The Role of Intermediaries in Evolving Distribution Contexts

A Study of Car Distribution

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Abstract

This study contributes to the understanding of the role of intermediaries in contemporary distribution systems. These systems are characterised by an increased variety stemming both from changes in customer demand patterns, new technological possibilities and new organisational arrangements. The distribution systems have adapted to this variety in a number of ways: through the use of multiple channels to the consumer, through modularising approaches and through an increased emphasis on postponing activities until real demand is known. This complexity creates a range of opportunities for intermediaries, and this should be reflected in the roles they take on.

Here, it is suggested that the present theory on intermediaries in a distribution context, some of which dates back as far as the 1950s can usefully be developed by confronting it with a contemporary setting. The three elements employed for studying the setting are the structure of the distribution system, the coordination mechanisms used and the roles of intermediaries. By investigating each of these elements as well as their interactions it is possible to say a great deal about how intermediaries fit into contemporary distribution systems.

The dissertation is based on a case study of one intermediary in the car distribution sector. Variation is introduced by studying how this one intermediary relates to three importer systems for different manufacturers in particular and the car distribution system in Norway in general. This makes it possible to generate a number of role definitions for the intermediary in the setting, using the empirical setting and existing theory. The concept of a role is broadly defined to mean activities to serve a specific need for one customer, allowing each firm to take a number of roles.

The study shows new roles for intermediaries especially where they do not take title to goods and function as specialists essential for the efficient functioning of the distribution system. This contributes to understanding distribution systems through actors that have not traditionally been focussed. Findings demonstrate that intermediaries are not only affected by the types of coordination used in the system, but that they can also be a prerequisite for certain types of coordination.

Finally, an alternative concept of position is developed which pulls together the understanding from the study and the literature. It is suggested that whereas roles describe what an intermediary does for a particular counterpart, position can usefully be employed to explain how an intermediary fits with the distribution system as a whole.

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Inevitably I should finish this section by thanking my parents for unwavering support and a convenient refuge for writing important parts of this thesis.

Leif-Magnus Jensen
Oslo, March 2009

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Chapter 1: Introduction

1.1 Background

This dissertation deals with the role of intermediaries in the distribution of cars[1]. This may be related to the more general topic of variety in distribution systems. The type of distribution systems we consider are contemporary systems with significant complexity. The degree of variety and complexity in these systems has increased considerably, leading to new opportunities for intermediaries in connecting the manufacturer and consumer. The changes are related both to increasingly varied customer demand, and new technological options in production and distribution. The intermediaries themselves have also adapted to the new setting. To give a background for this choice of topic and an understanding of the setting, we first consider modern business systems in general, before returning to the main question in the dissertation. To this end, we start by describing some of the main features of modern business systems and how these relate to the concept of variety.

1.2 Variety in modern business systems

Today's distribution systems incorporate a number of new features, combined with features which have long been part of distribution systems. Taken together these features represent variety since there are many alternative ways of structuring the system. In this section the focus is on describing the most relevant features of these systems. The label "modern business systems" is intentionally wide, since some of the features pertain to customers, some to the organisation of production and distribution and others to the nature of the firms involved. The purpose is, therefore, to start with a wide description and then narrow it down to the most important elements for the dissertation. We divide this into the degree of customisation to the end user, features relevant to the system as a whole and, finally, the issue of actors and specialists.

The degree of individualisation to end user requirements, is frequently high in modern business systems, reflecting a trend to increasing customisation (Hulthén and Gadde, 2007). This customisation can be both in terms of the product choice or the provision of a high degree of product variety, through

[1] The empirical domain is automobiles with a focus on regular passenger motorcars and related vehicles such as small vans. Other types of vehicles are specifically mentioned where relevant.

distribution channels providing goods through alternate routes. The background for the high degree of customisation consists of a number of factors. First, the customers are more demanding and expect to have a wide choice for many products such as cars, personal computers or mobile phones. Second, firms may see the ability to offer such variety as a source of competitiveness and, therefore, increase the variety of their offerings to tap new consumer segments. Finally, many industries now have the technological ability to offer such variety. Approaches such as mass customisation work by creating basic product modules which are combined when customer orders are known. This gives the customer increased choice, since each module may have a range of options, and it reduces inventories since there is no need to store all versions of finished products. A typical example in this regard is Hewlett-Packard which created power supply modules for its printers, and could quickly combine these with generic printers when the demand in different regions was known (Feitzinger and Lee, 1997). Typical of these approaches is the tendency to focus on postponing activities until actual customer demand is known (Hulthén and Gadde, 2007). These issues are further explored in Chapter 2.

A second major feature of modern business systems is the proliferation of channels used to reach customers. An instructive example is the IT industry, which although relatively young, has seen several types of distribution systems. The IT competence in the customer population varies widely, meaning that a manufacturer should serve a range, from people who assemble components from a variety of manufacturers themselves, to those requiring complete installation of the system at home, as well as extensive follow-up (Morris and Morris, 2002). This makes the IT sector a prime example of serving different customer segments in different ways, often described as hybrid distribution (Hulthén, 2002).

When buying a PC, the customer has a number of options available. One possibility is to go to a local retail store and buy a stocked PC for immediate pickup. In this case the PC will normally already be configured, and the purchase will also normally include a service agreement. Another option is the Dell version where the customer chooses from a limited range of options online for quick delivery. Local PC shops may also offer their own PC versions. Finally, users can purchase the parts and assemble the PC themselves. This last option will typically not include support and may not give the user the cheapest price for all the components, but it does allow for a very specific and tailor-made PC.

The final feature of modern business systems raised here is the considerable use of and reliance on specialists to carry out a range of tasks. For example, the market for third-party logistics services (3PL) has expanded considerably

in the last few years (Carbone and Stone, 2005, Hertz and Alfredsson, 2003), including services such as transport, handling, warehousing and increasingly packaging and light manufacturing operations (van Hoek, 2001). The tendency in third party logistics is that firms are taking on more and more specialised services in order to move away from the heavily commoditised market for basic transport (Persson and Virum, 2001, Carbone and Stone, 2005).

The reasons for this extensive use of specialists are complex. The central reason is that specialised actors can achieve greater efficiency in operations, which fits with core competence arguments (Ashenbaum et al., 2005, Prahalad and Hamel, 1990). Moreover, the increase in the number of channels and complexity of business systems means that it is increasingly difficult for manufacturers to carry out all relevant activities themselves. It seems that there are self-reinforcing elements in these systems. Increased complexity and outsourcing lead to opportunities for specialists to carry out some tasks more efficiently, but this again creates increased complexity.

In general, we can say that contemporary business systems are characterised by providing a wide choice of products through many channels to the consumer, but at the expense of complexity in terms of the channel structure and the number of actors involved. The wide choice requires options for customising products for the end user, through modularisation and postponement of activities. This general background allows us to focus more precisely on the object of study in this dissertation.

1.3 Focus of the study – intermediaries and distribution

The previous section has shown that there are now many different options for providing products to consumers, and a complex array of actors involved in providing them. The particular solutions chosen are dependent on a complicated interplay between consumer demand, the existing solutions in an industry and the availability of specialist skills, as well as strategic choices made by the firms. Thus, none of the traditional ways of distributing products to a consumer are obsolete, but new options have been added. The result is that there is a plethora of products, and ways of producing and delivering these to the customer, as well as different options for organising the system.

As we showed in section 1.2, contemporary distribution systems are increasingly dependent on specialists in order to carry out tasks more efficiently. In complex distribution systems representing a high degree of variety, it is reasonable to assume that these benefits are considerable. This

is both because it is difficult for the manufacturer to possess all the required skills, and because specialists can combine business from many customers to achieve advantages of scale. Distribution specialists, such as logistics firms and various 3rd party providers, for example information brokers, complicate the picture of who does what in the distribution system. In essence, this is a question of division of labour in the distribution part of business systems.

