

NETWORK PICTURES – CONCEPTS AND REPRESENTATIONS

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Abstract:

There has recently been an increase in interest in the notion of ‘network pictures’ amongst researchers in the field of business-to-business marketing. Network pictures are managers’ subjective mental representations of their relevant business environment. They are posited to work as ‘sense-making’ devices, and consequently shape managerial decisions, actions, and evaluations. However, while interest in this concept has been reported in a range of literature that we identify and discuss, there has been no attempt to rigorously conceptualise the underlying dimensions of such pictures. Based upon an extensive review of previous work, we propose a parsimonious set of interrelated dimensions, and initially test this approach. We show the model’s face validity, but also argue that not all dimensions are perceived as being equally useful: utilisation of the different dimensions is determined more by what it is that managers wish to represent. The implications of the concept of network pictures, as well as further research propositions, are discussed.

Keywords:

Network picture; network management; business-to-business marketing

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Taking Network Pictures Literally

The notion of exchange activities defines one of its main *explananda* of marketing theory (Hunt, 1976; Arndt, 1982; Hunt, 1983). Exchange is facilitated by marketing management, operating within a complex web of interactions and interdependences between organisations and other actors involved in the wider area of the creation of value (Anderson *et al.*, 1994; Cheung and Turnbull, 1998; Ford, 1998; McLoughlin and Horan, 2000; Sharma and Sheth, 1997). In such a network, value manifests itself finally as an offering to final consumers (Parolini, 1999). As such, marketing theory focusing on network management has a specific emphasis on dynamics (e.g. concepts of change or stability of networks) (Mattsson, 2002b) in addition to relationships between companies (Anderson *et al.*, 1994). Interdependencies between actors are based on exchanges that are contingent on other exchange relationships, in the sense of the axiom that ‘[n]o business is an island’ (Håkansson and Snehota, 1990, p. 187). This approach can be contrasted with a dyadic exchange perspective which focuses on direct value-chain interactions between (distinct) buyers and sellers, covering only primary functions of exchange relationships (Anderson *et al.*, 1994; Håkansson and Snehota, 1994; Ford, 1998) and not wider competitive or co-operative elements of a network (Mattsson, 2003). The network perspective, a development of the interaction paradigm of the International Marketing and Purchasing Group (IMP), enables marketing theory, as well as marketing management, to gain a more holistic perspective of business-to-business exchanges.

Longer-term relationships, their characteristics, antecedents and consequences, as well as dynamics within the whole network, have become important research objects within the IMP tradition. While the focus on ‘relationships’ is in itself not unproblematic (Blois, 1998; Rao and Perry, 2002), the network approach constitutes an alternative theory-building concept to traditional marketing concepts (Arndt, 1983) whilst grounded in the social exchange concept (Bagozzi, 1975; Donaldson and O’Toole, 2000).

Research on relational and network issues has recently re-introduced constructs of mental representations into its theory development. One such construct (based on Asch’s, 1952, notion of ‘activity systems’) are ‘network pictures’ (Ford *et al.*, 2002) or ‘network maps’ (Borders *et al.*, 2001). The notion of network pictures refers to the different understanding that players have of the network. It is based on their subjective, idiosyncratic sense-making with regard to the main constituting characteristics of the network in which their company is operating. These perceived network pictures form the backbone of managers’ understanding of relationships, interactions, and interdependencies, and constitute therefore an important component of their individual decision-making processes. Thus, network pictures are clearly a central concept to managing in networks and need further elucidation. They constitute what Möller and Halinen (1999) have described as the level two of network management, i.e. ‘*managing focal nets and network positions*’ (p. 416).

Attempting to conceptualize this construct, we endeavour to take it one step further: we propose to take these mental representations literally for what they are: pictorial representations, i.e. ‘pictures’. Therefore, we interpret an actor’s sense-making in networks not on the level of ‘belief systems’ or ‘attitude formations’ (the antecedents of

network pictures) but as their conscious transmogrification into ‘quasi-visual’ images (Arnheim, 1969), in line with the literature on managerial cognition (Walsh, 1995; Weick, 1995; Johnson et al., 1998; Spender, 1998). Thus, our interpretation presumes that the ‘network pictures’ are a *pars pro toto* (i.e. standing in) for the higher level constructs of beliefs and attitudes that have directional behavioural repercussions.

To interpret network ‘pictures’, we will deconstruct the pictures on two levels: first, on content level (“what do the pictures represent?”), and second, on a representational level (“how do the pictures represent their content?”). These two levels refer to the ‘representation of content’ versus ‘representation of representations’ issue of semiotic interpretations. (Foucault, 2003). Initially, a grounding of the descriptive discussions of network pictures is provided through an analysis of the main ‘architecture’ of network pictures. The aim of this analysis is to conceptually build on and qualify the existing literature on network pictures. Some exploratory results from in-depth interviews and experiments with managers will be used to illustrate the concept.

The Character of Network Pictures

The central concept of research driving the IMP Group is the network and its characteristics (Håkansson and Snehota, 1994; Turnbull *et al.*, 1996; Ford, 1998; Ford *et al.*, 2003). A market is not seen as consisting of isolated dyadic exchanges but is characterized as interactions between many (cooperative and competitive) relationships in a network (Mattsson, 2003). As such, ‘*any particular market is the consequence of operations of disentanglement, framing, internalization and externalization*’ (Callon 1999, p. 181), many of which have no ‘objective’ properties but are dependent on

participants' beliefs and interpretations. But what is a network? Whilst much research has tried to clarify this (Johanson and Mattsson, 1992; Weick, 1995), it remains somewhat unclear how to define or delineate a specific or abstract network beyond generic concepts (Cova *et al.*, 1998). This finding is not surprising bearing in mind the opaque nature of the boundaries of other market entities, such as firms (Araujo *et al.*, 2003). However, an understanding of the 'objective' nature of a network might not be necessary, as the critical construct of managerial attitudes, mental schemata, beliefs and actions (Lindell *et al.*, 1998) is crucially structured around the notion of the 'subjective' understanding of what the network represents: the 'network picture' (Ford *et al.*, 2003). Following an interpretive research perspective, these 'mental maps' (Johnson *et al.*, 1995) are assumed to be anchored in individual managerial cognition, to be more specific, they constitute epistemological processes (Bougon *et al.*, 1977). However, no reification on organisational level exists (Weick, 1979; Smircich and Stubbart, 1985; Meindl *et al.*, 1994; Walsh, 1995; Spender, 1998). Resulting from their subjective nature, network pictures are the outcome of individual sense-making, they are not objectively given but socially constructed, a bounded personal interpretation of the network context and therefore 'determinate in a purely individual way' (Gadde *et al.*, 2003; Mattsson, 2002a). As such, network pictures constitute what Actor-Network-Theory calls a 'frame', i.e. the individual actor's definition of a situation (Mattsson, 2003). This frame, while a subjective representation, is 'intersubjectively' constructed, i.e. other actors contribute to and interrelate with it (Weick and Roberts, 1993; Daft and Weick, 1994). However, any intersubjective 'frame' is the result of enacting sense-making concepts, not an antecedent of them (Spender, 1998; Mattsson, 2002b; Mattsson, 2003). Thus, the decidedly

subjective and individual character of cognitive concepts like network pictures is reasserted (Hodgkinson, 1997).

