Network Pictures as a Research Device:

Developing a Tool to Capture Actors' Perceptions in Organizational Networks

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Abstract

In business networks, strategic actions are believed to be guided by actors' subjective views or perceptions of their surroundings. Researchers thus consider these perceptions as important for understanding network related phenomena. Despite their recognized importance, there has not been much research aimed at developing a way to systematically capture these perceptions. The purpose of this paper is to show how actors' subjective views of the business network can be analysed using the research device of network pictures. This is done by developing an empirically derived dimensional model for capturing different aspects of an actor's subjective view. Furthermore, we explore the network picture of one respondent to exemplify how the developed device can be applied and to show what may result from its usage. We also illustrate how the research device of network pictures allows identifying differences between individuals and how there seem to be 'types' of ways of perceiving the business network. This is accomplished via a clustering analysis of 49 network pictures from respondents within two different networks. This paper therefore represents a methodological contribution through the development of a tool that may change researchers' practices in understanding business networks. As such, it enriches the literature on business networks, inter-organizational cognition, and strategic decision-making. Furthermore, as a managerial contribution it provides managers with the means to analyse their own as well as others' perceptions of the business network, and also to explore the potential consequences of perceiving the business environment in certain terms.

Keywords

Network Picture, Sense-Making, Research Tool, Business Network

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1. Introduction

Within the industrial network approach (Hakansson and Johanson 1992), research on industrial systems is based on the principle that companies are embedded in a complex network of interconnected relationships (Axelsson and Easton 1992; Hakansson and Snehota 1989). Researchers that draw on this approach believe that individuals in those interacting companies (un)consciously develop frameworks which help them to deal with the complexity of the business network, thus guiding their interactions (Mattsson 1985, 1987). This idea that actors' actions are conditioned by their perceptions, or cognitive schemata, is closely associated with basic principles of sense-making theory (Weick 1979a). Ford et al. (2002a) suggested the concept of network pictures to conceptualise this interrelation between cognition and action in business networks. Although the concept of network pictures has been used frequently in the extant literature on business networks (D. Ford and Redwood 2005; Mouzas et al. 2008; Oberg et al. 2007; Rohrmus and Henneberg 2006), it has only infrequently been operationalised (Henneberg et al. 2006; Ramos 2008). There is a recognized need to develop a way to capture individual actors' cognitive schemata on network characteristics (Henneberg et al. 2010; Welch and Wilkinson 2002) and this is the main focus of this paper.

This paper addresses the methodological challenge of operationalizing network pictures as a research device, i.e. a tool that once developed would allow researchers and practitioners to 'see' what an actor picture of the business network is about. We embrace this challenge by empirically deriving a dimensional model that we believe captures, in a systematic way, individual perceptions of the network. Besides showing how it the model is derived, we illustrate its usage. This paper thus represents a methodological contribution to research on business networks and to the intra-organizational cognitive field: it shows how it is possible to encapsulate actors' views of the world, on an inter-organizational level, with a structured dimensional model. It also contributes specifically

to the clarification and enrichment of the growing literature on the concept of network pictures. Additionally, the paper embodies a managerial contribution by providing managers with a tool that allows them to better understand how they and others perceive their business network. This sensitises them regarding the consequences of perceiving their surroundings in a specific way and helps them develop a more appropriate way of perceiving things.

We begin by putting forward a discussion of the theoretical cornerstones underlying the construct of actors' views of the network and of network pictures as a research device. A theoretical structure for the construct of network pictures is then suggested. This is followed by a discussion of the methodological choices made to develop network pictures as a research device, leading to the presentation of the dimensional model of network pictures that resulted from the empirical study. To exemplify what can result from the usage of the developed tool, we analyse the network picture of one individual, and as a result of a clustering analysis, four network picture structures are presented. In a final section we draw some conclusions on the validity and usefulness of the developed tool, with the main methodological, theoretical and managerial contributions and implications of this paper also being addressed in this concluding section.

2. Network pictures as actors' views of the world

For the past 20 years, research in the tradition of the industrial network approach (Hakansson and Johanson 1992; Hakansson and Snehota 1995) has been trying to achieve a better understanding of organizational network-related issues. Business network researchers have been developing new models and considering better ways of looking at the complexity that characterises industrial systems (Axelsson and Easton 1992; Hakansson and Snehota 1989). The importance of considering actors' perceptions of the world to gain an understanding of business relationships and networks has been frequently highlighted in the organizational network literature (J. Anderson et al. 1994; Mattsson 1985, 1987). Research posits that each actor holds an idiosyncratic and evolving view of the surrounding network, interacting "*on the basis of their perceptions*" (Hakansson and Snehota 1995, p. 34). The relevance of managers' cognitive structures has only recently been conceptually

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discussed in the business network literature via a model of managing in networks (I. D. Ford et al. 2002a). This model suggests a close interrelation between actors' "*views of the network*" (p. 5), defined by the authors as network pictures, and actors' networking activities and network outcomes. Network pictures are said to be "*the basis for ...[actors'] perceptions of what is happening around them and of their actions and reactions in the network*" (p. 4). The interconnection between the model's three elements highlights the idea that the business network is in fact a varying thing depending on what actors' believe it to be (I. D. Ford et al. 2002a; Hakansson and Snehota 1995).

Antedating the concept of network pictures, certain concepts within the business network literature referred to similar ideas. The most relevant ones were: network theories (Johanson and Mattsson 1992; Mattsson 2002), network horizon (J. Anderson et al. 1994; Holmen and Pedersen 2003), network maps (Borders et al. 2001), ideas or schemata (Welch and Wilkinson 2002), and network insights (Mouzas et al. 2008). None of these concepts has nevertheless ever been used as a research device. The concept and relevance of actors' subjective views can also be traced to other bodies of literature, as for instance in the strategic management research on competitive groups (Hodgkinson et al. 2004; Osborne et al. 2001; Porac et al. 1989; Stubbart 1989) or organizational behaviour research (Langfield-Smith 1992; Meindl et al. 1994; Sproull 1981; Walsh and Fahey 1986).Concepts such as cognitive strategic groups, cognitive maps, causal maps or belief structures were frequently utilised in these fields. The recognised importance of actors' views is something that has thus recurrently been addressed in varied areas of knowledge.

The association between the notion of network pictures and sense-making theory has recurrently been emphasised. Organizational sense-making is the process through which individuals try to make sense or try to find a logic for their encompassing working scenario by unconsciously developing frameworks that guide their behaviour (Weick 1969). These frameworks are also known as "*cognitive structures*" (Johanson and Mattsson 1992, p. 186) or "*frames of reference*" (Cantril 1941, p. 20). Sense-making is an ongoing activity, in the sense that the developed frameworks are modified whenever necessary, that is to say whenever the events an individual is confronted with is not coherent with the expectations drawn from his/her frameworks (Louis 1980; Weick 1979a, 1995).

Sense-making can be understood as encompassing two basic aspects: 1) *the process* of sense-making, and 2) *the outcome* of the sense-making process, i.e. individual frameworks (Weick 1979b). Network pictures are frequently referred to as organizational network actors' sense-making devices or tools (Henneberg et al. 2006; Mouzas et al. 2008; Oberg et al. 2006; Ramos et al. 2005; Rohrmus and Henneberg 2006), and it corresponds to the framework that results from sense-making. Moreover, the interconnection between network pictures, networking and network outcomes suggested in the literature (I. D. Ford et al. 2002a) reflects the sense-making ongoing cycle and the dynamic nature that underlies network pictures.

So far, the idea of network pictures as corresponding to the way an actor views the surrounding business network provided a conceptual basis (I. D. Ford et al. 2002a). However, Ford et al. (2006) have recently put forward a different definition, saying that network pictures are in fact "*a conceptualisation by the observer of the network views of the participants, [...] a representational technique that aims to capture or illustrate views that specific actors have of the networked environment within which they operate*" (p. 2). According to this definition, network pictures are defined as an instrument that can be used either by researchers or managers to interpret how actors perceive their surroundings. It is important to clarify the main differences between the two definitions that can be found in the literature for network pictures. When network pictures are defined as an actor view of the world, then they are believed to be (unconsciously) created / used by individuals and to result from their sense-making process in organizational networks. On the other hand, if network pictures are defined as a research device, then the concept is about a tool that once developed (by researchers) will allow researchers and practitioners to (consciously) create their own picture of what an actor view of the business network is about. Given that our research is developed around the idea that it is possible to develop such an instrument, the research builds on the most recent definition, i.e. network pictures are a research device. The need to develop such a tool, or to identify the dimensions a researcher should look for to capture actors' subjective perceptions, was underlined by Welch et al. (2002). These authors claim that "*research is needed to identify and measure the key dimensions of the mental maps used by firms to understand their relations and*

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network" (p. 44) and also that "*more generally, there is a need to develop ways of measuring the dimensions of business actors' mental models, theories-in-use or schemas*" (Welch and Wilkinson 2002, p. 43). Mattsson (2005a, 2005b) adds one more reason why it is important to capture actors' perceptions. According to this author's work on a 'performative perspective on markets', the development of the concept of network pictures could lead to an understanding of 'practitioner theories', resulting in the possibilities for academics integrate these (informal) theories with the development of (formal) theories concerning business networks.

There have been previous attempts to operationalise the concept of network pictures (Henneberg et al. 2006). These authors deconstructed actors' network pictures into eight interrelated dimensions, namely boundaries, directionality, power, time / task, environment, focus, actors / resources / activities and centre / periphery. They observed that not every dimension included in their model was used by every respondent in their drawing or representation of their surroundings. The authors identified network pictures' subjectivity and appropriateness to specific situations, as well as their purpose, being the reasons why there were variations amongst the aggregated network pictures' composition. There is one basic principle underlying the model developed by Henneberg et al. (2006): network pictures are defined as network actor sense-making tools. This assumption explains the reason why some dimensions of the model could not be found in the representations provided by respondents: some of the identified dimensions were not considered important by the respondents, who therefore did not use them in their representation of the business network. However, if network pictures were defined as a research device, this would not be the case. The way an actor perceives the surroundings would be characterised along all the dimensions identified for the model.

3. Theoretically derived structure of network pictures

Companies are embedded in a network of interconnected relationships, being connected to all other companies in direct or indirect ways (J. Anderson et al. 1994; Axelsson 1992; Havila 1996; Laage-Hellman 1989), leading some authors to claim that there is one single network in the world. This network encompasses every actor, resource and activity in the world: *the* network (J. Anderson et al.

