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RESEARCH WORK IN PROGRESS

N. 392, Nov. 2010

INNOVATION-BASED NETS AS COLLECTIVE ACTORS: A HETERARCHIZATION CASE STUDY FROM THE AUTOMOTIVE INDUSTRY

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Innovation-based Nets as Collective Actors:
A Heterarchization Case Study from the Automotive Industry

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ABSTRACT

Cooperation and collaboration between companies represents a key issue within the conceptual framework developed by the IMP Group. However, little attention has been paid to a phenomenon which can result from such collaboration, i.e. collective action. This involves cooperative activities undertaken by a significant number of actors sharing a common aim. This research uses the concept of issue-based net to open new avenues to understand collective action in the context of innovation activities, specifically by analyzing a case study of an innovation-based net in the automotive industry. Two main objectives are addressed in this study: Related to this discussion of different development paths of collective actors, the case study analysis focuses on how issue-based nets emerge and evolve in situations of innovation, specifically, what kind of structure and process issues characterize a heterarchization development path. Furthermore, the analysis addressed how issue-based nets change the positioning of individual member firms, a well as that of the collective actor within the overall network.

Keywords: Innovation, collective actor, issue-based nets, heterarchization, case study, automotive industry

1. INTRODUCTION

Firms are looking for new ways to enhance their competitive positioning in increasingly globalized and competitive markets. To do so, firms are reformulating their business models and competitive bases for example by developing virtual enterprises and interfirm collaborative strategies, such as R&D joint-ventures (Dilk, Gleich & Wald, 2008), strategic alliances or strategic networks (Achrol, 1997; Achrol & Kotler, 1999; Dyer & Nobeoka, 2000; Möller & Rajala, 2007; Cowan & Jonard, 2009). Innovation is generally considered a key factor to firms' success in the current competitive settings. At the same time, innovation processes are becoming more complex, expensive and time-compressed (Dilk et al., 2008). In order to cope with these new challenges, firms are relying more on interfirm collaboration to innovate by combining complementary activities and resources to develop new knowledge and share risks and costs (Sammarra & Biggiero, 2008). Mobilizing other companies in business networks via cooperative and collaborative business relationships therefore becomes a crucial managerial activity (Pfeffer & Salancik, 1978; Mouzas & Naudé, 2007).

The links between innovation, interfirm collaboration, and networks have been studied in several contexts, such as the automotive industry (Dyer & Nobeoka, 2000; Dyer & Hatch, 2004; Dilk et al., 2008), biotechnology (Powell, 1998), agriculture (Vanhaverbeke & Cloodt; 2006), banking (Swan, Bewell, Scarbrough & Hislop, 1999), or software industries (Ojasalo, 2008). Different kinds of firms have been investigated in this context, e.g. clusters (Bell, 2005), SMEs (Dickson & Hadjimanolis, 1998; Mohannak, 2007; Ojasalo, 2008), large firms (Weck, 2006) or virtual communities such as Mozilla and Linux (Chesbrough, 2006). Despite the differences in context and approaches between these studies, they share a common trait: innovation networks are built around a focal firm, also described as a network 'coordinator', 'manager' or 'orchestrator' (Vanhaverbeke & Cloodt, 2006).

However, our paper explores a different type of innovation networks and therefore contributes to the existing literature on innovation, networks, and interfirm collaboration by providing an alternative view. We are focusing on innovation networks whose members decide to cooperate with each other in order to collectively enhance their competitive positioning. Such a type of innovation networks may not have a central or focal actor which 'orchestrates' activities, instead the network shows characteristics of a collective actor, aiming at leveraging the innovation capabilities and competitive positioning of the whole set of participant actors.

These types of innovation networks resemble issue-based nets, i.e. sets of cooperative relationships involving actors that collectively confront a common issue (Brito, 1996, 2001). Based on combining a collective action (Olson, 1965; Oliver, Marwell & Teixeira, 1988; Wassenberg, 1982; Waarden, 1992) and an industrial network perspective (Håkansson, 1987; Håkansson & Johanson, 1992; Håkansson & Snehota, 1995), such an issue-based net perspective is useful for understanding collaborative interfirm phenomena in industrial networks that are aimed at innovating, thus overlapping with what Möller & Rajala (2007) have called 'intentional business nets'.

Issue-based nets rely on sharing and coordination. However, the firms involved may transfer some of the participants' resources, interests, or decision powers to the collective actor, resulting in an increased capacity to control overall activities and resource linkages. To gain a better understanding of these issues around coordinating, combining and developing resources, capabilities, or even business models required in innovation processes, our research uses concepts developed within the capabilities approach (Richardson, 1972; Teece, Pisano & Shuen, 1997; Loasby 1998) and shows how 'heterarchization' is achieved (Håkansson & Lundgren, 1995), i.e. finding innovative combinations of existing or new resources to perform different activities with new partners in the innovation network.

We will proceed with our argument as follows: The first section will introduce the theoretical background. Based on the industrial network approach and the collective action concepts, the section will discuss the role of collective actors within network dynamics, leading to an introduction of issue-based nets as well as a discussion of the capabilities approach. Based on these theoretical discussions, the next section details our research questions and the framework for analysis. Following on from this, we introduce our methodology and the case study setting. Case findings are presented and discussed, and a conclusion section looks at theoretical and managerial implications as well as the contributions of our research.

2. THEORETICAL BACKGROUND

2.1. The Industrial Network Approach

Business networks have been studied in the tradition of the Industrial Marketing and Purchasing Group since around thirty years. The two conceptual cornerstones for this research

tradition are the interaction approach (Ford & Håkansson, 2006) and the ARA (Actor/Resource/Activity) model (Håkansson, 1987). According to this model, industrial networks consist of connected systems of actor bonds, resource linkages, and activity ties (Håkansson & Johanson, 1992). These three aspects are intertwined as actors perform activities using resources. As no firm owns or has access to all resources it needs (Pfeffer & Salancik, 1978), it has to interact repeatedly with other actors to gain or mobilize such resources. These interfirm activities and underlying resources form the basis for collaboration and business relationships (Lorenzoni & Liparini, 1999; Gadde, Huemer & Håkansson, 2003).

Interactions between companies as part of business relationships contribute to stability or change in actors' bonds, their activity links, and their resource ties. Håkansson & Snehota (1995) argue that the combination of the three ARA levels provide six different interfirm collaborations: firms can improve their performance by (1) *structuring* existing links between their activities and/or resources more efficiently; but they may also decide to find new ways of combining activities and resources through (2) *heterogenizing* processes. Alternatively, firms can develop (3) *specialization* processes, by narrowing their activities and resources to the needs of their specific counterparts; but they can also take the (4) *generalization* path by performing different activities within relationships with new counterparts. Finally, firms can try to increase their control over resources as a way to develop some kind of advantage over other actors. To do so, they may develop a (5) *hierarchization* by strengthening the existing combination of resources within existing actors bonds that will lead to the reinforcement of activity patterns; or, actors may prefer the (6) *heterarchization* course, i.e. finding new combinations of existing or new resources to perform different activities with new partners, thereby weakening their current network connections.

The industrial network approach assumes that the way different collaborative interfirm relationships are formed and developed within the set of these six options is strongly affected by actors' network position, their network pictures, and their networking strategies (Johansson & Mattsson, 1992; Ford, Gadde & Håkansson, 2003; Snehota, 2004). Network pictures (also sometimes referred to as subjective network theories) reflect actors' vision and intentions that allow them to understand and act within the network, and to set network boundaries by including/excluding actors into/from a cognitive frame (Henneberg, Mouzas & Naudé, 2006; Zaheer, McEvily & Perrone, 1998). The actors' vision and networking strategies depend on their perceived positioning, i.e. their perceived set of exchange

relationships vis-à-vis other actors in the network, and the role they play in the network (Wilkinson & Young, 2002). Positioning is a cumulative process and constitutes the base for actors' strategic actions (networking), also holding a strong influence on their strategic identity (Håkansson & Johansson, 1988). For instance, a firm's network of relationships influences its capacity to innovate (Mohannak, 2007). Strategic actions evolve as firms interact with, and explore and adapt to new circumstances in their efforts to change or preserve their network positioning. As illustrated by Håkansson & Snehota's (1995) six interfirm collaboration options, the nature of the chosen strategic actions can contribute to the preservation of network structures (i.e. stability), or to its reconfiguration (i.e. change) (Håkansson & Henders, 1995; Håkansson & Lundgren, 1995).