Similar constructs ('cognitive groups' or 'causal maps') have also been discussed in the strategy literature on managerial cognition (Porac *et al.*, 1989; Stubbart, 1989; Bogner and Thomas, 1993; Hodgkinson and Johnson, 1994; Hodgkinson, 1997; Johnson *et al.*, 1998; Osborne *et al.*, 2001) as well as in the organisational behaviour literature (Bougon *et al.*, 1977; Weick, 1979; Meindl *et al.*, 1994; Jenkins, 1998). This elegant side-step ('the network is what the managers think it is') enables researchers, by using subjective relativism (Muncy and Fisk, 1987), to describe the network characteristics (Weick, 1995), though often this is accomplished in terms of paradoxes or myths (Ford *et al.*, 2002; Ford *et al.*, 2003). Network pictures have been defined as follows: '*[... A]ll of the actors involved in a particular issue in the network will have their own different 'picture' of the network. This picture is the basis for their perceptions of what is happening around them and of their actions and reactions in the network.*' (Ford *et al.*, 2002, p. 4). Network pictures are the '*actor's network theory*' (Mattsson, 2002a, p. 6, emphasis in original). Like Weick's (1995) notion of sense-making, network pictures are essential to the construction process of an organisations' identity. Network pictures are retrospective in the sense that they provide a depiction of past events and reinforce current positions. They are prospective in that they shape future options. Network pictures are the ongoing product of social interactions among network actors and they are inferred from a variety of cues rather than objectively given. Moreover, network pictures are enacted in the sense that existing business-to-business networks are constructed through the organisations'

own initiatives and activities which are linked to individual representational constructs, i.e. mental pictures (Smircich and Stubbart, 1985, Weick, 1995).

The notion of network pictures is found in the IMP literature since the end of the 1980s as part of sometimes overlapping and interacting constructs: network horizon, network context, network identities, or network environment (Anderson *et al.*, 1994; Håkansson and Johanson, 1988; Holmen and Pedersen, 2003). Such a subjective approach is in line with co-called new marketing paradigms, utilizing a social constructionist approach: '*In the absence of any objective reality, marketing knowledge reflects the interpretation of reality by individuals*' (Palmer and Ponsonby, 2002, p. 173). Hence, network pictures have two essential properties: they are an abstract metaphorical topology of the environmental space as perceived by actors within it. Further, they provide a context, and are framing devices as well as possible triggers for managerial activities. Network pictures, therefore, affect as a reference point the way actors interact with each other, as well as the cumulative results of these actions. They affect the actors' *networking*, i.e. an understanding by the actors of "...*what they can or might wish to do*" (Ford *et al.*, 2002, p. 7) **as well as** the *network outcomes*, i.e. the perceptions and judgements of a firm's activities (Anderson *et al.*, 1994; Ford *et al.*, 2003). Thus, network pictures have the dual role of meaning-creating devices as well as decision tools (in their capacity as 'mitigators' or as 'influencers') (Parolini, 1999; Snehota, 2003). As such, they correspond with Weick's (1995) notion of sense-making as a '*developing set of ideas with explanatory possibilities*' (p. xi). Network pictures determine all possible levels of managerial activities: choices within existing relationships, choices about positions, choices about alternatives, as well as choices about how to network itself (Ford *et al.*,

2003). Choice in this sense has to be understood as the perceived option set, i.e. the bounded field of decision possibilities within the limits of expectations shaped by the framework of the network pictures (Weick, 1979; Spender and Eden, 1998). However, because of their subjective nature, network pictures themselves constitute, to some extent, a choice: a choice of what the network actor wants to believe. This type of choice has been demonstrated in the organisational behaviour and managerial cognition literature and is shaped by situational expectations as well as by personal characteristics and other dispositions impacting on the individual (Snook, 2000)

Whilst the business network provides the context for business-to-business interactions, it is important to distinguish between the context itself and the *representation* of that context. This representation of the network as a whole and of relationships within it comprises the *different* network pictures of each company. These network pictures form the basis for their overall networking of which it is part (Ford *et al.*, 2003). The network context is a set of pre-existing dynamics, such as socio-economic externalities, network and dyadic business relationships. It defines a set of contingencies that provide impetus and resistance for acting companies to initiate changes. But companies are not passive receivers of contextual information. They also construct the forms in which this contextual information appears by using technologies of representation such as operating reviews, key performance indicators or scorecards and negotiate with each other in a web of relationships to make business deals (Mouzas and Ford, 2003). Thus, network pictures are not mental representations *per se*. They are linked to a specific purpose. As described by Ford *et al.* (2002), researchers use specific and subjective network pictures according to the aim and starting point of the analysis; as a framing device for their research.

Analogously, the network pictures of managers are ends-oriented, too. Managerial network pictures are sense-making devices to assist in coping with specific demands, to secure defined outcomes. Thus, the characteristics of network pictures become even more opaque: they vary not only because of their *subjectivity* (i.e. boundedness to a specific person) but also, to a certain degree, because of their *appropriateness* (i.e. boundedness to a specific task). Appropriateness of network pictures refers to their ability to help actors to achieve certain desired outcomes, especially on occasions characterised by ambiguity and uncertainty (Weik, 1995). For example, an understanding of the power positions based on the availability of crucial technological information within a network can help with successfully securing orders. A network picture that incorporates the notion of such power positions is clearly more appropriate than one that does not, as is one that corresponds better with the perceived network pictures of other relevant actors compared with one that does not. Håkansson and Ford (2002) suggest therefore the use of multiple network pictures as an optimal strategy to deal with a multitude of managerial demands. However, this can be posited as a common occurrence anyway: specifically, in a company (as well as a network), many different network pictures are used at the same time simultaneously. Because the granularity level for the ‘carriers’ of network pictures is that of individual actors, i.e. persons/managers, it is possible, in fact likely, for several network pictures to be held in one company, e.g. depending on functional expertise or experiences of persons in the network (e.g. sales people will have different network pictures from IT people, depending on their focus, experiences, etc.) (Sharma *et al.*, 1999). However, certain elements of the network picture will overlap and form a strategic network picture (a ‘focal point’ in the terminology of Callon, 1999) that is shared in its

general form by most (relevant) employees in a given company or network (Osborne *et al.*, 2001). It is postulated that there are common ‘stereotypes’ of network pictures, i.e. an understanding of what the network represents that is shared by all (or most) of the relevant actors (Halinen *et al.*, 1999; Ford *et al.*, 2002; Ford *et al.*, 2003). These stereotypes use specific (limited) combinations of the posited network picture dimensions. Domain consensus and set roles and expectations are consequences (Ford, 1978). This can cause network inertia, i.e. an ossification of the *status quo*.