We use the label intermediaries for these firms, since it is used to describe the original firms carrying out many distribution activities, and because the label itself is used extensively in the literature for those firms placed between a manufacturer and the consumer (Alderson, 1954, Giaglis et al., 2002, Howells, 2006, Marasco, 2008, Morris and Morris, 2002). However, we should be aware that empirically we are discussing tasks carried out by a group of specialists in distribution systems. The exact content of the label intermediary will be further explored in the theoretical framework but we can make some further comments on these firms here.

The changes in distribution systems have resulted in a greater variety or range of possible distribution arrangements. This leads to new conditions for intermediaries, and opportunities for new types of intermediaries to develop. The traditional intermediary is exemplified by a wholesaler that buys goods from a range of manufacturers and sells this on to retailers (Alderson, 1965). The wholesaler is then responsible for stocking the right goods, for transport and storage, and normally makes a profit due to a mark-up on the goods sold. New types of intermediaries may not own goods but rather provide services to manufacturers, retailers and others (Gadde, 2000, Marasco, 2008). Furthermore they may only carry out some of the tasks mentioned, such as determining the needs of retailers. To capture this type of intermediary requires widening the concept of an intermediary. It may also lead to including types of firms that have not traditionally been considered as part of a distribution system, such as transport providers.

The development of new types of intermediaries and more complex distribution arrangements leads to another issue which is important for the motivation of the study. Existing literature on the role of intermediaries in distribution goes back to the early 1950s (Alderson, 1954, Bucklin, 1965), and although studies have been done since then the new frameworks are not necessarily applicable to the older ones. Typically these frameworks focus either on the development of a particular type of actor such as 3PLs (Berglund et al., 1999, Lieb, 1992, Lieb and Randall, 1996), or a specific function such as IT or innovation (Bakos, 1998, Giaglis et al., 2002, Howells, 2006). These studies are useful but they are difficult to connect to the existing literature on intermediaries in distribution. If contemporary distribution systems are organised differently to those studied in the previous

literature, this raises the question of whether the existing theory is applicable to the new situation. Regardless of whether existing literature is relevant, it may be that it can be developed further by confronting it with the new reality. This question is relevant to the purpose of the dissertation as well as the overall contribution here.

Intermediaries may appear in many settings, but here we have chosen to focus on intermediaries in distribution. Some further comments are appropriate in terms of the focus on distribution as a setting. There is considerable interest in the topic of distribution, in academic literature as well as in business and politics. Legislators have made changes in order to increase competition in certain industries, with particular focus on the distribution system (e.g., the block exemption regulation in Europe[2].) Academics have also written on increasing customisation and the transition from channel-like to network structures in distribution systems (Gadde and Hulthèn, 2007, Hallström, 2005, Hertz and Alfredsson, 2003, Hulthén, 2002, Anderson et al., 1997, Gunasekaran and Ngai, 2005, Silveira et al., 2001). There is also evidence that businesses are paying more attention to their distribution systems as a source of competitive advantage rather than just cost absorption (Gadde, 2000).

There may be several reasons for this strong interest in distribution. One possibility is that many of the important improvements in manufacturing processes have already been made so that it is logical to proceed to distribution where there is more room for improvements. A second, albeit related possibility, is that some of the changes made to manufacturing to increase efficiency, such as centralisation of factories and supply, have effectively pushed costs on to distribution systems charged with the task of moving the goods to diverse and distant markets. This trend is strengthened by the increased internationalisation of business reflected by the steadily increasing volume of international trade[3]. A final possibility is that businesses find that they have to better match their production and distribution systems in order to operate successfully. Clearly, these possibilities are not mutually exclusive.

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[2] The competition rules of the EU should in principle apply in all member states (and the EFTA countries) and at all times. However, the European Commission can rule that certain arrangements are acceptable even if they contravene the competition principles. In order to avoid having to deal with thousands of firms individually, the EU has defined "block exemption rules" meaning that firms falling within a certain category (typically an industry) are exempt from certain parts of the competition rules. Such an exemption exists for the car distribution sector for example.

[3] See for example www.oecd.org

There is a final issue which arises from the setting itself and the focus on intermediaries, namely coordination. Given a large number of intermediaries carrying out only some tasks in distribution, how is it possible to coordinate these tasks? Coordination is an essential task in distribution, and especially so with many actors. The extra challenge appears because spreading tasks across many actors creates an inter-organisational coordination problem. The connection between specialisation and coordination is well established in the literature (Gadde, 2000, Richardson, 1972). This should also be the case in distribution. Increased specialisation where intermediaries play an important part leads to the need to coordinate the activities of these intermediaries. This means that in order to properly investigate the role of intermediaries in distribution we must also consider how they are coordinated.

1.4 Problem statement

The first premise for this study is the complexity and variety of many contemporary distribution systems, or stated another way the inherent variety of current distribution systems.

The variety in distribution systems is not rigorously defined at this stage, but it should capture central elements such as the degree and types of hybrid distribution, customisation and modularisation and the use of specialists (or intermediaries in this case.) The focus is on describing the distribution system in such a way that we can adequately capture different types of variety. To this end we will use the term “distribution system structure” to separate it from other elements of the distribution system. This is a selection made because it reflects some of the main features of these systems and matches the focus of the study.

As seen in the discussion of the focus of the study, coordination of the distribution system becomes important because these systems are increasingly characterised by many specialised actors. For the problem statement to adequately describe what we are studying, coordination of the activities of the intermediaries and the distribution system overall is necessary. We should be able to answer questions on how the distribution system is coordinated as a whole and how this fits with the structure of the distribution system and relates to the roles of intermediaries.

The final aspect is to include the roles of the intermediaries. It is essential to relate this both to the structure of the distribution system and the coordination mechanisms used. We want to both describe different roles for intermediaries and connect these to preconditions in the system. However,

we are not making a direct causal connection here, since there are many possible interactions between the three elements. An important aspect is to describe possible roles for intermediaries in a contemporary setting with a considerable amount of variety. On the basis of this, we can then later go back to existing literature and contribute in terms of new or changed roles.

Taking these points into consideration, we can then formulate our main problem statement.

Problem statement: What is the impact of distribution system variety on intermediaries and the roles they may play in such a system? How are the activities of the system coordinated, and how does this coordination affect intermediaries and their roles in particular?

This problem statement shows the three main conceptual areas to be explored in the theoretical framework. The first two are connected as they are both aspects of the distribution system itself, while the third can be viewed as the core of the dissertation.

First, we need a good description of the theoretical dimensions of distribution system structure, which is able to capture variety along several dimensions. The nature of these dimensions will be derived in the theoretical framework itself, but we have already seen the main conceptual areas above. It should be clear that when talking about variety in this connection, we are primarily talking about variety in how the activities of the distribution system are organised to serve the consumer. It should be pointed out that variety is a more general concept for the different dimensions of the distribution system structure, whilst the bulk of the dissertation will be concerned with these dimensions directly and not with variety as a concept.

Second, we need a framework for describing coordination within the distribution system. There are three reasons for this choice. Since coordination becomes particularly relevant as a consequence of the large number of specialists (intermediaries) and associated need for inter-organisational coordination in modern distribution systems, it is an important part of describing the distribution system. Second, there are interactions between the way a system is coordinated and its structure and vice-versa, as well as different interactions between how a system is coordinated and structured and the subsequent roles for intermediaries. Isolating the concept of coordination makes it easier to capture these effects. Finally, as we will see in Chapter 2, coordination also represents a different literature stream. In summary, we can say that hybrid distribution and customisation/modularisation lead to a focus on the structure of the

distribution system, whereas the use of specialists leads to a focus on inter-organisational coordination in the distribution system.

Finally, in terms of the framework, we need a conceptualisation of intermediaries and their roles. This should be made in conjunction with older literature on intermediaries and roles, since this is used as a starting point. This provides both a framework to discuss intermediaries, and also makes it possible to say to what extent existing literature is relevant to the current setting. The conceptualisation for the study, however, is variety in the distribution system allowing for different roles. This will be important to the design of the present study, as seen in Chapter 3.

Specific research questions can then be formulated for each of these parts in order to contribute to answering the overall problem statement. This leads to an initial model to be explored in the theoretical framework (see Figure 1.1 below).

