

Structures within Time
A combined approach to analyze change in industrial networks
Competitive paper submission for the 22nd IMP Conference in Milan, Italy

Marisa Dohrup
Copenhagen Business School
Center for Applied Market Sciences
iBirk Centerpark 40
DK-7400 Herning
Phone: +45 – 96 29 64 63 – Fax: +45 – 96 29 64 60
md.marktg@cbs.dk

Abstract

This paper proposes a model in which structure and processes are taken into account when analyzing change in industrial networks. As the current literature does not address the temporal aspect inherent to change, the combination of two frameworks addressing network dynamics, namely, the Actor-Resource-Activity (ARA) and Event Networks (EvNs), enhances the analysis. The first framework provides the spatial and functional elements of change, while the next, the temporal and conditional elements of change. A case study is used to illustrate the limitations of analysis of the individual models and show the enriched version by combining both. When structures are analyzed within the temporal perspective, it incorporates actors' interpretations of events manifest through actions or activities. As a result, managers are better equipped to deal with the range of possible delineated futures.

Keywords: Industrial Network Change, Actor-Resource-Activity, Event Networks.

Introduction

The business world overflows with stories of unexpected changes in networks that end up in successes or fiascos. Some of the success stories make the news, others do not. There is the well-known case of “accidental” innovation of 3M’s post it, Rapalla’s internationalization associated to Marilyn Monroe’s death and the rise and sell of Skype. Other stories are not so innovative, popular, or impactful. Still, they are in the heart of shaping marketing practices and forms. Change can only be observed retrospectively and in relation to a previous state. It is a relational difference between states: a before and after snap-shot that makes us wonder what has happened in between.

According to Araujo (2004, p. 3), “*the focus on the activities involved in the market making and the performativity of experts discourses are the two key areas in which Callon’s proposal breaks significant ground in relation to sociology literature.*” From this perspective, markets are constructed. One way to look at how markets are formed is to understand the dynamics of networks. By doing so, some assumptions arise. The first one is to accept that stability and change in industrial networks coexist in a dialectical manner. And the second is to find in interactions the place where reproduction and disruption occur. The construct of markets is visible through how marketers have been able to influence marketing practices. Their print in the way perception and practices influence market players can be traced in the discourse and practices of managers nowadays. However, there is another way through which markets are constructed: business interactions. Inter- actions among business units driven by meanings maintain and transform practices. Those practices become imprinted in the routines of business units from a continuous interplay of actions/reactions. When a pattern of practices replicates throughout a network, it becomes the norm. In this way, business relationships are also an important building block of markets, which are not given, instead they are a result of network stability and change.

Given that change embodies temporal and relational elements, it is not enough to assume that change processes are only driven by interactions in relationships. The timing of those interactions is also relevant for change to take place. Although network dynamics has been addressed by structural approach, the time dimension has been treated as an implicit element in business relationships. Thus, this paper proposes a model in which structure and processes are taken into account when analyzing change in industrial networks. The combination of two frameworks addressing network dynamics, namely, the Actor-Resource-Activity (ARA) and Event Networks (EvNs), enhances the analysis. The first framework provides the spatial and functional elements of change, while the next, the temporal and conditional elements of change. A case study, not likely to make the news, is used to illustrate the limitations of analysis of the individual models and show the enriched version by combining both.

The paper is structured in five sections. The first section presents the change in industrial networks literature, from which two models to analyze change are selected based on their individual ability to explain structure and process. At the end of the section, a combination of the models is proposed. In the second section, the method adopted for collecting data and writing the case is explained. In the third section, the case is presented and then discussed applying the frameworks for industrial network change. Finally, the main points are recapitulated and issues related to further research, limitations and managerial implications are pointed out.

Change in Industrial Networks

Industrial networks are at the same time stable and changing (Gadde and Mattsson 1987). According to Håkansson and Snehota (1995), the change process in networks is driven by interactions in relationships. Through the substance dimension of relationships (actors, resources and activities) the elements for reproduction and transformation are carried out. At the same time as the function dimension spreads stability and change to the business unit and/or throughout the network.

As result, network dynamics has been studied from different approaches, of which three areas stand out: types of changes observed, level of analysis, and patterns of initiating action and reactions. The different types of change have been classified as gradual or radical (Havila and Salmi 2000; Hertz 1996) depending if the change deals with existing or new relationships, and as confined or connected (Havila and Salmi 2000), depending if the change remains within the dyad or is able to influence other actors.

Business relationships as the simplest unit of analysis have been studied by a number of authors explaining how and why companies initiate (Batonda and Perry 2003; Dwyer, Schurr and Oh 1987; Easton and Lundgren 1992; Hallén & Johansson 2004; Hertz 1992; Håkansson and Snehota 1995), maintain (Anderson & Weitz 1992; Ford 1980; Hallén, Johansson and Seyed-Mohamed 1991; Harrisson 2004), and dissolve (Halinen and Tähtinen 2002) business relationships. At the network level, the studies have taken different approaches analyzing the role of embeddedness (Halinen and Törnroos 1998), the effect of multiple relationship dissolution (Harrison 2001), domino effects in networks (Hertz 1998), the role of path dependence in technical development (Håkansson and Waluzewski 2002), distribution channels (Gadde and Håkansson 1992), mobilization and coordination in industrial networks (Lundgren 1992) and vectors of change in networks (Håkansson 1992; Håkansson and Henders 1995; Håkansson and Lundgren 1995; Håkansson and Snehota 1995). The latter deploys the Actor-Resource-Activity (ARA) model as the basic framework for analyzing change in networks and explores the connections of the structural elements of business relationships, where actors are the initiators of change.

Analyzing the initiation of change Smith and Laage Hellman (1992) identified five patterns of action: by-pass, combination, bridging, displacement, and separation. These patterns demonstrate how actors can initiate change in a triad, but it is also applicable to network level. Easton and Lundgren (1992) describe an actor's options for reactions to initiate change through sequences (reflection, adaptation, absorption and, transmission, transmutation), amplitude modification and dissemination requirements. However, it is not clear what the object of action/reaction is. Hedaa and Törnroos (1997) propose that actors act on events, and as a result events, not actors, have the potential to create change. In order to analyze network dynamics from this perspective, the authors developed the Event Networks (EvNs) framework, which introduces the temporal embeddedness of networks.

Despite the academic efforts to provide tools for analyzing industrial network change, the models presented are either too case-specific, or fall-short in providing a framework that embraces the multiple facets of networks. Of special interest for this paper are structure and process. Although Håkansson and Henders (1995) emphasize the importance of network logic as changes are put into a context of time (past, present and future), the ARA model treats time as an implicit aspect of networks. Complementing the model with EvNs, the time dimension becomes an additional building block that can aid managers and researches in analyzing the process in industrial network change.

Next, network change through ARA and EvNs are presented.

Network change through ARA model

The Actor-Resource-Activity (ARA) model (Håkansson and Johansson 1992; Håkansson and Snehota 1995) expands the dyadic interaction model (Håkansson 1982) and suggests that business networks can be analysed as network of actors, network of resources and network of activities. There is a circular logic in the model as actors perform activities and control resources, activities are how actors use resources and resources are used by actors to perform activities, as shown in Figure 1.