The goals of such strategic networking of different actors within a business network are contingent on each other, as these goals are interdependent, and actors may compete, conflict, co-exist, cooperate or exhibit collusive behaviours in the fulfilment of their goals (Easton & Araújo, 1992). Bengtsson & Kock (2000) claim that some of these aspects may actually occur simultaneously, e.g. two firms may cooperate and compete at the same time in a process of 'coopetition', where actors cooperate to develop some activities and compete in others. Within coopetition processes, firms may commonly develop or share some activities and resources while at the same time preserving their own idiosyncratic and proprietary resources. In situations where firms share common issues or problems, actors may chose to cooperate and act jointly to solve these issues, creating a new actor: a collective actor. This concept is at the meso-level in between the micro-level (i.e. a firm within a network) and the macro-level (i.e. the business network itself). The next section will provide some conceptual discussion on collective actors. To get to grips with this issue, which within the industrial network approach represents a somewhat neglected aspect, the concept of issue-based nets is used.

2.2. Issue-based Nets

When a group of actors share common issues or goals this may cause them to aggregate resources and coordinate activities to promote or defend those issues. The resulting *collective action* may assume a formal or informal nature and include economic or non-economic links between the partners. Trade and industry associations, agriculture cooperatives, work unions, professional regulatory bodies, pressure groups, lobbying groups, or Web 2.0 social communities are some examples of collective actors.

The concept of 'collective actor' was first introduced in industrial business relationships by Brito (1996, 2001) as a way of understanding the dynamics of industrial networks. Based on the work of scholars in the tradition of collective action research (Olson, 1965; Hardin, 1968; Oliver et al., 1988; Wassenberg, 1982; Waarden, 1992), Brito shows that a group of firms can act collectively, i.e. become a collective actor, to solve a common problem or issue by forming an *issue-based net*, i.e. a clearly delineated subset of the overall network, including actors who are aligning their decisions and actions (Möller & Halinen, 1999; Möller & Rajala 2007). Issue-based nets emerge through a bottom-up process (Conway, 1995), originated from the initially uncoordinated activities of key actors that share common issues. This process clearly contrasts with top-down processes where the collective actor is triggered by a focal firm that plays a key role in selecting the members, configuring the net and designing the strategy (Doz, Olk & Ring, 2000). The formation of a collective actor can result from translation processes by which the actors' dispersed interests are aggregated and their fragmented power is concentrated (Håkansson & Snehota, 1995). This new and empowered actor on meso-level gains aggregate control and mobilization power over available resources to solve the participating firms' common issues.

In order for an issue-base net to emerge, two pre-requisites must coexist (Brito, 1996, 2001). The first one relates to pre-existing relationships between the participant actors that provide the foundation for cooperative behaviour. The second pre-requisite deals with the actors' network views or network pictures, as actors use them to make sense of the network, decide how to act, and influence others to share their views (Ford et al., 2003; Henneberg et al., 2006). The emergence of a collective actor calls for shared or, at least, compatible network views. This amalgamation of different network pictures has been described as the formation of network insight by Mouzas, Henneberg & Naudé (2008). Sufficient amalgamation of actor's views about the network enables the translation of the actors' perceptions, expectations and intentions towards network insight which forms the underlying rationale for the issue-based net. In the case of an innovation-based net, i.e. a collective actor formed around a common innovation issue, the emergence of such an actor is based on the characteristics of existing business relationships with regard to innovation processes on the one hand, and the formation of a common understanding and shared attitudes on how knowledge and innovation processes should be managed within the issue-based net and vis-à-vis the wider business network (Swan et al., 1999).

The creation and development of an issue-based net tends to be a long and complex process, especially when participants are numerous and heterogeneous. Actors will participate if they expect benefits to be larger than their contributions. However, in line with common characteristics of a collective actor (Olson, 1965), contributions are individual but benefits are collective (i.e. they are a so-called *public good* and as such available to every firm within the issue-based net independently of its contributions). Thus, free-riding behavior may arise. Larger collective actors have higher risks of attracting free-riders as opportunistic behaviour is usually less visible. However, free-riding effects can be diluted if enough critical mass of actors exists within the issue-base net (Oliver et al., 1988). This means that it is not necessary to mobilize all actors' resources to implement a collective action, if a smaller group of actors within the issue-based net is strongly connected and has access to the necessary resources.

2.3. Innovation and Capabilities

The main focus of this article is on a specific kind of issue-based net, namely one which is formed around the issue of innovation - an *innovation-based net* (IBN). In order to provide a framework for analysis of the IBN, some conceptual aspects of innovation is therefore provided in this section.

Innovation is becoming a growingly complex and costly process involving, for example, the management of specialized knowledge areas (Pyka, 2002; Dilk et al. 2008), and increasingly distributed activities across organizations (Swan et al., 1999). Araújo, Dubois & Gadde (2003) argue that proprietary control of capabilities and resources (such as knowledge) is unnecessary if a firm is able to access them effectively through its business partners. Furthermore, the fact that control over resources reduces the possibility of creating new knowledge (Foss & Loasby, 1998) might explain why innovation is increasingly conducted less within individual companies, and more in knowledge-creating networks integrating individuals, firms, universities and other institutions into innovation-based nets (Calia, Guerrini & Moura, 2006; Mohannak, 2007). Innovation processes, independently of whether they are oriented towards products or services, processes, or even new business models, require the concurrence of dissimilar but complementary resources and capabilities that need thus some kind of coordination.

The issue of coordination was addressed decades ago by Richardson (1972) who claimed that in order to coordinate closely complementary but dissimilar activities, firms need to cooperate with each other, and need to develop an adequate external organization with relational norms. Based on the work of Richardson (1972) and Ryle (1949), Loasby (1998) posits that an external organization integrates both direct capabilities ('knowing how to do things') and indirect ones ('knowing how to get things done by others'). Insofar as indirect capabilities allow firms to specialize while accessing complementary and dissimilar capabilities from other actors (Araújo, Dubois & Gadde, 1999; Mouzas & Naudé, 2006), they are an essential element of innovation processes. However, as the mere access or exploitation of resources and capabilities is insufficient to produce novel outcomes, firms will need to use dynamic capabilities that allow them to integrate, develop and re-configurate internal and external capabilities and resources by using coordination and learning processes (Teece et al., 1997).

Inter-organizational links are critical to knowledge and learning processes, posing managerial challenges for innovating firms (Swan et al., 1999; Powell, 1998). While relationships between firms that have similar knowledge stocks is less useful as sharing them will not result in new knowledge (Cowan & Jonard, 2009), establishing relationships with firms holding complementary resources and capabilities will improve learning and result in competitive advantages (Foss & Loasby 1998; Lorenzoni &Lipparini, 1999). However, for this process to be successful, firms may need to share overlapping knowledge (Richardson, 1972) and need to possess some absorptive capacity (Cohen & Levinthal, 1990) that allows them to recognize the value of external knowledge, in order to assimilate and combine it with internal knowledge. Absorptive capacity goes beyond technological knowledge, including capabilities shared in inter-organizational relationships, allowing firms to incorporate and develop own knowledge (Araújo et al., 2003) as well as to influence the development of capabilities held by their counterparts (Mota & de Castro, 2004).