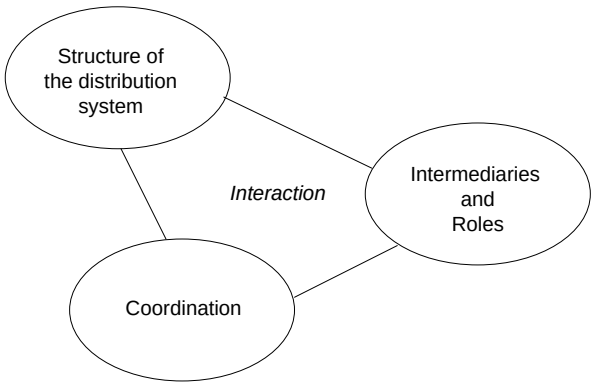

Figure 1.1: Theoretical framework

At this stage it should be clear that there are interactions between the three main blocks in figure 1.1, but this will not be addressed until the content of each has been explored further in Chapter 2.

1.5 Outline of the dissertation

The overall aim of this dissertation is to explore the role of intermediaries in modern distribution contexts characterised by considerable variety. The complexity of these systems and the challenging issue of coordinating a large number of specialists make this an interesting topic in itself. At the same time there is a lack of frameworks specifically for intermediaries in today's distribution contexts, and it is a relevant question whether older frameworks are appropriate in the new contexts.

The structure of the dissertation is as follows. Chapter 2 presents the theoretical framework used to structure the discussion and analysis in this dissertation. It presents a review of relevant literature going into more detail on areas used directly in the framework. This Chapter also includes the specific research questions to be explored and a framework structure for later discussion. This is followed by the method and research approach used in Chapter 3, which also includes a brief introduction of the empirical setting. Chapter 4 presents the setting and the focal firm in the study in more detail. The three main importer systems included in the case, are then presented in Chapters 5, 6 and 7. In Chapter 8 the data relevant to the focal firm across the different importer systems is drawn together in order to increase the understanding of how the firm operates in different systems. Chapters 4-8 then show the empirical case. Chapter 9 contains the main discussion and analysis, answering the research questions. Chapter 10 discusses the theoretical implications of the dissertation and relates the framework to theory, and finishes with avenues for further research.

Chapter 2: Theoretical Framework

2.1 Main elements of the theoretical framework

The purpose of this chapter is to develop a theoretical framework for the dissertation. This consists of taking the problem statement introduced in Chapter 1 and formulating specific research questions related to the research topic chosen. For this purpose, the focus is on identifying and exploring the literatures that help with developing the theoretical framework rather than a more general review of literature that has dealt with the problems raised here. This is both in the interest of brevity, and in keeping the focus on the literature and main variables pursued. Some compromises have been made to give the background for the choices made. Before looking at any of the appropriate literature in any detail, the main building blocks of the theoretical framework are shown, as a consequence of the problem formulation in Chapter 1.

Three main elements are defined and are tied to existing theory and each other to establish the theoretical framework. (See figure 1.1)

The first element is a framework for describing how the distribution system is organised or structured overall. This is tied to the need to describe variety in a way that allows for extensive analysis, i.e., capturing such diverse issues as customisation, customer demand and alternative ways of structuring distribution systems. The purpose is both to describe some of the main alternative ways of arranging a distribution system, and also to find the main variables for describing such a system. In the literature, this has been referred to as matching the technology of production representing the manufacturer to the technology of use representing the end customer (Alderson, 1957, Alderson, 1965). Using this as a point of departure, it is possible to look at the main alternatives and relevant variables for describing the distribution system so as to fill the first of the three main elements with content. *In lieu* of such a description, it becomes difficult to say anything meaningful about the characteristics of the systems studied in a theoretical sense.

The second part of the theoretical framework deals with coordination. Any distribution system requires coordination to operate successfully. This is, of course, a general point in that the way the distribution system is structured has consequences for how it is coordinated. It becomes even more relevant when we consider that one part of the theoretical framework deals with intermediaries taking on a number of tasks in the distribution system. This

means that many of the activities to be coordinated are spread across a number of actors, and, as such, the way these activities are carried out may differ because they are carried out by specialists and not a small number of vertically integrated firms. Here it is primarily the issues tied to dealing with intermediaries and coordination that are of interest, i.e., it is not an analysis of the differences between coordination in vertically integrated firms and inter-organisational coordination. Rather, the interest is in finding a toolset to describe both the inter- and intra-organisational coordination necessary when intermediaries are an important part of the distribution system. Additionally, we are dealing with an interaction that works dynamically between the different main components. The way the distribution system is structured has certain implications for what coordination mechanisms are used, and these coordination mechanisms, together with the structure of the distribution system, can create or destroy opportunities for intermediaries. At the same time, as was seen from the introduction, the existence of intermediaries can make new arrangements and types of coordination possible.

The final element to be looked at is a consequence of the first two, but it also reflects choices made in the study in terms of focus. In Chapter 1, we saw that one of the more notable features of many contemporary distribution systems is that outsourcing and technological changes lead to a large number of specialists employed in a typical distribution system. These specialists cover many areas, but the particular focus was on what we call intermediaries, that is, firms clearly placed between the manufacturer and the customer. This amounts to looking at a particular type of firm in the distribution system as a way of getting at some of the variation in the system. Although the theme of the dissertation is closely linked to variety in distribution, it is the role of intermediaries that is the core point of interest in the dissertation.

The opportunities for any firm in a distribution system are partially a consequence of the way the system is structured overall, so it is necessary to describe the system according to the first element stated above as a background to talking about particular actors. There are, however, a number of more specific issues regarding intermediaries to consider, not least of which is the basic definition of an intermediary and how this has been described in the literature. The dimensions of an intermediary are similarly important, especially since building on these, in new contexts, are an obvious way of contributing to existing literature. There is a strong interest then, in looking at what roles intermediaries have taken previously and how these roles have been described and conceptualised. At a basic level, we are considering the division of labour in the distribution system, with the

particular focus on intermediary firms and how they contribute to the system.

The above discussion suggests Figure 2.1, slightly simplified from Chapter 1, as a basis for the theoretical framework.

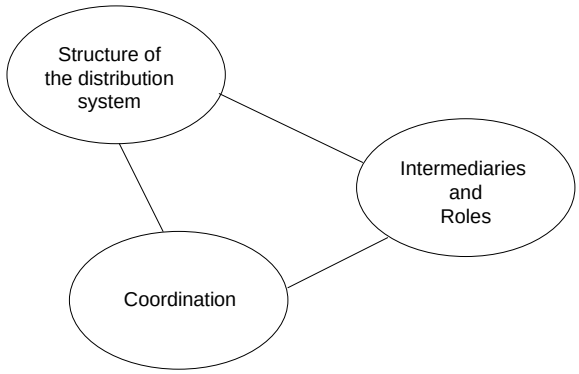

Figure 2.1: Main components of the theoretical framework

In the model, the structure of the distribution system has consequences for the role of intermediaries as well as possible coordination mechanisms. Similarly, the coordination mechanisms used also have significant impact on the intermediaries. For all the connections in figure 2.1, it is very much the case that effects are seen in both directions; thus, we can talk about interactions between any two of the main concepts. For example, intermediaries taking on specific roles may require the implementation of certain types of coordination mechanisms, and the existence of intermediaries can enable certain distribution system structures. The most important focus here, however, is on intermediaries and their roles.

The challenge here is to fill these elements with more precise descriptions from the literature and to identify the most important variables. This will, then, be the basis for formulating more specific research questions that can be handled with reference to the literature and the overall purpose of the study which it is useful to recap here.

Problem statement: What is the impact of distribution system variety on intermediaries and the roles they may play in such a system? How are the activities of the system coordinated, and how does this coordination affect intermediaries and their roles in particular?

This means that the theoretical framework consists of four main sections – the structure of the distribution system, coordination, the role of intermediaries and finally, the integration of these parts into a research model.

2.2 The structure of the distribution system

In Chapter 1, we saw that modern distribution systems are often characterised by a great deal of variety, both in customer demands and options for organising the system. In this section, the challenge is to take the central aspects of this variety and relate them to theory to arrive at a framework for describing the structure of the distribution system.