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1994; Easton and Araujo 1992; I. D. Ford et al. 2002a). However, practitioners choose to 'see' certain aspects of the network (J. Anderson et al. 1994), subjectively establishing where *a* network begins and ends (I. D. Ford et al. 2002a; D. Ford et al. 2003). Reviewing the literature (J. Anderson et al. 1994; Easton and Araujo 1992; I. D. Ford et al. 1998; Hakansson and Snehota 1995), we put forward that *a* network comprises the following elements: 1) scale and structure, 2) processes and 3) positioning. Each actor may see different things for each of these elements, and what and how they see it defines *their* network picture. We suggest that if this set of elements parsimoniously encapsulates all the things an actor may see in his/her surrounding network, then it corresponds to the structure of network pictures, one that is theoretically derived from the existing literature on business networks.

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Insert Figure 1

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This structure forms an initial operationalisation to the construct of network pictures. The need to identify this structure was mostly associated with the need to develop an interview guide that could then be used to collect relevant data (Krippendorff 2004). We briefly describe each of the identified elements of network pictures:

3.1. Scale and structure of the network

The scale of a network is defined by the number of actors an individual identifies in his/her surrounding network. An actor can only consider a limited number of these players (J. Anderson et al. 1994; I. D. Ford et al. 2002a; Holmen and Pedersen 2001; Holmen and Pedersen 2003).The structure or constitution of the network is defined by the nature of the actors and resources that the individual sees (I. D. Ford et al. 1998). Reviewing the business network literature, we identify three dimensions that define the structure of the network: actors' resources, aspirations and problems (D. Ford et al. 2003; D. Ford and Havila 2003; Hakansson and Snehota 1995). Actors resources may be defined by their internal assets, as well as by their relationships (Gadde et al. 2003; Hakansson and Snehota 1995) and position occupied in the network (Johanson and Mattsson 1992; Low 1997;

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Mattsson 1987; Salmi 1996). Actors aspirations underline one of the reasons why actors establish relationships, that is to accomplish their goals. Aspirations reflect actors' expectations of successful achievement (Johanson and Mattsson 1985; Wilson and Jantrania 1993). Finally, one important way of analysing how actors relate to other is through the identification of problems within the network (I. D. Ford et al. 1998): what problems and uncertainties actors face when purchasing and selling a product/service and the extent they count on their counterpart skills to provide a solution (D. Ford and Havila 2003).

3.2. Processes of the network

The processes of the network are about the relationships that take place between the interacting actors: the network actor bonds, resource ties and activity links, or substance of relationships (Hakansson and Snehota 1995). Actor bonds are defined by the extent to which the following qualities can be found in a relationship (Hakansson 1982; Sutton-Brady 2000): power (Hallen et al. 1991; Low 1997; Pfeffer 1981), commitment (Gundlash et al. 1995; Hardwick and Ford 1986), closeness (D. Ford 1980; Nielson 1998), trust (Moorman et al. 1992; Nielson 1998), cooperation (H. Anderson and Havila 1993; Easton and Araujo 1992), expectation (H. Anderson and Havila 1993; Gross et al. 1957; Katz and Kahn 1966) and understanding (Hallen and Sandstrom 1991). Regarding resource ties, each company holds a resource collection including technical and commercial resources, administrative know-how and tangible elements (e.g. man-power, equipment, plant and knowledge). Resources that are transferred or transformed in the network may therefore assume distinct natures: human, informational, relational, financial, organizational, legal or physical (Hunt and Morgan 1995). Finally, activities may reflect either a transfer or a transformation of resources between actors (Hakansson and Johanson 1992).

3.3. Positioning in the network

The position a particular actor occupies in the network may be determined by that actor's surrounding and co-existing web of actors, resource constellation and activity patterns and by the actor bonds, activity links and resource ties in which that particular actor is involved in (Hakansson

and Snehota 1995). When implementing a strategic action, by mobilising other actors and their resources, actors are looking to achieve a better position (Johanson and Mattsson 1985).

Although the three elements described above parsimoniously encapsulate everything an actor may see in his/her surrounding, there exists a more granulated set of dimensions that allow capturing an actor's perceptions in greater detail. For this reason, we carry out the empirical analysis that is presented in the following sections.

4. Research methodology and design

Drawing on the method used by Henneberg et al. (2006) to operationalize the construct of network pictures, we propose a two-stage method to develop our research device. As a first stage, the construct of network pictures is empirically derived and operationalised. As a second stage, the quality of the resulting construct is tested: the construct is used to interpret data with the aim of assessing its capacity to capture a fairly rich way an actor view of the network, and to capture diversity between individuals. Presented below are the choices made for the empirical research underlying this two-stage method (Brito 1999; Easton 1995).

The research draws on a social constructionist approach (Berger and Luckmann 1966). Individuals are defined as the primary unit of analysis (Yin 1993) as a consequence of network pictures always being held subjectively by individuals. Forty-nine respondents were included in the data collection and analysis, made up from individuals who played a key role in a company's decision-making process (e.g. CEOs and directors). Respondents were selected from two distinct networks, expected to present distinct features regarding their relational structure (Lambe et al. 2000). One represents a 'product network' that is associated with a long-term relational exchange situation, including companies connected to the production of plastic containers. All included companies were somehow associated with a 'hole-through-the-wall' production and delivery system. Twenty-seven managers were interviewed from this network (see table 1 and figure 2); most interviews were carried out in during June, July and October 2005.

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Insert Table 1. and Figure 2.

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The other network represents a 'project network', a form of short-term relational exchange. A network of companies involved in a project related to the transportation sector was selected, and twenty-two respondents were included in this network (see table 2 and figure 3). All interviews took place in March 2006.

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Insert Table 2. and Figure 3.

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Primary data on actors' views was collected firstly by visual eliciting respondents' representations of the network, with respondents being required to represent on a bland A4 sheet how they 'see' their business surroundings. This technique was underpinned by textual data to help understanding the representations: after providing the representation of their network, they were asked to explain why they had represented it in those terms. This was complemented by a semi-structured interview based on an interview guide developed by loosely using the theoretically derived structure for network pictures. The decision to combine visual and verbal data gathering techniques (Meyer 1991; Tufte 1983; Zuboff 1989) resulted from assuring a greater reliability of the collected data (Denzin 1978), and to provide researchers and respondents with a more structured and clearer idea of what was being said (Henneberg et al. 2010).

Data reduction was achieved via qualitative content analysis (Krippendorff 2004). The first part of this procedure consisted of analysing a sample of seven transcripts with the help of *QSR NVivo,* a software tool for qualitative analysis; this resulted in the identification of a coding tree. This tree corresponds to an empirically derived structure for network pictures, i.e. a dimensional model with twenty-one dimensions and corresponding sub-dimensions. The resulting structure is presented in the following section. The selected transcripts corresponded to interviews conducted in one company from the 'product network', which was chosen for developing the coding tree mainly because it was the company where on average respondents spoke more freely and therefore it was considered the

source of the richest data for identifying the network pictures dimensions. The second part of the content analysis consisted of using the derived coding tree of network pictures for analysing the forty-two transcripts that were not used in the initial development of the dimensional model.

5. Empirically derived model of network pictures

In this section the empirically derived structure for the construct of network pictures that resulted from the first stage of the content data analysis is presented. With the aim of establishing some order into the identified dimensions, these were categorised into four groups: focus, weight, consistency and specificity, and overall view of the surroundings. While a strong subjectivity underlay the process if integrating subdimensions into the four dimensions, they intuitively belonged together and were thus clustered (see figure 4) (Krippendorff 2004, p. 167).

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Insert Figure 4.

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In Table 3, we present some verbal expressions of the seven respondents typically used when describing their surroundings which allowed classifying their way of perceiving the network along the identified dimensions and corresponding sub-dimensions.

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Insert Table 3.

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The dimensions for the construct of network pictures were operationalised in the terms presented below. The classification of respondents' Network Pictures was not about *frequency* but instead about *intensity*. This resulted from the following observations: a specific issue could be mentioned more frequently by a respondent and yet it might not be the predominant issue of his perception of the network; also, some specific issues were identified by their omission in the interview and not by explicit statements or explicit comments. Therefore, instead of defining sub-dimensions in terms of what individuals most regularly talked about, they were described in terms of how *strongly* or

intensively they spoke and probably thought about something. The definition of *intensity* resulted from evaluating the passion or strength associated with each possible sub-dimension of a particular dimension.

5.1.Dimensional Group 1 - Focus

Dimension 1.1 Actors - This dimension can be used to classify how an actor perceives the world when it comes to selecting what they consider being the 'focal' actor or groups of actors. Three possible sub-dimensions were identified for this dimension: respondents described their surroundings placing greater emphasis on 1) themselves, 2) on the company they worked for and/or 3) on the surrounding actors.

Dimension 1.2. Processes – An actor may think with greater intensity about the different of element(s) of relationships. Respondents placed greater focus 1) on actor bonds, 2) on resource ties and/or 3) on activity links.

Dimension 1.3. Actors/processes – An actor may think about his/her surroundings as a set of relevant actors (networks as elements of scale and structure) or/and in terms of relationships between those actors (network as the element of processes). Respondents either placed greater emphasis 1) on the surrounding actors or/and 2) on the relationships between and with those actors.

Dimension 1.4. Actors' features – An actor may think about actors more intensively in terms of some structural features than other. Respondents placed greater emphasis on actors' 1) resources, on their 2) aspirations or/and on their 3) problems.

Dimension 1.5. Time span – An actor may think with different levels of intensity about distinct periods of time. Respondents placed greater focus 1) on past events, 2) on present events or/and 3) on future events.

Dimension 1.6. Function - This dimension allows classifying how an actor understands his/her surroundings in terms of its multi-disciplinary character. This can be achieved by identifying whether there is any particular function the actor places greater emphasis on. Respondents centred their

attention 1) solely on their own function, 2) solely on someone else's function, or 3) on several functions. In the latter case, they do not have a functional focus.

5.2. Dimensional Group 2 - Weight:

Dimension 2.1. Normative – An actor may know what should or should not be done in his/her surroundings so that success can be achieved in business practices. Respondents held a 1) normative view or 2) a non-normative one. In some cases, respondents could be said holding a normative view with respect to some aspects, and a non-normative one with respect to other aspects.

Dimension 2.2. Moral – The way an actor perceives the world may exhibit different levels of an underpinning moral philosophy. Respondents were either shown as having 1) a sense of what should/should not happen in their surroundings or 2) held a view without specific moral standards. Again, they could show different positions regarding different aspects of their surroundings.

Dimension 2.3. Knowing what is going on - Whilst an actor may consider it important to be aware of what is taking place in the surroundings, no matter how much it is related to his/her activity, other may not. Respondents considered knowing what was going on in their surroundings as 1) being important or as 2) not being important. Some showed different positions on this matter regarding different aspects of their surroundings.