For IBNs to succeed, firms involved have to create specific bundles of direct and indirect capabilities. Dynamic capabilities are essential to enable participants within the IBN to find novel combinations and solutions. This may include technical and non-technical (e.g., social) capabilities such as the identification of adequate partners (e.g. performing complementary activities or holding valuable network links), the creation or sharing of common network visions (e.g., aligned expectations about potential outcomes of the IBN), and the mutual influencing of their respective capabilities, activities, and investments. The emergence and

management of an IBN may result in restructuring of activity patterns, the creation and recombination of resources and capabilities, or in finding and connecting with new valuable business partners, and the enhancement of the collective as well as the individual firm's network position.

After reviewing and introducing some theoretical concepts from different research streams, namely the industrial network approach, issue-based nets, and the capabilities approach in the context of innovation, to ground the following case analyses, the next section uses these concepts to put together a conceptual framework for the analysis of the case example.

3. HIERARCHIZATION OR HETERARCHIZATION: FRAMEWORK FOR ANALYSIS

Based on these theoretical considerations, Figure 1 illustrates the framework for analysis that encapsulates the papers' research questions and guides the empirical plane. The focus of our analysis relates to the emergence and development of a collective actor within a larger business network that holds resources and performs activities, as proposed by Håkansson (1987). The left-hand side of the framework represents the point of departure in terms of the pre-requisites for an IBN to come about (linked to the ARA model), i.e. the *collective actor morphology*. For the IBN to emerge, there must be a number of actors agreeing on a common positioning. Those actors need to jointly hold a minimum (critical) mass of diversified resources upon which to create the IBN. As those resources are dissimilar and dispersed between the various actors, this poses a problem of coordinating and (re-) combining their activities to explore existing resources within the network. The right-hand side represents the *collective action process* by which the IBN is created and managed (and thus the processes map onto the prerequisites for IBNs): For the IBN to emerge, actors must align their sense-making, i.e. the perceptions of network pictures as well as their positioning vision (including integrating their intended networking strategies, i.e. the strategic decision regarding changing the network position). Therefore, collective networking occurs as another collective action proves. This refers to the interactions of IBN members, e.g., by following one of Håkansson & Snehota's (1995) pathways, e.g. hierarchization or heterarchization. As network outcomes are produced, interpreted and evaluated by the IBN's members, network visions may subsequently be altered, leading to a change in the collective actors' networking pathways (Ford et al., 2003). The categories of this model are used later on in the case analysis as construct templates.

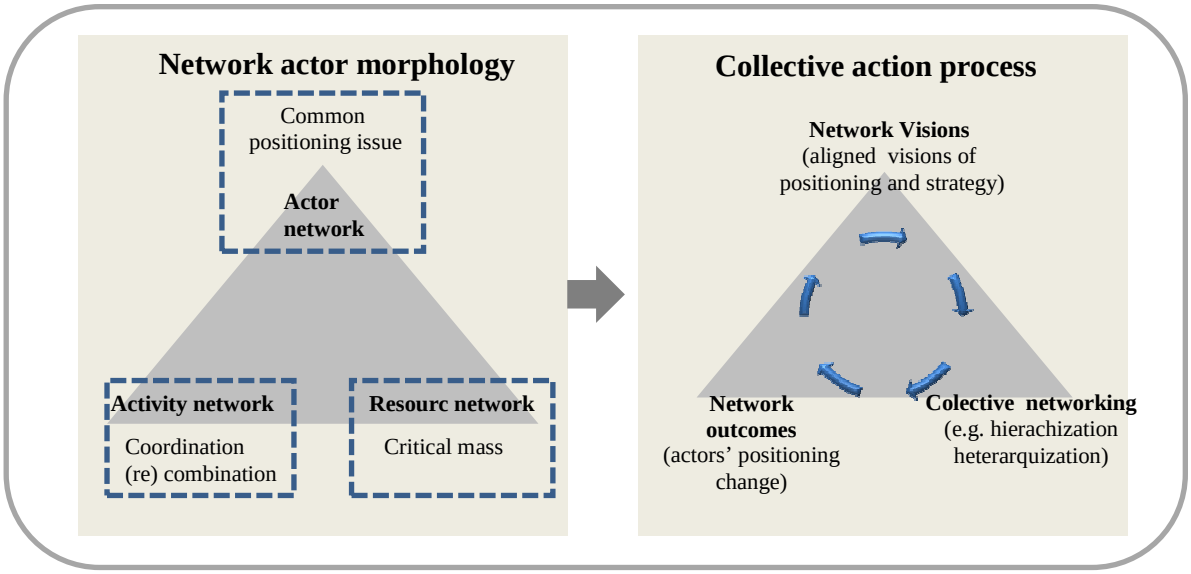


Figure 1– Framework for analysis and Research Questions

Of specific interest for the case examples is the need to change the individual firms' as well as the IBN's positioning in the network, and therefore the means by which the collective actor, i.e. the IBN, attempts to solve a common problem for the mutual interest of all participants. Such an issue, particularly inducing change via a translation process that concentrates dispersed power within the collective actor, is normally expected to happen via Håkansson & Snehota's (1995) *hierarchization* pathway, as argued by for example Vanhaverbeke & Cloodt (2006). However, it can be proposed that collective actors can also emerge by following a different pathway. Specifically, an alternative to hierarchization can be *heterarchization*, or a restructuration process (Håkansson & Snehota, 1995) by which resources, capabilities and activities are created or recombined in innovative ways between the participating firms which results in an enhanced strategic identity and a stronger network positioning of the collective actor, i.e. in the context of this article an IBN. As part of heterarchization, the collective actor's goal is to preserve or change its network positioning.

While firms must be mobilized to join up their efforts and resources as part of the collective actor, it is not necessary that large numbers of companies participate as long as enough critical mass exists (i.e. a *resourceful collective actor* is formed) to sustain strategic activities. Whilst in hierarchization processes, power is gained by concentrating similar resources from different firms, in restructuring processes based on heterarchization, power stays heterogeneous, as diversity breads innovation (Foss & Loasby, 1998). Thus, IBNs based on

heterarchization are more likely to be centered around firms performing dissimilar yet complementary activities, therefore posing a coordination problem that calls for inter-organizational cooperation (Richardson, 1972). This represents a problem which does not exist in the same way for hierarchized collective actors with more similar participants. However, diversity reduces the potential problem of competition between the participants in the IBN and, thus, facilitates cooperation (Easton & Araújo, 1992; Bengtsson & Kock, 2000).

Independent of the pathway chosen towards facilitating collective action, in both cases the desired outcomes are contingent on the participant firms (or at least those in the critical mass subgroup which forms the resourceful collective actor) aligning their network pictures and visions, particularly regarding the nature and importance of the common issue, on the way to achieve it, and on the adequate level of individual firms' commitments. This cognitive amalgamation (Mouzas et al., 2008) results in new ways of interacting between the firms within the collective actor, as well as in coordinated collective actions vis-à-vis external interaction partners, in order to induce change and reinforce the collective actor's positioning in the overall business network. Based on the actual outcomes of the collective action, there exist feedback loops that will adjust the actors' network pictures, and consequently their visions and their willingness to reinforce the collective actor may be revaluated.

Related to this discussion of different development paths of collective actors, specifically IBNs, the case study used therefore addresses two related issues:

- Why and how do issue-based nets emerge in situations of innovation, i.e. as innovation-based nets (IBNs)? (cf. left-hand side of the research model)
- How does the collective action process evolve within the context of IBNs? (cf. right-hand side of the research model)

4. RESEARCH METHODOLOGY

This section aims to make clear the links between the theoretical framework, the empirical phenomenon (IBNs), and the case method used in this project (Dubois & Gibbert, 2010). In order to achieve a rich and detailed understanding of issues relating to the two main research issues outlined, a case study design is adopted for the empirical analysis. The industrial network approach as the main conceptual framework of this paper specifically emphasizes the interdependencies between actors (Axelsson & Easton, 1992), the complexity of business

networks (Easton, 1998), and the difficulty to set clear boundaries around the context and the phenomenon in question (Yin, 2003). These characteristics call for qualitative and context-rich methods such as case studies as a relevant empirical tool for data gathering and analysis. In addition, the specific nature of the IBNs requires the existence of dynamic capabilities that are seldom created within the boundaries of a single company, but rather in the context of relationships, i.e. interactions between different actors.