These crucial characteristics of network pictures, though hinted at in the literature, remain mostly implicit. Although it is argued that for a researcher ‘*a company-centered view of the network provides an inadequate basis for understanding the dynamics within that world...*’ (Ford *et al.*, 2002, p. 3), this assertion is certainly not valid for managers who depend on a network representation that, optimally, enables them to fulfil certain (company-centred) functional activities¹. In fact, it is stated that network pictures represent an important aspect of a company’s strategy and its strategizing process (Ford *et al.*, 1998; Möller and Halinen, 1999; Ford *et al.*, 2003; Gadde *et al.*, 2003; Holmen and Pedersen, 2003; Tikkanen and Halinen, 2003) as well as its tactics (Ritter, 1999). In order to achieve the strategic aim of network exchange effectiveness, a company establishes and fosters relationships with other actors in light of its network picture (Håkansson and Ford, 2002). This subjective network picture overlaps with Mintzberg’s (1987) notion of ‘strategy as perspective’.

¹ Ford *et al.* (2002) themselves indirectly hint at this aspect in a footnote on p. 3. Implicit in the contrast between a ‘research view’ and an ‘actor view’ seems to be an epistemological distinction between a critical realist understanding (for theoretical) and an interpretivist/social constructionist understanding (for management activities) as part of ‘theories-in-use’.

Network pictures, therefore, play a crucial but, hitherto, under-researched role in the theory of network marketing. As such, ‘network pictures’ may well be another metaphor in a metaphor-rich environment (Shoib *et al.*, 2003); but they are crucial ones for the conceptual development of an understanding of networks in general and actors’ network activities in particular. With this in mind, we proceed to conceptually deconstruct the elements of network pictures.

The Concept of Network Pictures

Network pictures as the mental representations of network properties, i.e. subjective interpretations (Anderson *et al.*, 1994; Möller and Halinen, 1999), can be interpreted as a sign of what specific managers feel is important about the environment in which their company is working. Generally, these properties are described as comprising elements such as boundary, centrality, actor relevance, interactions, power, distance, information flows, exchange relationships, negotiations (McLoughlin and Horan 2000). Table I gives an overview of the treatment of network pictures and related elements in the literature in the last 15 years.

[take in table I]

What becomes apparent from this overview is that while there seem to be several conceptual developments that overlap with the notion of network pictures; these are described mostly in general terms without conceptual clarification. Many of the definitions use terminologies that are directly linked to the concept of network pictures

(such as ‘network position’ or ‘belief about network structure’) that make the definition viciously circular. Other concepts follow an ‘analytical’ definition of finding a common denominator for the *definiendum* of network pictures. Such a ‘closed’ neo-platonian definitorial concept is not in line with the characteristics of network pictures. Actors choose network pictures, as subjective sense-making devices, but, not in an arbitrary fashion, they are the ‘definition’ of the space in/for which sense is created. However, we posit that this definition (e.g. deciding on a ‘periphery’ and including and excluding actors and relationship) is not carried out by looking for ‘common denominators’ between the constituting elements of the space (e.g. they belong to a ‘value chain’). Rather, managers use a more open and fluid definitorial concept, congruent with Wittgenstein’s (1967) ‘open concept’ based on ‘family resemblance terms’: no common denominators for a network are necessary, only overlapping and criss-crossing resemblances of features (i.e. no common essence exists, but similarities in some respect but not in others). These similarities allow managers to include/exclude certain elements into their network picture. In order to develop a more empirical understanding of the construct of network pictures, a loose deductive approach was used to provide an *a priori* set of guiding dimensions from existing theoretical sources (in line with Huff’s, 1990, second ‘family’ of cognitive maps) (Jenkins, 1998). This approach is congruent with nomothetic research that aims at providing a tested ‘dimension’ pool (Daniels *et al.*, 1994; Eden and Ackermann, 1998) as well as with suggestions that research on cognitive maps needs theory-driven concepts (Meindl *et al.*, 1994; Johnson *et al.*, 1998). As such, similar concepts found in the literature were aggregated into meta-concepts. Only those meta-concepts that were based on a number of originating sources were included in our

construct development. Alternative approaches, e.g. a grounded theory approach (Strauss and Corbin, 1994), were not used for several reasons: potential construct variables were already widely discussed in the literature; integrated concepts using network pictures exist (Ford *et al.*, 2003), and the parsimonious and open nature of our model (in contrast to a more deterministic modelling approach) allows for the inclusion (as well as exclusion) of dimensions.

Building on the existing literature, we thus conceptualize network pictures as shown in Figure 1: a framework of interrelated dimensions, rather than the ‘onion models’ of Andersen *et al.* (1994) and Holmen and Pedersen (2003), consisting of Network Context → Network Horizon → Network Environment (which implies a closed and exclusive model). According to the proposed ‘open concept’, not all elements need to be present in a network picture. We propose that in order to study network pictures in an analytical and systematic way, some or all of the following dimensions might be considered. It is not our intention here to attempt to systematically operationalise each of these constructs, but rather to offer them as a parsimonious set of interrelated dimensions of overlapping attributes that may be used in the study of network pictures. Therefore, later on empirical data will be used by lightly overlaying them on to the model.

[take in figure 1]

Boundaries: We consider the boundaries of a network picture to be defined by both ‘depth’ and ‘width,’ such notions that overlap with Holmen and Pedersen’s (2003) network horizon; and which hence incorporate the idea of distance. Depth can be seen as

a measure of how many relationships a focal company has involving the direct supply of goods/services. These relationships may be either forward of the customers' customers, or backwards to their suppliers' suppliers (a government's Ministry of Defense, in buying a nuclear submarine, for example, may have 'deep' relationships with many layers of suppliers in discussing their particular technological specifications). On the other hand, the notion of 'width' may be used to examine the nature of relationships that a focal company has with other influencers outside the formal product/service delivery system. It is important to realise that the two measures are not mutually exclusive: arguably relationships will contain elements of both width and depth.

The boundaries of a network picture are thus mainly centred upon the focal company's value net (depth) but, naturally, also incorporate other external sources of influence (width). We recognise that the boundaries are essentially artificial (Ford *et al.*, 2002), since '*networks are in principle borderless*' (Holmen and Pedersen, 2003, p. 410).