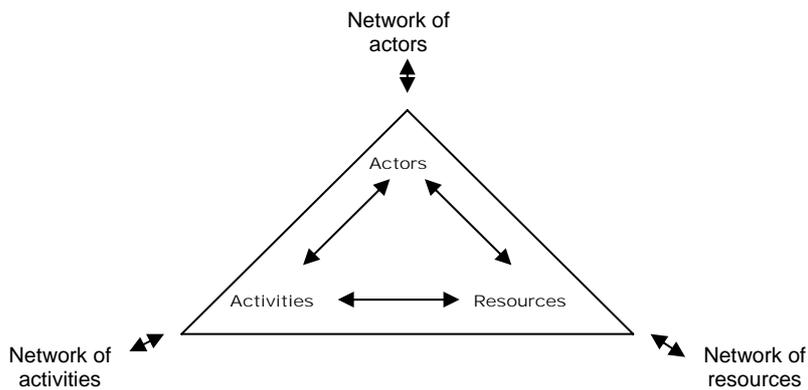


Figure 1: ARA model (Håkansson and Johansson 1992)

An important assumption in the ARA model is that resources are heterogeneous and its interactive effects allow for unpredictable and new unique combinations. That is, resources gain value through interaction processes. Through the three interconnected levels, actors are connected by bonds which reflect the interaction pattern that occurred, and consequently they may change over time. Links connect activities that may exist between different actors and ties connect resources. An interesting aspect of the latter is that the way resources are connected can be a resource on itself. These connections are defined as the substance dimension of business relationships, as it regards what the relationship affects on both sides. On the other hand, the function dimension regards the effects a relationship has for different actors, leading to three different functions: the individual company, the relationship itself and the network (Figure 2).

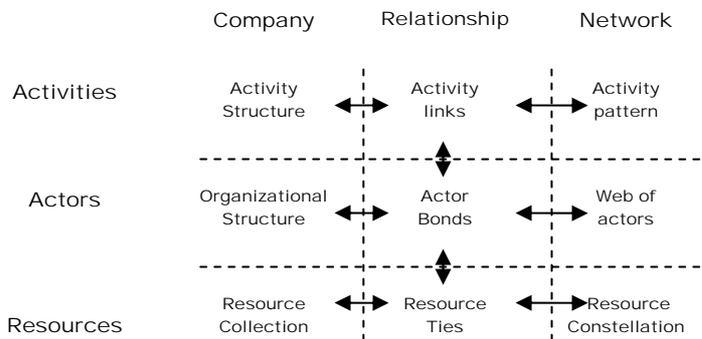


Figure 2: Scheme of analysis of development effects of business relationships (Håkansson and Snehota 1995)

From this angle Håkansson and Snehota (1995) explain how stability and change coexist in networks and propose a framework for assessing and interpreting change in networks following two lines of argument. The first refers to the fact that forces that generate change in business networks can be identified, and the second to the importance of understanding mechanisms and processes of change rather than trying to predict its effects, as a more valuable tool for managers. In their view, relationships are the means for change, whether it is endogenous or exogenous, and connections between bonds, links and ties will follow some kind of rationale called network vectors. When a pair is connected an effect in the third dimension is bound to occur (Figure 3). In this sense, how bonds and links are connected will affect in different ways the resource ties.

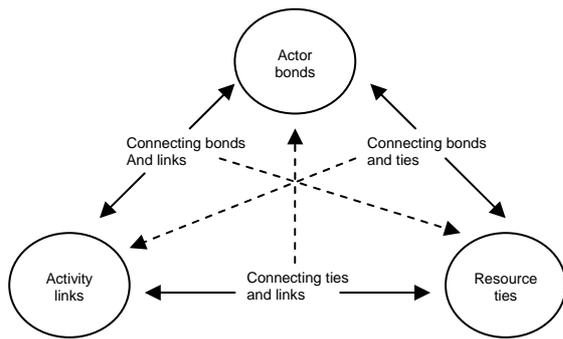


Figure 3: Dimensions of change in business networks (Håkansson and Snehota, 1995)

For example, the vectors related to bonds and links are related to changes in the activities' scope. Two trends, specialization and generalization can be observed. Specialization occurs when there is focus in activities to a certain group of actors. In this case, the emphasis is on cost efficiency of activities and convergence to a homogeneous customer or supplier group, for example. As a result resource ties become more specific, a concentration occurs. Another trend is generalization. In this case, the activities' scope is broadened, a new type of actor appears and ties become weaker.

The ARA model is useful in identifying the direction of change in industrial dynamics through the vectors. However, it assumes an actor's perspective (Hedaa and Törnroos 1997), which is not explicit in the model when analyzed from its resource ties and activity links perspectives as well. As such, the ARA model eclipses the temporal dimension embedded in events, which lead actors' to act on or react to.

Network change through Event Networks

Events have been defined as an outcome of acts or changes caused by nature or man (Hedaa and Törnroos 1997), and consequently are bound to an activity and an actor. They may exist independent of other actors' awareness of it. However, they have the potential to manifest change in networks as other actors perceive it and choose to act (or not) on it. In this sense, the lack of action may also be a cause for change, and an action can be a reinforcement of the network logic.

Along these lines, Hedaa and Törnroos (1997) developed a model of event networks (EvNs) in order to approach temporality for understanding inherent characteristics of business networks. According to the model, EvNs have the following characteristics (Ibid, p.6):

- The smallest unit of analysis is an event dyad (two interrelated events)
- An event is always an outcome of human acts or caused by nature
- Actors (or nature) are mediators of events
- Events are always contingent on the existence of some antecedent events
- Objectively, EvNs have no beginnings and no endings
- Seemingly similar events are differentiated by their position in time and space and through their loadedness
- Events may be loaded by the past or the future, and/or by the source of the effected objects (e.g.actor loaded)
- Connected events are always separated by time
- EvNs may appear as streams of interconnected events (event trajectories)

In this sense, events form another perspective for understanding change in business networks as shown in figure 3, as events come into the triangle when perceived by the actor(s). Actors react to events through activities (or actions). However, this response can be pro-active when actors create acts and new events, reactive when a pattern of action is maintained or inactive when there is no response.

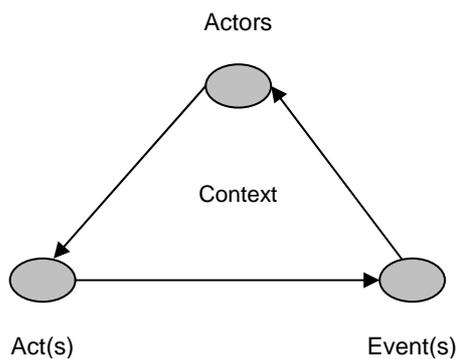


Figure 3: The triangle of event networks relations (Hedaa and Tornross 1997)

The EvNs model shows how events emanating from inside and outside the focal net create change and adaptation mechanisms to come into play. It also shows the temporal embeddedness of network forming event trajectories over time in a relational manner. Håkansson and Snehota (1995) propose that change process in networks can be of three general types: company internal factors, interaction in the relationship or external developments. And emphasize that “while exogeneous events and entrepreneurial action can cause change in relationships and thus in business networks the major source of change is the interaction within relationships” (p.271).

Butriss and Wilkinson (2004) argue that although some events are the result of purposeful action, others may well have been irrational, happen by chance or be a result of tradition or social influence. In this sense, events in business networks manifest through the actions from actors and can be perceived (or not) in a different number of ways in the network. It follows that events also drive change, as actors are not in control all the time but can be lead to certain actions as a result of a collection of events. Thus, events form the core perspective for understanding temporality and change in business networks (Hedaa and Törnroos 1997).

