, and they use the same knowledge type; they all work in the same field which is the after sales services for the firm's products.

Moreover, as small and medium enterprises, and independent organizations from the large manufacturing company, the dealers' network members take advantage of the IT-based collaboration and the face to face interactions offered by the manufacturing company creating an inter-organizational collaboration based on trust and motivation. This is a part of the codification strategy (Hansen, Nohria, & Tierney, 1999) of the firm that calls for a high codification infrastructure which results in more knowledge reuse via person-to-document exchange. Besides, the organization of the dealers into direct and indirect connections creates a sense of high morale and a differentiated communication system. According to Granovetter (1983) weak ties increase innovative capacities, facilitates access to resources and allows a faster working process, and The performance of innovation is improved by having both direct and indirect network relationships with other businesses (Ahuja, 2000; Tsai & Ghoshal, 1998).

Therefore, the similarities in the structures of the dealers, the trust and alliance management capabilities and the IT and face to face-based collaboration enhance resource exchange and combination (Anand & Khanna, 2000; Gulati, 1998; Lane & Lubatkin, 1998). The collaborative environment depends on the continuous learning, re-evaluation and readjustment of the partnerships for high performance. Thus, in the collaborative environment, there is sharing of technical knowledge among the firm and the dealers' network, and this can lead to incremental innovation. Moreover, there are many success factors leading to knowledge sharing in the collaborative environment, however, there are also some challenges; as stated by a manager responsible of the after sales services, *'the firm is continuously sustaining its collaboration with the dealers' network for customer satisfaction and high economic performance, however if the dealers' network and the firm capacities are not aligned, it means that there are factors slowing down the collaborative environment that we have to identify and resolve'*.

Accordingly, the challenges can be internal or external; the dealers, as small and medium enterprises, can have some barriers in understanding and using the technologies in the collaborative environment. In fact, the attitude toward technologies -as the computer self-efficacy (Compeau & Higgins, 1994) and the technology acceptance (Davis, 1989)-, and the digital divide are key challenges in the sustainability of the collaborative environment among the firm and the dealers. In one hand, computer self-efficacy and technology acceptance refers to a judgment of one's capability to use a computer and to accept the information technologies. As small and medium enterprises, the dealers can have some reluctance in the use of computers and IT-tools and applications due to for example:

- A lack of IT skills, the unfamiliarity with the technologies and lack of technical knowledge to utilize technology; This can lead to a misuse of the technologies. This is also linked with the perceived ease of use of the IT-tools or applications that refers to the degree to which a person believes that using a particular system would be free of effort (Davis, 1989).
- A lack of digital culture, the ignorance of the importance of technologies for the after sales services activities. This can slow down the after sales services processes. This is also linked with the perceived usefulness of the IT-tools and systems that is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989).

On the other hand, digital divide refers to the gap in the actual IT-instruments usage and the expected one; the reasons can be the high costs of technologies or the unavailability of fast and efficient IT-infrastructure and internet access. The collaborative environment challenges are addressed through the professional trainings and the face to face mechanisms taking place among the firm and the dealers' network. They play a key role in reducing the collaborative environment challenges; they are not only efficient mechanisms for knowledge sharing and creation but also for the reduction of the IT usage barriers.

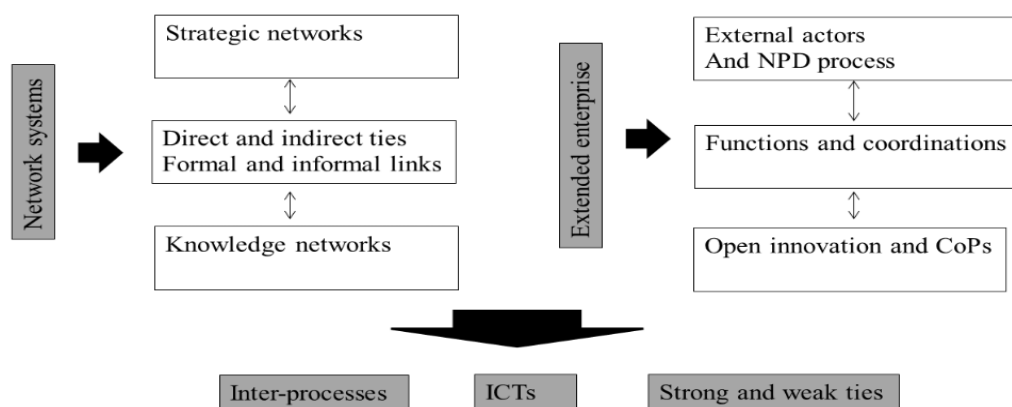


Figure 1. The new model for the types of ties.