When studying networks, the existence of manifold connectivities between actors makes the setting of appropriate boundaries (i.e. the network horizon) a difficult issue with direct sampling consequences (Johanson & Mattson, 1992; Holmen & Pedersen, 2002). In this research project, the sampling process was facilitated by the use of the issue-based net as a concept framing an appropriate qualitative research tool (Brito, 1996). Overlapping with Moeller's conceptualization of *nets* (Möller & Halinen, 1999), the issue-based net is an intermediate solution between studying the actors and their direct and important relationships on the one hand, or analysing the potentially borderless networks as a whole on the other. Using the issue-base net, i.e. an IBN in the case study, as a framing device respects the connectivity between the participant actors and at the same time facilitates the process of setting the boundaries within the network. As such, the unit of analysis is represented by the issue-based net, comprising all its participant member firms and other institutions.

The case setting was selected according to its relevance to the investigation (George & Benett, 2005) and its learning potential (Dubois & Gadde, 2002). The main goal was to investigate the emergence and development of an issue-based net (i.e. the pathway used forming a collective actor) aiming at reinforcing its participants' network positioning by strengthening their innovation capabilities. Consequently, ACECIA (Agrupamento Complementar de Empresas de Componentes Integrados para a Indústria Automóvel) was selected which represents a formal organisational arrangement involving diverse companies and research centres mainly operating in the automotive industry in Portugal.

Data was collected mainly through multiple semi-structured interviews (length: between one to five hours) to develop a rich and deep understanding of the phenomena in question (Rubin & Rubin, 1995). We interviewed one representative of all of ACECIA's current member firms, and of two pivotal research centres. One of the research centres (Inegi) joined

ACECIA initially but left the IBN later. The other research centre (Inteli) is a crucial in the automobile industry and was involved in several of ACECIA's projects.

The selection of the specific interviewees was done according to their ability to provide insightful information regarding the main issues of this study, (Yin, 2003; Rubin & Rubin, 1995): they were all directly involved in the creation, evolution and management of the issue-based net. Subsequent analysis shows that saturation within the gathered data was reached through the available interviews regarding the main conceptual categories of interest (Strauss & Corbin, 1998). Based on the research objectives and the conceptual framework, a semi-structured interview guide was organized to assure that all topics and concepts linked to our construct templates were fully covered by the respondents. Data was collected in such a way that the developmental path of the IBN was traced, i.e. interviewees were asked at different points during the interviews about critical incidents that marked different specific phases in the development of the collective actor at hand (Quintens & Matthyssens, 2010). All interviews (done in the native tongue of the respondents) were taped and transcribed for analysis. Interview data was analysed using qualitative content analysis, based on the construct templates developed (Krippendorff, 2004). Thus, the data from the transcripts was organized according to concept categories derived from the conceptual framework, allowing us to relate the empirical data to the theory used in this project (Piekkari, Plakoyiannaki & Welch, 2010). Other sources of information such as site visits, firm documentation, and relevant press articles were also used for data triangulation purposes.

5. ACECIA INNOVATION-BASED NET

Since the 1990's, seven of the then twelve automobile OEMs operating in Portugal decided to delocalize their production sites to other countries, especially to Eastern Europe. The decision of Opel/GM to leave Portugal at the end of 2006 represented a major blow to the national automotive industry, contributing to the 23 % drop in the production in 2008 compared to 2006 (according to ACEA - European Association of Automobile Manufacturers, www.acea.be). Following the departure of Opel/GM, major 1st tier international suppliers also abandoned the country, impacting 2nd and 3rd tier suppliers as a consequence. The automobile industry in Portugal currently (2009) employs more than 40,000 employees in about 180 companies, 90% of which are SMEs with up to 500 employees. These suppliers are highly dependent on the automobile industry that is the exclusive source of revenues for almost two-

thirds of them. Suppliers have very different profiles, ranging from multinational 1st tier suppliers with high levels of resource endowments, to 2nd tier suppliers producing simple components, to small and local 3rd tier suppliers, which manufacture standardized components (see AFIA- Associação de Fabricantes para a Indústria Automóvel, www.afia.pt). Directly or indirectly, they all face worldwide competitive pressure linked to changes in the global automotive industry.

In Portugal, the OEMs manufacture and assemble cars with no participation in the R&D processes of these vehicles. As such, Portuguese firms are not close to the innovation centres of OEMs. In the 1990s, Portuguese suppliers to the automotive industry were focusing mostly on low-value activities, e.g. producing components designed and specified by OEMs themselves, or their first-tier suppliers. However, at the same time OEMs reduced their supplier bases and kept only those suppliers that are able to deliver complete modules, thus shifting value-add to some suppliers which were consequently gaining more development tasks as well as innovation capabilities (Dilk et al. 2008). This development poses a further threat to national component producers which are unable to create those higher value modules and, consequently, they may be moving far back within the supply network, i.e. decreasing their connectedness with innovation activities.

5.1. The Emergence of ACECIA

In 1997, in order to counter some of these trends and the negative impact on Portuguese automotive suppliers, five firms from distinct areas (plastic, metal and textiles) and two technological centres (TC) involved in the automotive industry decided to create ACECIA - an European Economic Interest Grouping (EEIG) (see figure 2). The creation of this EEIG resulted from the efforts of an external mobilizer: a former senior member of IAPMEI, the Instituto de Apoio às Pequenas e Médias Empresas (a public body that supports SMEs in Portugal), who was involved in negotiating Ford and Volkswagen's investments in Portugal and who had a profound knowledge of the national automotive industry. ACECIA received some public funding when it was initially constituted, but its operational expenses are covered by annual contributions from its member firms and organizations. They all hold equal shares in this particular EEIG. A top management team was formed, with a CEO (the external mobilizer) and one representative of each member firm or organization.

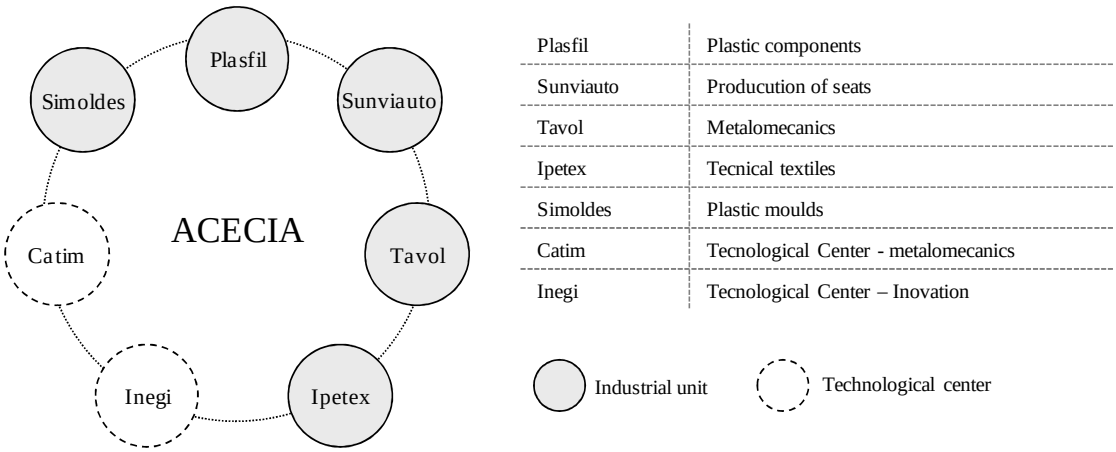


Figure 2 – Founding members of ACECIA in 1997

According to ACECIA's CEO "our *main goal is to supply complete industrial services to the OEMs and its main 1st and 2nd tier suppliers*". Thus, ACECIA is aimed at producing innovative modules that would make it possible for its members to 'move up in the value network', i.e. nearer to first tier suppliers and OEMs. Joint promotional activities and exchange of information as well as the development of proprietary knowledge (capabilities, experiences) were also set as goals that would help improve the position of the IBN in the overall network. The five industrial supplier companies had different technological backgrounds but they all belonged to the auto-component industry and held already a common view of its problems, i.e. their network pictures were already to some extent overlapping. The firms were not economically related, but they knew each other (or at least knew of each other), as the Portuguese automotive market is rather small and all of the firms were highly reputed. Due to the suppliers' lack of experience in working together and forming a collective actor, the TCs were invited to join the association to facilitate the coordination among them and speed up the development process for new modules due to their specific innovation capabilities. ACECIA's shared rationale was that whilst none of the participating firms and organizations alone was able to produce a complete module, they performed complementary activities supported by a diverse set of resources that, if combined in novel ways, enhances the development of innovative products.