Dimension 2.4. Internal procedures – An actor may consider knowing what is going on 'within' actors (i.e. their internal processes) as more or less relevant for their business activity. Respondents either chose to 1) highlight the internal procedures associated with their own company and/or other companies, or 2) they preferred talking mostly about external procedures between actors instead of internal ones. Some spoke with the same intensity about internal and external processes.

5.3. Dimensional Group 3 – Specificity/Coherence:

Dimension 3.1.Coherence with board's explicit identity – An actor may agree with different intensity with the principles that the company's board explicitly states for the organization. Respondents either perceived their surroundings in terms that could be said be 1) coherent with their company board's

explicit identity or 2) they were non-coherent with that identity. Some respondents showed a strong coherence with their company's board explicit identity on some matters but a strong incoherence on other matters.

Dimension 3.2. Situation specificity – An actor may think about situations or events with different levels of detail. Respondents talked mostly about 1) general situations or 2) specific ones. Some respondents spoke with the same intensity about general and specific situations.

Dimension 3.3. Actors Specificity – An actor may think with distinct levels of detail about the surrounding actors. Respondents either talked more intensively about 1) groups of actors or 2) specific actors. Some respondents spoke with the same intensity about groups of actors and specific ones.

5.4. Dimensional Group 4 – Overall View of their Surroundings:

Dimension 4.1. Stereotyping – An actor may use distinct forms of visual representation or framework to represent the surrounding network, reflecting different levels of stereotyping. Respondents either described their surroundings as a 1) network or 2) as some other form of representation such as: supply chains, chains of value or another visual form of representation. Some respondents claimed seeing things in a specific form (e.g. as a supply chain), but spoke in terms that could be described as those of a network or other.

Dimension 4.2.Consistency – An actor may see things in a more or in a less comprehensively coherent way. On a simplified basis, respondents either held an overall 1) consistent view or 2) an in conflict view. Some respondents were quite consistent regarding some aspects of their description but inconsistent regarding other aspects.

Dimension 4.3. Structuredness – An actor may perceive the world in a more or less structured and organised way. Respondents showed themselves as having a predominantly 1) structured view of their surroundings or 2) an unstructured one. Some respondents presented a very structured view regarding some parts of their description of their surroundings, but a very unstructured one regarding other parts.

Dimension 4.4. Stasis – An actor may think about the network in more or less dynamic or evolving terms. Respondents either held a 1) mainly evolving view of the network or 2) a mainly static one. Some respondents showed having a very evolving view regarding some aspects of their description but quite static regarding other aspects.

Dimension 4.5. Broadness - Broadness is defined in this research project as scope and wideness. Broadness is therefore closely associated, among other things, with the element of scale of the network, one of the suggested elements of the structure we initially suggested for network pictures. Two situations were identified: respondents either held a 1) broad view or 2) a narrow view of the network. Again, some respondents showed having a very broad view regarding some aspects, but a quite narrow view for other aspects.

Dimension 4.6. Comprehensiveness - Comprehensiveness is defined in this research project as the extent of specificity and detail of knowledge on a specific issue is. No matter how broadly or narrowly respondents' perceived the network, they either viewed it 1) comprehensively or 2) non-comprehensively. Some respondents could be said to see some things in a comprehensive way, but other in a non-comprehensive manner.

Dimension 4.7. Conflict / Collaboration - The network entails both conflict and collaboration situations. Respondents either saw their surroundings mostly 1) as conflict or 2) as collaboration between actors. They could also see it as a balanced combination of both.

Dimension 4.8. Actors as Providers for... - Actors provide services of diverse nature to different actors. Respondents saw the surrounding actors as providers for 1) customised solutions or 2) for standardised products/services. Some respondents perceived actors as providers of both customised and standardised products.

Several of these dimensions are overlapping with what has been previously mentioned in the business network literature. This is the case, for example, for the following dimensions: focus on actors (D. Ford et al. 2003; Hakansson and Ford 2002), on processes (I. D. Ford et al. 2002b; Hakansson and Snehota 1995), on actors/processes (J. Anderson et al. 1994; Hakansson and Johanson 1992; Mattsson 1985), on function (Easton 1995), and focus on time span (D. Ford 1980;

Hakansson 1982; Ravald and Gronroos 1990). It is also the case for the dimensions of normative weight (Johanson and Mattsson 1992; Mattsson 2002), coherence with the company's explicit identity (Hakansson and Johanson 1992; Mattsson 1985), overall stereotyping (Gadde et al. 2003; Hakansson 1982; Mattsson 1987), overall broadness and comprehensiveness (J. Anderson et al. 1994; I. D. Ford et al. 2002a; Holmen and Pedersen 2001; Wilkinson and Young 2002) and overall conflict/cooperation (I. D. Ford et al. 2002a; D. Ford et al. 2003). On the other hand, some of the dimensions included in the structure of network pictures have not yet been discussed in the business network literature (e.g. dimensions of moral weight, overall consistency and structuredeness). In the following section, we illustrate what can result from using this structure by analysing the network picture of one particular respondent.

6. Using the research device of network pictures

The structure of network pictures in terms of the dimensional model was used to interpret how respondents perceived their surroundings. The network picture of one individual is presented in this section, serving two purposes. First, it provides an illustration of how to use the research device of network pictures, thus showing that an actor perception of his/her surroundings can be captured in a structured way. Second, it demonstrates what can be achieved with the application of the tool, thus exemplifying what may result from trying to understand how actors perceive their business surroundings.

The network picture briefly described and interpreted in this section is from a respondent who had been the international technical director for approximately three years at a company in the 'product network', company Alpha. This company was a rigid plastic container producer, with a hole-through-the-wall production and distribution system. For a full description and understanding of this respondent's network picture, a detailed analysis of each of the twenty-one network pictures dimensions would be necessary. Due to parsimony considerations, a summary table with the main characteristics for this respondent's network picture is presented instead (see table 4); for each dimension, the sub-dimensions that were found to be salient to his perception of the business

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network were highlighted. This is followed by a discussion of the most unexpected and exemplary findings for this respondent.

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Insert Table 4.

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Using the tool has revealed many things that might be considered as common-sense and quite obvious. Nevertheless, it also brought other findings to the fore that could not have been identified without it, namely the two key findings set out below.

6.1 A rich description of a network picture

Table 4 reveals how this director unconsciously saw his surroundings in network terms: he perceived the interconnectedness of the surrounding relationships, thought about actors and relationships his company was not directly involved with, and perceived actors' positioning as being dependent on other actor business activity and strategic positioning. As a result of seeing his surroundings in such terms, this director may be expected to be able to identify potential threats and opportunities associated with the surrounding interconnectedness.

The dimensional model also showed how the manager held a dynamic view of the world, perceiving actors and processes as evolving throughout time. He talked about how things used to be in the past and what they had become. Amongst other issues, he spoke in evolving terms about the situation in the sector and the role of external forces, and about relationships with other entities of diverse nature. He would thus be expected to show openness towards the idea of scanning and interpreting information which may challenge his current framework. A greater reluctance to change might be expected if he saw the world in static terms.

The device of network pictures also revealed how this director perceived relationships in terms of human bonding, talking very frequently and intensively about relationships' social atmosphere. He therefore represented relationships mostly as patterns of social interaction between companies and particular individuals. This director apparently thought about relationships in a simplified and

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restricted way, rarely describing them as coordination of activities or joint development of resources. He hardly ever spoke about any relationship in terms of all three of the dimensions: actor bonds, activity links and resource ties. Given that actor bonding on which the manager focussed are a key aspect in the definition of the way actors perceive and interact with each other, this respondent may have an advantage in relation to other directors who may not place as much focus on actor bonding. On the other hand, an incomplete view of relationships may result in misjudgements when it comes to managing (in) relationships.

The tool of network pictures exposed how this manager held a broad and comprehensive view of the network. The respondent talked about several actors and processes that his company was directly involved with, including private and public organizations. Apart from talking about numerous actors, he also discussed the distinct relations with and between those actors. He spoke comprehensively about specific actors, relationships, and the sector. Seeing the world with such wide scope may reflect a good capacity to identify further opportunities and threats in the world. It may also be the case that given the considerable broadness of his view of the world, he may have been prevented from focusing on what really matters. Moreover, having a rich view of the surroundings may reflect the possibility of interacting and taking decisions in a more 'informed' way. It may also indicate a stronger capacity to identify opportunities and threats from the surrounding world.

One other aspect which came out quite clearly was how this manager frequently simplified reality; this might be a technique that helped him to deal with complexity. For example, he claimed to see a supply chain when he described a network. A supply chain is considered a traditional stereotyped framework of business relationships, a much less complex way of representing what goes on between business actors than that obtained via a network perspective. Given his apparent awareness of the world's complexity, he may have claimed to see a supply chain to gain a sense of control over what was going on in the surroundings, as well as a sense of focus. Moreover, this may be related to his professional socialisation. Furthermore, it may be associated with the attempts by the company he works for to institutionalise this stereotyped and simplified view of its business and inter-

organizational relationships. Finally, seeing the network as a supply chain may be related to what is considered the norm in this sector of plastic containers.

6.2. Contradictory outcomes in the way the respondent perceives the world

Using the tool of network pictures to interpret this director's beliefs also resulted in a set of identified contradictions. That is, outcomes that went against what business network theory or previous research on cognitive science would posit. These contradictions differ from the notion of inconsistency associated with dimension 4.2 (*Consistency*), where contradictory statements occurred at different points in the same interview. Some examples of the contradictions found for this respondent are set out below.