These mechanisms communicate to the dealers the importance of technologies for the business performance; the mechanisms contribute to the 'prise de conscience' –awareness- of the dealers about the importance of information and communication technologies. They show them the importance of the ITs for the business, for the after sales services activities and for the sustainability of the collaborative environment.

## **7. DISCUSSION**

### *7.1. Theoretical Implications*

The results and conclusions lead to the design of the following scientific hypothesis- [Figure 1](#):

*Hypothesis 1: There are strong and weak ties among the extended enterprise and the small and medium enterprises and different levels of computer self-efficacy in these latter.*

*Hypothesis 2: The dealers satisfaction index results are correlated to the type of ties among the extended enterprise and the small and medium enterprises.*

*Hypothesis 3: The strong ties are defined as the ones among the extended enterprise and medium enterprises, and the weak ties are defined as the ones among the extended enterprise and the small enterprises.*

*Hypothesis 4: Computer self-efficacy level\_CSE is correlated to the types of ties.*

The research implies that the data can be categorized into two categories; data analysis results of the small and medium organizations can be compared in order to find out the exact impact and a more specific meaning of these types of ties on the IT acceptance and vice-versa. In fact, considering the co-evolution of the extended enterprise and small and medium enterprises -SMES and their ties, does really the type of ties impact on the IT-acceptance? This is the research question for the confirmation of hypothesis 2 and 4. Thus, the research objectives would deal with the investigation on who are the small organizations that are around the medium in the data set in order to confirm hypothesis 2 and 4 since in this first research in this paper, the dealer satisfaction index output concerned all the after-sales services and considered them as the same for the optimization of the processes.

Then, for hypothesis 1 and 3, there are indeed strong and weak ties among the extended enterprise and the SMES. But still, with the co-evolution of these networks more research is needed to identify exactly the meaning of the strong ties and weak ties, in relation with the IT acceptance- [Figure 1](#), because there can be changes in the configuration of the network. The relationships for instance among the extended and the small organization can become strong ties as well. And so the question is what are the new network configuration and organizational and technological dimensions among this extended enterprise and these organizations? The research methodology for the investigation on all the hypothesis can be used based on the use of the research methodology used in this research paper and more generally explained in the research method implications.

### *7.2. Research Method Implications*

The research also leads to interesting research methodology implications for to analyze the impact of the ties on the IT acceptance of the organizations and vice-versa. The relationships among the SMEs using the IT acceptance analysis:

- The use of the number of customers as a representative of the type of organizations whether small or medium; since as the number of customers is increasing as the economic performance for each organization is increasing.
- The enumeration of the various IT systems and tools; the categorization of the systems and IT-tools is leading to the identification of the managerial and strategic performance of each organization.

- The investigation on the satisfaction of the dealers using the IT acceptance model; this lead to the identification of the level of understanding and awareness about the importance of technology management in these organizations.

This research methodology can be used in other sectors of the economy in order to investigate on the network configurations or the IT systems and tools spread in the environments or the types of relationships among organizations in various environments.

