

Sensemaking in Networks: Using Dottograms to analyse network changes

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Abstract

While considerable research exists on explaining business network structures in different research traditions, the issue of change within network is less well researched. Specifically the question whether or not change is perceived in the same way by different actors in the network is of interest as differences or similarities in any firm's perspective can be used to understand their strategic behaviour. In our article, such changes are analysed, based on the industrial network approach. This approach is underpinned by an interaction model between different actors in the network (Ford et al., 2003; Ford and Håkansson, 2006). Thus, companies interact based on their perceptions of the relevant network environment and their subjective sense-making of the network logic and exchange mechanisms relating to these activities, resources, and actor bonds (Holmen and Pedersen, 2003; Ford et al., 2003; Henneberg et al., 2006). In this paper we develop a concept of network change as well as an operationalisation for the comparison of these change perceptions. This will include a more detailed conceptualisation of the time/space specificity of network change. Following on from this, the concept of network pictures will be used as a conceptual tool to operationalise this concept, and a template model of "dottograms" will subsequently allow for an explanation of change in networks, exemplified in a case study of the Norwegian/Japanese seafood distribution system.

Key words

Network pictures, network change, seafood distribution, dottograms, Japan, Norway

1. Business Networks and Change

Recent research has stressed the importance of network structures in understanding business exchanges (Achrol, 1997; Stabell and Fjeldstad, 1998; Achrol and Kotler, 1999). Such complex networks of firms have been researched using different approaches. For example, strategic research has looked at strategic groups, either as defined by objective characteristics (Porter, 1980; Athanassopoulos, 2003; Hodgkinson and Johnson, 1994; Duysters and Hagedoorn, 1995; McNamara *et al.*, 2002, 2003) or delineated by a shared understanding of different companies (Porac *et al.*, 1989; Porac and Thomas, 1990; Bogner and Thomas, 1993; Fiegenbaum and Thomas, 1993; Reger and Palmer, 1996; Osborne *et al.*, 2001). While this research tradition looks at structures of competition between related companies, the channel management or supply/value chain literature treats each individual business relationship as a separate entity and posits that companies have to respond appropriately to changes in their marketing environment in order to manage these relationships (Alderson, 1957; Bucklin, 1966; Stern, 1969; Gaski, 1984; Porter, 1985; Christopher, 1992). Furthermore, business networks have also been characterised in strategic marketing as value-creating systems where companies co-operate in order to develop new value for different customers, and where they simultaneously compete to appropriate value (Normann and Ramirez, 1993; Parolini, 1999; Mizik and Jacobson, 2003; Henneberg and Mouzas, 2008).

While considerable research exists on explaining business network structures in different research traditions, the issue of change within network is less well researched. Specifically the question whether or not change is perceived in the same way by different actors in the network is of interest as differences or similarities in any firm's perspective can be used to understand their strategic behaviour (Smircich and Stubbart, 1985; Bogner and Thomas, 1993; Reger and Palmer, 1996; Osborne *et al.*, 2001). In our article, such changes are analysed, based on the industrial network approach. This approach is underpinned by an interaction model between different actors in the network (Ford *et al.*, 2003; Ford and Håkansson, 2006). As such, business networks are used as a metaphor for constellations of business relationships in the marketplace (Anderson *et al.*, 1994; Gnyawali and Madhavan, 2001; Helfert, Ritter and Walter, 2002), and are defined in terms of how *activities* are linked together, how *resources* are utilised in tie relationships, and in terms of the strength of bonds between the relevant *actors* (Håkansson and Snehota, 1995). Thus, companies interact based on their perceptions of the relevant network environment and their subjective sense-making of the network logic and exchange mechanisms relating to these activities, resources, and actor bonds (Holmen and Pedersen, 2003; Ford *et al.*, 2003; Henneberg *et al.*, 2006). This causes webs of interconnections and interdependencies to form between companies which make any networking activities contingent on other actors and the specific characteristics of the interactions between them (Håkansson and Snehota, 1995; Ford and Håkansson, 2006). Important for the perceptions of actors in business networks is their understanding or anticipation of the changing environment, and the ascription of explanatory mechanisms for these changes (Daft and Weick, 1984; Gronhaug and Falkenberg, 1989; Reger and Palmer, 1996; Osborne *et al.*, 2001). Companies adapt to perceived changes through interactions based on these perceptions. Thus, in the industrial network approach, network changes are seen as *manifested in* as well as *transmitted through* connected business relationships (Ford *et al.*, 2003).

Specifically, a number of studies in this research tradition has looked at changes in terms of the three underlying dimensions of interactions, i.e. the AAR-model (Håkansson and Snehota, 1995.): changes have been analysed regarding the impact on resource ties (Baraldi *et al.* 2001; Håkansson and Waluszewski 2002), or the impact of changes on activity links (Gadde and Håkansson 2001; Gadde 2004; Fredriksson and Gadde 2005). Furthermore, some studies have

focused on changes in actor bonds (Håkansson and Snehota, 1995; Gadde and Håkansson, 2001).

However, these studies have not analysed and compared the perceptions of manifold actors in a business network with regard to the dynamics of changes, specifically the time-space specificity of change in business networks (Ford et al., 2008). Firstly, the *time dimension* needs to relate the subjective understanding of past, present, and future change to the mechanism these actors ascribe to these changes, i.e. the perceived reasons for the change in the business network as well as the impact this change has. Secondly, with regard to the *space dimension*, it is important to be able to systematise these change dynamics in order to compare differences between actors in a business network. Therefore, the location of change within the confines of the business network structure needs to be analysed.

In this paper we address the existing shortcoming in the literature with regard to a systematic understanding of change perceptions in networks, and develop a concept of network change as well as an operationalisation for the comparison of these change perceptions. This will include a more detailed conceptualisation of the time/space specificity of network change. Following on from this, the concept of network pictures will be used as a conceptual tool to operationalise this concept, and a template model of 'dottograms' will subsequently allow for an explanation of change in networks, exemplified in a case study of the Norwegian/Japanese seafood distribution system. A discussion of our findings as well as limitations of this study, followed by an outline of research implications will end the argument.

2. A Model of Network Change

2.1 Space-specificity of network change

As a starting point, the model in Figure 1 is posited to characterise the perceptions of network change using the notion of their manifestation in space (Abrahamsen et al., 2007). For this purpose, the two dimensions of change intensity and level of change are employed. Changes are perceived by managers in terms of adaptations of actor bonds, resource ties, and/or activity links. Such changes in business networks can vary with regard to their perceived *change intensity*. While incremental changes are perceived as being developments which are based on existing structures of the interactions and relationships in a business network, radical changes are seen by companies as 'changing the rules of the game', i.e. dramatically impacting on different aspects of the business network. For example, Öberg et al. (2008) have shown the radical effect on the perceptions of network actors relating to mergers and acquisitions. The second dimension of network change relates to the area of the business network in which a change manifests itself, i.e. the *level of change*. From the perspective of a focal company within a network, change can affect either an individual actor within the network (either the focal company itself, or another actor in the business system), or it can be important for specific business relationships, i.e. the interactions between companies on a dyadic level. However, the level of change could also reside in the network itself, i.e. affecting the whole business system. An example could be the incremental change of introducing an updated SAP system in one company. This activity could either be seen as resulting only in change of the company where it is introduced (i.e. single actor level), or it could mean that the suppliers to that company need to adapt their JIT and EDI systems to the new SAP standards (i.e. dyadic level change). In an extreme case, all companies in the system would need to adapt their processes with the resulting change activities permeating the business network (i.e. network level change).