To begin with, according to an early study on selective perception by Dearborn and Simon (1958), there is a relation between managers' functional area work experiences and their understanding of business situations. In the pioneer study conducted by these authors, when asked to think about a problem from a company-wide perspective, managers showed having a selective perception conditioned by their functional areas, perceiving solely or mainly the aspects of the situation that were associated to the activities and aims of their departments. Managers' perceptions could thus be expected to be conditioned by their functional areas (Dougherty 1992; Hambrick and Mason 1984; Hodgkinson and Johnson 1994; Lawrence and Lorsch 1967). Considering this identified departmental bias underlying managers' problem identification, we acknowledged several contradictions for this director's network picture. Firstly, given that this manager's main function was in the technical area of project development, he was expected to place a stronger emphasis on resource ties and activity links and not so much on actor bonding. As an "output function" (Miles and Snow 1978) the technical area of project development emphasizes growth and the search for new field opportunities and is responsible for supervising and adjusting products and markets. As such, this function could be expected to imply a strong activity linkage and resource tying between parties. Another unexpected outcome concerned the focus the manager placed on different time periods. Although he appeared to have a clear view of what was going on his surroundings and was involved mainly in a function that

conditioned relationships and the company's strategic direction, he was also sometimes quite tentative and non committal with regards to what was going to happen in the future, reflecting a limited emphasis on output in the company's strategy (Hambrick and Mason 1984). Given the high responsibly that his role implies it would be expected that strategic planning for the future would be in the forefront of his mind. These contradictions corroborate with some of the findings by Walsh's (1988) on selectivity and selective perception. This author replicated and extended Dearborn and Simon's empirical study to find that contrary to what those authors had reported, only some managers held belief structures that could be said being conditioned by their functional area work experience. Walsh (1988) found that some managers that showed having a strong functional-area orientation within their belief structures were working in a different area from that reflected in their orientation; additionally, there was not much evidence of "parochial information processing" (p. 888), with managers being able to identify problems and use information from domains that were diverse from those functions that they were directly involved with[1]. This seems to be the situation for the director whose network picture we are discussing. It may the case that, and as Walsh (1988) suggested, this manager's belief structure is conditioned by his company's strong culture, or by the other functions that he has been exposed to throughout his life (Hambrick and Mason 1984), or it can even be conditioned by some training sessions he has attended. This would explain some of the inconsistencies described above.

Furthermore, previous research developed on the content of knowledge structure at the individual level, shows that variations in experience result in differences in schema content (Fiske et al. 1983; Larkin et al. 1980; Wagner 1987): individuals with more experience hold more extensive and detailed schemata than those with less experience (Lurigio and Carroll 1985). Because this manager had been in the business for a considerable period of time, he was therefore expected to hold a more

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[1] It is worth pointing out that there was also nevertheless some evidence that supported the idea that managers' functional orientations conditioned to a certain extent their belief structures. For example it was found that "managers with a marketing belief structure identified more external management problems and requested more external management information than managers in the human relations and generalists groups" (Walsh, 1988, p. 888).

complete view of relationships and describe them in terms of their three dimensions (i.e. actor bonds, activity links and resource) and not simply or mainly as actor bonds.

The features of network pictures indicated in the previous paragraphs as contradictory with previous research on cognitive science were also found to be contradictory with the IMP theory. Regarding the dimension Focus on Processes, one of the underlying ideas of the AAR Model (Hakansson and Johanson 1992) is that actor bonds, activity links and resource ties are a useful set of descriptors of relationships when taken together. Relationships are believed to be "not single dimensional and the business marketer needs to analyse them multi-dimensionally" (I. D. Ford et al. 2002b, p. 44). All relationships integrate to a greater or lesser extent into the three mentioned dimensions, and there is a strong interdependence between them (D. Ford et al. 2003; Hakansson and Snehota 1995). This manager was thus expected to perceive relationships as being three-dimensional. The contradiction found for the dimension Focus on Time Spam, can also be said contradictory with the IMP Theory. Relationships are made up by a series of episodes, involving exchange and adaptation processes between the engaged parties along the several stages of development of a relationship (D. Ford 1980; Hakansson 1982; Johanson and Mattsson 1987). Each interaction that takes place within a relationship is thus merely one episode of the global relationship (D. Ford 1980; Ravald and Gronroos 1990). Relationships' continuity is frequently considered a fundamental pre-condition for relationship exchange and development (Hakansson and Snehota 1995) and it reflects their dynamic nature. This respondent was thus expected to show greater interest in what was going to happen in the future in his surrounding business network.

A different type of contradiction arose in that the respondent claimed to see things in a particular way, but the analysis of the interview showed a different perspective. For example, he claimed that he held a strong functional focus, believing that his view of his surroundings was strongly influenced by his function in the company. However, he emerged as having quite a multi-disciplinary view of things, one that was not conditioned by any particular function. Furthermore, he claimed that he was not interested in holding a comprehensive view of what was going on in the national arena of his company, because as he stated he was based outside that country and he preferred to rely on others to

know what was going on in that context. However, at the same time the research device was able to show that he held a comprehensive view of his surroundings, wanting to know in breadth what was going on. Moreover, he claimed to see the world as a supply-chain, but spoke in terms that we interpreted as what could be described as those of a network. This respondent's network picture revealed itself to be of a complex and ever-changing form. The sense-making process is one of constant ongoing resolution with its subjectification-objectification-subjectification activities (Berger and Luckmann 1966; I. D. Ford et al. 2002a; Henneberg et al. 2006; Weick 1979a); it is about reflections, as the result of the dynamic nature of the sense-making processes and of the changeable nature of human beings. The fact that there were substantial contradictions in his responses reinforces the idea of his world being in permanent flux, in that there were many areas of his involvement where resolution of day-to-day issues were seen to be on-going. That is, it is argued that where a snapshot such as this manager's interview captures unresolved phenomena, the very fact that these need resolving exposes the dynamic nature of the situation, i.e. it is fundamentally about shifting perceptions.

Above we have described some of the counterintuitive and contradictory outcomes that were observed for this manager. It would now be important to understand the reasons why they exist. Although some of the possible reasons for these anomalies have been suggested above, it is beyond the scope of this research project to cover these in any more detail.

7. Structures of network pictures

To demonstrate that the developed dimensional structure for the network pictures research tool allows for identifying diversity (and also similarity) between individuals' perceptions, we carried out a cluster analysis of the 49 network pictures that were obtained in the two networks. We also wanted to show that the single network picture presented above does not represent an outlier but instead were characteristic of a common cluster of network picture structures. The clustering analysis was carried out with the help of *SPSS*. In order to apply a cluster analysis we coded the data; binary variables were used (i.e. a sub-dimension found an expression in the respondent's network pictures,

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or it did not). The binary variables for each sub-dimension were combined into a dimensional score, called a category. This category represents the structure of salient sub-dimensions within a specific network picture dimension. Thus, quantitative data for the clustering was obtained by converting each respondent's network picture into a set of categories, one for each dimension. The Hierarchical cluster analysis was applied based on average linkage between-group linkage by SPSS. By the use of the dendrogram generated as the result of the cluster analysis, four clusters of respondents were identified, i.e. a grouping of respondents that perceived the business network in similar terms. Two of the clusters included the majority of respondents (i.e. Cluster 1 and Cluster 2). For each cluster, the dominant features of the network pictures are identified (see table 5).

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Insert Table 5.

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In this table, the crosses mark the features of network pictures (for each dimension) that were most commonly identified for respondents within one cluster. Each row of crosses for each dimension, represent a specific category that was used for the clustering. When there is one row of crosses per dimension, it means that there was one sole dominant way for respondents to perceive their surrounding network along this dimension. However, in some cases, there are more than a single column of crosses for the same cluster, meaning that there was more than one way of perceiving things commonly found for that specific cluster. For example, for Cluster 2 in table 5, there are three dominant categories for the dimension Focus on Actors. The first row of three crosses indicates that some of the network pictures in this cluster show salience of all three sub-dimensions. The second row of two crosses, for the sub-dimensions of Focus on Themselves and Focus on the Company, indicates that another set of respondents of cluster 2 focus solely on these two sub-dimensions. The third dominant set of salient sub-dimensions is represented by the last row of two crosses, indicating greater focus of the Company and on the Surrounding. These multiple dominant categories for the dimension of Focus on Actors contrast with the single dominant category for the dimension of Focus

on processes in the same Cluster 2. In this case, only one category, i.e. salience on Actor Bonds and Activity Links characterises the network pictures in this cluster.

Some of the characteristics of network pictures were found commonly across all clusters, with most respondents considering actors' internal processes important (sub-dimension 2.4.1), holding a consistent (sub-dimension 4.2.1), structured (sub-dimension 4.3.1), and evolving view (sub-dimension 4.4.1), and also perceiving actors as providers for customised solutions (sub-dimension 4.8.1). Thus, these five sub-dimensions and corresponding dimensions could not be used to differentiate respondents (see grey areas in table 5).

Network pictures from Cluster 1 were mostly associated with respondents from the 'product network', and it included around 30% of all respondents. Network pictures included in this cluster could be characterised as frequently focusing simultaneously on themselves and on the company, or on the company and on the surrounding. In either case, the company was at the centre of their descriptions, reflecting a relatively egocentric view. These respondents apparently thought about relationships mostly as actor bonds, and perceived their surroundings commonly in terms of processes between actors. They thought more intensively about past and present events than about future ones, and in most cases did not exhibit a relevant functional focus. They held a significantly normative view of things, speaking frequently about implicit rules that were developed through out time in their company and network. Their view did not come across as having a significant moral weight, frequently talking in economic terms about issues that would be expected to be underlined by moral aspects. They commonly spoke about specific situations instead of general ones, and they could be said holding a comprehensive view of their surroundings. Commonly, they perceived relationships in terms of power and conflict. Given the summary of described features, we define this as a *Cluster of Industry Embedded Views*. The respondent whose network picture was exemplified in the previous section is included in this cluster, being a good example of the features of network pictures that were commonly associated with this group of respondents.

Most respondents from Cluster 2 were from the 'project network'; this cluster included about 47% of respondents. Very commonly, respondents focused on themselves and on the company. There was

also a considerable number of respondents that gave similar importance to themselves, the company and their surroundings, and other that focuses simultaneously on the company and on themselves. Again, the company was at the centre of respondents' descriptions. They frequently described relationships in terms of actors bonds and activity links, reflecting a more complete view of relationships than the one commonly found for Cluster 1. They generally perceived their surroundings mostly in terms of processes. The majority gave a similar emphasis to past, present and future events, as well as to actors' problems, resources and aspirations. Again, this reflects a more complete view than the one associated to Cluster 1. Almost every respondent held a normative view of their surroundings, frequently talking about explicit rules that could be found in the contractual terms regarding relationships. They showed a strong sense of should, again talking about what was explicitly described in the contract as the advisable or desirable practices. They commonly considered important knowing what was going on in their surroundings. These respondents regularly spoke with the same intensity about specific and general situations, speaking most of the times about specific actors. They frequently described the surroundings as a network, but it was also quite common for respondents to show holding stereotyped views. Most had a comprehensive and broad view of their surroundings and they perceived the surrounding as a result from both power and also collaboration. Because most respondents seemed to rely strongly on what was established by contractual terms to define what they saw around them, we define Cluster 2 as the *Cluster of Contractual Based Views*.