However, actors need to decide where they subjectively choose to 'cut-off' the network picture. The complexity and, importantly, richness of network pictures are clearly dependent on boundary choices. It is often stated that the network pictures should not be too broad, incorporating too many actors (and consequently relationships) with wide boundaries. Normative managerial theory would therefore prescribe a 'myopic' view of the network (Wilkinson and Young, 2002) without giving any indication how this is to be achieved, and what the specific appropriated characteristics are. Holmen and Pedersen (2003) rely on the teleological argument that, as long as relationship counterparts are efficient and effective in providing crucial information, a myopic network picture is appropriate. However, this in itself (whether or not the relationship with a counterpart is

efficient/effective based on specific mediating functions) is part of the network picture (Anderson *et al.*, 1994); and the normative argument becomes self-referential.

Centre/Periphery: Network pictures may have a clear centre, a focal company or perhaps a focal relationship (Ford *et al.*, 2002). However, a centre could also be interpreted as a value-chain or a central network of highly integrated companies. While a centre would also require a periphery, it can be argued that this distinction is not a necessary requirement; one can imagine network pictures without a clear centre, where a more systemic perspective is taken. While a 'Western' managerial perspective would find this notion difficult to grasp, it might be pivotal in other cultures (Hofstede, 1984; Hampden-Turner and Trompenaars, 1995).

Actors/Activities/Resources: A network picture will implicitly incorporate different types of actors, activities or resources (Håkansson and Johanson, 1992; Håkansson and Snehota, 1994). The actors may be depicted as individuals, groups of individuals, or whole companies. They can also be specific functions or activities within companies (the supply-chain management team in company X, the design team from company Y) or individual actors/managers, or not at all pre-determined '*but effects of the social process*' (Mattsson 2003, p. 9) of recursive interactions. Finally, we can also consider resource ties, in which particular resources, such as interorganisational information systems, are seen as playing a vital role in defining a network (Holland and Lockett, 1997)

Focus: Focus refers to the main ontological property of the actors in the network picture. The two main alternatives are an entity-related perspective versus a connectivity-related perspective. In other words, are networks constituted as '*sets of connected firms* [actors]' or as '*sets of connected relationships between firms?*' (Anderson *et al.*, 1994, p. 1). Is the

focus of the managers on the firms that are in the relationship, or on the relationship between the firms? Relationships themselves can become the main descriptive entity of networks. Furthermore, as social constructionist research of Actor-Network-Theory has shown (Callon, 1999), technology can be the focal ‘actor’ in an interpretative cosmos. A network picture might for example be constructed around integrative technologies like JIT or EDI systems, ERP and ECR applications, or shared intranets.

Directionality of Interactions: Interactions lie at the heart of networks. A network consisting only of actors without any indication of their interrelationship with each other seems to be a poor representation. We argue that the dimension of directionality refers to two different aspects. The first is the main directionality of the interaction: is the flow of goods or other entities essentially seen as being only one-way; is a relationship that is characterized by one company primarily ‘giving’ and one ‘taking’, or is there recognition of the multi-directionality involved? Second, we see directionality as referring to the interdependence of the relationships, examining whether or not a primary relationship has an impact on a secondary one (relationship A is constituent on relationship B) and what quality this interdependence has (‘positive’ or ‘negative’) in terms of the six generic modes of interconnectedness: being neutral, assisting, hindering, synergizing, lacking, or competing, plus also their effect on unitary triads (i.e. on other relationships) (Ritter, 2000).

Time/Task: Besides the directionality of the interactions, a network picture can also provide information regarding the time horizon involved (Ganesan, 1994). Network pictures may represent singular relationships, where a network is designed to exploit a short-term one-off commercial task or opportunity or, at the other extreme, may represent

an on-going longer term relationship that is spread over a longer time-frame and which consists of many more, on-going adaptive offerings (Weik, 1995).

Power: Network theory describes the boundaries between entities as conceptually blurred by the existence of relationships (Anderson *et al.*, 1994; Holmen and Pedersen, 2003), and, moreover, these are tempered by the relative power of the parties involved (Håkansson and Gadde, 1992). Therefore, the network picture might involve power issues by indicating the extent to which the actors (companies)/activities/resources involved are perceived as being (relatively) independent or (relatively) dependent upon each other within their network of relationships. We see this dimension as also covering the strength of the relationship: there are both strong and weak ties (Granovetter, 1973), there is strong and weak commitment (Ganesan, 1994), which may or may not correlate with the extent to which the different parties are dependent upon each other.

Environment: The final dimension that may form part of the network picture is the external environment: aspects that are outside the visibility of the network picture, i.e. whose position lies outside the boundary, but whose role is none-the-less accepted as being one that can possibly influence the outcome of how the network picture evolves. It comprises those forces that the managers involved cannot clearly describe as being integral, and yet whose characteristics they are aware of, and whose (mediated) influence can alter the network (Anderson *et al.*, 1994; Holmen and Pedersen 2003).

Models of Representation: Managers' Network Pictures

In order to initially test the face validity of our proposed dimensions of network pictures, a group of managers (n=51) were asked to depict their ideosyncratic network pictures

(Smircich and Stubbart, 1985; Laukkanen, 1998). The abovementioned model was lightly overlaid with the resulting data. The managers were selected from a wide range of backgrounds and industries. Selection criteria were that they belonged in a wider sense to a top management team (TMT) in their company in order to ensure that their work experience meant exposure to network issues. Only established industries and companies were selected for 'settled' network pictures to exist.

In this exploratory research design, only minimal instructions were given: prior to any discussion of networks at all, managers were simply asked to indicate their name and country of origin, and then to "draw a picture of the network in which you work." (Laukkanen, 1998). Participants were discouraged from using specific action- or task-related network pictures. If necessary, the interviewers clarified that a general or 'strategic' perspective for the network pictures was envisaged. After an initial analysis, in-depth interviews were conducted with the managers to understand the elements of their network pictures better (Eden and Ackermann, 1998; Laukkanen, 1998). To illustrate our network picture concept, two network pictures are depicted (see figures 2 and 3) and discussed, with specific reference to the dimensions mentioned above. Where appropriate, quotations are used in the discussion below; the elements referring to the network picture concept as introduced above are capitalised.

This 'light' framing methodology was used in contrast with 'heavier' eliciting strategies sometimes used for cognitive mapping like Self-Q techniques (Bougon *et al.*, 1990), means-end chain methods (Jenkins, 1998) or computer-based analysis and eliciting methods like the Repertory Grid technique-based CMAP2 or Decision Explorer (CORE) (Reger, 1990; Bood, 1998; Laukkanen, 1998). Although our main aim was to elicit

dimensions and categories for a cognitive taxonomy of network pictures (Huff, 1990; Jenkins, 1998), the probands were not explicitly restricted to this task. Bougon et al. (1977) referred to the identification of variables and dimensions within a cognitive map as the ‘epistemological’ approach which needs to be separated from a more ‘cybernetic’ approach which is concerned with patterns of relationships within maps.