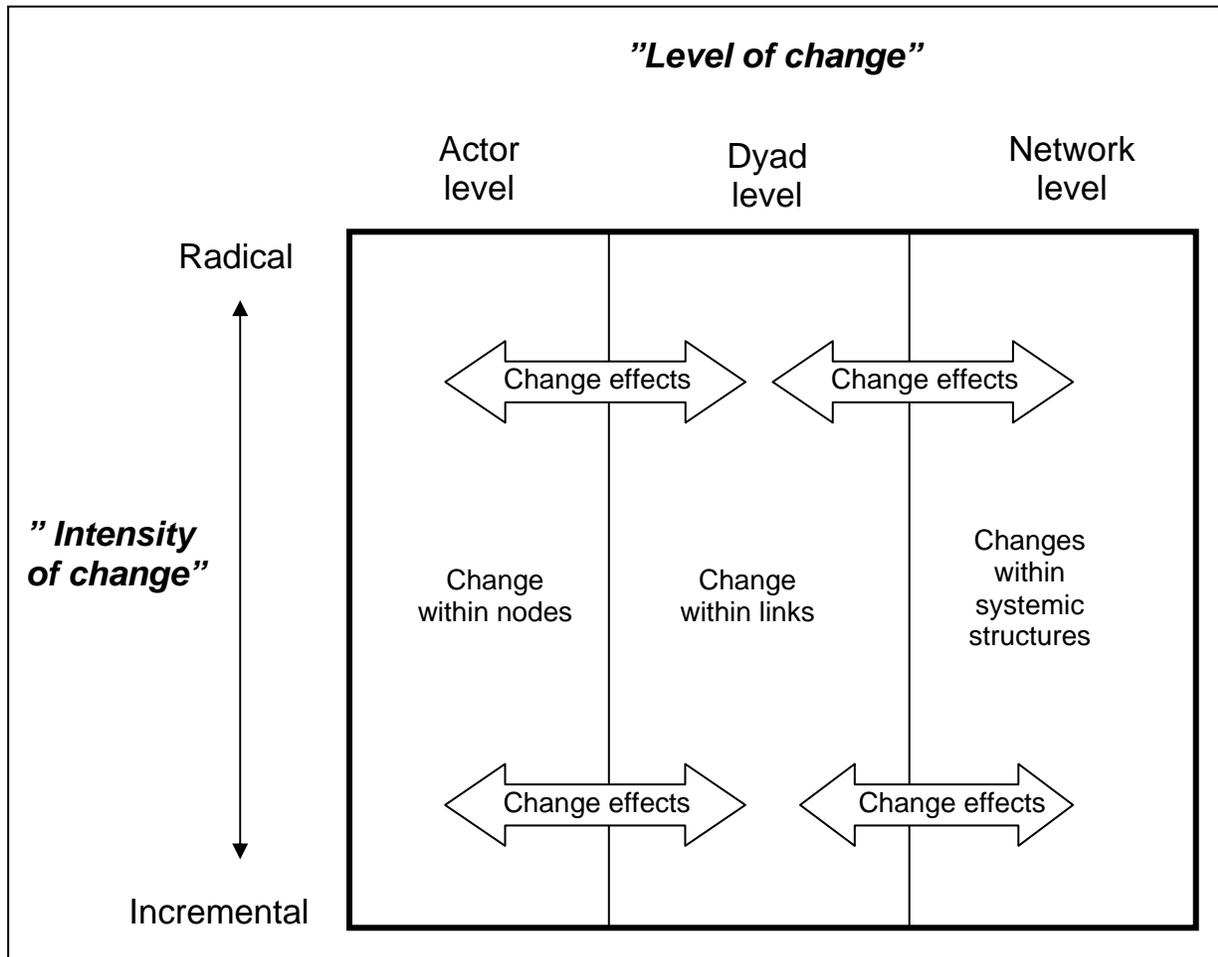


Fig. 1: Initial model explaining network change

2.2 Time-specificity of network change

Networks change over time. Current change is embedded in events which happened within the network structure in the past; and the current situation impacts on future options or shapes future network development by activating assumptions and expectations (Smircich and Stubbart, 1985; Gronhaug and Falkenberg, 1989; Håkansson and Waluszewski, 2002). Thus, to understand business interactions and especially changes within business networks, it is important to capture the time dimension as well (Ford et al., 2003). The time-specificity of network change therefore refers to the aspects of past, present, and future changes in the network, and how actors perceive these different changes to be interconnected over time.

2.3 Developing an integrated model of network change

By integrating the aspects of time-specificity and of space-specificity of network change, a dynamic conceptual model of change perceptions can be developed (see figure 2). Along the vertical axis in this model the time dimension is indicated, in terms of the network characteristics in the past, present and future. Each of the three aspects of the level of change, i.e. actor, dyad, and network, are used to present these network characteristics. Thus, for simplification purpose, the left-hand side (i.e. boxes A, B, and C) can be called the "what"-column, because here the description of change in the business network is mapped out. However, on the horizontal axis

another column indicates the “*why*”, i.e. the reasons are described as to why change is happening in the business network, explaining why companies act as they do. This sense-making sphere which relates to ascribing reasons for change can again be linked to the three levels of the actor, the dyad, or the network level. For instance, one actor may attribute the change of introducing a new version of SAP to some action taken by an individual company, e.g. because a new CEO is keen to introduce updated technologies. But the same change could also be explained because a key customer is forcing this change onto a (dyadic) relationship, or because of a network effect which makes it necessary to conform to a certain software standard in the business system. However, it is also possible that some actors will have no explanation of why a change is happening, therefore, boxes D and E could remain empty.

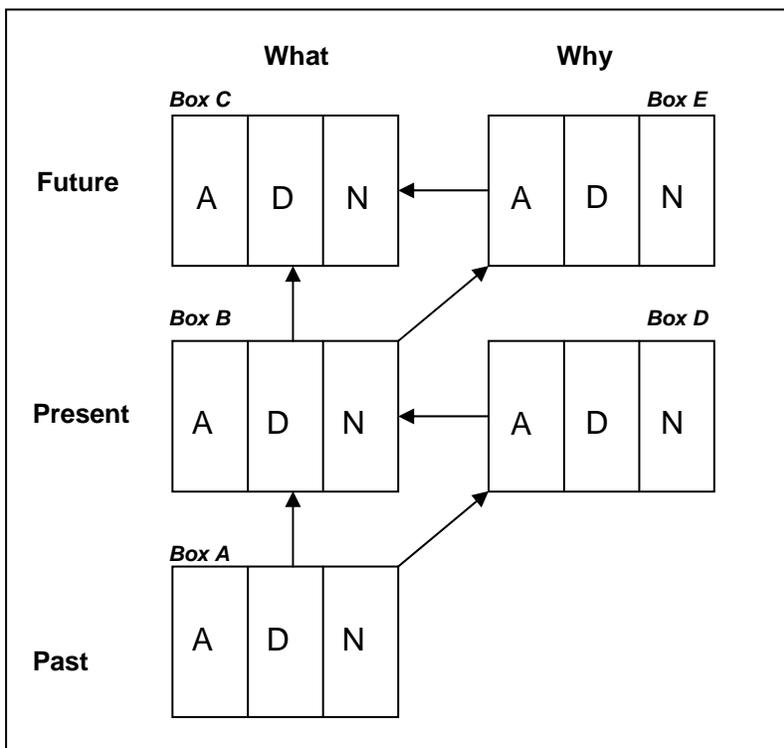


Fig. 2: Integrated model of network change
 Note: A – Actor; D – Dyad; N - Network

According to this model, network changes occur along the *what*-column (boxes A, B, and C) at actor, dyad and network level. Driving the change or understanding the change is a sense-making processes or sense-making device described in the *why*-column (boxes D, and E). A progression dynamic therefore exists within the model: The transformation and change from a past state of change in the network (box A) to the current state of change in the network (box B) is explained by the specific reasons for change (box D). The same is true for the expected developments regarding the changes in the present and the future network (box B to box C) which are made sense of using the explanation captured in box E.

Following on from this discussion of network change and the development of an integrated model which will conceptually underpin the empirical part of this study, the concept of network pictures is introduced as a way of capturing the perceptions of network actors regarding the time and space-specific aspect of network changes.

3. Network Pictures

Network pictures are used in this study to conceptually identify the different aspects of actors' understanding of change in their business networks. The concept of network pictures is well suited to this purpose as it represents the subjective sense-making of managers within complex systems of business interactions and relationships, due to the fact that "*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 (Lindell *et al.*, 1998; Henneberg *et al.*, 2006). Recent research in the areas of network management and business relationships shows increasing interest in this concept (Anderson *et al.*, 1994; Håkansson and Johanson, 1988; Holmen and Pedersen, 2003; Henneberg *et al.*, 2006), to aid our understanding of how managers react to dramatically changing network environments (e.g. because of M&A situations; Öberg *et al.*, 2008), or to explain strategic decision-making behaviour (Borders *et al.*, 2001; Ford *et al.*, 2003). As such, the concept of network pictures is influenced by, and related to the areas of cognitive strategic groups (Porac *et al.*, 1989; Stubbart, 1989; Bogner and Thomas, 1993; Hodgkinson and Johnson, 1994; Hodgkinson, 1997; Johnson *et al.*, 1998; Osborne *et al.*, 2001), cognitive mapping (Hastie, 1981; Huff, 1990; Fiol and Huff, 1992; Johnson *et al.*, 1998), and managerial cognition/sense-making in organisations (Bougon *et al.*, 1977; Weick, 1979; Daft and Weick, 1984; Gioia and Chittipeddi, 1991; Meindl *et al.*, 1994; Walsh, 1995; Weick, 1995; Jenkins, 1998; Johnson *et al.*, 1998; Spender, 1998).

Network pictures are the manager's network theories, they represent what managers subjectively perceive to be of importance in their business environment and what the pertaining logic for actions and consequences of managerial activities in the business network are. As such, network pictures are the 'theories-in-use' which help managers not only to make sense of their complex environment but also to guide their decision-making, their option analyses, and their managerial behaviour (Cornelissen, 2002; Welch and Wilkinson, 2002) They are about context but they also act as framing devices. Network pictures are therefore posited to guide networking activities (i.e. the managerial activities of a company which are geared towards influencing or affecting business interactions with other network actors) but they are also used to ascribe meaning to events in the network, such as activities instigated by other actors (Smircich and Stubbart, 1985; Ford *et al.*, 2003). The individual decision-maker is thus provided with a bounded field of decision possibilities within the limits of expectations shaped by the framework of the network pictures.

Network pictures are proposed to exist on two levels of analysis: as narrow and as broad network pictures. Henneberg *et al.* (2006) suggest that network pictures collected from managers as the unit of analysis can provide an insight into the individual frame of mind of actors (i.e. *narrow* network pictures) and therefore provide an understanding of what decision-makers believe to be relevant and important in business networks. Thus, they are defined as managers' "*subjective, idiosyncratic sense-making with regard to the main constituting characteristics of the network in which their company is operating*" (Henneberg *et al.*, 2006, p. ???). Mouzas *et al.* (2008) argue that these individual network pictures do not just represent managers' nor companies' views, but rather the interactions between managers, i.e. it is the clash of different network pictures that guides managerial actions by companies. Interactions

therefore cause a shared and inter-subjective understanding of the network environment (Weick and Roberts, 1993; Daft and Weick, 1984).