Respondents from Cluster 3 and from Cluster 4 represented the remaining 23% of respondents. Most respondents included in these two clusters held a more egocentric view, focusing either on themselves or on the company. They frequently perceived relationships in terms of actor bonds, placing great emphasis on processes. They preferred speaking about specific situations and in most cases, held what could be described as a non-comprehensive view of their surroundings. This was defined as the *Cluster of Egocentric Views*. Most respondents from Cluster 4 held internally oriented functions in their companies. They held a more complete view of relationships than those from Cluster 3, perceiving them in most cases not only in terms of actor bonds, but also activity links. All

respondents focused mostly on their own function, not considering important knowing what was going on in the surrounding. They held in most cases a stereotyped view of their surroundings and could be said as having a narrow view. This was named the *Cluster of Function Oriented Views*.

It therefore seems that the *Cluster of Industry Embedded Views* and the *Cluster of Contractual Based Views* include respondents that may be said having a more complete view of their surroundings, focusing on several aspects for each identified dimensions and holding comprehensive and/or broad views of their surroundings. Respondents from the two remaining clusters, i.e., the *Cluster of Egocentric Views* and the *Cluster of Function Oriented Views*, present what can be classified as a simplified view of the business network, holding an egocentric view centred mostly on themselves, focusing mostly on their own functions and holding non comprehensive and/or narrow views. It is not the aim of this paper to try to understand the reasons underlying these differences between groups, but instead to point out that there are differences and that there are certain 'types' of way of perceiving things. It could well be that these differences between clusters (and similarities within them) are associated with some contextual factors, such as those of individuals' features (e.g. experience in the business), features of the companies (e.g. positioning) or of the networks (e.g. importance given to formalisation).

8. Conclusions and implications

Our model and analyses demonstrates that it is possible for researchers to capture in a systematic way how network actors perceive their surroundings. We developed a research device as a dimensional model that allows researchers accomplishing this aim. Moreover, to illustrate what may result from using this tool, we explored the network picture of one particular individual. In addition, we presented the structures of network pictures that resulted from using the research device to interpret respondents' perceptions of the business network to demonstrate that the device allows identifying differences and commonalities between individuals. The clustering also allowed identifying five dimensions of the developed model that did not reflect significant differences

between respondents. The empirically derived structure for a tool to capture network pictures can thus be initially deemed to be robust.

8.1. Contributions

The paper reflects a methodological contribution in the sense that a research device was developed which can be used to improve research in business network. In addition, we have identified what researchers ought to look for so as to get an understanding of 'practitioner theories' (Mattsson 2005a, 2005b), providing researchers with the possibility to integrate those (informal) theories into their (formal) theories. This paper also reflects a contribution for the business network literature by translating actors' views into something that can be captured and used by researchers in their research. The contribution of this paper is thus not confined to business marketing area but also adds towards knowledge development in the cognitive science and organizational behaviour fields of research. It also makes a significant contribution to the area of strategic management, e.g. by providing a way to analyse the consequences of actors having similar/dissimilar ways of perceiving things, thus assisting in guiding top-management teams towards optimal alignment for decision-making.

The paper also reflects a managerial contribution, with practitioners being enabled to understand how they (and others) perceive the business network. Regarding their decision-making processes managers may now, for example, understand whether there is an optimal way of perceiving the network considering the aims they want to achieve. They may also identify when a specific way of perceiving things can be better than other (e.g. when is it better to have a broader or narrower perspective of the network).

8.2 Limitations and Implications for Further Research

One of the most important limitations of this study results from the decision to consider only individuals from two specific networks. Such particularity does not allow therefore a generalisation of the findings. However, this does not detract from the fact that a tool has been devised where previously none did exist. Therefore, further research can take up and modify/improve the dimensional model. One other limitation, also associated with the exploratory nature of the paper, is

that there was no attempt made to develop intensity scales to analyse the collected data. Future research should address the aspects of an actor's views which are 'ossified' into his/her frameworks and thus are not susceptible to change. Furthermore, the impact of different levels of commonality or diversity in the way actors from one company or one network perceive the world could be analysed, for example with regard to the overall effect on performance (e.g. decision-making performance or networking outcomes). It would be important to explore whether there are any contextual factors that condition the way actors perceive the world, this could be done as a further development of the clustering that was carried out in this paper.

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Figure 1

Theoretically derived structure of network pictures
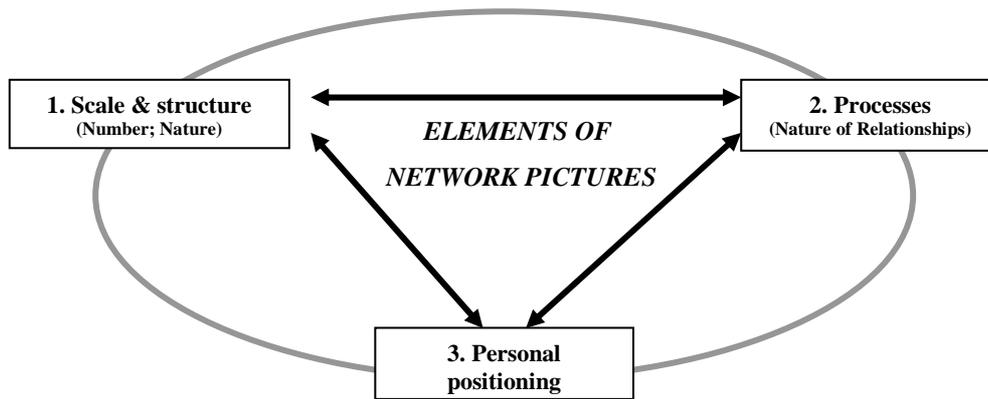
Figure 2.

Companies and direct relationships included in the 'product network'
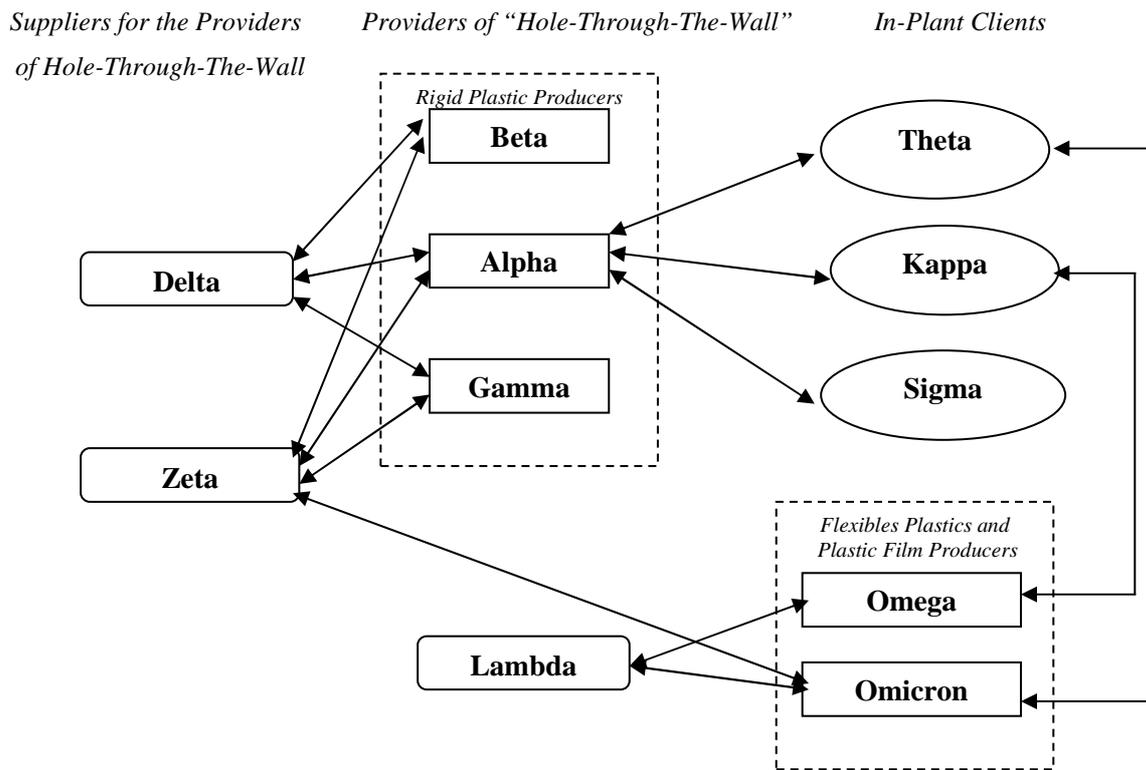
Figure 3.

Companies and direct relationships included in the 'project network'
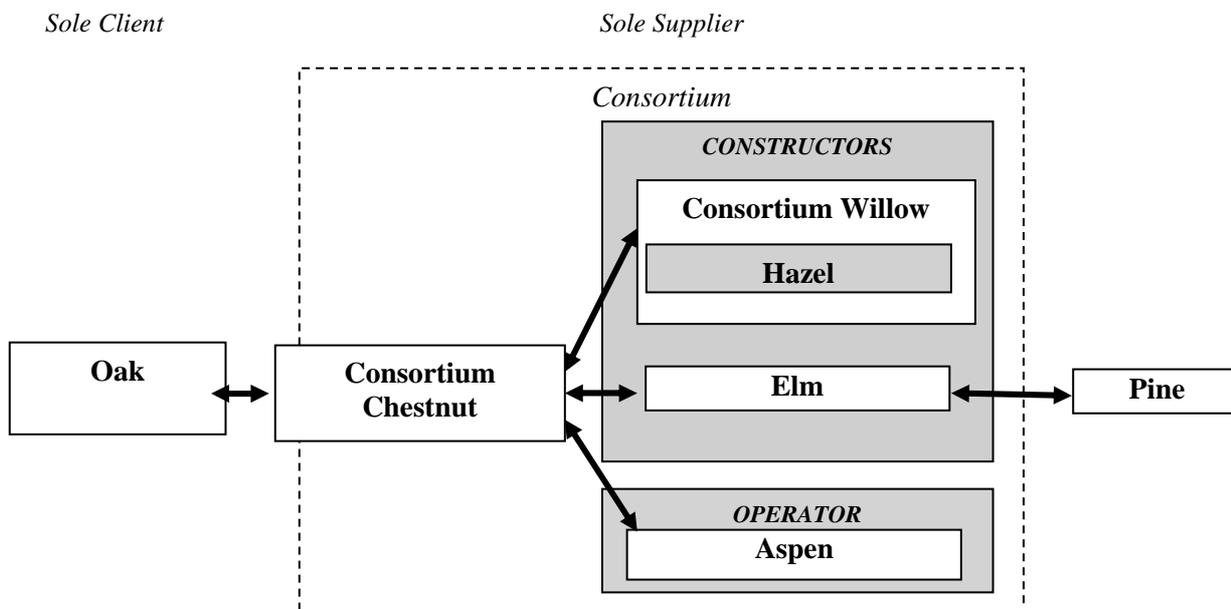
Table 1

Respondents from the 'product network'