Applying the EvNs model however may be extremely difficult and require bringing certain chains of events to the foreground while leaving others aside in order to highlight subplots of processes. The number of events in one interaction alone is so large that the expansion to a network would not be viable. Therefore, not only a perspective, but also the actors involved must be chosen to explain the relevant connections in time and space.

Since change is a phenomenon that can only be observed ex-post, in comparison to a previous state, origins of network change can be traced through event trajectories. However, chain of events can also carry a future loadedness through the expectation they bear within, which can trigger a present action. In this sense, alternate futures are discarded to make the present and then each present makes new alternate futures (Luhmann 1979).

In this sense, each choice enacted incorporates restrictions and opportunities for the next choice. While EvNs enables the identification of the location in time and space of change in the network, it does not explain the direction of change as it misses the structures that enable and constrain it.

The complementarities in ARA and EvNs frameworks

After looking at the limitations of the two models, their complementarities are shown in the next section. While the ARA model lacks the temporal dimension, and the EvNs the structural one, combining both models can improve the framework for network dynamics analysis, as shown in Figure 4.

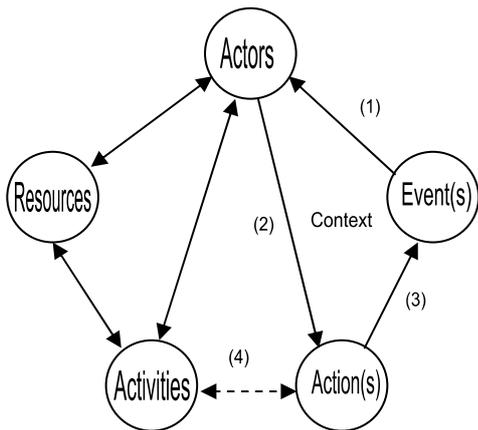


Figure 4: Complementarities of ARA and EvNs models

Events are brought into the network by the actors' interpretation (Eden 1989, cited in Hedaa and Törnroos 1997) as shown by arrow (1) in Figure 8. The actor may decide to act (or not) (2) generating another event (3). Assuming the same actor(s) that in the ARA model, who owns and deploys resources through activities, the change process has the required elements to take shape. And as one pair of connections between actors (bonds), activities (links) or resources (ties) is triggered, an effect in a third connection will occur. The circular logic present in the ARA model enables it to explain structure but it does not succeed in determining the process. Thus, events indicate a point of origin as they do not define activities or actors, but are defined by them.

An interesting point is the fact that actors are not the only unifying point in both frameworks. Activities and actions are also able to induce the change process. According to Activity Theory, a psychological approach with origins in the works from Rubinshtein (1935) and Leont'ev (1947), activity refers to the human mobilization around conscious goals in a concrete, external world. The goals can be object-oriented and subject oriented (Bedny and Karwowski, 2004). Moreover, activities are motivated and oriented by higher order goals and realized through actions, independent components of each activity (Jonassen and Rohrer-Murphy 1999). In this way, actions are a sub-element of a certain activity, when they attend the same goal, and the level of consciousness determines an activity, an action or an operation. All operations are actions when they are first performed because they require conscious effort. With practice, activity collapses into actions and eventually into operations. The reverse path is also possible.

For business units, operations are usually translated as routines, activities performed mechanically. From this perspective, actions may create change in network without the awareness of actors, as a pattern of reactions arise and becomes imprinted in the organization structure (arrow 4 in Figure 7). In this sense, it is aligned with Weick's (1969) concept of activity structures emerging spontaneously as reactions to counterparts' activities. Activity links are formed basically with relationships between suppliers and customers. However, there are interdependencies of activity links between those actors that can be direct or indirect, and even perceived or not. When an actor perceives a pattern of links it is also possible to reverse an activity into an action to provoke an event with potential to create change in the network.

As a result, combining both models provides an understanding of the structure and process of change in industrial networks. The applicability of the combined model is not only to present an understanding of the past and present of a focal net, but also to foresee the options of possible futures. As Håkansson and Snehota (1995, p. 281) affirm:

"[changes] can only be assessed and understood with hindsight. Yet not every change is possible. Changes taking place always flow from the actual existing structure of the network, which is a product of processes that in the past have led to formation of the network's structure as it is experienced today. That provides for the possibility to anticipate change; some sequences of events are ruled out."

A case study illustrates the combination of the models to study change in industrial networks. But first, the method used for collecting data and presenting the case is described in the next section.

Method

The case company together with other 7 furniture and component manufacturers are studied by two doctoral projects, which has stimulated the focus on applied research. In this field of research, it is important to be able to come as close as possible to the object of analysis in order to become familiar with the context and obtain trust, in order to have access to relevant data (Dohrup and Lutz 2005). Therefore a concentration on qualitative data is observed. At first, the question about the object is diffuse, but with time a problem takes shape and the relevant issues surface. Therefore, Dubois and Araujo's (2004) view of cases as a convoluted process of systematic iteration and combination of empirical evidence, theoretical frameworks and persistent reframing of what it is the researcher is studying, fits my perception of how this investigation has evolved.

The SubCon case was chosen because it illustrates how a subcontractor increased its client base from 1 to 67 customers in the past five years, besides adopting a new role as furniture manufacturer. Contrary to furniture manufacturers, SubCon does not have sales representatives, assistants and not even a homepage. Its sales organization is composed of a sales manager and an assistant. The manager is predominantly reactive to external stimuli and averse to change. Nevertheless, change happened and it was intriguing to find out how.

The case is described in a narrative form. According to Weick (1995) stories give meaning to events, actions, and objects and sensemaking (or understanding) depends on our ability to think in narrative terms: retrospectively and prospectively. The narrative properties used in the case are: sequence indicating patterns of events, focal actors presenting roles and social network, voice showing a point of view and moral context reflecting the cultural values and assumptions adopted (Pentland 1999). From this perspective it follows Araujo's (2003) suggestion in writing case studies from a relational perspective deploying narrative that deals with episodic and synchronic dimensions.

As the managers are too locked into their daily operations, the narrative was put together by the researcher. And it may not reflect the manager's perception of reality, as the data was collected as fragments and then assembled into the event sequence. Clark (1985) warns researchers to be trapped into choosing event sequence in a pragmatic way and from the point of view of the researchers themselves. Pentland (1999) on the other hand, claims that researchers set their print into the story by creating objectivity, rather than letting their research subjects do the talking. I agree with the last opinion and argue that it is an important role of the researcher to choose a perspective and provide a broader or alternative view to a topic. All in all, it becomes a question of how one views the world.

The data was collected through 4 personal semi-structured interviews lasting 2 hours each, over a period of 6 months. Throughout the first 2 interviews, the main objective was to understand the main activities of the case company, from which the relations to the client base started to take shape. The last interviews were aimed at finding out how those contacts were first established. The interviews were also supported by other 12 interviews, of which 8 with furniture manufacturers in Denmark, and 4 with potential suppliers. The main and only research contact in the case company is the son, third generation in management position. Whenever possible, the data provided by the company was cross-checked with other furniture manufacturers, of which some are SubCon's clients. In addition, a second researcher is investigating the same sample companies and also validated the data collected.

Throughout the interviewing processes, the respondent became more aware of the activity pattern that resulted in an increase of the client base. He was also confronted with the final findings and was surprised to find out the interconnectedness of events and the outcome for his company.

Next, the case is presented and analysed deploying the models of industrial network change presented in the previous section.