On the other hand, Ford et al. (2003) suggest that network pictures, although based on the individual managers' sense-making, can be integrated by the researcher into a *broad* network picture. Thus, Ford, et al. (2006) define network pictures as “*a conceptualisation by the observer of the network views of the participants. It is a representational technique that aims to capture or illustrate views that specific actors have of the networked environment within which they operate*”. This conceptualisation can even make the network the unit of analysis by providing an overview and a research lens which abstracts from the specific managerial network pictures to create a network-based perspective (which is nevertheless determined by individual beliefs which are shared, e.g. about the relevant network horizon) (Holmen and Pedersen, 2003). Defined in this broad sense, network pictures can, for example, be used to trace longitudinally the development of a whole network (Ford and Redwood, 2005).

4. Research Design

4.1 Explaining network change through network pictures

For the purpose of this study, we use the unit of analysis of focal companies within a distribution network. Thus, the following empirical part will utilise narrow network pictures, i.e. those of key decision-makers, which represent generally the sense-making shared by top management within the company (Halinen *et al.*, 1999; Ford *et al.*, 2003), i.e. they represent Callon's (1999) 'focal points'. This subjective narrow network picture overlaps with Mintzberg's (1987) notion of 'strategy as perspective'. The network pictures used are framed in such a way that they relate especially to issues of change within the different levels of the network. Thus, while the network pictures are about the structural characteristics of the business network as perceived by the respondents, these characteristics refer specifically to change.

Narrow network pictures cover the specific aspects of space and time specificity as part of their interpretative frame. It is possible to distinguish between how a respondent describes a change situation (i.e. the content of a change within the network), and what he perceives to be the cause of this change (i.e. the reasons causing the change). This multi-layered information is due to the fact that capturing network pictures, as cognitive maps, consist of a pictorial 'image' as well as an abstract 'text'. The text provides additional information about the image (e.g. reasons for changes occurring, ascribed intentions, specific information about the content of a change occurring). As such, network pictures are akin to metaphors: they are rich sense-making devices in their own right (Draaisma, 2000). Specifically, they provide information about the intensity of the perceived change by respondents identifying and emphasizing the importance of a particular change event, or the importance of the effect of the change. Furthermore, network pictures encompass information about the level of change, for example by identifying the source of change (as either being an actor, a relationships between actors, or the network itself). By allowing the respondents to think about network changes retrospectively but also prospectively, network pictures can compare the different time layers of network characteristics held by the respondents. In this study the respondents' recollection of what the network used to look like (*past*), how it looks now (*present*), and how it will be (*future*) are utilised. We specifically asked the respondents to draw their network pictures along these three time dimensions, using *five years ago* (box A in figure 2), *today* (box B) and *five years from now* (box C) as the basis for the interviews.

4.2 Operationalising network change: Dottograms based on network pictures

4.2.1 Initial template analysis

To operationalise the data in the form of network pictures (i.e. pictorial and textual descriptions of participants' subjective understanding of change in the network), template analysis was used to relate empirical findings to the integrated conceptual model of change. Thus, template analysis is used as part of a contextual constructionist epistemology where multiple interpretations of any phenomena may be arrived at, depending on the perspective the researcher takes and “*the richness of the description produced*” (King, 2004: 257). Template analysis enables the researcher to look at the source data from various angles, all depending on conceptual templates and categories (in the case of this analysis, the integrated conceptual model of network change). Such an analysis provides a flexible and continuous process of altering categories and finding increasingly suitable interpretations as the material is analysed (King, 2004).

1. Passage from text/picture	2. No. Code	3. What is happening? ADN levels? Intensity levels?	4. Why is it happening? What is driving the change? ADN levels? Intensity levels?
<p>“We haven’t seen the main changes yet. Compared to the other main seafood markets things are slow in Japan. But the underlying change which we see is accelerating is a more direct contact between suppliers and end user. One reason is that this is a global trend and on the retail level in Japan they wish to adopt purchase strategies and management practices used by international retail chains such as Carrefour and Wal-Mart. They are inspired by this and they see that if they are to survive they have to get closer to the origin of the products that they source. This is to a great part driven by the retail level.”</p>	1	<p>Respondent describes the general change towards direct distribution. Dyadic and network level. Initially incremental but potential for radical change.</p>	<p>This change is explained (sensemaking on respondent level) by retailers adopting new purchasing practices (actor level). Radical change intensity.</p>

Fig. 3: Example of initial template analysis

Note: AND level – actor, dyad, network level

A simple template relating to the dimensions of the conceptual model allows for the empirical data to be systematized (see figure 3): initially, textual statements are classified with regard to whether the respondent describes the changes itself (column 3 - *what*), or *why* the changes happened (column 4), plus their specific change intensity. We add this aspect of space specificity, i.e. the change intensity, in order to capture the (implicit) weights that they are given within the different boxes *vis-à-vis* other explanations (e.g. a current actor change, such as the introduction of a new SAP module, is seen as incremental, while a concurrent dyadic change of a new NPD collaboration between key suppliers and customers in the business may be assessed as radical).

To keep track of the changes in the model, each change described in the template was given a unique code. In a second step, the changes described were then mapped onto the integrated model of network change.

Following on from this, the different pictorial statements, i.e. the network pictures, are copied into the network level boxes A, B, and C of the model. This is done for each respondent. Changes at network level can then be analysed as to whether they represent a change from box A to box B (i.e. from “*past*” to “*present*”), or from B to C (from “*present*” to “*future*”). Corresponding changes at actor, dyad, and network level are also logged by integrating the initial textual analysis by means of adding the perceived changes plus the explanations (by using their codes) to the

pictures (see figure 4). Consequently, different changes can be attributed to different reasons (i.e. connecting lines between boxes which trace the linkages)

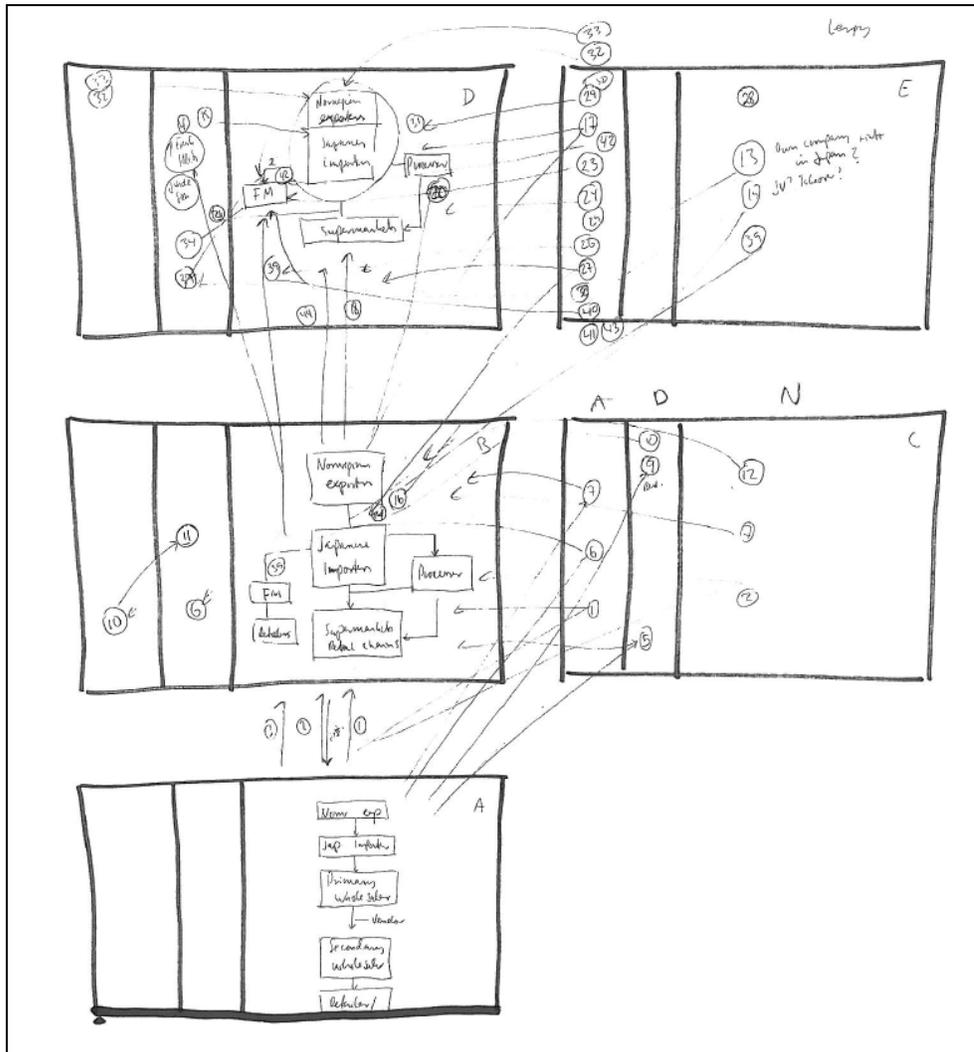


Fig. 4: Initial template analysis integrating textual and pictorial data into the integrated conceptual model of network change

4.2.2 Introducing the Dottogram

In order to understand structures of change, reduce the complexity of the data, and to make perceptions of change comparable between different actors in the network, dottograms were introduced. In the dottogram, each dot represents a change referred to by the respondent. The size of the dot indicates change intensity. From the distribution of these dots in the different boxes the change density can be gauged, i.e. if there are lots of changes occurring at a specific level. Empty boxes indicate that there are no changes discussed at this level. Lines between the boxes indicate the relationships between described changes in the network and the attribution of reasons for these changes. While in the initial templates these connections are the lines between individual coded change events, in the dottogram arrows represent with their thickness an aggregation of these lines. The dottogram therefore provides information about the

predominant level on which change occurs (numbers of dots in boxes), and the levels that drive change in the perception of an actor (thickness of lines between boxes). Furthermore, differences in the assessments of the past, current, and future development of the network come into a clearer focus (differences in change density between boxes).