However, even with a ‘light’ framing methodology, it is generally accepted in the literature that eliciting cognitive maps or pictures constitutes an act of ‘consciousness’, i.e. the research methodology impacts directly onto the cognitive characteristics of the output data. Previously un- or semi-conscious cognition is made ‘explicit’ as part of the research. In our research, the surfacing, mapping and interpretation/analysis phases of such conscious eliciting approaches fell together (Jenkins, 1998)

The resulting network pictures as well as the transcribed in-depth interviews were used to identify and ‘overlay’ dimensions onto the theoretical taxonomy introduced above. At this stage, no new categories/dimensions of network pictures were found in the empirical data. In order to ensure reliability, multiple ‘coders’ for the matching of dimensions between empirical findings and theoretical taxonomy were used (Jenkins, 1998). All were familiar with the concept of network pictures. Following on from this, the network pictures were clustered into groups by the coders according to their similarities in using the dimensions of the network picture concept.

[take in figure 2]

Network Picture of a Securities Trader in Japan

This network picture (figure 2) shows many different aspects of the depth and width (Boundaries) of the network, i.e. there are several distinct spheres ('overseas', 'counter-party', 'focal company/department') but no or few amorphous entities within the spheres. The 'clients' constitute an environment that is described without any details ('frame') and interactions are characterised as bi-directional and of different intensity (Directionality), e.g. the 'framing' interactions of 'trades' between clients are strong ('thick') while the 'equity-settlement'-related ones are weaker ('thin'). As such, the Focus is very much on the relationships *per se* and less on actors in the relationship.

In subsequent interviews it became clear that the network perspective of this particular individual was shaped by an assumption that 'Me' and the 'securities services department' were the relationship enablers that directly linked their clients to the counter party clients. However, while the 'securities services department' – 'client' relationship was identified as the focal one, it became clear that internally there was another department instrumentally involved in this. In fact, this department controlled the interactions with the clients. Nevertheless, the individual was adamant that this department should not be part of the network picture.

The network picture does not clearly identify a focal entity or relationships in the sense of a Centre (only the interviews pinpoint the interactions with the clients as the focal activities) although the individual ('Me') is framed within an inner sphere by other actors: 'colleagues', 'securities' service department', and 'boss', all of which form a back-office department. All direct actors are either individuals or companies, while the outer actors (i.e. the ones in the environment) are amorphous 'clients', only categorised by their country of origin.

As a first hypothesis, using the dimensions identified in the generic concept of network pictures, this mental representation of the environment indicates a business environment that this manager believes she or the company cannot influence substantially. 'Trade' activities seem to dominate this network and frame every element of it. Furthermore, the entities are poorly demarcated, it seems difficult to find 'responsibilities' or 'tangible' actors apart from the direct environment of for example 'boss' or 'colleagues'. Most aspects of this network are complex, ill-definable and somewhat bewildering to the manager/company. The focus on relationships over actors having relationships could indicate a clear exchange activity prerogative over actor characteristics in this network. However, subsequent interviews and the questionnaire showed that the individual seems to be much more confident about her ability to understand and shape the environment than the network picture initially indicated (e.g. "...we [the securities services department] *are initiating the trades*"). This contrast of 'confident interpretation' versus 'bewildering picture' indicates a friction between the veneer of her confidence and the department's/company's perceived network position and the actual network 'reality' that she is only implicitly willing to acknowledge. This was backed by several statements made during the interviews: The interviewee 'omits' actors and relationships that do not fit into this confident assessment (e.g. the 'operational front departments' in her company), or she has to admit that in fact the clients on both sides (not the 'security services department') set all the parameters (Power) that determine interactions and also negotiate without her departments involvement, that the network position of the respective clients determine the exchange outcome, or that her department is not even able to chose the 'counter party'. In the end "*clients have the power. They have the*

definite power. We are not authorized to do anything without their instructions". This ambivalence might have something to do with the fact that the network interactions, in the perceptions of the individual, might dramatically change in the future: with automation *"we might not need our settlement department"*.

[take in figure 3]

Network Picture of a UK Civil Service/Defence Manager

This network picture (figure 3) shows two different macro-spheres, one enveloping the other (Boundaries/Environment). The first (inner sphere) is characterised through an 'onion-model' of a logistics department that operates seemingly independently from the entities of the second macro-sphere (outer sphere) which consists of other internal actors (e.g. 'primary internal customers', 'process owners') but also external 'stakeholder/influencers'. As such, this network picture addresses two boundary issues: for the inner macro-sphere, the clear centre, is not clearly delineated from the 'other' environment. The outer sphere, i.e. the enveloping environment that constitutes the periphery of the network, can be divided again into two subsets: first, clearly defined and the inner sphere influencing entities, plus, second, the rather opaque and clearly external set of 'stakeholder/influencers'. These can be seen as the environment in the narrow sense of the word. The manager acknowledged in interviews that the equidistance between core and different actors in the periphery was intentional: He felt that his organisation's relationship 'distance' to internal as well as external stakeholders/influencers was about the same. The individual was not able to identify a

‘focal relationship’ (Focus): although the two sets of primary customers were clearly important, contextual elements meant that this was a dynamic focus.

The network consists mostly of actor groups (‘management board’, ‘process owners’) that are defined around activities and functions that they fulfil. Their interactions seem to be nearly exclusively bi-directional (Directionality), the one notable exception is the interaction between the ‘logistics department’ (inner sphere) and the ‘stakeholder/influencers’ (Environment): while the ‘logistics department’ seems to be directing activities/exchanges at the ‘stakeholders’, a reciprocal arrangement does not exist. Furthermore, many of the entities in the enveloping macro-sphere interact with each other without involving the ‘logistics department’: ‘...a very messy picture’ in the sense of many different actors ‘...bouncing between very powerful forces’. These secondary relationships appear to be at least as strong as those connecting peripheral entities with the centre. Interestingly enough, the individual located the primary customers ‘on top’ of his organization (in the drawing) while most other network pictures would have them ‘below’ or ‘to the right’.

Discussion

By clustering the different network pictures according to their use of the identified dimensions, four ‘types’ of network pictures were extracted as part of this exploratory analysis. These four network picture types or models are briefly characterised below:

- *The ‘sphere’ model*: characterised by a network picture with a lack of focus and a clear and dominating emphasis on boundary definition (between units and

spheres) as well as on directional interactions between spheres (this type constitutes 24% of the collected network pictures).

- *The 'world' model*: complex and intertwined use of most/all dimensions of network pictures, resulting in a very detailed representation of network characteristics (14%).
- *The 'politics' model*: characterised by a clear emphasis on representing actors and power relationships (40%).
- *The 'reductionist' model*: catch-all category for a variety of simpler models, using only a limited number of dimensions (18%).

Two network pictures (4%) could not be categorised to any of type by the coders.

[take in table II]

Table II summarises our interpretation of how four managers (representing examples from all four cluster types) used the different dimensions to portray their networks. As we can see, not all dimensions are utilized in all pictures (NP4 was unclear on Direction, NP3 weak on incorporating the Environment, NP1 had a lack of Focus, etc). However, we do not see this lack of consensus on utilization of the different dimensions as a shortcoming, but rather as recognition that there might not be a requirement for a tightly defined set of common denominators. Managers will use different dimensions according to the type of picture they wish to portray.