'Hole-Through-Wall':	**Company's Name**	**Function in the Company**
PROVIDERS FOR 'HOLE- THROUGHT -THE-WALL'	**Alpha**	1. Commercial Director (PT)
		2. Commercial Director and KAM (IT)
		3. Operations Director
		4. RM Purchasing Director
		5. LPTD Director (R&D)
		6. International Technical Director
		7. Technology Director
	Beta	1. CEO (and all other)
	Gamma	1. Financial Director
		2. International Director
		3. Production Director
	Lambda	1. *In-Plant* Director
SUPPLIERS OF PROVIDERS FOR 'HOLE- THROUGHT-THE WALL'	**Delta**	1. CEO
		2. Logistics Director
		3. Production Director
	Zeta	1. CEO
		2. Commercial Director
		3. Production Director
CLIENTS OF 'HOLE- THROUGHT-THE WALL'	**Theta**	1. Production Director
	Kappa	1. Production Director
	Sigma	1. Production Director
	Omega	1. CEO
		2. Commercial Director
		3. Financial Director
		4. Production Director
		5. IT Director
	Omicron	1. Commercial Director

Table 2

Respondents from the 'project network'

PROJECT:	**Company's Name**	**Function in the Company**
PROVIDERS	**Chestnut**	1. CEO
		2. Construction Coordinator
		3. Planning and Controlling Director
		4. Commercial/Contractual Director
		5. Technical Director
	Willow	1. CEO
		2. Planning Director
		3. Commercial Director
		4. Production Director
	Aspen	1. CEO
		2. Project Director
		3. Operations Director
	Hazel	1. CEO
		2. Production Director
	Pine	1. CEO
		2. General Coordinator
	Elm	1. CEO
		2. Operations Director
		3. Technical Director
CLIENT	**Oak**	1. Operations Director
		2. Communication & Image Director
		3. Infra-Structures & Production Director

Figure 4.

Overview of the dimensional model of Network Pictures

Table 3.

Examples of typical sentences used by respondents that perceived the world in certain terms

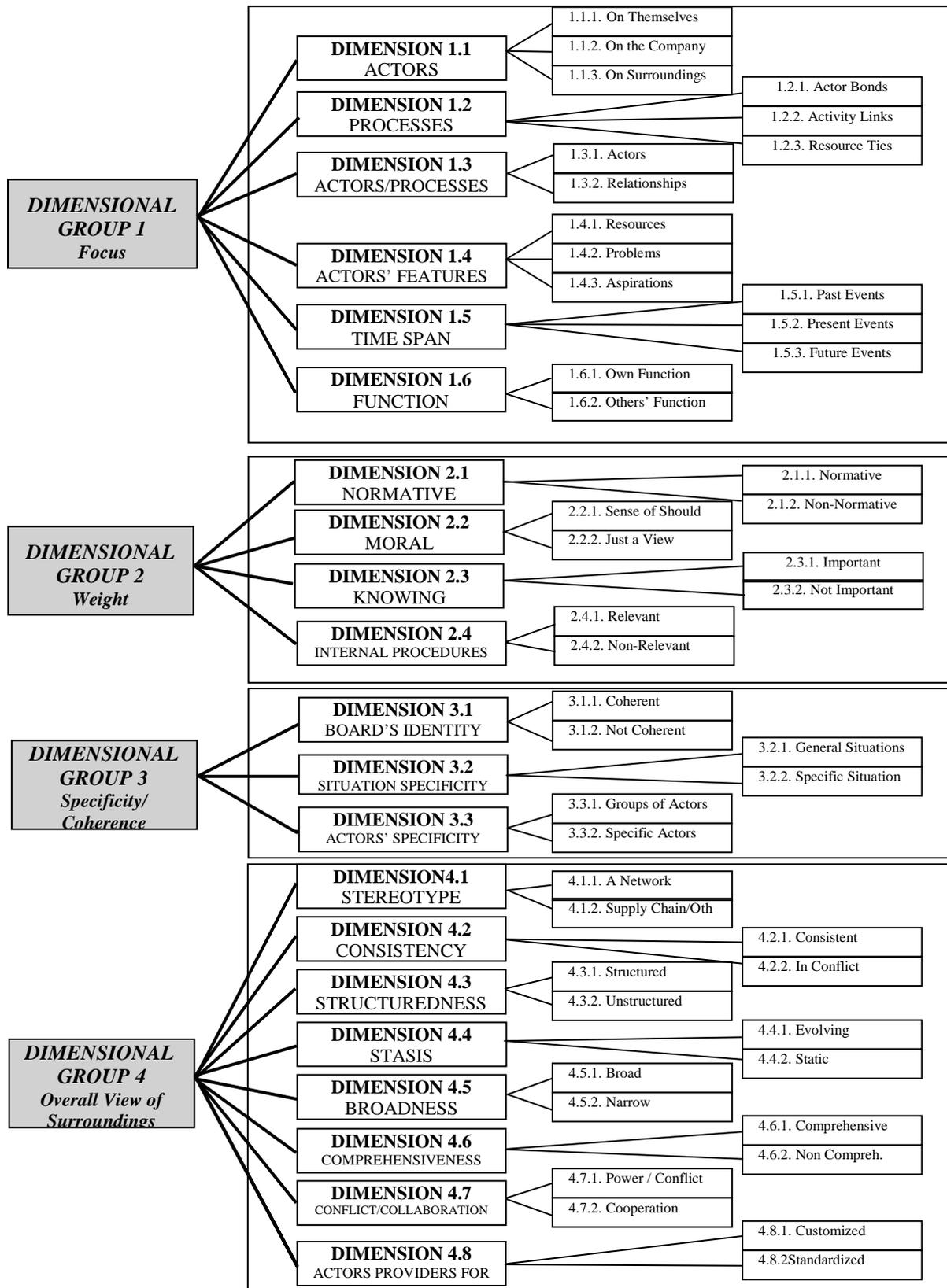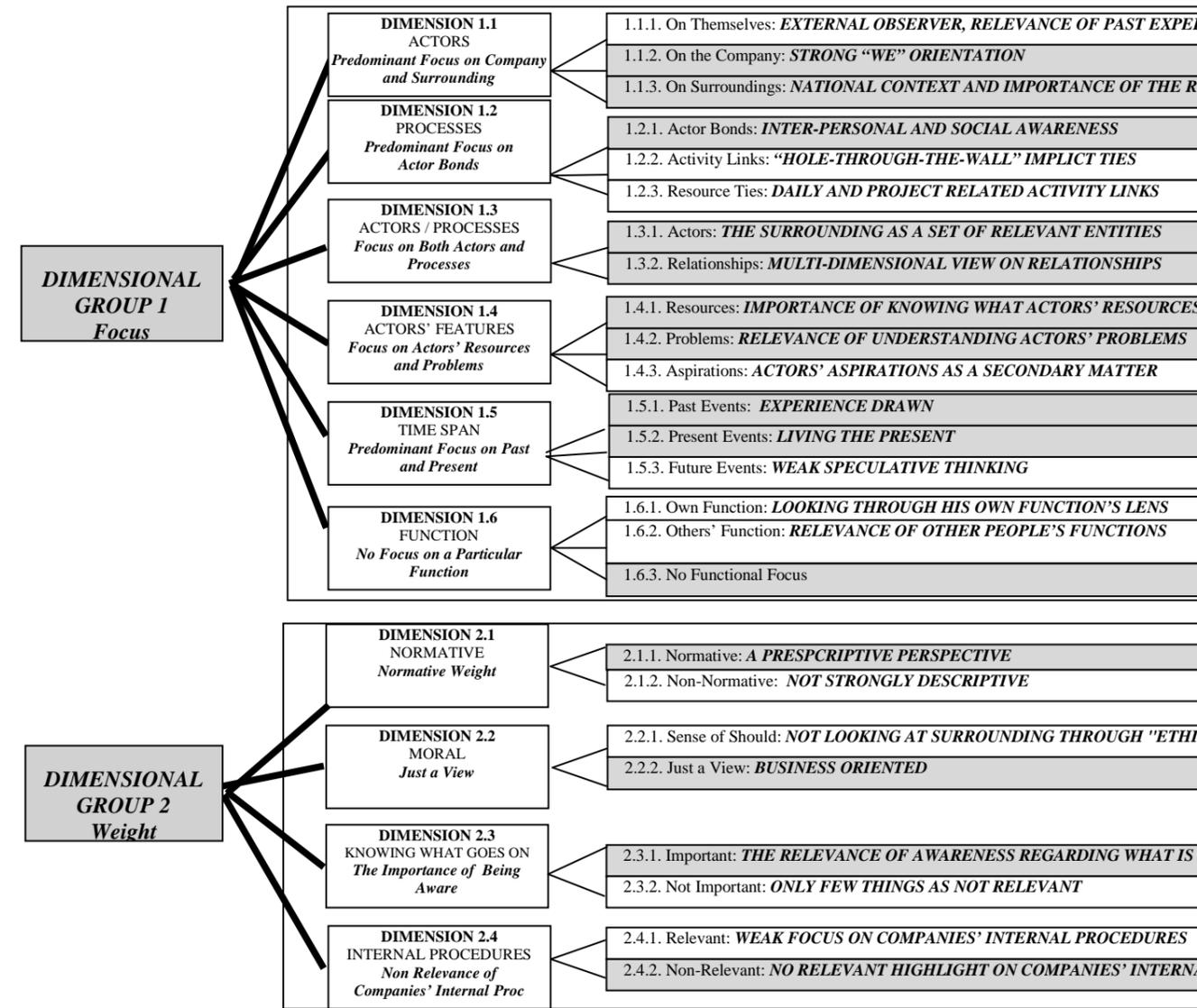| Dimension	Sub-Dimensions	Illustration
1.1 Actors	1.1.1 Themselves	. "... I do not have any relations with this company." . "...my clients are also supplied by my competitors."
	1.1.2 Company	. "...our strategy is... ". . "We are increasingly looking for sectors where we can grow...".
	1.1.3 Surrounding	. "...for me is my competition and can't leave them out of my sight...". . "We are within this Universe."
1.2. Processes	1.2.1 Actor Bonds	. "... I maintain a personal relationship, but it is more an exchange of information on a personal level...". . "That supplier's facilities are very near and that is a huge advantage for us....".
	1.2.2. Activity Links	. "...we have a Key Account Manager...". . "...there are rehearsals for raw materials...".
	1.2.3. Resource Ties	. "...since we supply in a just-in-time regime...". . "...we have some cross-relations in the technology area... ".
1.3 Actors / Processes	1.3.1 Actors	. "...they have the typical problems that other companies in this country have: great lack of organization, personnel training levels are low...". . "...it is an interesting company, with good health, which has been growing by making acquisitions of other companies or growing by its own means....".
	1.3.2 Processes	. "We have a very balanced relationship with suppliers...". . "...in operational terms, they have inbound logistics, which traditionally consists in bringing trucks with plastic containers from a faraway location, which suppliers are faraway...".
1.4 Actors' Features	1.4.1 Resources	. "That company's major resources are the old influences since they are very well positioned in the market... old relations, good contacts...". . "They are technologically advanced and enjoy an image of technological ability, quality...".
	1.4.2 Problems	. "They wanted to have a larger market share, having invested enormously in their facilities". . "…they want to go through a restructuring process but are not able to...".
	1.4.3 Aspirations	. "…they are arrogant, inflexible, and technically distant, with high costs...". . "This company can't understand that there are major problems between the Portuguese and the Spanish market."
1.5 Time Span	1.5.1 Past Events	. "I remember some situation from the past...". . "...In those times, it was a family owned, typically familiar...".
	1.5.2 Present Events	. "... at this moment […] we are increasing the capacity." . "Nowadays, the final customer is probably the one that influences the most...".
	1.5.3 Future Events	. "... potentially we will have to be very flexible to overcome the situations...". . "... as the company grows, it's natural that there will be a need to increase financial control...".
1.6 Function	1.6.1 Own Function	Commercial Directors would typically used expressions such as: . "Competitors are interesting first of all because it's important to know your enemy to win the battle." The RM (Ram Materials) Purchasing Director on the same matter said, for example: . "I don't have a clue if there are relations between clients. […] That is very, very far away from this business area...".
	1.6.2 Others' Functions	Commercial Directors would say things such as: . "...we are in strategic relations with our transport and convey system suppliers, raw materials, equipment and machinery. The RM Purchasing Director used expressions such as follows: . "... was a very interesting project and innovative in technological terms."
2.1 Normative	2.1.1 Normative	. "To renew the contracts, we have to do two things: we have to be competitive which means having low prices (reflecting a sexy price) and to guarantee high quality." . "...has to be very strong as a business partner...".
	2.1.2 Non Normative	. "…and that is more or less how we behave...". . "Typically, what we do is...".
2.2 Moral	2.2.1 Moral	. "We always pay on time; we are not a company that does not do what it has agreed...". . "... but it's a "job for the boys"...".
	2.2.2 Just a View	. "I do consider it important that we are once again within this recycling world because our survival goes through there...". . "... and anyway I do not worry much about our environmental impact...".