Empirical study

The SubCon case

SubCon is a subcontractor for the ready-to-assemble (RTA) pine furniture manufacturers, producing sometimes components, like wardrobe doors, but mostly the whole furniture, ready for delivery. The company was founded 25 years ago and it is a family-run company with the third generation in management position. As one walks into the only administration office, three generations of management are present: the grandfather, the father and the son. The father is located at the end of the room, in order to have an overview of the office. His location also indicates who is in charge nowadays. A door leads directly to the production facility, where the main activities of the company take place. In 2000, SubCon had 98 employees and in 2005 only 45 were left, a cutback of 54%, as a result of pressures for cost reduction.

The company is one of the few that remained a subcontractor of pine furniture and did not follow the trend in the 1990s to move downstream in the value chain. The manager felt there would always be room for smaller production series and the need of a buffer in seasonal peaks. However, it is hard to determine whether if this reasoning is a motive or a justification. As the manager states: "Any decision that required change in our routines has been avoided to the utmost".

Organization of activities from SubCon's perspective

The main activities performed by the subcontractor are focused in the production part. First, SubCon transforms wooden boards into edge-glued panels, and then shapes into components (panels, tops, fronts, and frames). Then, the components are drilled into and receive surface treatment before being packed with screws, fittings and assembling manual. The package is labelled and placed in the warehouse, where it waits for shipping. At first, the main pieces of furniture produced were wardrobes, but nowadays SubCon also produces chest of drawers, desks and beds. Furniture manufacturers are also engaged in production, but use the subcontractor for specific series that are too small to match their production processes.

The subcontractor has also been involved in developing industrial designs in order to provide a better fit from clients' requests to SubCon's machinery. "Even when the industrial drawing is ready from furniture manufacturers, we always need to make some adjustments so that the flow in our production is optimized", says the manager. In this sense, two types of designs are required: one, with an overall sketch of what the furniture should look like, and another one that enables an efficient production process.

Sales activities for the subcontractor are related to handling orders. Confirmation of orders, invoicing, and payment control are familiar activities for SubCon. The furniture manufacturer, besides carrying on the same activities with its own clients, wholesalers or retailers, also take care of after sales activities, handling claims. In addition, the furniture manufacturer engages in marketing activities like producing catalogues, participating and exhibiting at trade fairs, and maintaining contact with the customers.

Some furniture manufacturers have used SubCon's facilities for warehousing of finished products as well, while others provide immediate delivery from SubCon to wholesaler and/or retailers. The administration activities may overlap depending on the type of customer and the arrangement with the furniture manufacturer. For deliveries, it is furniture producers or wholesalers that provide the arrangements and payment to freight carriers in Denmark or abroad, depending on the destination of the product. A summary of the activity chain for RTA pine furniture and the main actors involved in relation to SubCon is shown in Figure 1.

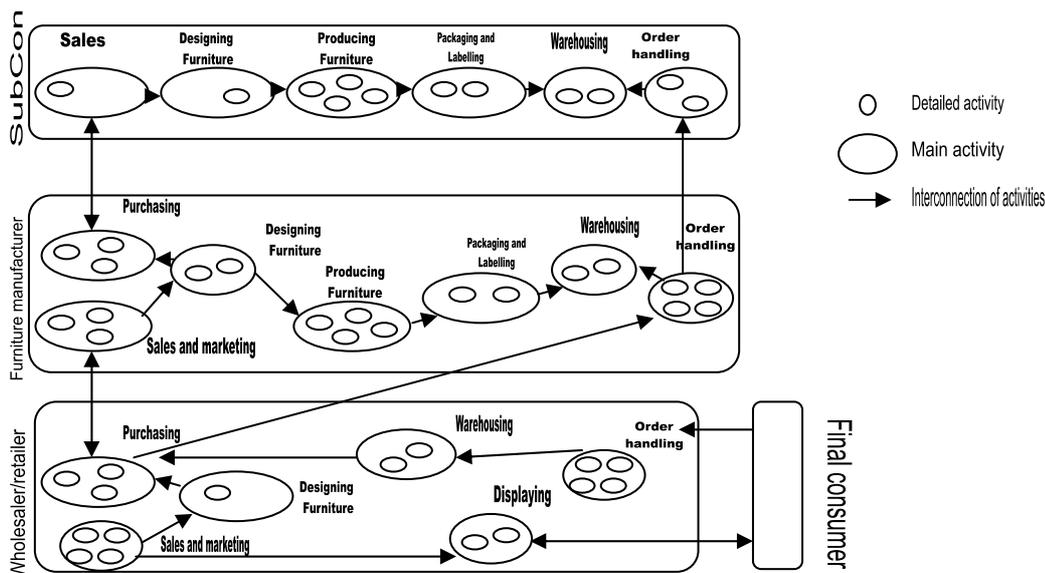


Figure 5: Organization of activities and main actors for RTA pine furniture from SubCon's perspective until 2003.

The context

Danish furniture manufacturers are known by their excellence in the production of ready-to-assemble (RTA) furniture and set as benchmarks worldwide (Meyer-Stamer 1999; Schuler and Buehlmann 2003). This type of furniture became popular with IKEA's way of selling, where furniture is sold in flat-pack form to avoid transporting and selling "air". The role of product development has been to continuously reduce production costs. The main raw material, pine wood, represents 70% of total costs and reducing the thickness of wooden boards from 28 to 18 mm associated with high-volume production was the path chosen to cost reduction. As a result, pine furniture became associated with a discount product due to its low price and thin boards and lost its association with solid wood. It became comparable to even cheaper RTA substitutes, like veneered particle boards.

As the pine furniture trend ceased in Denmark, most of the RTA Danish manufacturers have established a sales force structured to tackle export markets and channels (agents, wholesalers or direct contact with retailers). More than 90% of the production has been exported to countries like Germany and England, and most recently, France. Large retailers and mail order companies have been the main customers. Manufacturers participate in at least 3 trade shows a year, produce catalogues, set up a homepage and some of them have sales offices abroad. Nevertheless, the main customers have remained the same for the last 10 years and very few new clients have gained relevance in their profitability composition.

Since 2000, Danish pine furniture manufacturers are struggling for survival. Fierce price competition from peers and other suppliers from the Baltic area and Asia have crumbled profit margins. Today, every Danish plant operates with significant overcapacity. Instead of running 3 shifts as they used to in 1998, in 2005 most operate with 1 shift but some still manage to hold two shifts. Bankruptcy occurs often enough to make one wonder who is the next in line. In 2000, there were 88 pine furniture producers in Denmark, dropping in 2002 to 11, and the association of Danish Furniture Manufacturers expects that 90% of sales of pine furniture from Denmark will be in the hands of 8-10 companies in the near future (BAT, 2003). Despite these strenuous circumstances, SubCon is a survivor, and many of the changes observed today were not strategically planned but more a reaction to opportunities that literally knocked at their door.

From its founding days until 2000, SubCon had only one client and today the active client base has grown to 67. The company's sales activities were restricted to servicing this sole customer and no efforts to directly increase the client base were ever made. It has been as if providence has taken care of that for SubCon.

Development of SubCon's client base

SubCon's one and only client for 19 years, C1 was a wholesaler, part of a Swedish conglomerate, which conquered successfully the English market. However, in 1999, one of C1's sales representatives left the company and joined what would shortly after become C2 for SubCon. C2 was a Danish retailer focused on discount pine furniture products. Through the recommendation of the new sales representative SubCon became a new supplier. However, one year later, C2 was bought by C1 and SubCon was back at servicing one client in 2000. From 1998 to 2000, SubCon experienced a sales boost of 61%. On the other hand, net profit reduced 25% in the same period, an indication of the price pressures experienced by the manufacturers.