4.2.3 Creating the detailed template

While the dottogram allows for an analysis of the structures of change in a network as perceived by different actors, we also use another, auxiliary revised template to capture ‘thick’ descriptions of the occurring changes and the reasons for them. The same template structure is used as in the dottogram analysis to facilitate cross-referencing. Using *insertion*, *deletion*, *changing scope* or *changing higher-order classification* (King, 2004), more specific details regarding the changes, especially their level of relating to actors, dyads, or the network were added. Thus, the revised template uses higher-order classifications. The dottogram structure can therefore be enriched by substituting each dot with the specific change description (see fig. 5). It provides in-depth understanding for the specific network changes which are important to an individual actor, and how these changes are linked through sense-making mechanisms and through a progression in time. Based on these two analytical lenses (dottogram and revised dottogram), a case study of change in a network can be constructed, using information from all relevant network actors.

4.3 Case study setting

The case study setting for this research includes the whole salmon distribution network from Norwegian farmers and exporters through to the Japanese distributors and retailers. Currently, this distribution network is undergoing considerable change. Historically, Japanese multi-layered distribution structures have been seen as a major barrier to entry for foreign firms due to being time-consuming, expensive, complex, confusing, inefficient, and archaic (Lazer et al. 1995; Rajaratnam and McKinney 1995; Shimaguchi and Lazer 1979). Arguably, this system is now shifting towards direct distribution (Bestor 2004). Adding to this are changes in the overall Japanese retail structure with fewer but larger retailers (Lohtia et al. 1999; Lohtia and Subramaniam 2000; Min 1995), and less powerful wholesalers (Maruyama 2005). Changes are also evident in terms of Norwegian exports of salmon to Japan: recent export statistics show a decline, as Norwegian suppliers have difficulty competing with Chilean salmon in Japan due to their higher prices (Statistics Norway, (2006). However, for the world market Kontali (2006) predicts an increase in demand for salmon by 15-20% in the coming years, with production increasing by only 5%.

4.4 Empirical plane of case study

To understand the Norwegian/Japanese seafood distribution network, an initial study of five Norwegian salmon exporters and seven Japanese salmon importers was undertaken in 2006 (see appendix 1 for a list of the companies involved). The Norwegian sample was identified by crosschecking information from preliminary discussions with key actors in the seafood industry and official Norwegian export statistics. Subsequent data analysis indicates that 69% of salmon exports to Japan are covered by the respondents. The Japanese sample was identified by information given during the interviews with the Norwegian suppliers, with a focus on seven respondents out of approximately twenty.

The initial case study corroborated that the salmon market provides an appropriate case study for network changes due to traditional fish distribution being replaced by direct distribution, with large importers and retailers bypassing network layers such as the traditional fish markets (Abrahamsen et al. 2007). It also initially pointed to the fact of differences in the actor’s perceptions regarding these network characteristics. For instance, Norwegian exporters perceive the Japanese traditional distribution system as inefficient and long-winded, whereas the

Japanese importers believe the system works well. However, perceptions held by the Norwegian exporters have taken them to new customers in other countries. Similarly, Japanese importers' frustration with their Norwegian suppliers' lack of attention and continued efforts to bypass the traditional distribution systems has resulted in new ties to business partners in Chile and Canada.

Håkansson and Snehota (1995) argue that “*the different and contrasting perceptions of the [activity links] are at the origin of some changes*” (p. 272). Similarly, Hertz (1992) states that “*...The perceptions of integration might cause greater effects that otherwise might be expected from the actual change*” (p. 121). Thus, the different perceptions, and the uncertainty of the actor's gleaned from the initial study, indicated that a detailed case analysis of the Norwegian/Japanese salmon distribution system with regard to network changes was appropriate.

A detailed follow-up case study was conducted in 2007. Several distribution networks for salmon were used to conduct multiple interviews with Norwegian exporters, Japanese importers, wholesalers, distributors, processors, and retailers, but also government agencies (see appendix 2 for follow-up study companies). Interviews traced the route of the salmon through the two different systems: the traditional fish market-based system, and the direct distribution systems. Interviews were held with different actors in several companies, enquiring about their understanding of the network and changes they perceived. These interviews included the collection of network pictures of past, present, and future salmon distribution system. For a parsimonious discussion of the network and a description of the use of dottograms, this study will focus on one of the direct distribution systems (see fig. 5).

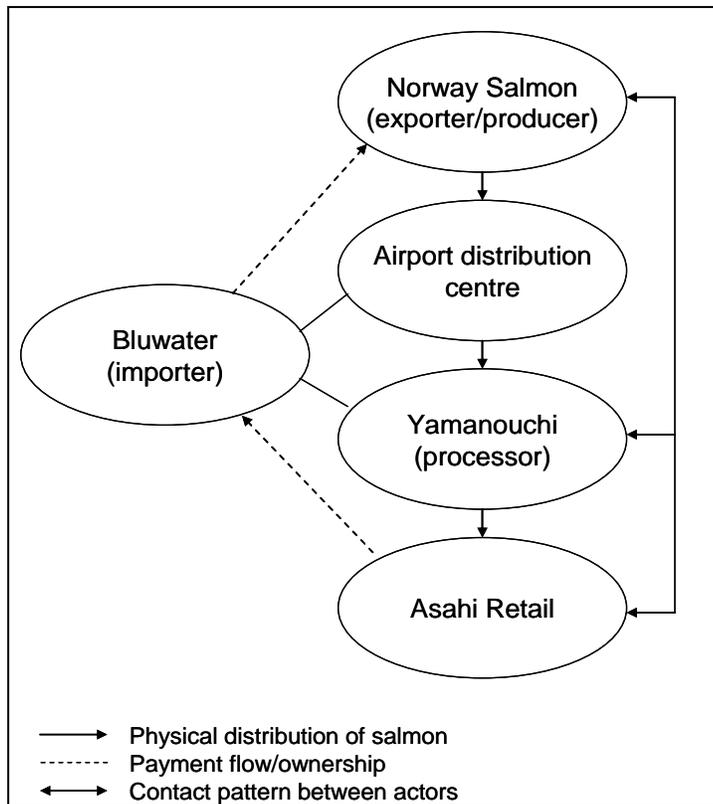


Fig. 5: Presentation of the direct distribution network analysed in the follow-up study.

Note: The Airport distribution centre is not covered in the analysis of dottograms.

5. Analysis and Findings

In this section we will present an analysis of one distribution system by application of our proposed model of dottograms. The analysis is initially done for one company, Norway Salmon, with regard to their initial as well as their revised and detailed dottogram, and then a comparative representation of the different change perceptions by producers/exporters, importers, processors and retailers in the network is provided.

5.1 Initial Dottogram Norway Salmon

Norway Salmon is one of Norway's largest seafood producers and exporters. As an integrated producer, it has its own seafood farms and processing plants. Norway Salmon has been selling salmon to Japan for over 20 years; it has a wide product range, but fresh salmon remains one of the key products. The Japanese market represents ten per cent of its exports, totalling about twenty per cent market share for fresh Norwegian salmon in Japan. Norway Salmon handles most of its relationships with Japanese customers from its head office in Norway where seven people are dedicated to these activities. Figure 6 shows its initial dottogram.