Participating firms indicate that they initially expected three main benefits from forming the collective actor ACECIA: participating in innovative module development and production and, thus, becoming eventually first-tier suppliers; profiting from economies of scale in joint promotional activities; and increasing their sales while keeping their autonomy. ACECIA was

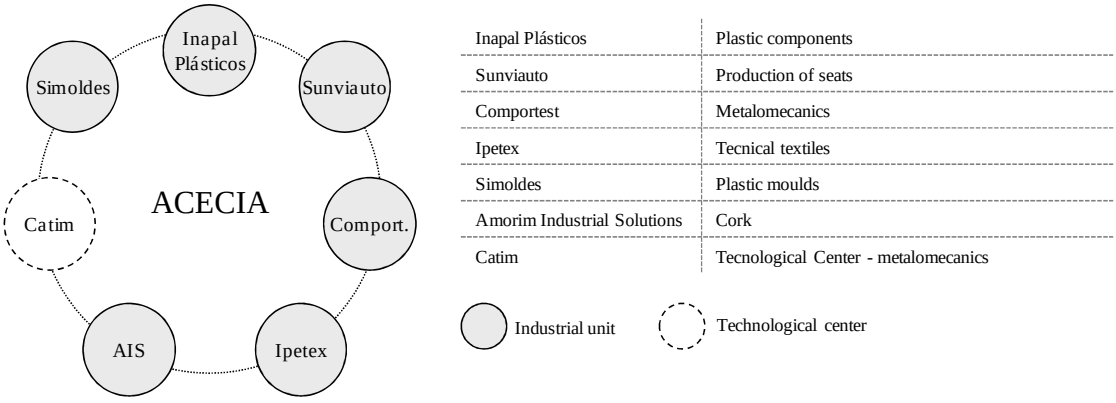
able to obtain considerable awareness of its activities within the automotive industry quite rapidly. ACECIA firms and organizations promoted the association to their customers, stressing their improved capabilities. ACECIA also organized a major promotional event attended by all ministers of economy since 1974, and provided their support to five international commercial missions. The missions revealed that even if the OEMs seemed to accept ACECIA's concept of innovative component supply, they were nevertheless suspicious about its reliability; the OEMs believed that ACECIA still lacked adequate critical mass and solid technological experience and reputation due to its heterogeneous make-up.

This suspicion was partially corroborated by the following developments. During its initial development phase, ACECIA showed low levels of coordination and integration between participating firms. Their lack of experience in module architecture engineering and the unexpected inability of the TCs to facilitate and speed up the module development resulted in huge delays and no relevant outcomes for the IBN. ACECIA was not able to come up with an innovative component module that attracted any OEM's interest and, additionally, the members had different time expectations and degrees of commitment, thus exhibiting the fact that 'network insight' within the new collective actor had not been formed (Mouzas et al., 2008). These first years of ACECIA were considered by many (within and outside the IBN) a disappointment, even if some member firms were able to exploit some individual opportunities. In 1999 the association suffered a major crisis: two of its members (Tavol and Plasfil) were acquired by Spanish companies that were not welcomed by other ACECIA members as they were seen as possible competitors, and consequently left the IBN. One of the TCs also held divergent views on how to achieve the association's goals. These critical incidents, together with the lack of results, caused high levels of dissatisfaction among members and led to the restructuring of the association.

5.2. The Reformulation of ACECIA

In 2000, three new industrial companies joined ACECIA, occupying the vacant places in the set-up of the IBN (cf. Figure 3. Two came from similar specialization areas to the companies which had left, with the third being owned by the world leader of the cork industry. This company dominates the application of the so-called *corkrubber* technology which has many applications in the automotive industry. With this reformulation of the morphology of

ACECIA as a collective actor, the scope of activities, resources and capabilities was widened, enabling new combinations of resources and developing new capabilities.



Inapal Plásticos	Plastic components
Sunviauto	Production of seats
Comportest	Metalomecanics
Ipetex	Tecnical textiles
Simoldes	Plastic moulds
Amorim Industrial Solutions	Cork
Catim	Tecnological Center - metalomecanics

Figure 3 - Members of ACECIA since 2000

Shortly after this reorganization, ACECIA faced a major opportunity in 2001, after the Portuguese government began negotiating the purchase of two submarines from a German Submarine Consortium. This purchase included a 'pre-offset' and an 'offset program' that forced the consortium to purchase from Portuguese naval, automotive and software industries manufacturers to offset the value of the submarines. ACECIA received a large volume of business linked to that deal. The German consortium either placed the orders itself or worked as a broker finding buyers for Portuguese components. One member of the German consortium – Ferrostal (which owned 100% of MAN, a major truck and steel manufacturer) had close contacts with BMW, the Volkswagen Group, as well as major first-tier suppliers in the automotive sector. Ferrostal subsequently played an important role as the facilitator of contacts between ACECIA and some of these major OEMs and their first-tier suppliers.

The offset program had two main outcomes. Firstly, it represented a major business opportunity for ACECIA as sales (under the off-set agreement) had to relate to new contracts, rather than ongoing business between ACECIA and any of the automotive buyers. Thus, this program offered the six participant firms tangible benefits for belonging to and investing in the association. It also enabled them to prove to the automotive sector that they were reliable suppliers and capable of fulfilling large orders on a continuous basis. Secondly, and more importantly related to ACECIA's strategic goals, was the possibility of interacting and contracting directly with major (prospective) customers, including large and important OEMs, and proving to them their joint technological and innovation capabilities. ACECIA's priority

became the development of component modules that fulfilled two conditions: quickly attracting the attention of the OEMs, and involving the diverse capabilities and resources of all (or at least most) of its member firms and organizations. As the association was not commissioned specifically to develop any particular module or component, it decided to innovate on its own, within the IBN. The ACECIA top management team, assisted by an external consultant, collectively discussed the future evolution of the automotive industry and its supplier network, and what they believed would represent major opportunities for technology developments in order to identify promising investment areas.

Environmental, specifically climactic changes were identified as a major threat to the industry, forcing OEMs to find solutions for, amongst others, two main problems: CO^2 emissions reduction, and recyclability of materials. Focusing on these issues, ACECIA developed between 2000 and 2006 four new and innovative component modules (see Figure 4 which identifies the firms contributing to the four module development initiatives). The four component modules share two common traits in terms of innovation characteristics: They are lighter than comparable components due to innovative combinations of materials (such as compound materials using metal and plastic, for example in front-ends and pedal system modules, or compound materials with cork and rubber composites in seat modules). Secondly, the innovative modules are also characterised by a high proportion of recyclable materials. For example, this created a seat module which was almost totally recyclable.