Many other Danish pine furniture contractors and manufacturers supplied C1 in England. And actually, they became acquainted with each other through C1. In 2000, one of them, C3, enquired SubCon to produce a line to be sold in Germany as they had recently acquired a wholesaler there. Back to a two-client base, SubCon had enough to deal with. However, the English market started to shrink for C1 as one of the other suppliers (S1) decided to toughen the competition and reduce one link in the chain by approaching the market directly. The Swedish conglomerate was not willing to take the fight and put C1 up for sale in 2003.

C3 bought it in hope to have a better foothold in the English market as it had attained in Germany. The name of the company and the facilities came along. However, the personnel and all the customer contacts from C1 fled to the Danish supplier operations (S1) in England. SubCon was suddenly worried about its survival for two reasons. The first one refers to the fact that C3 was also a manufacturer. It could easily supply the English market with its own product line. Fortunately, the managers at C3 had their hands full with the lack of personnel and kept SubCon as a subcontractor. The second reason is the experienced drastic drop on sales. When S1 took C1's personnel, C3 felt the English ground disintegrate and the market for C3 reduced to one third of SubCon's output capabilities. Between 2000 and 2001 sales plummeted 40%, but against expectations, net profit increased by 16%.

Still in 2003, another of C1's supplier, C4, contacted SubCon to complement their production line. And soon after, SubCon proved to be a more reliable supplier to one of C4's client and with C4's support, C5 ordered a first bedroom program in 2003, a dining room program in 2004 and in 2005 redesigned the bedroom line. C5 is a retailer with a designer in-house that also had one manufacturing facility in Denmark but recently closed it down and moved it to Lithuania.

In the same year, another employee from C1 started to work in a Danish pine furniture manufacturer in a financial function, but soon informed the purchasers of SubCon's work, that was immediately contacted to take some of the peak and small series productions of C6.

C7 is a client which neither the current owner nor the son remember how it precisely got started, but suppose they could have been tipped off by one of the many common suppliers of cardboards or fittings in the business. The first contact was also in 2003, but the first order came only in 2004. C7 became soon an important client, representing 20% of SubCon's sales.

At this point all new clients used SubCon's manufacturing abilities to take of the burden of small orders or complement their production lines, until an agent partially owned by fellow Danish manufacturer knocked at their door approaching the end of 2003. The agent offered the possibility to sell their products directly to French retailers. It was a proposition that required consideration. There was an underlying concern of their clients facing them as competitors and not as suppliers. Taking those issues into account, before accepting the offer, SubCon had an honest talk with C3, a company that also operated in the French market. As a result, C3 targeted larger clients than those proposed by the agent so there was room for both of them. By the time SubCon signed the agreement with the agent, the French market was seen just as a way to provide additional use of production capacity for SubCon's production line. However, this new contact demanded that SubCon also participated in a trade show exhibition in Paris in the beginning of 2005. Until then the manager had only visited those shows. They were asked to make a catalogue of their products, besides presenting their own product line.

SubCon did their best to cope with those new demands and as a result, 60 new small clients in the French market slowly started to order throughout 2005. Even though these clients were not very significant in terms

of sales volume, the earnings were higher in this segment if compared to pine furniture manufacturers. It looked like a promising client base for 2005.

Unfortunately, in the beginning of 2005, C7 went bankrupt, a client that represented 20% of SubCon sales. However, C6 snatched the largest of C7's client base and brought back to SubCon some of the orders, as they had the drawings and production apparatus ready to start production with no need of adjustments in design.

Moreover, a new client in Spain, C70, emerged after the participation in Paris in 2005 through the agent. The Spanish market had not been explored by Danish pine furniture manufacturers yet. C70 does not speak English and SubCon has already faced some communication problems for delivery when attempting to talk directly with the client.

As if those changes had not been enough in the last 3 years for SubCon to cope with, one of the French clients, C8, was not satisfied with the agent's performance and started to contact SubCon directly. C8 would like some new products designed exclusively and visited SubCon manufacturing facilities in order to discuss the new terms on the contract. In order to keep the agent motivated SubCon decided to offer a reduced commission related to C8's purchases, despite the direct sales.

SubCon's reputation spread out and unveiled new opportunities to remain in the game. However, from 2001 until 2004 sales plunged 40%, alongside profits which in 2003 was close to break even and in 2004 presented the first loss in SubCon's financial history. According to the manager, the situation could have been even worse if the new clients did not come along, and today the small clients in France are the ones who provide the best contribution margin, but unfortunately there is no critical mass yet to compensate for the reduction of orders from furniture manufacturers and wholesalers.

From having an expertise in manufacturing and adapting drawings for a better fit to the production line, SubCon has watched the increase of its client base (see figure 6) and with that the administrative, design and sales activities it did not have to cope before. Moreover, new relationships required attention. The next step for SubCon is how to cope with change that was not planned in the first place. It just happened.

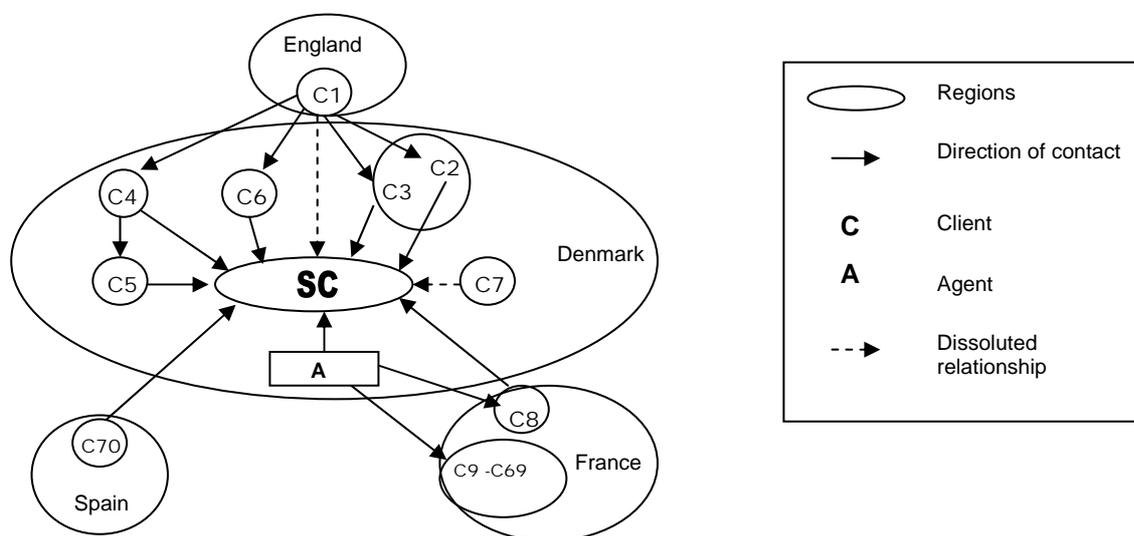


Figure 6: Expansion of SubCon's customer base

Discussion

SubCon case and network change through ARA model

Through the ARA model it is possible to observe a tendency towards specialization. New bonds emerged but with the same type of actors, furniture producers and or wholesalers, and the activities were kept the same. Only an increase in the work load with more invoices, more deliveries and more stock to handle is observed. However, no physical resources were added to cope with it.