One way of looking at a marketing system, supply chain or distribution system is that it must connect the manufacturer to the consumer. This connection can become quite complex when it is not clear what firm is the original manufacturer. The focus here is on distribution, e.g. finished products from manufacturer to consumer. Conceptually, at least, this is a relatively identifiable part of an industry. It also represents a much-studied quantity, i.e., large manufacturing firms producing consumer goods. Looking at distribution only means that we reduce the scope of the subject matter studied, and this naturally turns the literature review in the direction of distribution literature. The main consequence is that since the type of intermediaries in which we are interested have often been seen in the distribution part of various industries, we naturally get a better focus on these intermediaries by using distribution literature. However, other literatures are relevant to the matching of manufacturer and consumer needs. Here we use the overall label of technology of use and technology of production to describe these two issues.

The technology of production can be seen as originating with the manufacturer's problem, where issues such as production efficiency, closeness to supply, production smoothing and transport to the customer are important. The technology of use refers to the customer's requirements. We can exemplify this with a customer going to a supermarket for normal fast moving consumer goods (FMCGs). Important elements for the customer are

the closeness of the supermarket, the range of goods available and the price (rather than cost). Crucially, the value or utility the customer can derive from the supermarket's offer depends on the current assortment of goods the customer holds. In this regard "There is only one kind of utility – namely, the value which a product contributes to the potency of an assortment." (Alderson, 1957, p.198)

In other words, the utility the customer derives depends not only on goods being provided in the right place, but also the timing and match with existing goods. The implication for distribution is that transporting a product from A to B changes its features and can be considered to be a time and place transformation. Additionally, storage or long lead times can change the utility for the customer in both positive and negative directions. The further implication is that value is not added in discrete and measurable steps along the way, but is realised when the finished product is placed in the hands of a consumer. From a theoretical point of view, transporting an item from A to B is a change in the product that is as potentially important as a manufacturing operation.

For example, a customer will assign a greater value to canned tomatoes if these are the only ingredient missing for a meal, and especially so if they are needed for a planned dinner party. Conversely, a customer who has mistakenly bought too much sugar will not be interested in a three for the price of two type offer for more sugar. A consequence is that the expected availability affects the utility the customer derives from a product. A customer, with a long way to travel to the nearest supermarket, will have a completely different shopping pattern compared to one who walks past a corner-store every day. Although the focus here is not on customer preferences, it is essential to keep at least some aspects of them in mind when discussing the structure of the distribution system because the customer represents the final technology of use.

The examples used here show clear opposites in the distribution system by exemplifying through the manufacturer at one end and the final customer at the other, but there are many additional possibilities. While some descriptions of distribution channels only show one intermediary, it is possible that there are many levels between the manufacturer and customer. In this case, every level is, in some sense, the customer of the level before, and the same limitations apply in terms of the technology of production and use. A wholesaler will hold large stocks of a number of goods in specific categories, and may repackage these so a supermarket can use them more easily. Here, the wholesaler's problem represents the technology of production to a greater degree, and the supermarket the technology of use. These different levels in the distribution channel then, move the goods ever

closer to the customer and must finally match the requirements of the customer to operate successfully. They must also match the requirements of the different levels in the distribution channel, and although these are finally affected by the requirements of the customer, they may also be affected by specific needs of other actors. Furthermore, it is not given that the needs of the customer are effortlessly reflected throughout the distribution channel. It is also likely that the requirements of the final customer and the manufacturer are in opposition at some level, and that some form of compromise must be found for both to achieve their goals, at least partially.

The discussion of distribution system structure, then, deals with the fundamental problem of how to match the technology of use and production, and is more specifically about variety in the ways this takes place. From Chapter 1, we already have the main topics to be dealt with here. The first is hybrid distribution or the proliferation of channels and ways of providing a product. The second is customisation and modularisation, which deals with how the product itself is made to match customer demand. The final topic is postponement and speculation, which is heavily tied to customisation and modularisation, but conceptually separate and an important topic in the literature. The section ends with our first set of research questions.

2.2.1 Hybrid distribution

In the introduction, the PC industry was used as an example of hybrid distribution, specifically from the point of view of the customer. Although hybrid distribution is based on serving a customer in different ways, that is, the technology of use, we are studying here primarily the system that makes this distribution possible. Serving the customer in different ways will often mean through different channels, i.e., retail stores, internet and so on. In the literature, this is often called multi-channels. In this section, we discuss both multi-channels and hybrid distribution. Generally we can say that multi-channels are a case of hybrid distribution, but hybrid distribution may also have more aspects than the channels used to serve the customer. The references to hybrid distribution in the later discussion in this dissertation should be taken to mean multi-channels as well.

Overall, one can think of hybrid distribution as combining several channels or elements in different types of distribution systems. That is, although hybrid channels means offering several channels to the customer, these channels need not be wholly separate in terms of organisation. There are many conceivable options where parts of different channels are combined to effect economies, and the consumer may not see this. Hybrid distribution, then, deals with different preferences both in terms of how goods are

provided and how to organise this. The challenge for the firm or distribution system then is dealing with multiple channels or ways of providing goods. As an example, both franchise and manufacturer-owned retail outlets may appear to be the same channel to the customer, but this can be thought of as a hybrid arrangement for the manufacturer. On the other hand, ordering a CD online or from a local music shop may represent quite a different experience to the customer but many of the steps involved in delivering the CD will be the same.

There are an increasing number of distribution arrangements that can be used to reach customers (Anderson et al., 1997, Coelho and Easingwood, 2004). Traditionally, manufacturers have been able to use direct channels (i.e., their own retail outlets) or a number of indirect options. These indirect options are becoming increasingly numerous, with options such as independent retail stores, the use of agents to act on behalf of the manufacturer, independent resellers or travelling sales representatives as well as phone sales (Cespedes and Corey, 1990, Moriarty and Moran, 1990). These relatively costly options are complemented by others, such as retail catalogues, online catalogues and increasingly various electronic commerce options such as, for example, online banking, ordering directly online, and third party online retailers, e.g., Amazon (Wilson and Danile, 2006). Combined options such as E-bay, which is essentially a hosting layer for a large number of small auctions, is also a possibility for manufacturers, especially in the second-hand market, which is also significant both in value terms and in the way it affects the primary market.

The examples from the PC industry in the introduction show the variety in ways of obtaining a PC from the point of view of the final customer, and also how variety is provided by an industry in aggregate. They also indirectly show several other main issues in hybrid distribution. The actors involved in the different ways of obtaining a PC shown above may or may not be the same. For example, the same manufacturers that sell some of their PCs through retail stores may be involved when the self-build customer orders particular components, and the same software manufacturers are likely to deliver the operating system for many of the options above (Hulthén, 2002, Morris and Morris, 2002). Indeed, it is often the case that a manufacturer is involved in a number of different channels to reach different customers. The challenge then becomes how to balance and organise the different channels, especially where manufacturers cannot carry out all the operations themselves.

For firms, this creates a wide variety of options for reaching and serving the customer that are essentially about how products and accompanying services are provided. Since different ways of providing a product have different

qualities in terms of costs, required expertise and the level and type of service provided, firms have responded by trying to serve customers through a number of different mechanisms (Coelho and Easingwood, 2004, Rangan et al., 1992). This is the essence of hybrid distribution, either trying to reach new types of customers with current offerings by using different channels, or of trying to serve existing customer groups better or more cheaply through a combination of channels.