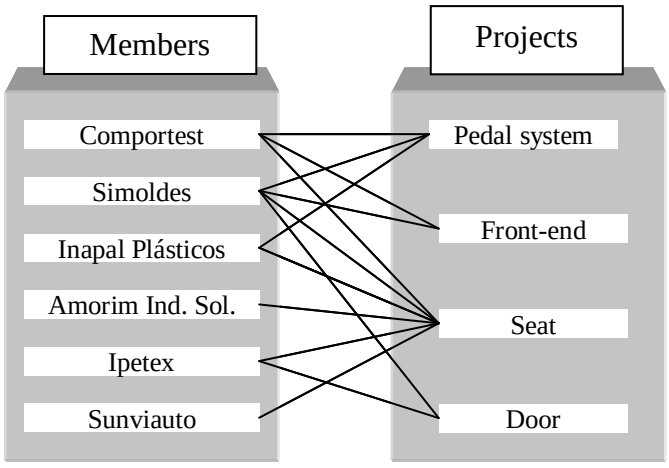


Figure 4 – ACECIA's main innovation projects (2000-2006)

In terms of business impact, the outcomes of these innovation projects by the collective actor were varied. The front-end module has not yet attracted the interest from any OEMs. The door

module produced mixed results: It was presented to several OEMs and was adopted by the Korean manufacturer Daewoo, which consequently joined this specific ACECIA project as a technological partner. However, Daewoo suffered a major financial crisis and went bankrupted shortly after, causing the suspension of the project. The pedal system, on the other hand, showed excellent results in terms of innovative capabilities: in terms of weight a reduction by fifty percent was achieved, while reducing production costs by twenty-five percent. This new module offering was well received by some OEMs that requested ACECIA to even further reduce costs. The commercialization of this module was planned to begin in 2008. The seat module represents the most complex and promising innovation project, involving a multidisciplinary team of forty persons belonging to the six participating ACECIA firms, a design partner, and two universities. 10,000 hours of engineering have already been invested, and 130 single components are projected or have already been developed. The new seat prototype was presented at the end of 2007 and promoted via several trade fairs in 2008. ACECIA was also trying to sell it through the German facilitator company Ferrostal.

6. CASE STUDY FINDINGS

6.1. The emergence of an innovation-based net

The creation of ACECIA as a collective actor was linked to the realization of a common problem affecting companies which became its founding members: their weak positioning in the automotive value network, detached from innovation activities which were concentrated in OEMs and first-tier suppliers. They also shared a common vision, evidenced by overlapping network pictures: they were looking for strategic networking options to enhance their network positioning to come closer to the OEMs and main automotive suppliers. Their initial joint 'network insight' consisted of an intention to effect this by higher resource application to innovation activities, i.e. to invest in their R&D capabilities. They also agreed that their issue was a 'common problem' for all of them, and that it could be better solved collectively. This resulted in the decision to 'create' ACECIA as an IBN. Thus, ACECIA fulfil one of the basic pre-requisites of an issue-base net (Brito, 1996, 2001), i.e. the existence of a *common issue*. However, they lacked adjustments of other aspects of networking, i.e. finding a common coordination mode, or aligning their time perspectives, all pre-requisites for full 'network insight' (Mouzas et al., 2008).

Pre-existing *relationships* are another framing aspect for the development of collective actors, and a pre-requisite for issue-based nets. In the case of ACECIA, there were no pre-existing relationships between the different firms and organizations, although there were sporadic social encounters between some employees, thus firms knew of each others' existence, mainly because of the 'small world' of the Portuguese automobile industry and the good reputations of all the firms involved. Initially, the external mobilizer, i.e. the individual who became later the CEO of ACECIA, was meant to negotiate with potential member companies and research organizations, selecting those with diverse and complementary capability profiles and proven performance (i.e. a vision of heterarchization drove this stage). However, it turned out that the actual composition of the initial stage of the ACECIA formation (see figure 2) was strongly influenced by the firms that were the first to join, either because they 'imposed' other participants, or because they refused to accept others to participate in the collective action.

A similar practice was followed in the reformulation process (see figure 3), with the 'founding' companies providing a core within the IBN. Such 'homophily', i.e. the association with similar actors (McPherson, Smith-Lovin & Cook, 2001), in the context of an IBN relates to the fact that innovation is linked to the sharing of tacit and proprietary knowledge which is based on trust, a willingness to share, and recognized mutual benefits over time. Especially the 'vetoed' companies and organizations were not seen as trustworthy and valuable partners by the founding companies. Often, these decisions were made based on apparently superficial knowledge of potential members, thus influencing the participation or non-participation of actors in an issue-based net, and thereby determining its profile and future development. Thus, while heterarchization was intended (i.e. finding a complementary mix of actors with different capabilities), there were tendencies towards hierarchization (i.e. finding similar actors with overlapping capabilities and similar characteristics) due to the homophily criteria implicitly applied on membership selection. Although the new members provide new and non-overlapping capabilities (heterarchization), the main contested issue related to subjective preconceptions about the trustworthiness of the new owners of Plasfil and Tavol, thus, these companies did not posses in the eyes of ACECIA similar traits to the established members.

Another theoretical aspect linked to a collective actor such as ACECIA relates to the condition of *critical mass*. The benefits for participating companies and technology centers associated with ACECIA are similar to those identified for cooperation amongst SMEs by

Mohannak (2007): collective economies of scale (e.g. of promotional activities, or research resources), benefits of dissemination of information (e.g. during the development of the module projects), and inter-firm division of labour (e.g. owing to participants' specialized activities and resources). The creation of ACECIA permitted specifically the minimization of a general problem of smaller companies: the lack of a critical mass of essential resources for innovation (Dickson & Hadjimanolis, 1998). By making their specialized activities and resources available to the other IBN members, this resource endowment problem was diminished and collective innovation potential was fostered. Direct control over innovation-relevant assets was replaced by general access within ACECIA, thus advantageous relational governance mechanisms took over from hierarchical decision-making (Araujo et al., 2003).

A specific aspect of the progress of a collective actor is the existence of sufficient capabilities to *make action feasible*. In an IBN, the critical mass is linked to the quantity of available innovation resources, but also to their complementarity and differentiation, as diversity breads knowledge creation and innovation (Foss & Loasby, 1998). Right from the start, three of the initial participating firms (Simoldes, Sunviauto and Impetex) held adequate resources to make the intended innovations technically feasible, and the CEO of ACECIA held a wide and valuable set of network links. As time went by and some of the initial members were becoming increasingly dissatisfied with the lack of results, this group of actors also played an essential role in sustaining the collective actor's cohesiveness and enabling its reformulation.

Richardson's (1972) argument that *inter-firm cooperation* is an adequate mechanism to coordinate dissimilar and close complementary activities relates to the successful formation (as well not so successful initial operation) of ACECIA. Inter-firm cooperation was needed not only to manage resources collaborations, but also to create new innovation-related capabilities (e.g. knowledge exchange processes) and to find new resource combinations. Sometimes parts of the resources were external to the ACECIA network. A case in point was the innovation developments aimed at the seat module: a design firm (Modus Design) and two universities (Instituto Superior Técnico and Faculdade de Motricidade Humana) joined the ACECIA R&D multidisciplinary team. Figure 5 summarizes the main characteristics of the ACECIA case in terms of network actor morphology.