As the client base grew, and a new type of actor, the agent, was introduced, SubCon became less dependent on C3's performance in the English market. One would expect that the ties would loosen up (Håkanson and Snehota, 1995). However, the fact that SubCon consulted C3 before entering the French market and still provides commissions to the agent related to sales to C8 shows that loosening up ties is also a process. With the new bond, some generalization occurs as SubCon moves downstream in the supply chain. Consequently, new activities are part of SubCon's operations like: participation at trade shows, production of catalogues, and product development. Still, the change in resources is mostly visible in business relations and incipient in products (new product development), while changes in facilities and/or capabilities cannot be traced yet. The manager has not found it necessary to hire a sales assistant competent in foreign languages, even though he has had some problems in communicating with the new clients. He is also taking the responsibility with the production manager to develop new products. And despite the increase in administrative processes, no attempt to change the current information technology set up has been made so far.

All in all, SubCon is becoming a furniture producer, changing its role in the network through the new activities performed, as show in figure 7. Moreover, a direct contact with carriers is also required, which before was made by the furniture producers or wholesalers.

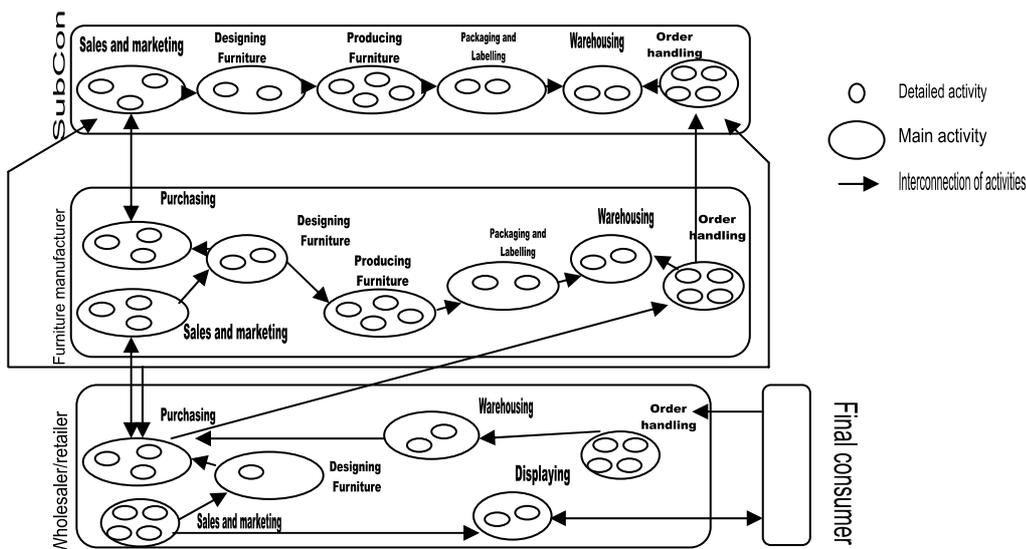


Figure 7: Organization of activities and main actors for RTA pine furniture from SubCon's perspective after 2003

Thus, the ARA model helps to show how the changes in bonds and links reflect the direction for generalization and standardization in this focal net. Still, the expected changes in resource ties are embryonic and much dependent on the manager's perception of their capabilities, or lack of them, to cope with the new activities.

Through vectors it has also been possible to predict the initial phases of the direction of change, although they are not linear nor irreversible (Håkansson and Henders 1995). From ARA model's perspective, SubCon's business relationships together with its production abilities and reputation enabled the enlargement of the client base, and not its sales activities per se. The missing link in the model is the identification of where and when change was triggered in the network.

In the following section, the change in Subcon's client base is analyzed deploying Events Networks (EvNs) approach.

SubCon's network change through EvNs model

The managers' reactive behaviour to actions outside his firm helped to shape the fate of the company. Neither of the changes can be claimed as endogenous to SubCon. They have been external in character and the order in which they took place also has implications for the current outcome. Thus, another possible interpretation is that events (external factors) somewhere else in the network lead SubCon to react (or not).

The trajectory of events set off by C1, combined with others along the way, as shown in the table below, makes it possible to identify the origins of change in SubCon's client base.

Event 1	Event 2	Event 3 (Outcome for SubCon)
Previous C1's employee change jobs.	Employee spreads SubCon's reputation. C2 and C6 contact SubCon.	C2 and C6 become client.
Previous C1's supplier talks about SubCon to customers.	C4 contacts SubCon.	C4 becomes a client.
S1 starts selling directly in England.	C1 is pressured in England.	No immediate reaction.
C1 is sold.	C3 buys C1 and faces managerial and market problems.	C3 continues as client, but sales reduce significantly for SubCon.
C4 turns out to be unreliable for C5.	C4 suggests SubCon. C5 contacts SubCon.	C5 becomes a client.
Probably a supplier tips of SubCon to C7.	C7 becomes a client.	C7 represents 20% of SubCon's sales.
Agent contacts SubCon to sell in France.	SubCon asks for permission to C3 to sell in France.	SubCon moves forward in the supply chain and starts selling in France with significant increase in client base.
C7 declares bankruptcy.	SubCon loses significant source of revenues.	No immediate reaction.
C6 contacts previous C7's clients.	C6 contacts SubCon to continue to deliver to previous C7's clients.	SubCon recovers part of C7's lost revenues.
French client not satisfied with agent.	French client contacts SubCon directly.	SubCon moves further in the supply chain, but keeps reduced commission to agent.
Participation in trade show.	C70 in Spain contacts agent.	C70 becomes a client.

Table 1: Event trajectory increasing SubCon's client base

As events are a consequence of actions, the activities (or lack of it) performed by the actors reflect how they interpreted (or not) those events. In the SubCon case, the events related to C1 indirectly increased the client base, by adding other furniture manufacturers and wholesalers in their client list. When the agent contacted SubCon's, this incident triggered a change in sales activities. Once C7 went bankrupt, there was no immediate reaction to look for new clients, despite the 20% reduction on annual income. On the other hand, it encouraged SubCon to maintain the relationship with the agent and later on, accept the direct contact with C8 and later on enter the Spanish market through C70.

Therefore, the order in which events take place and their connection with each other are relevant. For SubCon, the fact that it slowly started to do business with more clients made the path easier for the agent to bring 70 small clients to the list. It would be reasonable to assume that due to the manager's motto in keeping doing things as usual, if C1 was still their only client he would not see the need to expand the client base. Thus, by adopting an EvNs perspective to the case it becomes clear where and when change were initiated for SubCon.

The SubCon case illustrates a heteronomous actor (Hedaa and Törnroos 1997), when an actor is under control of other actors, and is only able to react to events. It was the capability of clients' purchaser or agent in finding an adequate supplier that promoted the development of SubCon's client base.

Håkansson and Snehota (1995, p. 274) state that: "The actual form of a network is a product of its past and determinant of its future form. It is a workable compromise for today that is bound to change tomorrow". But it

is the actors' selective interpretations of past events that shape all understanding of present activity and future possibilities (Medlin 2002), which can be reflected into events through actions.

SubCon's network change combining ARA and EvNs

Business relationships have been an important resource for SubCon to expand the client base, as C1's employees and suppliers provided SubCon's name to be among a potential subcontractor. It is important to stress the fact that if SubCon's capabilities did not live up to expectations, those business relationships would have not been much worth. In this sense, resources functioned as enablers of change, as there was production capacity available, and SubCon had a good reputation. That is, SubCon was able to deliver the desired product and was chosen as an attractive partner to work with.