Payne and Frow (2004) have reported that in many cases, providing goods through different channels can mean both reaching different customers, and serving present customers better. That is, customers may want access to products through normal retail outlets, by ordering directly from the manufacturer, or through distribution specialists such as online stores (e.g., Amazon). In the context of this discussion, a channel should be thought of as one way to distribute goods. The terminology is kept when discussing this literature because it is so ubiquitous. As stated by Frazier "The use of multiple channels of distribution is now becoming the rule rather than the exception, given the fragmentation of markets, advancements in technology, and heightened inter-brand competition…"(Frazier, 1999, p.232)

This variety in channels or ways of organising distribution poses some hard challenges for the distribution system (Gadde and Hulthèn, 2007). Some form of overall balance must be achieved in the system. The appropriateness of the mix depends on how well it serves both the customer and manufacturer. "A company that makes its hybrid system work will have achieved a balance between its customers' buying behaviour and its own selling economics." (Moriarty and Moran, 1990, p.154) Some significant challenges are posed in order to achieve this. One challenge is operating several distribution systems. This can increase costs if the overheads are not sufficiently compensated for by greater efficiency. More fundamentally, the problems can be categorised into conflict and control (Frazier, 1999, Webb and Hogan, 2002).

Conflict can arise when, for example, the manufacturer is seen to bypass traditional intermediaries and sell directly to the customer. In some sectors (such as Automobile retailing in the US), legislation has been introduced to regulate who is allowed to sell goods to the end customer, mandating that only dealers may do this (Knupfer et al., 2003). With such increasing variety in ways of providing goods, finding brokerage positions becomes increasingly attractive (Gassenheimer et al., 2007). At the same time, any successful broker risks becoming the source of conflict. Additionally, fairness in distributing the gains is an issue when bringing in new specialists, especially where existing ones stand to lose. Similar problems can arise within a firm itself when trying to handle different ways of distributing

goods (Webb and Lambe, 2007), so that there are both intra- and inter-organisational issues and conflicts. Although some conflict is inevitable and may be a positive sign, a high level of conflict will tend to reduce the performance of the distribution system (Webb and Hogan, 2002).

Control issues arise because indirect channels are comprised of a number of actors, thus it is more difficult to know and direct the activities of these actors. This becomes increasingly complicated as indirect channels are made up of more and more specialists, which is further compounded if distribution takes place through more different types of channels. This issue is not explored further here because part 2 of the theoretical framework (Section 2.3) discusses coordination issues in the system as a whole. However, we should note that the problem of control is formulated from the point-of-view of the manufacturer, while the approach taken here with a focus on intermediaries is somewhat different. First, it is not formulated in terms of one firm controlling the distribution system, but rather how the distribution system is coordinated (although some firms may be very influential in this). Second, a lack of control or influence on the part of the manufacturer is not inherently seen as a problem.

Firms have to find a workable balance to the question of how many outlets to have in a given area, and what types of outlets are appropriate. When these problems are spread across multiple channels, one solution is to use an intermediary that is able to consolidate volumes from several providers. This changes the structure of the distribution system since intermediaries can be valuable also for serving larger customers who are traditionally served directly by the manufacturer (Frazier, 1999).

Using hybrid channels does not just mean using parallel systems, but rather different types of systems. For example, establishing a second parallel system of retail outlets may, in some very few cases, be a workable solution, but normally using multiple channels means a mix of direct and indirect channels, and different cost structures for the channels in order to reach different customer segments effectively. Some authors have pointed to exploiting economies of scope between the different channels as essential to achieving efficiency in the distribution system as a whole (Mason and Lalwani, 2008).

Finally, an essential point is that a distribution system does not consist of completely discrete and self-contained channels to the customer. Rather, as pointed out in the functionalist literature (Alderson, 1965), a number of distribution tasks have to be carried out to place goods with the customer. When these are spread across different channels and specialists, the picture can become very fragmented, and it still remains a problem of splitting up

the tasks that have to be carried out. In other words, the trend toward multi-channel and hybrid distribution and the way it means splitting up tasks across different firms fundamentally changes how the distribution system operates.

2.2.2 Customisation and modularisation

Customisation and modularisation are two recurring issues in the examples used in the introduction, and represent two large topics in the literature. The two concepts are not necessarily linked since it is possible to modularise for other reasons than customisation, and customisation can be carried out without modularisation. However, in practice, the two topics are often linked since many customisation efforts are based on modularisation. Frequently, these issues are also tied to the concept of postponement, which has been extensively treated in the literature and is discussed in the next section.

Customisation to fit with customer needs is appropriate where these needs show a degree of variety or heterogeneity. Customer needs can be defined in terms of the product varieties offered, but also in terms of wanting products to be provided through different channels (Gassenheimer et al., 2007). The channels issue has been discussed further in the section above on hybrid distribution. Although some of the variety is specifically about providing the goods in different ways, much of the emphasis in the literature has been on providing different varieties of products. The challenge is to provide products sufficiently adapted to the individual customer without losing all the benefits of mass production.

This has been labelled mass customisation: "…a system that uses information technology, flexible processes, and organisational structures to deliver a wide range of products and services that meet specific needs of individual customers (often defined by a series of options)." (Silveira et al., 2001, p.2) In other words, mass customisation is about providing a large variety of products at a reasonable cost to meet a wide range of demands. Typically, production problems are overcome by creating modules cheaply, and then assembling these modules at a later stage. An obvious example of this type of product design is the PC, with a normal PC made up of a relatively small number of modules that are quite easy to assemble. Crucially, much of this modularity is related to IBM's decision to operate on an open platform, meaning that the company, which held great dominance in the PC market, specified the design requirements for compatibility, but left the rest to parts manufacturers (Curry and Kenney, 1999). Significantly, it is not necessarily the inherent qualities of the PC itself that makes it modular, but design decisions taken by a central firm. Although there are, of course,

features of products that are not so easy to change, this ability to design for modularisation is a crucial point in the customisation/modularisation theme. It also feeds back to the previous discussion of postponement and speculation, in that the ability to postpone manufacturing operations may be tied in to the way the product is designed, and the modular nature of a product can make such postponement more viable.

It is not given that mass customisation efforts will be successful. Feitzinger and Lee (1997) suggest that the ability to modularise a product is an essential prerequisite for mass customisation. Feitzinger and Lee further suggest that the ability to customise is also industry dependent and that certain high-profile industries lead to the impression that customisation is more common than it is in practice. There is also a distinct difference between the customisation of, for example, premium motorcars that are still pre-designed by the factory, and actual custom projects for an end-customer such as software written to specifications. For customers to perceive customisation as truly adapting to their demands, there has to be some standardisation of expectations, and for customisation to benefit the manufacturer, there has to be some limitation of choice (Fredriksson and Gadde, 2005).

Despite the need for some standardisation, the customer is offered substantial choice in the final product features, ranging from the design of the steering wheel for a car, to the total specification of the possible 10-15 modules that make up a PC (Curry and Kenney, 1999). This has both been described as build-to-order or mass customisation. The benefits for the customer include a more appropriate product, i.e., the ability to choose desired product features and not least, the ability to exclude unwanted features. For the manufacturer, the advantages are many – inventory costs are reduced, obsolescence costs should be lessened and the customer's willingness to pay should be greater for a product that fits their requirements better. Potentially, there are also substantial cash-flow advantages depending on the credit structure with regard to suppliers (i.e., the manufacturer receives money from the customer early and pays its suppliers later).

Other features, such as reduced costs due to technological developments, have favoured certain types of distribution arrangements (such as Dell's direct distribution). This arrangement took a number of years to become dominant, and may not work in other industries (Curry and Kenney, 1999). Different variations on the concept have been proposed (Gunasekaran and Ngai, 2005). These include: make-to-order (MTO) - components are made and then assembled to order; and build-to-order (BTO) - components are ready for assembly and are then built to order. Generally, build-to-order will have a shorter lead time. There are, however, further variations; e.g., with

suppliers holding stock or obligated to deliver parts on very short lead times. This can be related to JIT (just-in-time) systems. The point of these systems is to serve the customer by delivering a pre-determined variety; however, each particular variation is low volume so forecasting the need is difficult. This requires a set number of components to be combined in different ways. In this sense, the object of discussion is not unique customer orders in the wide sense (i.e., an architect designing a house), but ways of providing a wide range of predetermined options to customers that simultaneously benefit the customer and manufacturer.