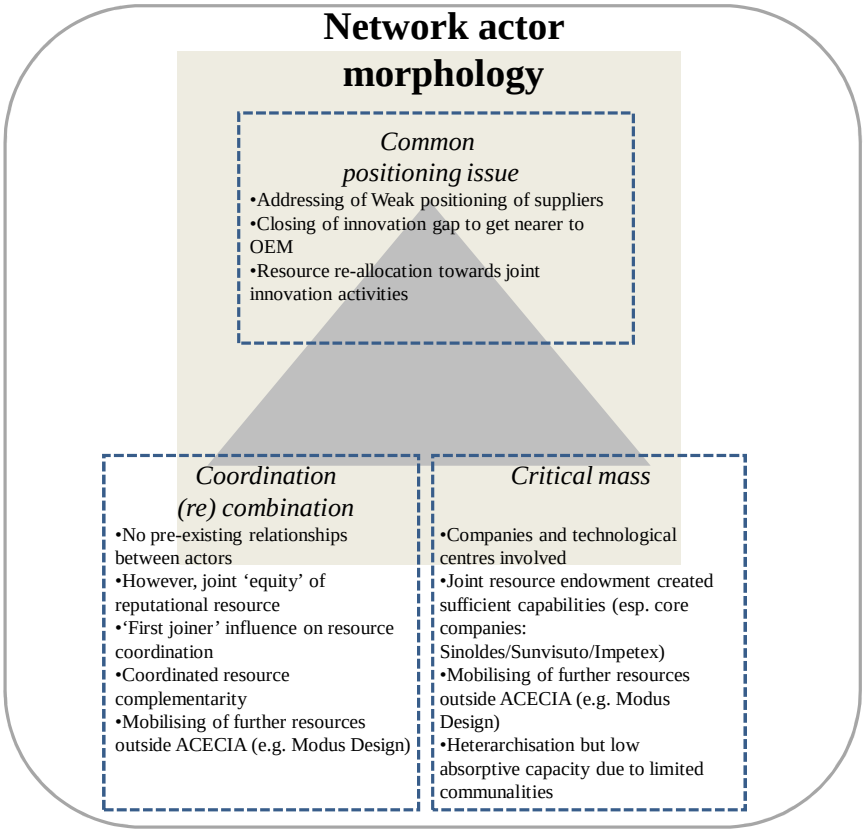


Figure 5 – ACECIA network actor morphology

Due to the fact that the participating companies had no previous business relationships and experiences with each other, building the preconditions for working together was somewhat difficult. This illustrates that direct capabilities of firms (i.e. knowing how to make things), must be complemented by indirect capabilities (i.e. knowing how to have others make things) to enable the coordination or development of new resources. The case study also suggests that in the absence of some degree of overlapping knowledge or experience (Richardson, 1972; Lorenzoni & Lipparini, 1999), as happens with heterarchization IBNs, absorptive capacity in the these companies may be low (Cohen & Levinthal, 1990), thereby hindering firms' to build competitive advantages from available network resources.

6.2. The collective action process

The previous section discussed the 'requisites' for a collective actor to emerge and its characteristics in the case of ACECIA, a heterarchization IBN. This section analyses the collective action process, e.g. the formation of a common network visions (overlapping network pictures, and network insight), the networking activities within and outside the IBN,

and the different perceptions and repercussions of resulting network outcomes. As such, in distinguishing these three elements, we follow Ford et al.'s (2003) model of managing in business networks.

It has been suggested that the creation, development or even survival of a collective actor requires the alignment of their network visions (Johansson & Matsson, 1992). This seems particularly true in the case of an IBN formed by heterarchization where participants who may not know each other well, or do not have overlapping capabilities, have to share resources (sometimes sensitive knowledge), invest time and money and interact in an intense manner. In this case, compatible visions (i.e. network picture alignment) may not be enough to sustain the net in the long run. In the case of ACECIA, participants seemed to have similar perceptions of their common problem (their positioning on the automotive industry), their capability profile, the potential benefits of cooperating, and a feasible common solution: collectively coordinating or restructuring their activities to produce innovative components and thereby becoming a more valuable counterpart to the OEM's and 1st tier suppliers. However, the companies did not achieve network insight (Mouzas et al., 2008), i.e. during the initial operation of the IBN the participants did not, implicitly or explicitly, come up with a mental framework which aligned time, space, activity, and detailed goal expectations across actors. This case also shows how this lack of network insight caused a loss of alignment (at the end of the first phase) which caused severe conflicts and posed serious threats to the collective actor. When this happened, some members had to leave either by choice or by being coerced by other members. However, this meant that the 'critical mass' subgroup further aligned its visions and amalgamated, arguably helped by the opportunities around the external German Submarine Consortium and the associated 'pre-offset' and 'offset program', its network pictures into something resembling network insight. This probably had an essential and positive effect on the survival of ACECIA.

Collective networking is present right from the formation of ACECIA. Participant members influenced each other's activity priorities. An important aspect of this networking is represented by the choice of module projects as these did not offer the same level of potential benefits to the participating six firms. Balancing individual company interests therefore became a crucial dimension of the collective actors' activities. The fact that the CEO was not connected to any of the firms may have facilitated his leadership and mediator role in achieving this. Collective networking included some level of hierarchization (Håkansson &

Senhota, 1995) or translation (Brito, 1996, 2001) as participants concentrated their power and interest within the collective actors. Structuring also became important as firms continuously worked together and acquired economies of experience and learned about more efficient uses of resources. However, probably more important to ACECIA's strategic networking activities were the change vectors, namely heterarchization or restructuring processes that are crucial to innovation processes. The restructuring process occurred as firms changed and adapted activity patterns vis-à-vis the other participating firms who had different capabilities, processes, and experiences. This enabled the innovative combinations of resources within the IBN and allowed new connections with established but also new business partners outside the IBN.

Regarding the network outcomes of the IBN, it remains at this point in time (2009) difficult to assess if ACECIA was already, or will be, able to fulfil its strategic goals. In 2008, when ACECIA expected to begin selling its new modules, the global economy and particularly the car manufacturing industry entered a major crisis, whose timeframe and consequences are hard to foresee. However, one can look at some of the intermediate outcomes since the inception of ACECIA. A first important outcome resulted from the fact that previously unbonded actors with diverse knowledge and capability sets were put to work together (e.g. a cork company now works within the automotive industry) and had the opportunity to explore each others' potential. This was done via different ACECIA-induced projects but had also spillovers to projects outside its scope, with added benefits to the individual firms. The case also suggests that ACECIA was very effective in gaining public awareness and recognition as a credible actor, as its participation in the offset program seems to indicate. In fact, it was the (externally induced) offset program that produced the outcomes perceived as most positive by the participating members. It brought valuable contacts with the OEMs and 1st tier suppliers and made ACECIA and its member companies and organizations visible, brought new business and increased sales, and allocated funds to the module innovation projects. Without the offset program and the network connections provided by Ferrostal, the network outcomes would probably be much more modest, even if the participants and their innovation potential was the same. Figure 6 provides an overview of ACECIA's collective action processes.