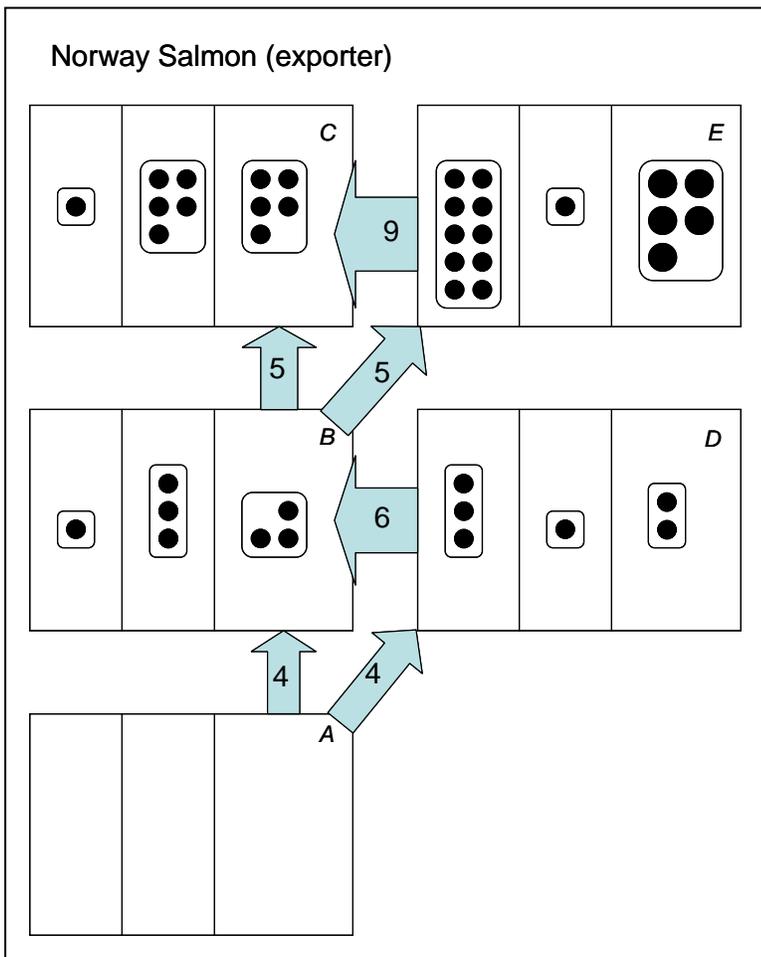


Fig. 6: Initial dottogram Norway Salmon

Norway Salmon perceived that a lot of the changes likely to happen were in the future network (box C) compared to the current situation. Most prominent are future changes at network and dyadic level, and to a lesser extent at actor level. Explaining these future changes, Norway Salmon attributes these changes to developments especially on the actor level, and only to a small extent on network level (with nearly no change explanation being located at dyadic level; box E). Norway Salmon perceives future changes (which will mainly affect its business relationships as well as the general network) to be driven by decisions and actions taken by Norway Salmon itself (and other individual actors). The arrows in this template are thickest between box E and C, highlighting the connection between changes in box C and especially the actor dimension in box E.

Compared to these wide-ranging changes in the future, the current change density is rather low (box B): some changes are happening (especially on network level), driven by events in all three areas of network characteristics, dyadic relationships, and individual actor activities (box D). Past change is not mentioned (box A), indicating a hitherto ossified network structure which currently but especially in the future will undergo wide-ranging developments in the eyes of Norway Salmon.

5.2 Detailed Dottogram Norway Salmon

Developing the analysis of change perceptions from the initial to the detailed dottogram, the specific change events and attributions behind the dots are now presented (see figure7):

<i>Actor level</i>			<i>Dyad level</i>			<i>Network level</i>		
Further integration						C		
	- Higher volumes to retailers - Will develop new concepts together with retailers - Financial ties and ownership	- More integrated network - Direct control over processors - Mergers with Japanese partners				E		
Development of category management								
Japanese are slowly adopting Category Management			Strong belief in category management, wants to contribute to it	Needs to work closer with the retailers to develop category management	New health trends appearing in Japan			
From whole fish to fillets								
	Fillets become more important than fresh fish				Direct distribution more suitable for fillets			
Fishmarket still important								
	Fishmarket will grow in importance		-Wants strong ties to the fishmarket - Ambition to become no. 1 in Japan - Needs to produce top quality salmon		- Needs to keep ties to the fishmarket - Possible new network discussed but rejected - Current cooperation model better than direct ownership			
Change from fishmarket to direct distribution						D		
Exporter has created new positions within the company	New positions have improved cooperation	- Closer ties to actors in direct distribution - General trend towards direct distribution, bypassing the fishmarket	Retailers are adopting new purchasing strategies Increasing retail power					
Fishmarket slow to change								
		The fishmarket changes very slowly		Pricing is more effective in the fishmarket system	Fishmarket has distinct functions that are not easily replaced			
Change from whole fish to fillets								
	From whole fish to fillets		Fillets are cheaper to produce		Network will save costs by switching to fillets			
Cooperation, integration, new model, old model								
	Current business model means more commitment							

Fig. 7: Detailed dottogram Norway Salmon

Each of the dots of figure 6 has now been detailed as a change description or a change ascription. These are grouped thematically in figure 8 for an integrated analysis (previously, this was referred to as 'higher order classifications'). For example, in the actor column of box E ten dots are grouped into four themes. Regrouping the changes into themes allows us to see which reasons are used by the respondent to make sense of what kind of change in the network. In detail, the theme of *Further Integration* Norway Salmon shows that having to change ones view by incorporating interaction partners' perspectives, is seen as an important actor level change reason (in fact the one with the highest change intensity, incorporating four dots of the initial dottogram) which is expected to result in future dyadic changes of the network (i.e. retailer interactions will gain higher volume shares; new concept development with retailers will be intensified; and financial co-ownership structures will develop) as well as changes of the network itself (higher overall network integration; network process control will increase; and Norwegian-Japanese mergers). Likewise, the theme *Development of Category Management*: actor-specific changes are for example the development from fresh whole fish to fillets production as well as the introduction of category management in Japan. This is further substantiated by Norway

Salmon's perception that in future, relationships will be based on the resource of 'fillets' (not 'fresh fish'). Drivers of these future developments are beliefs around category management (on dyadic level, a strong belief in its superiority as a management tool; on dyadic level the needs to work closer with retailers; on the network level the new health trends in Japan).

We will now use one actor, Norway Salmon, as an example of how changes in a network can be analysed using this detailed dottogram, i.e. we will now go behind the dots.

5.3 Interpreting the Detailed Dottogram to Analyse Norway Salmon

Looking first at boxes B (what change is currently happening?) and D (why is it happening?), three main themes can be distinguished from the point of view of Norway Salmon. These themes are exemplified by quotes from the relevant respondents.

5.3.1 General change from fishmarket to direct distribution

In box B, Norway Salmon describes how the network changes from a fishmarket system to progressively more direct distribution: *"Compared to the other main seafood markets things are slow in Japan. But the underlying change which we see is accelerating due to more direct contact between suppliers and end users, i.e. primary actors in the production and end users on the consumption end".* The general trend is bypassing the fishmarket: *"What is happening now is that you have a Norwegian exporter which sells to a Japanese importer or to an importer owned by them such as Global Seafood. This importer has direct contact with retail chains or restaurant chains. This model has grown in magnitude the last 5 years. It has been more common to do this type of distribution than 5 years ago".* Another example of change at network level is closer ties to importers, processors and retailers: *"The main difference in resource ties is that we develop concepts together in the direct system. These concepts can be regarding packaging, logistics, special product quality, feed mix at the fish farm, category management together with the supermarkets, and menu development with the restaurants. A broad range, actually."* As a result, Norway Salmon has created new positions within the company (change at actor level): *"We share knowledge with our customers. We have recently hired a product development manager and a brand manager. These are resources that we draw upon together with the importers and retailers in Japan. We have not created them specifically for Japan, but for our company".* This has improved cooperation with their partners: *"Our company is now in a much better position to negotiate with the retailers than previously, and these skills are important to us. But we have a broad scope when we create these positions, and we use them to get in closer cooperation with our customers."* Furthermore, the increased ties and integration of the network has led to greater commitment between the actors: *"We have three companies in Japan that we define as strategic partners. With these three partners we draw on various types of resources. So here we position ourselves much closer than we do in the traditional system."*

The way Norway Salmon explains these changes (box D) relates to the role of the retailers which they perceive as increasingly powerful: *"The purchase function in the direct system is more professional than in the traditional system. And the retail power is greater in the direct system."* Further, retailers are adopting new purchasing strategies (i.e. sense-making at actor level): *"The reason behind this is that in Japan the retailers wish to adopt purchase strategies and management practices that have been introduced by international retail chains such as Carrefour and Wal-Mart. They are inspired by this and they see that if they are to survive they have to get closer to the origin of the products that they source. This is to a great part driven by the retail level."*

5.3.2 The fishmarket is slow to change

Norway Salmon also discusses change at network level as the fishmarket system is changing, although at a slow pace: *"Despite what all predictions say that we will see a less fragmented retail level in Japan, this development is going extremely slow. As long as we have the*

fragmented retail level, the fishmarket fulfils an important role". Looking to box D to find the reason behind this, at the network level the company perceives that the fishmarket has some distinct functions that are not easily replaced: "What I think is easy to overlook when we talk about Japan is the real importance of fish market has and which will be there in the future. It will be wrong to suggest that the fishmarket will loose its importance in Japan. It is an effective way of distributing large volumes of fresh fish. In a fragmented market like the Japanese, it is very effective". Further, on the dyad level the fishmarket is an effective way to determine prices between the actors: "You may regard it as a gigantic cash and carry wholesale outlet where small retailer, supermarkets and shops and restaurants meet and get what they need at the time that they need it. With guaranteed freshness. So obviously, this role is important as long as the retail level is as fragmented as it is".