It is instructive to look at the continuum of strategies presented in Figure 2.2 below (Lampel and Mintzberg, 1996). The background is highly relevant here "…customisation and standardisation do not define alternative models of strategic action but, rather, poles of a continuum of real-world strategies." (Lampel and Mintzberg, 1996, p.21)

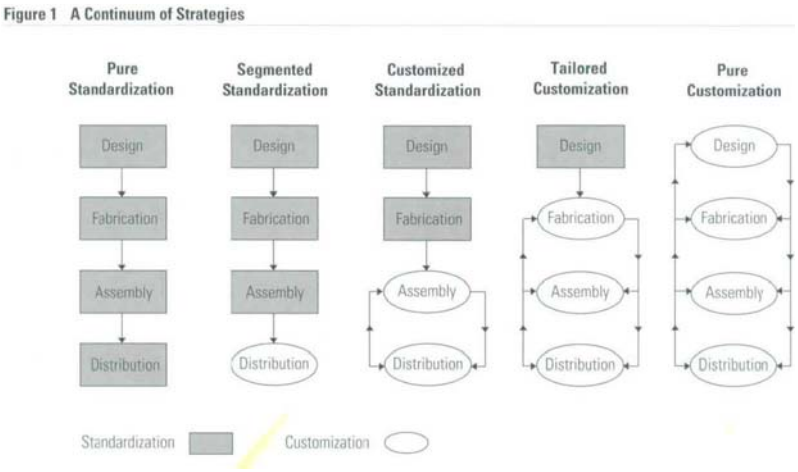

Figure 2.2: Customisation strategies
(Lampel & Mintzberg, 1996, p. 24)

The point of this figure is to show that although mass customisation is a recognised concept in the literature, there is really a continuum of strategies available in a distribution system, where different parts of the overall process can be more or less standardised and customised. Because this dissertation mainly deals with distribution, it will not be necessary to go into any detail about the design and fabrication of goods, since it is generally assumed that these have already taken place, although parts of assembly may have been shifted into the distribution system (van Hoek, 2001). It is, however, important to know something about the background of the system in terms of

what design decisions and splitting of activities have already been made, since this clearly affects how distribution can take place. For example, if a product is highly standardised and provided to only one type of customer in one way, then the need for customisation is not really present.

As well as broadening the scope of strategies or different ways of structuring distribution systems, it is important to point out that mass customisation is not a panacea for fulfilling customer demands. Agrawal et al. (2001) point out that mass customisation is only appropriate to some settings, i.e., a contingency argument. They do, however, point out that in certain industries it would be very beneficial to the manufacturer if customers could be convinced to order goods directly within a mass customisation context.

A final point regarding mass customisation and make-to-order systems is that although the two are, to some extent, conflated in the literature, they are not identical. Mass customisation is essentially a system for producing a large number of varieties based on combining modules, whereas make-to-order essentially means postponing some or all activities until a customer's order is received. In practice, systems that enable make-to-order will often require some extent of mass customisation and modularisation to achieve this.

2.2.3 Postponement and speculation in distribution systems

Postponement and speculation are two concepts that originate with the functionalist literature. The label functionalism covers a literature that is primarily concerned with what functions are carried out in a distribution system, and how the structuring and execution of these impact on the performance of the system (Alderson, 1954, Bucklin, 1965). To a lesser degree, it also considers how these functions are divided up between the different actors in the system. At the core, the concept is often focused on a manufacturer, one or more intermediaries and an end customer. In many cases, the intermediaries and their organisation are not an important theme. Rather, it is the nature of the functions performed and whether they are performed by an intermediary that is of interest. The advantage of this approach is that it is easier to analyse the functions of a marketing channel as a whole rather than to focus on a single firm. To the extent that the literature takes the point of view of a particular firm, it is usually the manufacturer.

I draw on functionalism here because some of the central concepts in this particular literature are very useful in describing variety. However, it is the further development of these central concepts that is most applicable, as will be seen below. First, the concept of functions used in functionalism can be related to activities that are used throughout in all the theoretical streams

drawn upon here. Second, functions are important for the description of roles as discussed in section 2.4. Third and finally, several important principles guiding the structure of activities in a distribution channel, such as postponement and speculation, will be important parts of the theoretical framework. These principles originate in the functionalism literature, although they have also been used more generally in the SCM and marketing literature (Abrahamsson et al., 1998, Pagh and Cooper, 1998).

Functionalism is based upon a strong belief that given sufficient data, most marketing and distribution issues can be solved (Alderson and Cox, 1948, Alderson and Martin, 1965). It is an approach that allows for a detailed description of the activity structures in a marketing channel (or here a distribution system) without limiting this to a particular firm. This suggests that the unit of analysis must be more than the focal firm or business unit, and that many of the significant issues that need to be studied are found at the level of the distribution system. Questions, such as where to store inventory, who should bear risk and how to best meet the needs of the customer, are difficult to address without considering the distribution system as a whole. We should note that there are clear normative ambitions in this work – i.e., that certain structures are better suited to meet particular environments. This is not an important point here in the sense that although certain structures may be better suited to certain environments, the main objective is to analyse and describe these structures rather than test predictions about performance.

Postponement and speculation are not only two central concepts in the functionalist literature, they are also highly important concepts in more recent distribution literature. Additionally, these two principles are descriptive in terms of some of the archetypes of distribution systems presented in the literature, making them a good starting point for a detailed theoretical description of a distribution system structure. The approach here is to first present two distribution systems, one based on speculation and one on postponement, to show the two principles more clearly and start the discussion. The concepts of postponement and speculation are then subjected to further scrutiny in order to identify their more specific dimensions.

2.2.3.1 The speculation-based system

The speculation based system (referred to as a channel in this section, for consistency, since this is the use within the functionalist literature) in this context reflects the mass-production, mass-marketing firm described by Chandler (1977). In this situation, the manufacturing firm is mainly concerned with achieving advantages of scale and improvements in the

efficiency of production. These improvements may be organisational or technological in nature. The manufacturing firm concentrates its resources and efforts on production. Essentially, to have any chance of achieving efficient production, the manufacturing firm must standardise. This applies both to processes and consequently to products. Taken to an extreme, this can be reflected in the assembly-line production of the T-Ford, which famously was said to be available in "any colour as long as it is black.[4]"

Reading between the lines, this quote succinctly illustrates two points. One, there were manufacturing advantages in producing long runs of identical cars. Two, the customers, to a large degree, accepted this. In the long run, it was not sufficient to produce cars of only one colour, but significant variation quickly became costly (Womack et al., 2007).

At this stage, two problems remained for the manufacturer, even if factory production were efficient. Factories had to be kept operating continuously, preferably with as long production runs as possible, and somehow, the goods had to reach the customer. The answer lay in full-service distributors, typically wholesalers, who bought the goods from the factory and then sold them to the retailers. In this way, the manufacturers could get their products to the customers without investing in massive distribution systems. This lead Shimokawa to observe that:

…the distributor's strengthened position reflected the relatively weakened positions of the maker and dealer; if the maker's position later strengthened, the distributor's would weaken or he would become a dealer. (Shimokawa, 1981, p.8)

The stock-holding of the wholesaler was illustrative of a general problem in the system – it was driven by the need for constant production and general forecasts of customer demands. The system was essentially buffered against forecast errors and minor variations in customer demands by keeping substantial stocks of goods at each level in the system. This put the wholesalers in a particularly important role since they delivered goods to the retailers who had direct customer contact.

Bucklin has called this "speculation," and provides the following definition:

The principle of speculation holds that changes in form, and the movement of goods to forward inventories, should be made at the earliest possible time

[4] The exact quote is: "Any customer can have a car painted any colour that he wants so long as it is black." Ford, H. (1922) "My Life and Work". London, Heinemann. pp.37-38.

in the marketing flow in order to reduce the costs of the marketing system. (Bucklin, 1965, p.27)

In effect, the manufacturer and wholesaler "speculate" on future customer demand and build substantial stocks in order to have the product available when the customer wants it. The system is essentially production-driven, and although the overall capacity is ideally matched to the market, the task of the distributors is to find ways to sell the products "channelled out" to the market. Speculation, as a principle, was formulated by Bucklin to explain why Alderson's postponement was not always seen in practice. In this sense, the speculation-based system is often associated with the traditional mass-production firm.