## REFERENCES

- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425-455. Available at: <https://doi.org/10.2307/2667105>.
- Anand, B. N., & Khanna, T. (2000). Do firms learn to create value? The case of alliances. *Strategic management journal*, 21(3), 295-315. Available at: [https://doi.org/10.1002/\(sici\)1097-0266\(200003\)21:3%3C295::aid-smj91%3E3.0.co;2-o](https://doi.org/10.1002/(sici)1097-0266(200003)21:3%3C295::aid-smj91%3E3.0.co;2-o).
- Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, 2(1), 40-57. Available at: <https://doi.org/10.1287/orsc.2.1.40>.
- Carlsson, S. A. (2003). Knowledge managing and knowledge management systems in inter-organizational networks. *Knowledge and Process Management*, 10(3), 194-206. Available at: <https://doi.org/10.1002/kpm.179>.
- Chesbrough, H. (2006). *Open business models: How to thrive in the new innovation landscape*: Harvard Business Press.
- Childe, S. J. (1998). The extended concept of co-operation. *Production Planning & Control*, 9(4), 320-327. Available at: <https://doi.org/10.1080/095372898234046>.
- Compeau, D. R., & Higgins, C. A. (1994). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189-211.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. Available at: <https://doi.org/10.2307/249008>.
- Davis, E. W., & Speckman, R. E. (2007). *The extended enterprise: Gaining competitive advantage through collaborative supply chains*. Englewood Cliffs: Prentice Hall.
- Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23(4), 660-679. Available at: <https://doi.org/10.5465/amr.1998.1255632>.
- Granovetter, M. (1983). The strength of weak ties: A network theory revisited. *Sociological Theory*, 1, 201-233. Available at: <https://doi.org/10.2307/202051>.
- Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*, 19(4), 293-317.
- Gulati, R. (1999). Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20(5), 397-420. Available at: [https://doi.org/10.1002/\(sici\)1097-0266\(199905\)20:5%3C397::aid-smj35%3E3.0.co;2-k](https://doi.org/10.1002/(sici)1097-0266(199905)20:5%3C397::aid-smj35%3E3.0.co;2-k).
- Gulati, R., & Gargiulo, M. (1999). Where do interorganizational networks come from? *American Journal of Sociology*, 104(5), 1439-1493. Available at: <https://doi.org/10.1086/210179>.
- Gulati, R., Nohria, N., & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, 21(3), 203-215.
- Hair, J., Anderson, R., Tatham, R., & Black, W. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Prentice-Hall. Inc.
- Hansen, M., Nohria, N., & Tierney, T. (1999). What's your strategy for managing knowledge? Response. *Harvard Business Review*, 77(3), 196-196.
- Hoffmann, W. H. (2005). How to manage a portfolio of alliances. *Long Range Planning*, 38(2), 121-143. Available at: <https://doi.org/10.1016/j.lrp.2005.03.001>.

- Jagdev, H., & Browne, J. (1998). The extended enterprise—a context for manufacturing. *Production Planning & Control*, 9(3), 216-229. Available at: <https://doi.org/10.1080/095372898234190>.
- Johns, N., & Lee-Ross, D. (1998). *Research methods in service industry management: Cassell*. London and New York: Cengage Learning Business Press.
- Konsynski, B. R. (1993). Strategic control in the extended enterprise. *IBM Systems Journal*, 32(1), 111-142. Available at: <https://doi.org/10.1147/sj.321.0111>.
- Lane, P. J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, 19(5), 461-477. Available at: [https://doi.org/10.1002/\(sici\)1097-0266\(199805\)19:5%3C461::aid-smj953%3E3.0.co;2-l](https://doi.org/10.1002/(sici)1097-0266(199805)19:5%3C461::aid-smj953%3E3.0.co;2-l).
- Magnusson, M. G. (2004). Managing the knowledge landscape of an MNC: Knowledge networking at Ericsson. *Knowledge and Process Management*, 11(4), 261-272. Available at: <https://doi.org/10.1002/kpm.210>.
- Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, 50(9), 741-749. Available at: <https://doi.org/10.1037/0003-066x.50.9.741>.
- Passiante, G., Fayyoumi, A., Filieri, R., & Taifi, N. (2007). *Modelling the extended enterprise in the digital economy: Some empirical evidence*. Paper presented at the Proceedings of the 8th GITMA Conference, June 2007, Napoli, Italy.
- Seufert, A., Von Krogh, G., & Bach, A. (1999). Toward knowledge networking. *Journal of Knowledge Management*, 2(3), 180-190.
- Straub, D. W. (1989). Validating instruments in MIS research. *MIS Quarterly*, 13(2), 147-169. Available at: <https://doi.org/10.2307/248922>.
- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464-476. Available at: <https://doi.org/10.5465/257085>.
- Veal, A. J. (1997). *Research methods for leisure and tourism: A practical guide*. London: Pitman.
- Vernadet, F. B. (1996). *Enterprise modeling and integration principles and applications*. London ; New York: Chapman and Hall.
- Weenig, M. W., & Midden, C. J. (1991). Communication network influences on information diffusion and persuasion. *Journal of Personality and Social Psychology*, 61(5), 734-742. Available at: <https://doi.org/10.1037/0022-3514.61.5.734>.
- Weenig, M. W. (1993). The strength of weak and strong communication ties in a community information program 1. *Journal of Applied Social Psychology*, 23(20), 1712-1731. Available at: <https://doi.org/10.1111/j.1559-1816.1993.tb01062.x>.
- Weenig, M. W. (1999). Communication networks in the diffusion of an innovation in an organization 1. *Journal of Applied Social Psychology*, 29(5), 1072-1092.
- Wenger, E. C., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. *Harvard Business Review*, 78(1), 139-146.
- Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice: A guide to managing knowledge*: Harvard Business School Press.
- Yin, R. (1994). *Case study research: Design and methods*. Thousand Oaks, CA: Sage Publications.

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