5.3.3 Change from whole fish to fillets

Thirdly, Norway Salmon sees a change from whole fish to fillets on the dyad level (box B). *"But the growth in Japan is larger regarding fresh fillets rather than whole fish with head. Whole fish products are mainly found in the traditional system. Fresh fillets very rarely find their way to the traditional system because the market is not suitable for this kind of distribution. One of the problems is perishability, challenges regarding freshness, which means that you need to have a shorter distribution. You have less flexibility. The filleted fish is only suitable for some purposes, whereas whole fish has much more options, greater variation. And this flexibility you find in the fish market. You don't need this kind of flexibility in direct distribution."* Driving this change (box D) is according to Norway Salmon a belief among the actors that fillets are cheaper to produce: *"The rise in the production of fillets is all a question about money. We pay on average 12 NOK per kilo in airfreight to Japan. If you have a gutted salmon of 4.5 kilo times 12, this represents 54 NOK in airfreight. Out of 4.5 kilo whole salmon you get 3 kg fillets. Times 12 this is 36 NOK in airfreight. These two volumes (4.5 and 3) represent the same amount of end product. If you are making sashimi out of this (4.5 kg fresh fish) you get the same amount of sashimi as this (3kg fillet). But you have saved 12 NOK in freight. Literally, you don't ship the bones and the head, and this saves you money."* Hence, this transition is beneficial to the whole network as other the actors also will save costs (sense-making at network level): *"You never see a Japanese sushi-chef, or a retailer, filleting the fish himself. If you go to the most expensive restaurants the sushi chefs do it, but if you go to the kaiten [belt] sushi restaurant, which represents the majority of restaurants and is the largest segment for salmon, they buy ready sliced products. And this is sliced in Japan or South-East Asia for frozen products. And for companies doing this slicing operation, normally processors with own or outsourced production, it is more profitable for them to buy the fillets as compared to whole fish."*

Turning to (future) boxes C and E, changes and change reasons are grouped into four themes:

5.3.4 Further integration

Regarding future change at network level (box C), Norway Salmon believes that the network will become more integrated: *"We agree on a strategy now, and I am going over to Japan in two weeks, and we are visiting four primary wholesalers and describe precisely this picture [integration] to them and propose a joint strategy to get closer to the retail level. We want to approach the retailer in cooperation with the primary wholesaler. And then it is up to them to find the best route from here to the restaurants together with us. Further, Norway Salmon's network picture suggest that it will work directly with the processors: "I also envisage that we are involved at the processor level in Japan through a joint venture company. And that we have a much greater part of our turnover in direct relation with the main retail chains both in the supermarket and the restaurant segments". Possibly, Norway Salmon will merge with some of its partners in Japan: "In 5 years time we have merged with one more of the importers". At the dyad level this*

implies higher volumes: *“We will have a much greater part of our turnover in direct relation with the main retail chains both in the supermarket and the restaurant segments”*; furthermore, new concepts will be developed: *“We want to remain in the fish market. And we will try to develop concepts which are suitable for this kind of distribution”*, and stronger ties in terms of financial ownership are envisaged: *“We will have a strategic cooperation which is financial and which is based on shared ownership in Japan.”*

The reasons for this to happen (box E) are according to, Norway Salmon the increased interactions between actors, resulting in overlapping views. Norway Salmon refers to this theme a number of times, emphasising its importance: *“To achieve this I have to find partners which share this view of reality. And I find them at the importer level and at the retailer level. This has definitely been the main selection criteria!”* Another way to create change is to confront the view of reality held by Norway Salmon’s current partners: *“We have spent a lot of time recently discussing and establishing a common view of reality with our partners. A lot of time.”* For instance, they need to change the view of their partners at the fish market: *“These guys [the fish market people] will not accept our view outright. They are resistant and say that ‘this is impossible’, ‘this will not go’, and so on. But I don’t accept this. I have to try and try over again.”* Norway Salmon must also try to influence the importers *“...the primary thing is to convince the importer, and to have them sharing your view in order to get closer to the primary wholesaler. And we to a large degree achieved this”*. Note also that Norway Salmon believes that sharing network pictures is important in driving change: *“To create changes, the pictures which the retailers in traditional systems have must be the same as the rest of this distribution chain”*. Another example of sensemaking at actor level driving the changes in box C is that the respondent has a strong determination to produce top quality salmon: *“I believe that there is an extreme potential to increase salmon sales in the traditional segment. To achieve this we need to supply salmon of high quality to this segment”*. Norway Salmon also has an ambition to become market leader in Japan: *“Today we are the second largest in Japan. But we have a definite aim of taking the number one position. We have a strategic cooperation which is financial and which is based on shared ownership in Japan”*.

5.3.5 Development of category management

As a second theme of future change, Norway Salmon predicts that Japanese actors will become more professional at developing category management, but this is a slow process (change at actor level): *“Actually we see the same trend in the West. The difference is that in the West we have started to do something about it. A major reason for our dominant position in the Nordic countries is that the major retail chains have seen that farmed salmon is a key product in developing the seafood category. And this realisation is slowly coming to the Japanese market”*. Explaining the forces behind this trend (box E), Norway Salmon refers to their own strong belief in category management (sense-making at actor level): *“And here we can play a key part... We want to contribute to this development [of category management] in Japan”*; a need to develop this in cooperation with retailers (sense-making at dyad level): *“but to achieve this you have to be present at the major retail chains, and you must have facilities and market impact that enables you to do category development with the retailers”*. This is also linked to a general health focus in the Japanese population (sense-making at network level): *“In Japan, there is a strong focus on health issues at present ... For instance, the Japanese Department of Fisheries recently published a white paper on concerns over reduced seafood consumption. Japan is actually one of the few countries in the world which experiences a reduction in seafood consumption! I think one of the main reasons for this is lack of innovation, rigid structures, and lack of new ways of developing categories at the retail level”*.

5.3.6 From whole fish to fillets

Thirdly, in box C Norway Salmon talks about the shift from whole fish to fillets (change at dyad level): *“The growth in Japan is greater regarding fresh fillets than whole fish with head”*. He refers to direct distribution being more suitable for fillets as one explanation for this change (sensemaking at network level): *“Fresh fillets very rarely find their way to the traditional system because the market is not suitable for this kind of distribution.”* This theme further develops an issue of network change already discussed above as important for current changes.

5.3.7 Importance of the fish market

Norway Salmon further believes that the fishmarket will become more important to them in the future (change at network level); *“I believe that we will be heavily involved in the traditional market”*. To explain this change (box E), Norway Salmon holds that this is a part of their strategy (sensemaking at actor level): *“We have no plans to downscale our turnover at the fishmarket, but we will increase our turnover in the direct market. This is where the growth will be. We aim to double our turnover in the direct system. But I think that we will grow even in the traditional system”*; and that they must work with the fishmarket to get access to restaurants that are only reachable through the fishmarket (sensemaking at network level): *“To reach this segment [traditional sushi restaurant market] the direct system doesn’t work. You have to be in the traditional system [the fish market]”*.

There exists a noteworthy connection between the network picture boxes of B and E. In box E Norway Salmon discusses the drivers of a possible future network, but they reject this because they believe that the current cooperation model works better: *“Today we are in the same advantageous position through our three strategic partners as if we had set up our own import company. And this must be seen in relation to how we work with these three actors”*. This belief has led to more commitment *vis-a-vis* their current partners (change at dyad level in box B); *“These three actors are interested in that we involve ourselves as much as possible at the retail level”*. At the same time, Norway Salmon discusses new models of cooperation with their partners, even new ownership structures and integration (boxes C and E above). Thus, a certain ambivalence regarding Norway Salmon’s own strategic approach towards these expected changes is recognisable.

5.4 Comparative Analysis of the Salmon Distribution Network: Initial Dottograms

Dottograms can be used in a second step to systematically compare the different perceptions of change by several key players in a network. Our analysis thus changes from a focal company to multiple companies. The following will present the findings for a comparison of four actors (each representing a different actor group) in the Norwegian/Japanese salmon distribution network: in addition to Norway Salmon (a producer/exporter), these are Bluewater (a large Japanese importer), Yamanouchi (a large processor) and Asahi Retail (a large retail chain in the Kyoto/Osaka area). Figure 8 shows the initial dottograms for these actors.

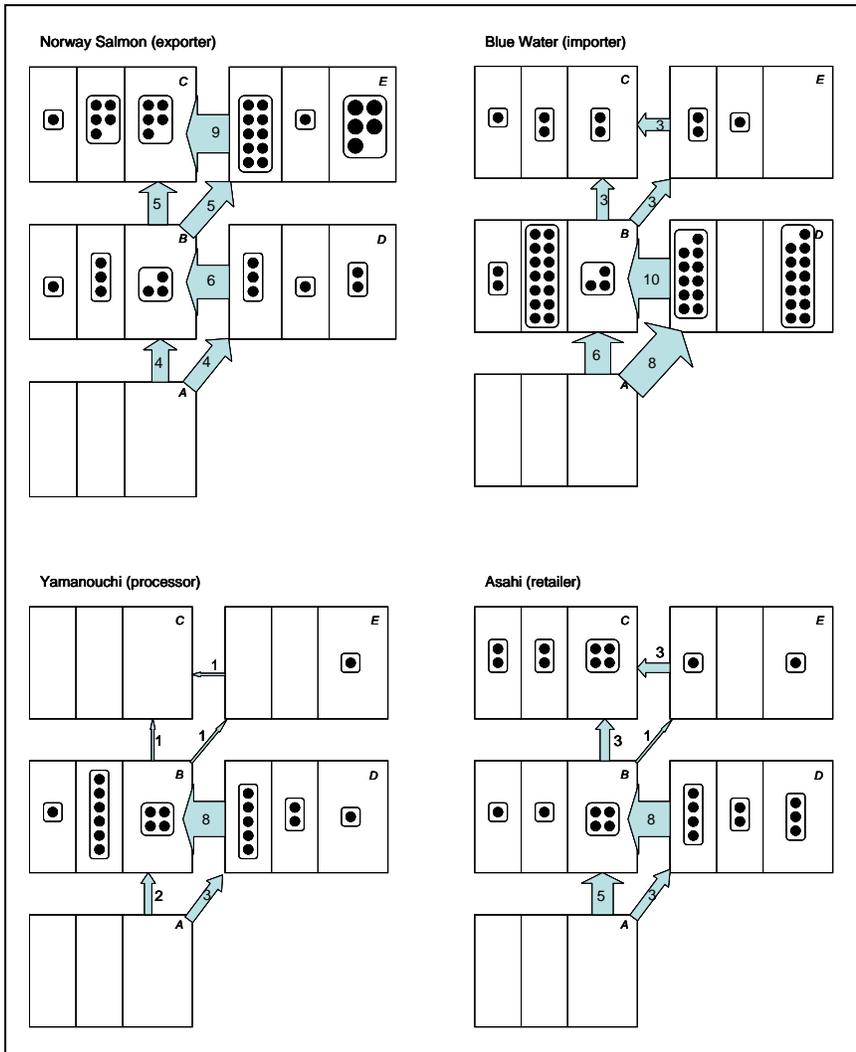


Fig. 8: Initial dottograms for four key actors in the Norwegian/Japanese Salmon Distribution Network