The arrangement described above is ideally suited to a situation where demand exceeds supply for a whole range of basic consumer goods. With such high demand, a primary concern was naturally to increase production, since most of the goods produced could be sold. Customer preferences were not formed for many products (i.e., there was no market for safety razors before they were introduced) making the market more homogenous, at least in terms of what customers were willing to accept.

The principle of speculation dominated many of the channels observed by Alderson, so the formulation of the principle of postponement as a normative principle to create efficiencies in distribution systems was, in some sense, ahead of its time. Bucklin also states that:

Rapidly evolving methods of using air transport economically and efficiently are serving to narrow the spread between the cost of high-speed transportation and low-speed transportation. This has the effect of reducing the relative advantage of speculation over postponement. Hence, intermediate inventories will tend to disappear and be replaced by distribution channels which have a direct flow. (Bucklin, 1965, p.31)

Both of these authors could see the potential benefits of postponement, but they also saw that there were strong limitations in its applicability tied to the state of technology.

It is also clear that the system contributes to efficiency in the right type of setting; however, a number of problems can arise. Of great significance is obsolescence. If consumer 'tastes' change or a competitor brings a new product into the market, then the company risks being left with very large stocks of unsold products. The large stocks will either have to be sold at discount prices or simply written off as a loss since the products are already finished and in storage waiting for the consumer. Since the focus is on

channelling products from the manufacturer and it takes some considerable time to make changes to production, the system is best suited to fairly stable demand situations. More fickle consumer tastes and/or more alternatives for the consumer, generally make these issues more salient since more frequent changes to market demands naturally increase problems with obsolescence.

A related issue is that the production and distribution system, as a whole, leads to a very high level of tied-up capital, particularly in stocks of goods. The need to keep stocks at many levels, and the high level of stocks, are very costly in this type of system. This must, however, be seen concomitant with the advantages derived from the system of buffers, i.e., long production runs and high availability to the consumer, as well as lower investments by the manufacturer in the distribution system. Bucklin also mentions the advantages of large orders leading to lower transport costs and reduced expenditure on sorting (Bucklin, 1965). The speculation-based channel is then one archetype matching traditional mass-manufacturing, and it is also observed in a number of industries today.

2.2.3.2 The postponement-based system

In many contemporary settings, two main differences exist compared to the setting described in the speculation-based system. One is the increase in customer demands, and the second is the state of more flexible technology for production and distribution. Historically, the increase in customer demands is tied to increasing wealth and customer experience with various lines of products, although this may equally reflect different products or markets. For our purposes, it is sufficient that customers are willing to pay for products that are, to a greater extent, customised to their particular preferences. This willingness runs the gamut from a high degree of segmentation served by mass customisation (Feitzinger and Lee, 1997), to made-to-order production where a customer picks exactly the features wanted from a very large range of options, and the product is then made according to these specifications. The key issue is that customers expect a large product variety where they can choose from a large number of different product features.

In some industries, highly flexible manufacturing and distribution technologies have been introduced. For example, at an extreme, this could mean that each consecutive car on an assembly line would have a different setup. This flexibility is mostly achieved through modularisation (Feitzinger and Lee, 1997) and just-in-time technology pioneered by Japanese automakers (Schonberger, 2007, Shimokawa, 1981, Shimokawa, 1994). Indeed, the initial challenge to the speculation-based mass-manufacturing system was posed by these automakers by producing high-quality cars using

far less resources than, for example, US firms. This posed a fundamental challenge to the speculation-based US system where quality and cost were seen as an essential trade-off (Shimokawa, 1994). Some authors might consider this a movement to another productivity frontier (Porter, 1996), but for the purposes of this discussion, it is relevant that a reconfiguration of the system created a great increase in efficiency.

This system is based on close ties to a smaller number of suppliers, making it possible for them to deliver the required modules on short notice and with a consistently high quality. In other words, the demands on the manufacturers' suppliers are very high in this system since the intermediate stocks are small or non-existent. More qualified suppliers, which to a greater extent produce modules, is an important way to improve production. The changes to the supplier side are, of course, part of the inbound logistics, which is not a primary concern in this dissertation. However it does have implications for distribution as well since it shows how much reliance is placed upon specialists.

One important implication for distribution is that the assembly point may be moved "closer" to the customer, both in terms of time and space. This is in line with what Alderson calls the principle of postponement, stating:

the most general method which can be applied in promoting the efficiency of a marketing system is the postponement of differentiation .. postpone changes in form and identity to the latest possible point in the marketing flow; postpone change in inventory location to the latest possible point in time… (Alderson, 1950 in Bucklin, 1965, pp. 26-27)

This is in direct opposition to the principle of speculation mentioned earlier, since late finalisation means that large production runs at a factory, far removed from the market, become difficult. Indeed, the formulation of the speculation-postponement principle is intended to show the tension between the two principles (Bucklin, 1965). A typical example of such postponement is in the clothing industry, where some manufacturers pre-prepare only basic clothing shapes until feedback from the market indicates which colours and fashions are in vogue. The manufacturers then quickly produce large volumes of the identified clothing on short notice (Feitzinger and Lee, 1997).

This example hints at some important issues when it comes to postponement. An ideal form of postponement is simply to wait for customer orders and then make goods to order, which makes it possible to deal with only specific and real customer demands. This should lead to zero misspecification, no out-of-stock problems and no inventory. However, this may not be viable in practice. Certainly, a number of customers are willing to wait for some time

to get their particular product for certain types of goods. By reducing the time from when an order is placed until it is produced and transported to the customer, the manufacturer can capture a higher proportion of this type of customer. Most likely, however, many customers are interested in getting products faster and may not be concerned about whether a product is made exactly to order, as long as it has the desired features. For the manufacturer, the challenge is to fulfil enough of the customer's requirements to tap the willingness to pay without incurring excessive costs.

In this type of setting, the principle of postponement means that the final assignment to a specific customer in terms of form and space should be delayed as long as possible. Products should be designed so these final adjustments can be made as late as possible. This might involve moving some assembly operations into what has traditionally been considered purely a distribution system. Some distributor firms have taken over part of these operations in certain industries (van Hoek, 2000), blurring the boundary between distribution and assembly.

The main advantages of using the postponement principle are a better fit with customer demands, i.e., a reduction in obsolescence, and a greater ability to tap variations in customer preferences. The reduced inventories also lead to substantial savings in operating capital. Because the system is geared towards more flexible manufacturing, it should also be possible to introduce new models more frequently, for example, as a response to new varieties introduced by competitors. However, the system is also more vulnerable to poor performance by both suppliers and distributors. The reduction or elimination of inventory makes it difficult to compensate if a supplier cannot deliver as agreed (Womack et al., 2007).

This is especially the case when the customer has picked a product with specific features rather than picking the product from a selection and has been promised its delivery by the manufacturer. If the manufacturer/system cannot deliver, the system cannot ask the customer to take another product because this would be seen as reneging on promises made. This means, in effect, that if the performance of the suppliers and distribution system cannot deliver consistently, then postponement becomes far less attractive as a strategy. In many industries, there are still a large number of customers who want to pick a product from stock and obtain this immediately, thus making it necessary to produce some stock that is available immediately.

In itself, the principle of postponement, often combined with telling the customer that they can choose from a large number of varieties, may make the demand more heterogeneous. This can be dangerous for the firm if it promises too much. For example, the Volvo system allows for over 1

million product varieties (Fredriksson and Gadde, 2005). It has been necessary to restrict the possible combinations allowed to particular users to keep at least certain scale advantages.

This section has presented two stylised distribution realities, one based on speculation, and the other based on postponement. However, Bucklin, in formulating the principle of postponement, states quite clearly that these are two opposing principles in tension with each other.