2.3 Know Going on	2.3.1 Important	. "...we don't know enough about what competitors are doing." . "... be in the lead of what is happening, to direct what is important for the company...".
	2.3.2 Not Important	. "Me, relations with suppliers, I am very distant...". . "I don't have a clue if there are relations between clients...".
2.4 Internal Procedures	2.4.1 Relevant	. "They try not to be dependent on internal scientists regarding technologies...". . "...we don't produce and then stock it and transport and then deliver; instead, we produce and deliver immediately."
	2.4.2 Non Relevant	...
3.1 Coherence with Board Identity	3.1.1 Coherent	. "We know how to choose the best solution on behalf of our clients: we are specialists". . "...we do things because we believe in them."
	3.1.2 Non Coherent	. "...and the Group is much more formally structured than it is willing to admit." . "And even our CEOs are everything except low profile and therefore, there is a certain tendency for stars at our company! Personally, it's not my style since I'm generally low profile but here, we are compelled, we can't... ".
3.2 Situation Specificity	3.2.1 General	. "In the past, this industry had many players (small and medium size companies that easily invested in this kind of technology and produced plastic containers)...". . "...before plastic replaced PVC, there were many quality problems in production due to the poor quality of raw materials...".
	3.2.2 Specific	. "For example, we conducted a study of a modification for a material of a container". . "Once, this competitor had to lower their prices too much because of us...".
3.3 Actor Specific.	3.3.1 Groups	. "Consumers want environmentally friendly containers and increasingly attractive containers." . "...many multinationals were led into reviewing their industrial units' configurations....".
	3.3.2 Specific	. "But this also happens, like with these 3 specific clients, in which we take in whatever it is necessary to do directly from the marketing...". . "... and the clients all need a "lifting" (changing their image or reformulating and shaping) every 3 or 4 years. This client is obviously not one example."
4.1 Stereotype	4.1.1 Network	. "...our strategic positioning depends on the positions of these companies." . "...there is a very strong interconnection in all of this, in such a way that the containers that we produce are according to what the society expects from us."
	4.1.2 Supply Chain or Other	. "If we had what we call a supply chain, it is quite obvious that this company is nowadays a seriously important player...". . "This is the value chain of a typical multinational which has business in home or body care, typically our clients."
4.2 Consistency	4.2.1 Consistent	. "... it is also an industry of small series." and "right now, our company has the right formula: very flexible, [...] with a very low pyramid...". . "The way we relate to these companies is also in function with their Latin and Saxon base, respectively" and "our trend is to be much more formal with this client than with that one...".
	4.2.2 Not Coherent	. "There is not really a motive for drawing the company in the middle; it's more an emotional issue..." and "I think that in terms of importance, the multinational companies are also the ones who have a bigger capacity to influence the others...". . "I know about relations with suppliers... even this week I visited two trying to understand what they are doing..." and "...I am not sure if I am the most appropriate person to tell you about the relations we have with suppliers... because [...] here, it is the director of the plants and the person responsible for the purchases... [...] that has relations with them."
4.3 Structuredness	4.3.1 Structured	."Our company is inserted into a group of services suppliers related to containers. [...] I can draw the different companies that we fundamentally have relations with, which are different multi-nationals that we work for. Our company supplies the containers in a partnership regime. [...] These multinationals are also supplied by our competitors, who are in the market and who are important players worldwide...".
	4.3.2 Unstructured	."Imagine!!! I forgot to include the competitors in my drawing...". ."...and therefore I question myself: "where am I going to place competition, suppliers and others on this piece of paper? And this is due to the fact that for me, in a certain moment in time, they all have to be in the first line."
4.4 Stasis	4.4.1 Evolving	. "In the past, this industry had many players and nowadays the same that happens in the other industries is taking place, with concentration trends...". . "Consumers are increasingly environmentally aware and they are sensitive to prices."
	4.4.2	. "I have some difficulty in describing the relationship with this client but surely

	Static	it hasn't changed much from 5 years to this part...". . "In the relation with this client, and in Portugal, there is nothing new... It's like a wedding: a very cold relationship since everything is defined, the boundaries are perfectly established...".
4.5 Broadness	4.5.1 Broad	. "...what the raw material suppliers try to do is obviously to convince us to buy but they go to these companies (the clients) with institutional presentations...". . "...typical multinationals which have business in home or body care, typically our clients. [...]... support activities such as purchasing, technical and technological support, finance, IT and others, such as human resources [...], bringing trucks with plastic containers from a faraway locations...".
	4.5.2 Narrow	. "I am very ignorant in this area and I haven't been worried with recycling matters, legal issues or lobbying. On a day to day basis, I don't deal with this." . "The company, then the clients (which here are also designated by partners)... [...] We have the suppliers here to this side... [...]I forgot to include the competitors in my drawing... ".
4.6 Comprehensiveness	4.6.1 Comprehensive	. "It's a relation that... since I have arrived to this company, it has been through several stages. Nowadays, it is going through a difficult stage because for what I understood, it is designated as a commodity and that is worrying." . "Technology suppliers usually try to focus on a particular specialisation [...]. And they try to develop their competitiveness factor to the maximum: it's obviously the prices of the equipment and the market technology and their performance in terms of costs and productivity."
	4.6.2 Non Comprehensive	"I don't know about concrete situations but I imagine that it must be like that with my client. It's a relationship at two levels...". . "I am not able to say much about them. I know that they are very strong in the segment where our company works...".
4.7 Conflict Or Collaboration	4.7.1 Conflict / Power	. "... sometimes, we also win and it feels great beating that competitor. But they often win...". . "Raw material suppliers are world giants from the chemistry area and we try to get into their radar by concentrating our purchasing...".
	4.7.2 Collaboration	. "Our company supplies the containers in a partnership regime. We have an honest and open relationship with our partners...". . "...what I can do for them and what they can do for me."
4.8 Actors as Provider for…	4.8.1 Customized Offers	. "They weren't able to understand that their products didn't suit us and there were other producers who would." . "...the equipment and plants are increasingly flexible: changes can be introduced in a rapid way."
	4.8.2 Standard Offers	. "We don't have much necessity to influence them since they provide a standard product." . "... but also multi-client plants; this sometimes enables them to have competitive advantages, because it takes complexity out of the relationship and they are able to supply clients which volumes do not justify for an in-plant solution".

Table 4.

Summary classification of the respondent's network picture (Note: salient sub-dimensions are highlighted i

	DIMENSION 1.1 ACTORS *Predominant Focus on Company and Surrounding*	1.1.1. On Themselves: ***EXTERNAL OBSERVER, RELEVANCE OF PAST EXPE***
		1.1.2. On the Company: ***STRONG "WE" ORIENTATION***
		1.1.3. On Surroundings: ***NATIONAL CONTEXT AND IMPORTANCE OF THE R***
	DIMENSION 1.2 PROCESSES *Predominant Focus on Actor Bonds*	1.2.1. Actor Bonds: ***INTER-PERSONAL AND SOCIAL AWARENESS***
		1.2.2. Activity Links: ***"HOLE-THROUGH-THE-WALL" IMPLICT TIES***
		1.2.3. Resource Ties: ***DAILY AND PROJECT RELATED ACTIVITY LINKS***
	DIMENSION 1.3 ACTORS / PROCESSES *Focus on Both Actors and Processes*	1.3.1. Actors: ***THE SURROUNDING AS A SET OF RELEVANT ENTITIES***
DIMENSIONAL GROUP 1 *Focus*		1.3.2. Relationships: ***MULTI-DIMENSIONAL VIEW ON RELATIONSHIPS***
	DIMENSION 1.4 ACTORS' FEATURES *Focus on Actors' Resources and Problems*	1.4.1. Resources: ***IMPORTANCE OF KNOWING WHAT ACTORS' RESOURCES***
		1.4.2. Problems: ***RELEVANCE OF UNDERSTANDING ACTORS' PROBLEMS***
		1.4.3. Aspirations: ***ACTORS' ASPIRATIONS AS A SECONDARY MATTER***
	DIMENSION 1.5 TIME SPAN *Predominant Focus on Past and Present*	1.5.1. Past Events: ***EXPERIENCE DRAWN***
		1.5.2. Present Events: ***LIVING THE PRESENT***
		1.5.3. Future Events: ***WEAK SPECULATIVE THINKING***
	DIMENSION 1.6 FUNCTION *No Focus on a Particular Function*	1.6.1. Own Function: ***LOOKING THROUGH HIS OWN FUNCTION'S LENS***
		1.6.2. Others' Function: ***RELEVANCE OF OTHER PEOPLE'S FUNCTIONS***
		1.6.3. No Functional Focus