The time and spatial dimension in which those bonds developed become accessible only when events that lead to an increase in the client base are identified. In the SubCon's case, their clients' purchaser search capabilities strongly based on their personal network, rather than SubCon's sales abilities, promoted the development of the client base. But the increase was only possible as the motivation resulting from external circumstances like reduction of the English market and bankruptcy, pushed SubCon in that direction.

Therefore, combining both frameworks enables to visualize the main variables into play, structure and process, which resulted in the increase of SubCon's client base. The connection between action and activity is only realized, in this case, when a pattern is observed. The direct links with suppliers, competitors and clients turned those actors, indirectly, into sales representatives of SubCon. However, until the trajectory of events is put together, the manager could not put into words his activities related to acquiring a new customer. At that point he was unaware of the role of his suppliers, and how the network logic worked within this focal net. As a result, he became more active in asking his suppliers if they know of a potential client. In this way, an activity pattern was broken down to an individual action with the purpose to create an event. In addition, C6 must be paid in advance and are monitored with care due to bankruptcy risk. The manager acknowledges the need to add new resources to its sales and marketing activities in order to improve its performance as a furniture manufacturer. Pressures on financial resources though have hindered any movements in that direction, as marketing activities are perceived as costs and not investments.

By combining EvNs and ARA perspectives, not only what happened can be understood in a different light but also what one may expect of the future. The actor remains reactive, and the scope of change he is able to handle is narrow, in this sense, more incremental than radical. Its survival is still determined by the opportunities that knock at their doors.

Concluding Remarks

The paper combines two approaches into the construct of network change. The change in the client base of a subcontractor for ready-to-assemble (RTA) furniture manufacturers illustrates the need to tackle both structure and process in analysing network dynamics. The reactive trait of SubCon's management made it easier to detect the influence of other actor's actions into their activities. A closer look at the complementarities of the two models, Actor-Resource-Activity (ARA) and Event Networks (EvNs), provides an alternative and enriched view on network dynamics, as neither alone is able to grasp the complexity of the matter.

The ARA model helps to identify patterns and direction of change, as network logics provide the rationale for network vectors. The EvNs model introduces the time dimension into the analysis and shows when change is initiated. As a result, actors are not in control all the time but can be lead to certain actions as a result of a collection of events, which may be triggered by nature and unexpected actors. Moreover, the sequence in which events take place determines the network outcome.

Two nodes in both models superpose each other: actors and actions. Overtly, actors are the same. More implicitly, actions appear as sub-element of activity, dependent of repetition in order to establish a pattern in the network, or reciprocity to create a link. Further research into the relation between the actions from EvNs and activities in the ARA model could enrich the framework for network change.

Another path for further research is from a classification of events and their connection to the structures of change. In historical sociology, events have been classified as self-reinforcing or as reactive sequences (Mahoney 2000, cited in Araujo 2003). The first reproduces, stability, while the other creates new paths. This classification can also be deployed in EvNs in order to understand the role of events in change and their connection to the actors, activities and resources.

Although, the combination of the models improves the analysis of network change, it falls short in explaining the how the interpretation of events affects network dynamics. Welch and Wilkinson (2002) introduced the idea of schema element, which represent the way managers make sense of their world. Through the distinct levels of analysis (organization, relationship and network) and the system of ideas (schemas, schema couplings and schema configurations), any change in schemas will impact the structure and operation of the network. Still, one may assume that those interpretations manifest through actions or lack of it. It raises a debate that should be a matter of further research to refine the proposed model.

However, it also poses a methodological challenge or limitation, depending on one's ontology. The events are experienced by an actor, according to his view, and then interpreted by a researcher. Different actors can have distinct perceptions of the same reality. So different that replication is not possible. If a researcher approached the same case company today, the story would be told in a different manner, and other relevant issues would arise. This is the result of applied research and another example of network dynamics, where third parties (researchers) also influence, directly or indirectly, the sample of analysis.

One clear limitation of the study is the fact that is based in one case, SubCon's client base, a very limited part of a network and the events trajectories linked to it. Other event trajectories combined with the ARA model could be identified to understand changes and/or stability in the supplier base as well. Complexity increases when elements are added in network analysis. Thus, applying to focal nets may enable to identify and develop important fundamentals in combining both models before expanding its use to a larger scope.

The managerial implications are clear as the manager realized that suppliers and clients acted as SubCon's sales representatives through word-of-mouth. This is the identified activity pattern from which its client base grew in such short period of time despite its minimalist sales organization. The implications that arise from this change are also relevant to be taken into account, in order to prepare the company to respond to the new challenges it will have to overcome in the short run to survive. The increased client base and change in activities will require the development of new competences. The fact that SubCon's management has been basically reactive emphasizes how and which events lead them to change. It also indicates the likelihood of the pattern to continue.

However, it does not rule out the fact that it may also happen to more entrepreneurial managers. Awareness of events and their role can be significant for managers to understand the dominating network logic. And therefore, aid to reduce the element of surprise in daily operations or even understand the elements required to break that logic. In this sense, if the manager is able to understand how previous events have shaped their current situations, it may provide indications to where future events may lead (Geersbro and Hedaa, 2003).

References

- Anderson, Erin & Weitz, Barton (1992), "The Use of Pledges to Build and Sustain Commitment in Distribution Channels", *Journal of Marketing Research*, 29(1):18-34.
- Araujo, Luis (2003), "Narratives, path dependence and case studies", *E & G Economia e Gestão*, 3(6):11-22.
- and Geoffrey Easton (1996), "Networks in socioeconomic systems: A critical review". In D. Iacobucci (Ed.), *Networks in marketing*: 63-107. Thousand Oaks, CA: Sage Publications.
- Axelsson, Björn and Easton, Geoffrey (eds.) (1992) *Industrial Networks – A New View of Reality*. London: Routledge.
- Baraldi, Enrico, & Roberta Bocconcelli (2001), "The quantitative journey in a qualitative landscape: developing a theoretical model and a quantitative methodology in business network studies", *Management Decision*, 39(7): 564-577.
- Batonda, Gerry and Perry, Chad (2003), "Approaches to relationship development processes in inter-firm networks", *European Journal of Marketing*, 37(10):1457-1484.
- BAT Kartelet (2003), En analyse af de strukturelle udfordringer for træ - og møbelindustrien i Danmark. Danmark: BAT Kartelet.
- Bedny, Gregory, & Waldemar Karwowski (2004), "Activity theory as a basis for the study of work", *Ergonomics*, 47(2): 134-153.
- Burtriss, Gary & Ian Wilkinson (2004), "From "snap-shots" to "moving pictures": Tracing processes using narrative sequence analysis in the evolution of an E-business", Paper published at the 20th IMP-conference in Copenhagen, Denmark (accessed January 10, 2006), [available at <http://www.impgroup.org/uploads/papers/4516.pdf>]
- Clark, Peter. (1985), "A review of the theories of time and structure of organizational sociology", *Research in the Sociology of Organizations*, 4: 35-79.
- Dohrup, Marisa and Salla Lutz: (2005) How to Approach Purchasing and Marketing Practices in the Danish Pine Furniture Industry?, Paper presented at the 21st IMP-Conference in Rotterdam; Netherlands. (accessed January 10, 2006), [available at <http://www.impgroup.org/uploads/papers/4681.pdf>]
- Dubois, Anna and Araujo, Luis (2004), "Research methods in industrial marketing studies". In H. Håkansson, D. Harrison, & A. Waluszewski (Ed.), *Rethinking marketing*: 207-227. England: John Wiley & Sons Ltd.
- Dwyer, F. Robert, Schurr, Paul and Oh, Sejo (1987), "Developing Buyer-Seller Relationships", *Journal of Marketing*, 51(2):11-27.
- Easton, Geoffrey (1992), "Industrial networks: A review". In B. Axelsson & G. Easton (Ed.), *Industrial networks: A new view of reality*: 3-27. London: Routledge.
- and Lundgren, Anders (1992), "Changes in Industrial Networks as Flows through Nodes". In Axelsson, B. and Easton, G. (Eds.), *Industrial Networks – A new view of reality*: 88-104. London: Routledge.
- Eden, Colin (1989), "Using cognitive mapping for strategic options development and analysis". In J. Rosenhead (Ed.), *Rational analysis for a problematic world*: 21-42. Chichester: John Wiley & Sons.