Norway Salmon’s initial template has already been analyzed above. In comparison, Bluewater has a limited view about changes in the future. The most striking feature of Bluewater’s initial dottogram is that the majority of changes they describe are current, i.e. concerned with boxes B and D. Box B indicates that the majority of changes are occurring at the dyad level, notably in the relationship between Bluewater and its suppliers (exporters). The arrows from box A to box B, and B to D also show that the respondent’s main focus is changes which have occurred (six examples), not changes which will occur (three examples). Bluewater makes sense of these changes (box D) by referring to manifold reasons on the actor and network level

Yamanouchi’s template for a processor company is characterised by a limited number of arrows and dots compared to Bluewater and Norway Salmon. In Yamanouchi’s case, the majority of changes going on are at the dyad level in box B. Sensemaking devices used to explain these changes are found especially at the actor level in box D, indicating that the respondents’ view changes in Yamanouchi’s business relationships as happening due to actions taken at the actor level. The majority of arrows indicate this; the thickest arrow is from box D to B. As such, the Bluewater and the Yamanouchi templates are similar. Both emphasise changes at the relationship level. But whereas Bluewater is very much focused on sensemaking at the

networking level to explain changes in his relationships, this dimension is missing almost entirely in Yamanouchi's template which is focused on the current network change characteristics almost exclusively, ignoring any future changes in and of the network.

Asahi Retail's template is similar to Bluewater and Yamanouchi in its description of changes mainly at the relationship level (box B) and the use of sensemaking mostly at actor level to explain these changes (box D). Where Asahi Retail differs is in the descriptions of future directions of changes in box C: Asahi Retail sees more changes appearing in the future than the importer or the processor company. However, not many considerations are offered as to why these changes are likely to appear (box E, with only three changes).

Norway Salmon's dottogram demonstrates knowledge of the Japanese market with a clear view about future changes. These 'thick' expectations about network change contrast with the rather 'thin' views of the Japanese companies. While Norway Salmon perceives the main drivers of change to relate to the actor level, the other companies do not share this view. Norway Salmon has in general a broader network pictures perspective, referring to changes and change reasons usually along all three dimensions (network, dyad and actor level). Bluewater on the contrary seems to be much more tangled up in the 'here and now' changes which seem overpowering (at least if viewed through the perspective of their initial dottogram). This actor is continuously adjusting to the changes taking place at the dyad level such as changes in Bluewater's relationship to their new supplier (Norway Salmon), to their new customer (Asahi Retail), to their old customer (the fishmarket), and to the processor which is also a new actor in his network. Explaining the dyadic changes, Bluewater has a broad scope as it refers to sensemaking at network level in addition to actor level (box D). This is also evident in Yamanouchi's case, albeit on a much more parsimonious level. Yamanouchi also seems to be mostly concerned with the current state of the network, although they perceive change to be much less intense than Bluewater. Yamanouchi does not seem to have any expectations regarding change in the future. Their focus is on their current dyads, and use sensemaking device mainly on the actor level to explain these changes, seemingly adjusting and manoeuvring with regard to changes taking place in their distribution relationships. Their concern is to make things work in their closest relationships.

Norway Salmon and Asahi Retail are at 'opposite' ends of the distribution network. Their initial dottogram indicates that they are facilitating changes, not merely responding to them: both have more detailed perspectives about the future of the network. From the interviews it appears that both Norway Salmon and Asahi Retail are very 'action oriented' and they want things to happen in the network with regard to future developments. They have a (complementary) vision of where they want to go in line with the network developments; Norway Salmon wants closer ties to the retailers, and Asahi Retail wants closer ties to the producers. They both have already initiated actions based on these change-related network pictures. Thus the templates of Norway Salmon and Asahi Retail are similar in their focus on the future. Yamanouchi and Bluewater may understand these concerns, but their challenge is to respond to them without a clear future-oriented network picture. Thus, also Yamanouchi and Bluewater share similar templates, particularly concerning boxes B and D.

5.6 Comparative Analysis of the Salmon Distribution Network: Detailed Dottograms

Using the detailed dottograms of the four actors, a comparison of their specific themes with regard to network changes is presented. Five main themes were identified:

5.6.1 General change towards direct distribution

Norwegian Salmon, Bluewater and Yamanouchi all identify changes towards direct distribution, with Yamanouchi addressing this only indirectly. Norwegian Salmon talks about “*closer ties to actors in direct distribution*” and the “*general trend towards direct distribution, bypassing the fishmarket*”. Bluewater mentions “*increasing direct distribution, 50/50 now but slowly changing*”, Asahi Retail also mentions “*more direct distribution*”. In this context they all point to improved relationships with other actors in the newly developed or future network, compared to how they used to work with actors in the fishmarket. Bluewater (an importer) is perhaps the respondent which gives the richest description of the adaptations regarding this theme. In terms of actor bonds it highlights closer relationships with retailers as well as processors (mentioned twice), strengthened ties to Norwegian Salmon (three times), more commitment in terms of meetings, discussions and cooperation (four times), and friendlier atmosphere (twice). In terms of resource ties Bluewater also discusses better access to information, fresher salmon, and increased volumes. Finally, in terms of activity links they discuss promotion activities, campaigns and pricing policies, and also highlight the role of chartered flights in improving the efficiency of the network. Other changes in actor bonds mentioned here are improved communication (with Norwegian Salmon) and improved access to information, closer ties, better communication and fewer conflicts (with Asahi Retail). On the actor level, there are relatively few changes mentioned regarding this theme: Norwegian Salmon argued that they have created new positions within the company as a result of these developments. Asahi Retail has improved their sales and product strategy and Bluewater has become clearer and more concise in planning marketing activities. How do the actors explain why the changes are happening? Interestingly, all three of them point to retailers demand for traceability as the most important explanation for more direct distribution. Norwegian Salmon also mentions increased retail power, but there were few other explanations besides these.

5.6.2 Reduced number of suppliers

The second theme relates to an expected decrease in the number of suppliers in the network. Yamanouchi and Asahi Retail both mention that they have reduced their number of suppliers of fresh salmon. Asahi Retail has moved from several to only one, Yamanouchi has gone from five to one. By this “one” supplier they actually refer both to Bluewater. However, this is where the similarity ends between the network pictures regarding this particular theme. Yamanouchi talks about how this change (the decrease in supplier numbers) has resulted in a closer relationship, increased volumes and improved stability in their relationship with Bluewater, whereas Asahi Retail does not mention anything about changes on the dyadic level. On the actor level, Asahi Retail has saved costs, but Yamanouchi does not mention any equivalent actor level changes. Both companies also explain the change represented by this theme differently. Yamanouchi mentions only a few simple issues: a need for stability, and being less geared towards risk. Asahi Retail talks about how they gave more business to Bluewater as satisfaction grew. Now they are very pleased with how the network has become integrated, and they talk about it as “*one team!*”

5.6.3 The diminishing role of the fishmarket

Norwegian Salmon, Bluewater, Yamanouchi, and Asahi Retail all discuss the decline of the fishmarket, a point somewhat related to the growing rate of direct distribution. They talk about this theme in very similar terms. On the network level, Bluewater points to the decline of the fishmarket as related to the growth of direct distribution; Yamanouchi adds that they are increasingly bypassing the fishmarket; Asahi Retail buys a lower volume from the fish market. Norwegian Salmon mentions that the fishmarket is slow to change. However, they attribute different reasons for this theme of network change. Norwegian Salmon is perhaps the most positive towards the role of the fish market, seeing a role for it in the future as it has distinct

functions that are not easily replaced, and they therefore want to keep strong ties with the fishmarket. Yamanouchi has similar arguments as they still use the fishmarket as a distribution centre. Perhaps the actor which has the most negative perceptions towards the fishmarket with regard to change expectations is Asahi Retail. They talk about tensions in their relationship with the fishmarket actors, and are clearly dissatisfied with their ability to supply quality products. Although not discussed, this may be due to the overriding interest in product traceability by retailers.