	DIMENSION 2.1 NORMATIVE *Normative Weight*	2.1.1. Normative: ***A PRESPCRIPTIVE PERSPECTIVE***
		2.1.2. Non-Normative: ***NOT STRONGLY DESCRIPTIVE***
	DIMENSION 2.2 MORAL *Just a View*	2.2.1. Sense of Should: ***NOT LOOKING AT SURROUNDING THROUGH "ETHI***
DIMENSIONAL GROUP 2 *Weight*		2.2.2. Just a View: ***BUSINESS ORIENTED***
	DIMENSION 2.3 KNOWING WHAT GOES ON *The Importance of Being Aware*	2.3.1. Important: ***THE RELEVANCE OF AWARENESS REGARDING WHAT IS***
		2.3.2. Not Important: ***ONLY FEW THINGS AS NOT RELEVANT***
	DIMENSION 2.4 INTERNAL PROCEDURES *Non Relevance of Companies' Internal Proc*	2.4.1. Relevant: ***WEAK FOCUS ON COMPANIES' INTERNAL PROCEDURES***
		2.4.2. Non-Relevant: ***NO RELEVANT HIGHLIGHT ON COMPANIES' INTERN***

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DIMENSIONAL GROUP 3
Specificity/ Coherence

DIMENSION 3.1
COHERENCE BOARD'S IDENTITY
Coherent

3.1.1. Coherent: *TOTAL COHERENESS WITHBOARD'S EXPLICIT IDENTITY*

3.1.2. Not Coherent: *NO SIGNS OF LACK OF COHERENCE WITH THE BOARD'S*

DIMENSION 3.2
SITUATION SPECIFICITY
Specific Situations

3.2.1. General Situations: *FINDING SIMILARITIES BETWEEN DIVERSE SITUATI*

3.2.2. Specific Situations: *SITUATION DRIVEN AND COMPREHENSIVE USE OF I*

DIMENSION 3.3
ACTOR SPECIFICITY
Groups of Actors and Specific Actors

3.3.1. Groups of Actors: *IDENTIFYING COMMONALITIES BETWEEN ACTORS*

3.3.2. Specific Actors: *RELEVANCE OF SPECIFIC ACTORS*

DIMENSIONAL GROUP 4
Overall View of Surroundings

DIMENSION4.1
STEREOTYPE
Seeing a Network and claiming to see a Supply Chain

4.1.1. A Network: *UNAWARENESSTHAT SEES THE SURROUNDINGS INTERMS*

4.1.2. Supply Chain/Other: *CLAIMING TO SEE A SUPPLY CHAIN*

DIMENSION 4.2
CONSISTENCY
Consistent and Inconsistent

4.2.1. Consistent: *OVERALL CONSISTENT VIEW*

4.2.2. In Conflict: *ADOPTING A DOUBTFUL "HUMBLE" POSITIONING*

DIMENSION 4.3
STRUCTUREDNESS
Structured

4.3.1. Structured: *STRONGLY STRUCTURED VIEW*

4.3.2. Unstructured: *NO SIGNS OF AN UNSTRUCTURED VIEW*

DIMENSION 4.4
STASIS
Evolving

4.4.1. Evolving: *A STRONGLY DYNAMIC PERSPECTIVE*

4.4.2. Static: *NO SIGNS OF A STATIC VIEW*

DIMENSION 4.5
BROADNESS
Broad

4.5.1. Broad: *WIDE SCOPE*

4.5.2. Narrow: *NO INDICATORS OF A NARROW SIGHTED VIEW*

DIMENSION 4.6
COMPREHENSIVENESS
Comprehensive

4.6.1. Comprehensive: *RICH AND DETAILED DESCRIPTIONS OF THE SURROUN*

4.6.2.. Non Comprehensive:: *NON SPECIFIC INFO ON NON RELEVANT ACTORS*

DIMENSION 4.7
CONFLICT OR COLLABORATION
Power / Conflict

4.7.1. Power / Conflict *A VIEW PREDOMINANTELY DRAWN ON POWER RELAT*

4.7.2. Cooperation: *COOPERATION AS A NATURAL PROCESS BETWEEN PARTI*

DIMENSION 4.8
ACTORS AS PROVIDERS FOR
Customized Problem Solutions

4.8.1. Customized Offers: *PREVAILING VIEW OF A CUSTOMIZED OFFER*

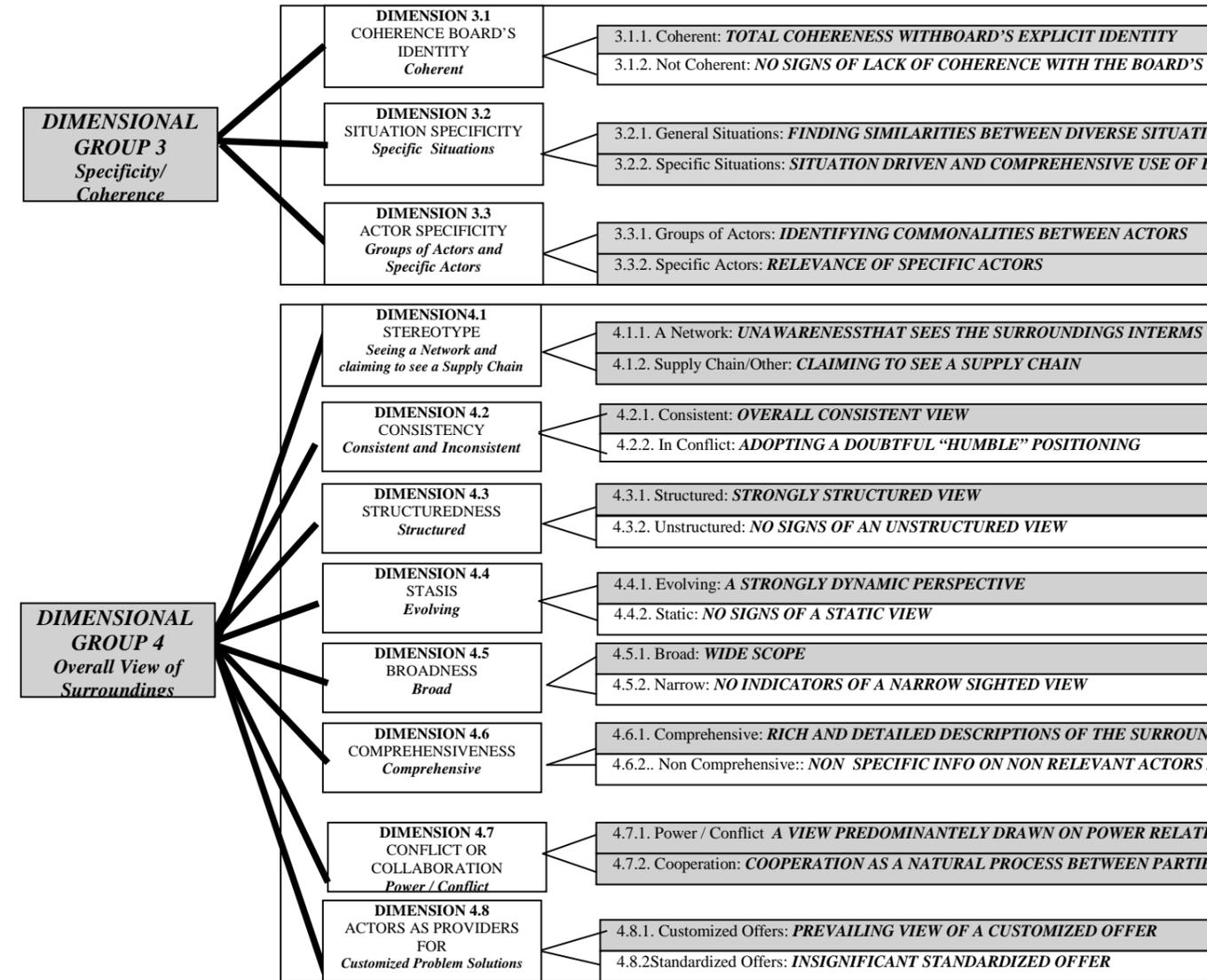4.8.2Standardized Offers: *INSIGNIFICANT STANDARDIZED OFFER*

Table 5.

Predominant network picture features of each cluster of respondents (Note: grey sub-dimensions did not differentiate between clusters)

	Network Pictures Dimensions		Cluster1	Cluster 2	Cluster 3	Cluster 4
Dimensional Group 1. FOCUS	Actors	On Him/Herself	X	X X	X	
		On the Company	X X	X X X		
		On Surrounding		X X X		
	Processes	Actor Bonds	X	X	X	X
		Activity Links		X		X
		Resource Ties				
	Actors' Features	Resources		X		
		Problems	X	X		
		Aspirations		X		
	Actors Vs Processes	Focus on Actors				
		Focus on Processes	X	X	X	
	Time Focus	Past Events	X	X		
		Present Event	X	X		X
		Future Events		X		
	Functional Focus	Own Function	X			X
		Other's Function(s)	X			
Dimensional Group 2. WEIGHT	Normative	Normative	X	X	X	
		Reference				
	Moral	Sense of Should		X		
		Just a View	X		X	X
	Knowing what Goes on	Important	X	X	X	
		Not Important				X
	Internal Procedures	Relevant	X	X	X	X
		Not Relevant				
Dimensional Group 3. SPECIFICITY / COHERENCE	Coherent with Board's Identity	Coherent	X	X	X	X
		Non Coherent				
	Situational Specificity	General Situations		X		
		Specific Situations	X	X	X	
	Actor Specificity	Groups of Actors				
		Specific Actors		X		
Dimensional Group 4. OVERALL VIEW OF SURROUND	Stereotype	A Network		X X		
		A Supply Chain/Oth		X X		X
	Consistency	Consistent	X	X	X	X
		In Conflict				
	Structuredness	Structured	X	X	X	X
		Unstructured				
	Stasis	Evolving	X	X	X	X
		Static				
	Broadness	Broad		X		
		Narrow				X
	Comprehensiveness	Comprehensive	X	X		
		Non Comprehensive			X	
	Conflict/Coolaboration	Power/Conflict	X	X		X
		Collaboration		X		X
	Actors as providers for...	Customised Offers	X	X	X	X
		Standadised Offers				