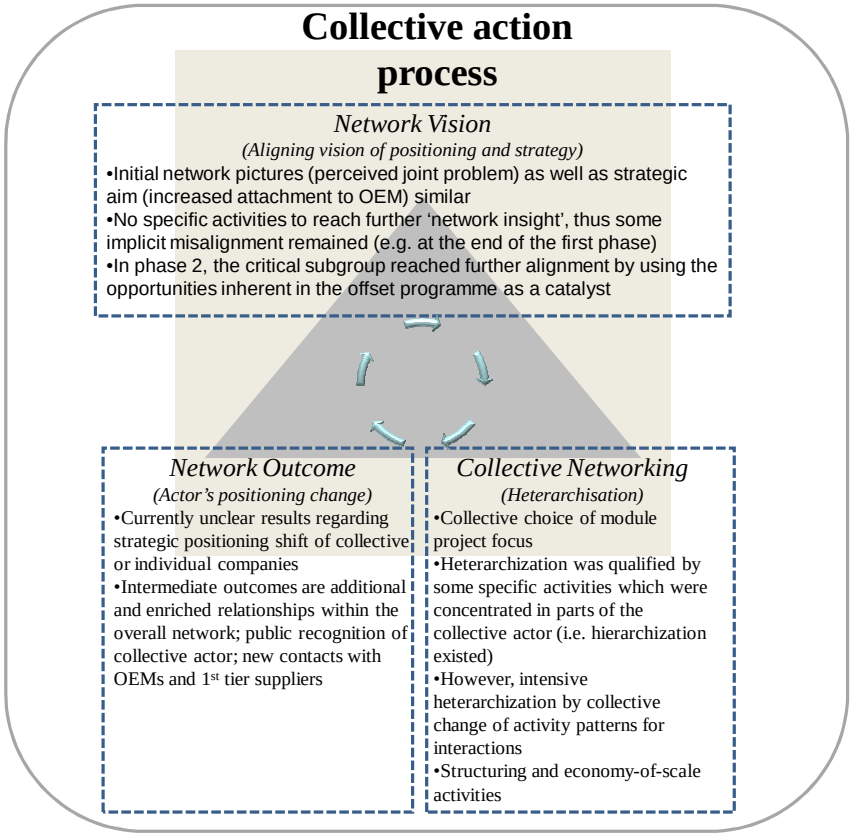


Figure 6 – ACECIA collective action process

7. CONCLUSIONS

7.1. Summary of the ACECIA case

ACECIA provides a case study of the development of a collective actor (an IBN) via heterarchization. The aim of ACECIA was for the participating companies to achieve a more beneficial network position vis-à-vis 1st tier suppliers and major OEMs in the Portuguese automotive market. As such, there are some initial indicative results which show that this aim is achievable. This may provide evidence that IBNs are an effective solution to common positioning problems of SMEs in highly competitive settings. IBNs may be useful to overcome problems commonly associated with innovation processes, specially when carried out by SMEs: generating specialized knowledge involved in developing new products and processes; sharing of tacit knowledge; large capital investments; shorter time-to-market cycles. IBNs, if successful in their formation, provide members with a common framework in

terms of a network vision as well as cooperative and trusted environment where the broader goals of the system are orchestrated and interactive relationships built (Swan et al., 1999). By joining their bundles of differentiated resources and capabilities and combining them in novel ways as part of a heterarchizaton vector of innovation activities, associated members may actually come up with different types of innovation: new products, such as the seat modules; new processes, as the process of combining textiles with injected plastics; new business models, as ACECIA itself.

However, ACECIA demonstrates that collective technical and financial resources may be not enough when changing positioning through innovation processes. Strategic identity and positioning are cumulative, path dependent, and long and complex processes. This is probably one of the main reasons why ACECIA had such difficulties in convincing OEMs of their credibility and reliability. As such, network connections and networking capabilities seem crucial to leverage or hinder the potential of innovation processes.

ACECIA emerged from a group of actors recognizing that they share a common problem and believed that collective action is an adequate strategy to deal with that issue. However, this in itself was not sufficient. Prospective members must agree on the collective actors' scope of action: in ACECIA, the scope was defined as the production of innovative interior components for the automotive industry. By delimiting scope, it is possible to define what type of resources and capabilities involved in projected activities, to define the adequate capability profile of future members and to identify actual firms that match that profile. It must be stressed that in IBNs, actors' indirect and dynamic capabilities are of outmost importance as they strongly impact their ability to adapt, share and produce new knowledge and generate innovative outcomes.

Having the 'right' capability profile may also not be sufficient to allow eventual members to join the 'club'. Alignment of network visions is also crucial as they will condition the future development of collective action. Thus, the network theories of prospective members and those of the collective actor must be aligned. A paradox seems to exist here. The existence of a collective actor's visions presupposes the existence of a collective actor. But for a collective actor to exist there must be joining members. How can those joining members align their network visions with the visions of a not yet existing organization? What seems to happen is that the issue-based net's perspective is heavily shaped by the theories of the first members.

Their shared visions seem to constitute the initial strategic drivers and also work as a reference point in relation to which other candidates are measured, accepted or refused. Later on, collective visions are the outcome of networking process where all members try to influence each other, but where prominent members may play a decisive role.

Networking or strategizing occurs inside and outside the network while participants interact with each other at an individual (e.g. in bilateral projects) or collective level (e.g., when top management meets to decide on priorities and investments) very much in the ways proposed by Häkansson & Snehota (1995). In the specific case of AECIA, change vectors, such as heterarchization seem to play an essential role. However, in order to assure cohesiveness and stability, hierarchization and structuring processes must also be present. Actors do sometimes conform, concede and consolidate their relationships at all levels in order to reinforce stability, while at other times they must coerce, confront and create new solutions and change (Ritter & Ford, 2004). An interesting aspect of collective actors is that at the same time that members avoid hierarchies, they may still want someone to play a coordinator or leading role, granted with authority to take care of coordination activities and decision-making if necessary. Finally, network outcomes are perceived as the benefits that actors gain by participating in the issue-based net. If they are perceived as larger than their contributions, this may reinforce their positive perceptions and attitudes about the collective actor, leading to reinforced participation. For the collective actor to survive, it is not needed that all members see the outcomes as positive, as long as members representing its critical mass are satisfied and willing to maintain their commitment.

7.2. Theoretical and managerial implications

This paper took its starting point from the fact that stability and change coexist in industrial networks as interaction occurs at the actors, resources and activities levels, influenced by the actors' network theories and positioning. The paper then focuses on the role of collective actors in network dynamics. Issue-based nets are presented as a specific case of collective actors emerging to solve a group of actors' common issue, in ACECIA's case the the enhancement of their network positioning through innovation. Finally, as this paper deals with IBNs, it relates to the capabilities approach to explore how direct and indirect, static and dynamic capabilities are used by participants in novel combinations or creations of activities

and resources, possibly leading to the restructuring of activity patterns, and connections to new valuable business partners, thereby enhancing their network positioning.

The paper contributes to a deeper knowledge of the concept of collective action in industrial networks, specifically relating it to a heterarchization case study of an IBN, by combining it with some central aspects of the capabilities approach. The paper suggests that collective actors can change the 'rules of the game' by finding new ways of combining dissimilar activities, resources and capabilities. It also highlights how issue-based nets that arise from sharing processes must be firmly grounded in networking capabilities, namely indirect and dynamic capabilities which help building and maintaining the relationships within the net. Collective action may also be an adequate mechanism to solve SMEs difficulties in innovation processes, such as lack of adequate endowment of resources (e.g. knowledge, money, network connection), credibility and reputation.

The paper furthermore explains how pre-existing relationships, common interest, critical mass and avoidance of free riding identified by Brito (1996, 2001) as pre-requisites of issue-based nets also apply in the case of IBNs. Here, as innovation calls for differentiated contribution by all members, free-riding is a less probable phenomenon. The concept of critical mass gains specific contours in this context, as leverage is not achieved just by concentrating similar resources, but rather by finding, obtaining and combining differentiated resources which foster knowledge creation and innovation. While pre-existing relationships (namely those of economic nature) may not necessarily exist, actors still need some kind of knowledge about each other to identify adequate partners and organize collective action.

The paper suggests that collective actors may follow different pathways to enhance their network position other than the usually discussed translation and hierarchization processes. When the issue-base net's goals are directed towards change, actors may chose the pathway of heterarchization, as in the case of ACECIA, in order to change their activity patterns, create new constellations and resources, and promote bonds with new actors. However, building new network identities and changing network positioning are ambitious goals that may be hard to achieve if the collective actor's members do not own previous experience and credibility. As such, even when actors collectively hold adequate resources to produce pioneering offerings, create ground-breaking processes or design original business models,

their ability to network within the larger business environment is most likely a critical factor that hinders or enables the translation of that potential into actual business outcomes.

7.3. Limitations and suggestions for further research

Our research is based on a single case study in the automotive industry in Portugal. While such a research design allows for a rich and 'thick' understanding of the activities, interactions, and exchanges which characterize the IBN in question, similar research needs to look at the transferability of the results in other setting, e.g. other industries or in collective actors with different strategic focus. A related issue which must be seen as a limitation of the current analysis is the limited process and longitudinal perspective which was employed. Using a qualitative snapshot approach as common in case study research could be complemented by observations and interview interventions over the time period of the formation and development of a collective actor. This would allow for a more detailed understanding of especially process-related aspect of a heterarchization example.

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