- Ford, David (1980), "The development of buyer-seller relationships in industrial markets", *European Journal of Marketing*, 14(5/6): 339-354.
- Gadde, Lars-Erik and Håkansson, Håkan (1992), "Analysing change and stability in distribution channels – a network approach". In B. Axelsson and G. Easton (Eds.), *Industrial Networks – a new view of reality*, pp. 166-179. London: Routledge.
- and Mattsson, Lars-Gunnar (1987), "Stability and Change in Network Relationships", *International Journal of Research in Marketing*, 4(1):29-42.
- Geersbro, Jens and Hedaa; Laurids (2003), "Theme networks – network themes: A case of unexpected relationship dissolution". Paper presented at the 19th IMP-conference in Lugano, Switzerland. (accessed January 10, 2006), [available at <http://www.impgroup.org/uploads/papers/4344.pdf>]
- Halinen, Aino and Tähtinen, Jaana (2002) "A process theory of relationship ending", *International Journal of Service Industry Management*, 13(2):163-180.
- and Törnroos, Jan-Åke (1998), "The role of embeddedness in the evolution of business networks", *Scandinavian Journal of Management*, 14(3):187-205.
- Hallén, Lars and Johanson, Martin (2004), "Integration of relationships and business network development in the Russian transition economy", *International Marketing Review*, 21(2):158-171.
- , Johanson, Jan and Seyed-Mohamed, Nazeem (1991), "Interfirm Adaptation in Business Relationships", *Journal of Marketing*, 55(2):187-205.
- Harrisson, Debbie (2004), "Is a long-term business relationship an implied contract? Two views of relationship disengagement", *Journal of Management Studies*, 41(1):107-125.
- Harrison, Debbie (2001) "Network effects following Multiple Relationship Dissolution", Paper presented at the 17th IMP-conference in Oslo, Norway (accessed June 15, 2006), [available at http://www.impgroup.org/paper_view.php?viewPaper=190]
- Havila, Virpi. and Salmi, Asta (2000), "Spread of change in business networks: an empirical study of mergers and acquisitions in the graphic industry", *Journal of Strategic Marketing*, 8:105-119.
- Hertz, Susanne (1992), "Towards more integrated industrial systems". In Axelsson, B. and Easton, G. (Eds.), *Industrial Networks – A new view of reality*: 105-128. London: Routledge.
- (1996). "Drifting closer and drifting away in networks". In Iacobucci, D. (Ed.): *Networks in Marketing*: 179-204. Sage Publications, London.
- (1998), "Domino effects in international networks", *Journal of Business to Business Marketing*. 5(3):3-31.
- Håkansson, Håkan (1982), *International marketing and purchasing of industrial good: An interaction approach*. Chichester: Wiley.
- (1992), "Evolution process in Industrial Networks". In Axelsson, B. and Easton, G. (Eds.), *Industrial Networks – A new view of reality*: 129-143. London: Routledge.
- and Lundgren, Anders (1995), "Industrial Networks and Technological Innovation". In Möller, K. and Wilson, D. (Eds.): *Business Marketing: An interaction and Network perspective*: 300-320. Boston: Kluwer Academic Publishers.

- and Alexandra Waluszewski (2002), *Managing technological development*. London: Routledge.
- and Henders, Barbara (1995), "Network dynamics: Forces and processes underlying evolution and revolution in business networks". In K. Möller & D. Wilson (Ed.), *Business marketing: An interaction and network perspective*: 139-154. Massachusetts: Kluwer Academic Publishers.
- and Johansson, Jan (1992), "A Model of Industrial Networks". In B. Axelsson & G. Easton (Ed.), *Industrial networks – A new view of reality*: 28-36. London: Routledge.
- and Snehota, Ivan (1995). *Developing relationships in business networks*. London: Routledge.
- and ---- (2000), "The IMP perspective: Assets and liabilities of business relationships". In J.N. Sheth & A. Parvatiyar (Ed.), *Handbook of relationship marketing*: 69-93. Thousand Oaks, CA: Sage Publications.
- and, Waluzewski, Alexandra (2002), "A Path-dependence: restricting or facilitating technical development?", *Journal of Business Research*, 55(7):561-570
- Halinen, Aino, and Törnroos, Jan-Åke (2005), "Using case methods in the study of contemporary business networks", *Journal of Business Research*, 58: 1285-1297.
- Hedaa, Laurids and Törnroos, Jan-Åke (1997), "Understanding event-based business networks", Working Paper, Copenhagen Business School, Dept. of Management, Politics and Philosophy, Copenhagen, Denmark.
- Jonassen, David and Rohrer-Murphy, Lucia. (1999), "Activity theory as a framework for designing constructivist learning environments", *Education Technology: Research and Development*, 47(1): 61-79.
- Leont'ev, Alexei N. (1947), *Outline of the developments of mind*. Moscow: Moscow University Press.
- Luhmann, Niklas (1979), *Trust and power*. New York: Meridian Books.
- Lundgren, Anders (1992), "Coordination and Mobilisation Processes in Industrial Networks". In B. Axelsson & G. Easton (Ed.), *Industrial networks – A new view of reality*: 144-165. London: Routledge.
- Mahoney, James (2000), "Path Dependence in historical sociology", *Theory and Society*, 29(4):507-548.
- Medlin, Chris (2002), "Interaction: A time perspective". Paper presented at the 18th IMP-conference in Perth, Australia. (accessed January 10, 2006), [available at <http://www.impgroup.org/uploads/papers/4223.pdf>]
- Meyer-Stamer, Jörg (1999), "Stimulating growth, improving competitiveness in Brazil: Beyond industrial policy and outsourcing responsibility". Paper prepared for ILDES- Friedrich Ebert Foundation ed., São Paulo, Brazil. (accessed January 10, 2006), [available at <http://www.meyer-stamer.de/1999/ildes-e.pdf>]
- Pentland, Brian T. (1999), "Building process theory with narrative: From description to explanation". *Academy of Management Review*, 24(4): 711-724.
- Rubinshtein, Sergei L. (1935), *Foundation of psychology*. Moscow: Education Press.
- Smith, P.C. and Laage-Hellman, Jens (1992). "Small Group Analysis in Industrial Networks". In B. Axelsson & G. Easton (Ed.), *Industrial networks – A new view of reality*: 37-87. London: Routledge.
- Schuler, Albert and Buehlmann, Urs (2003), "Identifying future competitive business strategies for the U.S. residential wood furniture industry: Benchmarking and paradigm shifts" (NE-304 ed.). Pennsylvania: USDA-Forest Service.

Weick, Karl E. (1995), *Sensemaking in organizations*. Thousand Oaks: CA: Sage.

Welch, Catherine and Wilkinson, Ian (2002), "Idea Logics and Network Theory in Business Marketing", *Journal of Business to Business Marketing*, 9, (3).