5.6.4 New type of retailers

Yamanouchi and Asahi Retail both mention the change at retail level in terms of expected new types. Asahi Retail talks about this at the network level with regard to the expected growth in numbers of large retailers (with small retail shops correspondingly decreasing). As a result, the power balance between retailers and suppliers is expected to move in favour of the retailer. By contrast, Yamanouchi does not talk about the retailers on the network level; they address the changes at dyad and actor level. Yamanouchi is now in a position to better serve the needs of the retailer (especially via adaptations to their production processes), underlining again the existing and expected growth in power by retailers which is used both by Asahi Retail and Yamanouchi to make sense of the reasons behind this theme. Hence, these two actors (the retailer and the processor) have very similar perspectives regarding this theme while the exporter and importer (Norwegian Salmon and Bluewater) also discuss the power of the retailer, but relate it as a sense-making device to explain the change towards direct distribution.

5.6.5 The network is becoming more integrated

There are similarities in the way the different actors refer to this theme of how their cooperation started, and how they have adapted to each other. Norwegian Salmon does not discuss this in box B (i.e. as a current change in the network), but they refer to it as a future change (box C). Asahi Retail, Bluewater, and Yamanouchi all refer to this integration process on the network level as perceived reality which has already happened. Bluewater holds that they have just started the relationship with Asahi Retail which has given them access to a new type of processors (Yamanouchi) and a new type of producers (Norwegian Salmon). Yamanouchi also discuss how they started collaborating with Norwegian Salmon and Bluewater. Bluewater is perhaps the actor which is most concerned with changes resulting from the integration of the network. In addition to discussing how Norwegian Salmon, Bluewater, Yamanouchi and Asahi Retail are working together, they also highlights the role of the Norwegian Seafood Export Council (a governmental agency helping to market Norwegian seafood abroad) in this network. They also give examples of how ties within this network have enabled them to access other networks, like access to Norwegian Salmon network overseas for distributing yellowtail. In box C (future changes in the network) they refer to sense-making on all three levels to explain why the network is becoming more integrated, but the underlying theme seems to be very much individual actor motivated.

6. Contributions and limitations

This paper has presented two main themes: firstly, it has developed a model illustrating how actors describe and explain network change, and, secondly, this model has then been used to analyse data collected in a case study aiming to understand current changes in Norwegian-Japanese distribution networks, both for individual actors and in a comparative way. The model represents a systematic way of using network pictures, i.e. the idiosyncratic 'network theories' of different actors, to analyse actor perceptions of change in networks, and herein lays its main contribution. Network pictures has so far mainly been discussed as a conceptual construct (Ford et al. 2002; Ford et al. 2006; Henneberg et al. 2006) and only a few studies exist using network pictures as a research tool (Öberg et al. 2007, Ramos, 2008). A further contribution of our study

relates to the conceptual link between network pictures and their use to understand network changes. Industrial networks are dynamic, and there is growing interest within the industrial network approach to understand how networks change, and how perceptions of change affect these changes.

Furthermore, by developing dottograms, we show how network pictures can be systematically collected and analysed, also in a comparative way between actors. Thus, from a methodological point of view, the model and dottogram method offers new insights in that it captures an understanding of change concerning several dimensions. First, there is the actor, dyad and network dimension suggesting that change may be studied according to whether it happens within a company, in the relationship between companies, and/or in a network of further connected relationships. The model also incorporates the time dimension, as change is seen as something that was (past), to something that is (present), and to something that will be (future). Additionally, the model offers a way to understand how actors explain change, as the attribution of causes may be studied, again separating whether they appear at the actor, dyad or network level, both at present and in the future.

This model and operationalization via the dottogram method opens a variety of ways to understand change in networks. The case study of the Norwegian/Japanese seafood distribution system has describes how four different actors in a distribution network describe and explain change. Important observations and analyses can be made in terms of where change perceptions are similar between actors with different positions in the network, and where they differ. This also includes comparisons of the attributions, i.e. the reasons for change: Actors may describe similar changes, but attribute them to different causes (or have similar explanations for different events for that matter). In case study research, this provides a window for interesting combinations of analyses and insights. For instance, further research including a wider sample (i.e. several exporters, importers, processors and retailers) could analyse in more detail whether and how perceptions differ within the network depending on network function/position. Another way is to structure the analysis in terms of cultural background (Norwegian/Japanese). This model also opens for further studies and comparisons of perceptions across different networks. The study described in this paper is a cross-sectional study of actor perceptions in a network. Although it uses different time dimensions (past/present/future), they are collected at one point in time. However, it is also possible to use the model and dottogram method in a longitudinal study. In our research we asked actors to describe their network at three points in time: five years ago, today and in five years time. Changes from the past to the present are discussed in terms of how the network today differs from what it used to look like, and future changes are discussed in terms of what will change from today's situation. If a similar study is conducted in five years time, this will give unique insight and comparisons in terms of what the actors believed would happen, and what actually happened. In other words, the present is the future of the past.

For management practice, this study suggests that we cannot explain network change without first understanding how managers understand their surrounding networks in relationship to the network position of the company they are embedded in. Strategy and general management literature generally advocates that management should base their decisions upon an analysis of a company's "environmental forces" and build their actions on this analysis. Rather, we believe that perceptions of a company's network (and knowledge of the representations used by other actors) represents a better way of explaining the options open to management, or the limitations of their actions. Managers base their decisions on how their future network positions are believed or desired to be. Strategy thereby becomes a way of changing or maneuvering the network toward this desired position rather than mere reactions and responses to changing economic conditions.

When it comes to the limitations of the study, we encounter the general concerns that have been raised when doing case study research. Dubois and Gadde (2002) for instance discuss a number of limitations: First, case studies have are seen to provide little basis for scientific generalization (Weick 1979; Yin 1994). Second, case studies are often rich descriptions of events without clear analytical framing; they at best only partially support quasi-deductive theories, and they suggest some notion of statistical generalization where multiple case studies are used (Easton 1995). Dubois and Gadde (2002) introduce the “abductive approach” to case study research, also referred to as “systematic combining”, where “theoretical framework, empirical fieldwork and case analysis evolve simultaneously” (p. 554). This has also been our experience in developing the model and the dottogram method. However, such a process obviously has implications for the interactions between empirical and theoretical plane.

A second limitation of our study concerns the model. It presents an account of how actors perceive changes affecting different aspect of the network. As such, this is not a representation of “reality”, but represents perceived reality, i.e. a socially constructed view of the world. It bases its foundations on the concept of network pictures and sensemaking, where reality is an ideosyncratic construct of sense-making. Other research approaches taking a realist view may shed light on changes affecting the actors, but where the actors are not aware of them. But when studying changes, we actually study the outcomes of change, i.e. the product not the process of change. Changes can only be understood in retrospect. It therefore makes sense to describe changes in terms of the actor’s perception of them, because it is these perceived changes which serve as basis for their actions (Ford et al., 2003).

A third limitation is the dimensions of the model. The model is concerned with time and level dimension, but it does not take into account other dimensions such as company performance. As such it is descriptive, not normative.

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Appendix

Appendix 1: Company/respondent description for initial study (names have been altered)

Company	Type of business	Key respondent
Norwegian sample		
Global Seafood	Farmer, processor, exporter	Sales director + Key account manager, Japan
Rocky Coast	Farmer, processor, exporter	Trade and development manager + KAM
Norway Salmon	Farmer, processor, exporter	Team manager, Asia
Viking Seafood	Farmer, processor, exporter	Sales unit manager, fresh dept. Asia
Ocean Salmon	Trader, processor, exporter	Sales manager frozen dept. + sales manager
Japanese sample		
Karatsu Co. Ltd.	Importer, wholesaler, trader	General Manager, int. trade and marketing dept.
GMC Inc.	Importer, trader (<i>sogo sosha</i>)	Manager, seafood dept.
Japan Corporation	Importer, trader (<i>sogo sosha</i>)	Manager of marine products
Tokyo Fisheries Corp.	Importer, wholesaler, trader	Deputy general manager, overseas department
Nippon Trading	Importer, trader	President
Kato Marine Products	Importer, trader, processor	President
Global Seafood Japan	Importer, trader, sales subsidiary	Managing director

Appendix 2: Company/respondent description for follow-up study (names have been altered)

Company	Type	Key respondent
Norwegian sample		
Global Seafood	Farmer, processor, exporter	Sales director, Managing director
Norway Salmon	Farmer, processor, exporter	Team manager, Asia
Viking Seafood	Farmer, processor, exporter	Sales unit manager, fresh dept. Asia
Ocean Salmon	Trader, processor, exporter	Asia manager
Japanese sample		
Karatsu Co. Ltd	Primary Wholesaler	General Manager, int. trade and marketing dept.
Akimoto Ltd.	Primary Wholesaler	General manager
Tokyo Fisheries Corp.	Importer/secondary wholesaler	Deputy general manager, overseas department
Rocky Coast Japan	Importer	General Manager
Kato Marine Products	Importer	President
Blue Water Trading	Importer	Vice President
Asahi Retail	Retailer	Head Buyer
BCC	Retailer	Head Buyer
Shoitachi	Retailer	Head Buyer
Sensei Transport	Distributor	General Manager
Narita Distributors	Distributor	General Manager
Yamanochi	Processor	President
Norwegian Seafood Council	Gov agency	Counsellor, fisheries section
Tokyo Metro. Government	Gov administration, Tsukiji	Director General
+ various other actors		