Conclusion

The objective of this paper has been to analyse the existing body of knowledge in the business-to-business literature with regard to central sense-making concepts within a network environment. Building on this, we propose a new conceptualisation of network pictures as a set of dimensions that can be used in the development of network pictures within a business-to-business network context; we then continued by describing and deconstructing a subjective network picture, i.e. the representations formed by a manager. The concept development of network pictures follows a (mild) social constructionist epistemology, employing subjective relativism as well as an interpretative perspective followed on (Berger and Luckmann, 1966; Muncy and Fisk, 1987). This overlaps with current developments in the strategy literature where a social constructionist approach is used for the analysis of cognitive maps within strategic groups (Hodgkinson, 1997; Osborne *et al.*, 2001; McNamara *et al.*, 2003). Actor-Network-Theory (ANT) was used to inform the definition and support interpretation of specific properties of a network picture. However, as Mattsson (2003, p. 15) states: '*ANT is not a market(ing) theory. It is a methodology that might be applied to studies of market dynamics...*'. It is applicable because of its fundamental conceptual overlap with network theory: '*The market-as-networks approach represents a non-reductionist view of the market as an evolving, socially constructed institution*' (Mattsson 2002b, p. 3)

Thus, we have proposed a set of dimensions that can be formally used to compare and analyse different representations of network pictures. Ford *et al.*, (2002) argue that there is no one network picture, but that the different actors involved will naturally have their own interpretations and perceptions of what the pictures represent. However, we found that also the structural composition, i.e. the network picture type, varied. Using the

dimensions and cluster types proposed in this paper, managers and researchers alike now have a set of elements that they can use to juxtapose these different representations, and hence to draw meaningful conclusions about how the managers' perceptions vary. The proposed model, although initially tested, needs to be subjected to rigorous retests for the usefulness of individual dimensions. Therefore, more network pictures need to be collected in a more systematic and possibly longitudinal fashion, as suggested by Anderson *et al.* (1994) who proposed that subjective network perceptions should be researched using '*qualitative field research such as field-depth interviews and case studies*' (p. 12). Their suggestion is that case studies capture longer time periods, material from different functions within a firm, as well as from different organisations.

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Author/Publication	Aspect of Network Picture	Description
Ford <i>et al.</i> (2003)	<ul style="list-style-type: none"> ▪ Centre ▪ Network Picture 	<ul style="list-style-type: none"> ▪ Subjective position; objectively an arbitrary construct ▪ Actor's representation of network: basis of their perception, actions, reactions
Gadde <i>et al.</i> (2003)	<ul style="list-style-type: none"> ▪ Network Logic ▪ Network Position 	<ul style="list-style-type: none"> ▪ Development pattern ▪ Determined from the outside
Holmen and Pedersen (2003)	<ul style="list-style-type: none"> ▪ Network Context ▪ Network Horizon ▪ Network Environment 	<ul style="list-style-type: none"> ▪ Relevant actors and relationships within network ▪ Enveloping the network context: other actors/relationships known to the company but regarded as irrelevant (for chosen perspective) ▪ Beyond network horizon: residual of non-identified actors
Mouzas and Naudé (2003)	<ul style="list-style-type: none"> ▪ Identity ▪ Network Insight 	<ul style="list-style-type: none"> ▪ Plausible narrative for past events and current position: inferred from cues ▪ Unique knowledge about the company's nice position/identity
Ford <i>et al.</i> (2002)	<ul style="list-style-type: none"> ▪ Network Surrounding ▪ Network Picture 	<ul style="list-style-type: none"> ▪ Difficulty to delineate/ delimit network Actor's representation of network ▪ Actor's representation of network; basis of their perceptions
Mattsson (2002a)	<ul style="list-style-type: none"> ▪ Network Connectivity ▪ Network Position ▪ Network Theory 	<ul style="list-style-type: none"> ▪ Direct/indirect connection of actors ▪ Attributes of internal resources/connectedness to other actors ▪ Actors' systematic beliefs about network structure, processes, performance
Borders <i>et al.</i> (2001)	<ul style="list-style-type: none"> ▪ Network Map 	<ul style="list-style-type: none"> ▪ Managers' information on firms that play major roles in network/value chain
Gadde and Håkansson (2001)	<ul style="list-style-type: none"> ▪ Identity 	<ul style="list-style-type: none"> ▪ Determined by network position; internal attributes (especially 'specialities') as well as external relationships/connections of company
Donaldson and O'Toole (2000)	<ul style="list-style-type: none"> ▪ Relationship Strength 	<ul style="list-style-type: none"> ▪ Consisting of beliefs and actions
McLoughlin and Horan (2000)	<ul style="list-style-type: none"> ▪ Continuity ▪ Complexity ▪ Symmetry ▪ Informality 	<ul style="list-style-type: none"> ▪ Level of long-term characteristics of relationships ▪ Multiple party involvement ▪ Balance of mutual activities/commitment ▪ Degree of non-formal aspects characterising a relationship

	<ul style="list-style-type: none"> ▪ Network Position 	<ul style="list-style-type: none"> ▪ Net of relationships with other actors/ result of relational investments
Ritter (2000)	<ul style="list-style-type: none"> ▪ Interconnectedness 	<ul style="list-style-type: none"> ▪ Degree to which exchange relation is contingent upon other exchange relation(s)
Wong and Tam (2000)	<ul style="list-style-type: none"> ▪ Perceptual Positioning 	<ul style="list-style-type: none"> ▪ <i>Guanxi</i> construct; initial relationship/company characteristics to precede 'interaction testing'
Halinen <i>et al.</i> (1999)	<ul style="list-style-type: none"> ▪ Enacted Network 	<ul style="list-style-type: none"> ▪ Mental process of enactment; key explanation for stability/change in networks
Möller and Halinen (1999)	<ul style="list-style-type: none"> ▪ Focal Net 	<ul style="list-style-type: none"> ▪ Central construct, from the perspective of the firm, that describes the relevant environmental context of the actors
Parolini (1999)	<ul style="list-style-type: none"> ▪ Value Net 	<ul style="list-style-type: none"> ▪ Mental representation of value-creating systems
Ritter (1999)	<ul style="list-style-type: none"> ▪ Network Competence 	<ul style="list-style-type: none"> ▪ Qualification to manage relationships plus the demonstration of this qualification through task execution
Cova <i>et al.</i> (1998)	<ul style="list-style-type: none"> ▪ Network Boundaries 	<ul style="list-style-type: none"> ▪ Linked to the notion of 'members of a network'; contrast with 'non-members'
Turnbull <i>et al.</i> (1996)	<ul style="list-style-type: none"> ▪ Network Position 	<ul style="list-style-type: none"> ▪ Resource; consists of company's relationships; elements are 'access', 'reputation', expectations'
Weick (1995)	<ul style="list-style-type: none"> ▪ Sense-making 	<ul style="list-style-type: none"> ▪ Involves placing stimuli into some kind of framework; subjective construct with the characteristics: grounded in identity construct, retrospective, enactive, social, ongoing, cue-oriented, plausible
Anderson <i>et al.</i> (1994)	<ul style="list-style-type: none"> ▪ Environment ▪ Shared Network Perspective ▪ Network Context ▪ Network Horizon ▪ Network Identities ▪ Strategic Network Identity 	<ul style="list-style-type: none"> ▪ Relationships; questioning boundaries of entities ▪ Part of 'secondary' or 'network functions' ▪ Part of network considered relevant; structured in the three dimensions actors/activities/resources ▪ Extended view of the network by actor ▪ Perceived attractiveness of an exchange partner ▪ Perceived own attractiveness as an exchange partner
Easton (1992)	<ul style="list-style-type: none"> ▪ Network Position 	<ul style="list-style-type: none"> ▪ Dialectical concept; role of other firms that are related to a company
Johanson and Mattsson (1992)	<ul style="list-style-type: none"> ▪ Network Position 	<ul style="list-style-type: none"> ▪ Engagement in a number of exchange relationships; defines network structure and distance

	▪ Network Theory	▪ Perceived network positions and identities; aim of strategic actions
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Table I: Network Pictures and their Elements

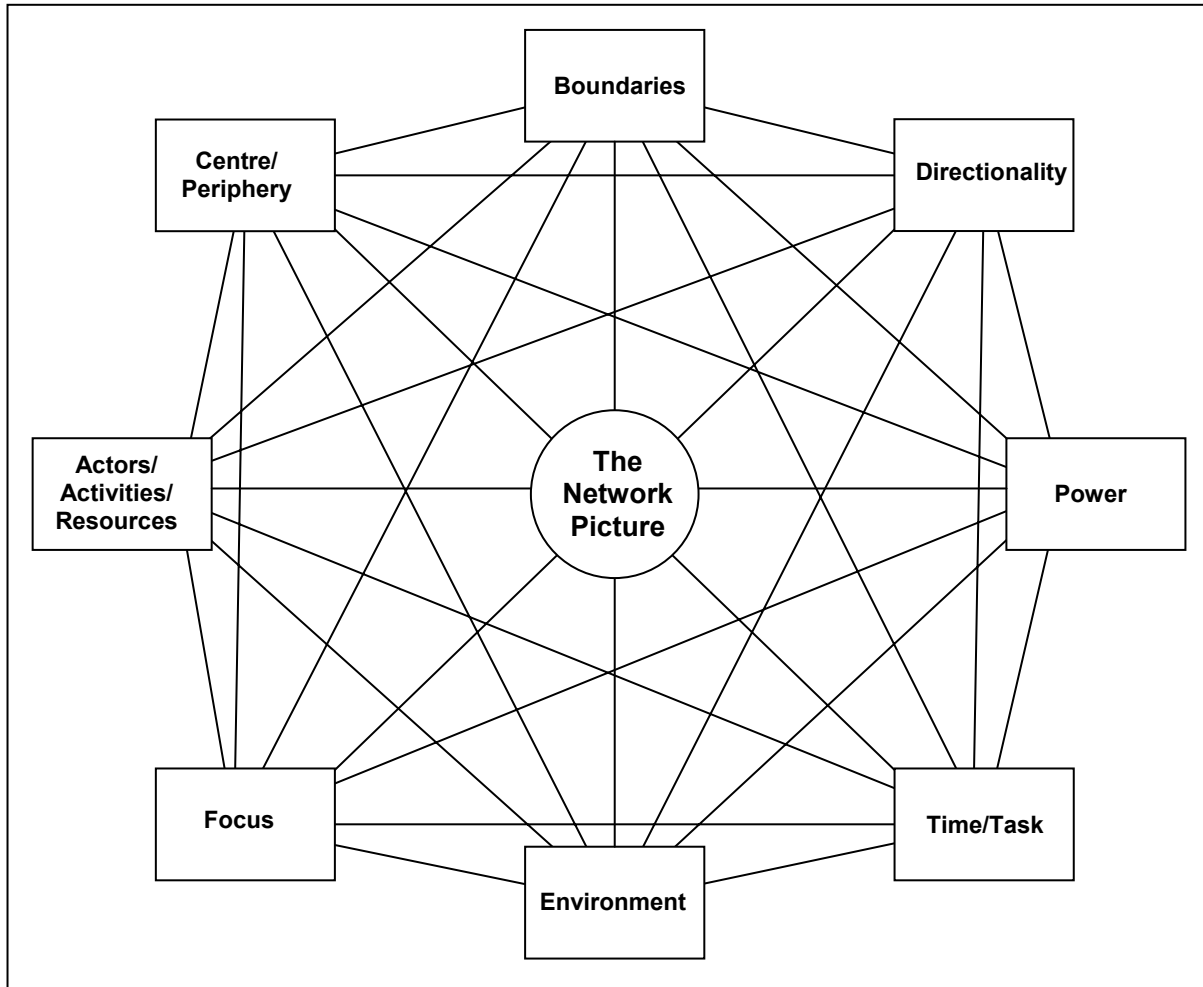


Figure 1: The Building Blocks for Network Pictures

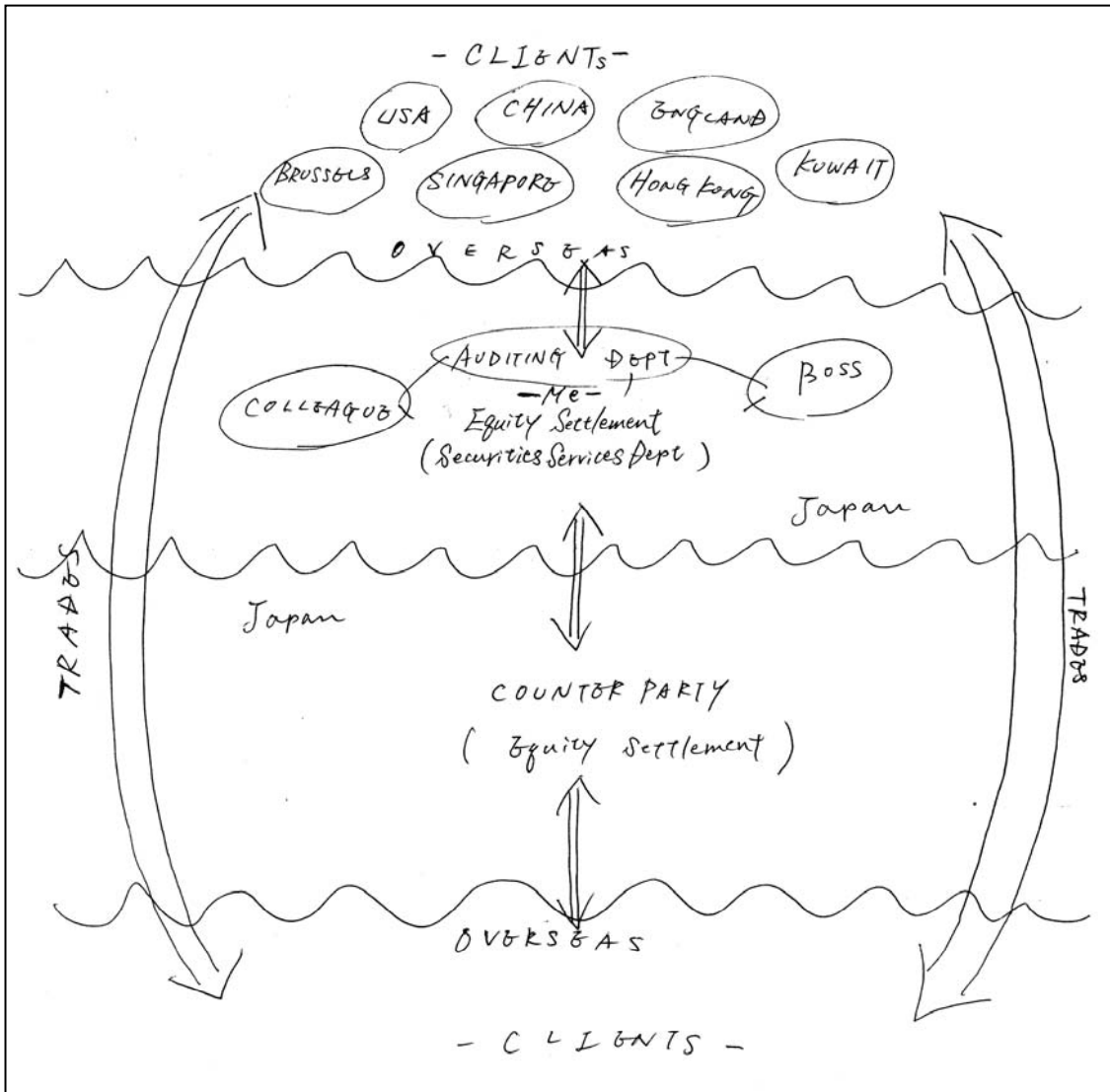


Figure 2: Securities Trading Market in Japan/Global

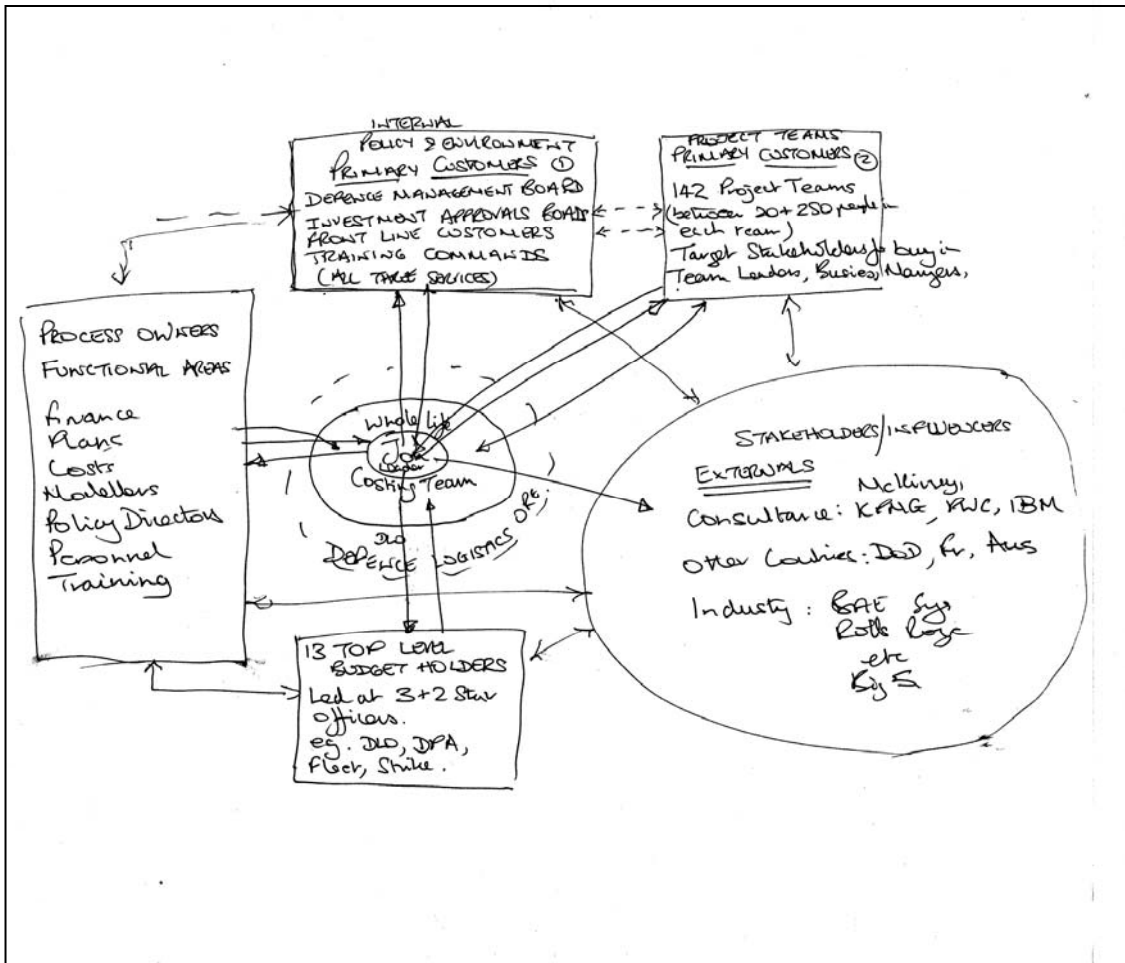


Figure 3: Civil Service in the UK

Dimension	Network Picture Example			
	NP 1 Sphere Model (see figure 2)	NP 2 World Model (see figure 3)	NP 3 Politics Model	NP 4 Reductionist Model
<i>Boundaries</i>	√	√ (multiple)	(√)	√
<i>Direction</i>	√	√	√	(√)
<i>Power</i>	---	√	√	---
<i>Time/Task</i>	---	√	---	---
<i>Environment</i>	√	√	---	√
<i>Focus</i>	√ (lack of)	√	√	(√)
<i>Actors</i>	(√)	√	√	√
<i>Centre/Periphery</i>	√	√	√	√

√ - used (√) – used to some extent --- – not used

Table II: Different Dimensions Used by the Respondents