The combined principle of postponement-speculation may be stated as follows: A speculative inventory will appear at each point in a distribution channel whenever its cost are less than the net savings to both buyer and seller from postponement. (Bucklin, 1965, p.28)

In most distribution settings then, it is a matter of finding a workable balance between the two principles – i.e, speculation to obtain some economies of scale and make goods available, and postponement, to avoid obsolescence and obtain a better fit with customer demands. In commenting upon Porter's work, Stern & Weitz state:

One of the major lessons learned from system-wide value chain analyses is that continuous, small lot production at the manufacturing level can sometimes produce savings in inventory and storage costs throughout a channel. These savings more than compensate for the loss in scalar economies generated by single-run, large lot production. (Stern and Weitz, 1997, p.824)

Indeed, one would expect the activity structure of the distribution system to be different for both when activities are carried out, and how they fit together depends on whether speculation or postponement was the dominant principle. Distribution is also heavily affected by how manufacturing is carried out, and this is a central point here – the configuration of the system cannot simply look at manufacturing in isolation because of its impact on the distribution system.

2.2.3.3 Further development of the postponement and speculation concepts

The postponement and speculation-based systems discussed previously are essentially two archetypes representing extreme points on a postponement-speculation continuum. Furthermore, they are relatively limited descriptions in terms of the dimensions of the concepts – both postponement and speculation are described as essentially monolithic. That is, even though it is pointed out that postponement and speculation exist in a tension, it is not so

clear exactly what is postponed, for example. Considering more recent literature on these concepts, it is possible to give a more detailed description of both.

A first effort at clarification, before discussing the dimensions of postponement and speculation, is that a distribution system, based on postponement, is not the same as one based on customisation. In the discussion above, these two may be somewhat conflated since the two archetypes go from little customisation to a high level of customisation. However, the two describe different variables and although not entirely orthogonal, both dimensions can vary independently. That is, it is possible to produce standard products to customers' orders. This is done, for example, when inventory costs are prohibitive (the case of certain types of nuclear power plants is relevant here – these contain a number of standard components so expensive that they are always made-to-order). On the other hand, it is possible to carry out most of the assembly processes for certain products and then to finalise these to match customer demands, depending on how standardised this demand is.

The most central issue here, in order to show some of the dimensions of the postponement-speculation principle, is to show the different types of postponement, and how these relate to other issues, such as the degree of customisation offered. This discussion is styled in terms of postponement only because this is how the issue is discussed in the literature. In accordance with the principle of postponement-speculation, however, it means the impact on speculation is equivalent. That is, more postponement in one dimension means less speculation.

The concept of postponement can be described more accurately by looking at the question of what exactly is postponed. According to Zinn and Bowersox (1988), there are five types of postponement, summarised in table 2.1. Four of these are related to the form of the product, and the final one relates to time postponement.

Types of postponement
Labelling
Packaging
Assembly
Manufacturing
Time

Table 2.1: Types of postponement
(Zinn & Bowersox, 1988)

Time postponement refers to when processes are initiated, i.e., whether they wait for a customer order or are carried out in advance. If processes are carried out in advance this means goods are produced to stock or moved close to the customer. The central variable is when a process starts in relation to the customer order – whether it is done to a short term or long term forecast, or triggered by the customer order. A good level of time postponement is one in which the costs of lost sales, production costs and inventory costs are balanced (Waller et al., 2000). However, as later authors have shown, the effect of individual firms optimising their level of postponement can be sub-optimising at the level of the distribution system or channel (García-Dastugue and Lambert, 2003). This is clearly an issue that needs inter-organisational coordination. The remaining types of postponement can be considered different types of form postponement and are not discussed in detail here.

However, what Zinn & Bowersox (1988) call assembly and manufacturing postponement can be handled by asking where and when in the distribution system certain tasks are carried out. If assembly is putting together more or less finished parts and manufacturing refers to the basic production of modules, then this blurs its boundaries with the distribution system. Having a manufacturer wait to produce certain products until demand is known is quite different from having a logistics provider assemble parts from different manufacturers for the end-customer.

Splitting this into a 2x2 table, with high and low values for postponement and speculation in manufacturing and logistics (the assumption here is that the effect will be similar for distribution), results in figure 2.3.

		Logistics	
		Speculation *Decentralized inventories*	Postponement *Centralized inventories and direct distribution*
Manufacturing	Speculation *Make to inventory*	**The full speculation strategy**	**The logistics postponement strategy**
	Postponement *Make to order*	**The manufacturing postponement strategy**	**The full postponement strategy**

Figure 2.3: Supply chain strategies
(Pagh & Cooper, 1998, p.15)

A full speculation strategy is one based on forecasts with mass-manufacturing and mass-distribution, and producing to stock. This is the traditional mass-manufacturing setup, and corresponds to the speculation-based system above. Similarly, the full postponement strategy waits with both the manufacturing and distributing of goods until customer demand is known and corresponds to the postponement system shown above. The two other strategies are somewhat different. The logistics postponement strategy is based on manufacturing in advance to forecasts, but not moving goods to their final destinations until demand for a particular area is known. Manufacturing is stable in this system, and stocks are at a central warehouse. Lead times from the central factory to customer locations become important in order to bring goods to the customer fast enough. Finally, the manufacturing postponement strategy means that goods are moved close to the customer, but the final manufacturing operations wait until the customer order is received.

There are other categorisations of postponement. For example, Yang et al classify postponement into purchasing, product development, logistics and production (Yang et al., 2004). Indeed, by "slicing the cake" differently, it is possible to come up with a great number of categorisations. Here, however, the point is twofold. First, one has to say something about what are the main elements for postponement in terms of a distribution setting. Second, by referring to the scheme used by Pagh & Cooper, it is possible to say something about the division of postponement between manufacturing and distribution. The present study is primarily about distribution, but it seems

clear that what is happening in distribution is heavily dependent on what is happening in manufacturing. This is especially relevant when manufacturing tasks are moved to the distribution system.

This leads to the first research question using the theoretical terms discussed in this section (the more general discussion of research questions follows below in section 2.2.4). *How is postponement and speculation by making-to-order, making-to-inventory and placement of inventory in the distribution system used to handle different demands on a distribution system?* This is a relevant question on its own, but will be tied in to the main research questions for this section, so it will not be discussed further here.

2.2.4 Research questions regarding the structure of the distribution system

Several issues must be covered in formulating research questions for this section on the structure of the distribution system. One issue is that we want to say something overall about variety in the system, but it is not possible to cover all aspects of variety. The different aspects of variety may exist in different combinations, but here the focus remains on the structure of the distribution system. This may be approached by formulating the first overall research question to cover the alternative structures seen in a contemporary setting. That is, knowing what different alternatives are available in a setting is a good starting point for the rest of the study. This should then be supplanted with more specific research questions on the three sub-blocks discussed here – hybrid distribution, customisation and modularisation, and postponement and speculation. Tentative questions have already been formulated for the postponement and speculation section, since this is theoretically fairly straightforward. Questions were not immediately formulated for the other sections because the issues are more over-arching. That is, both customisation/modularisation and hybrid distribution are wide topics, and should be related to the technology of use and production.

Returning to the first research question in this section, it can be considered in regard to how specific instances of technology of use and production impact on the channel, or how variety in customer demands is reflected in the structure of the channel. This is not based on a deterministic assumption that particular features of technology, for instance, lead to one specific channel, but rather that the need to match the technology of use and production constrains the possibilities in the distribution system. This overall question borrows from a number of the parts here, such as features of the product, different ways of distributing, and postponement and speculation.

Research Question 1 (RQ 1): What alternative distribution arrangements can exist in a particular industry in terms of hybrid arrangements, customisation and modularisation, and postponement and speculation?

Considering the literature review above, part of the answer to RQ 1 is likely found in different hybrid distribution arrangements, i.e., the matching of technologies of use and production effected through the use of multiple channels. This will not, however, delve into how these hybrid arrangements are actually used to deal with the tensions created by different demands on the system both by the consumers and other actors in the system. We can formulate this as a subsidiary question in terms of how it is handled in the particular instance. To do this, we must first have answered the question of what alternative arrangements exist in a specific industry in RQ 1, since this gives us the range of alternatives that are actually used. Then, we can proceed to a discussion on the use of hybrid distribution arrangements.

Research Question 1a (RQ 1a): How are hybrid distribution arrangements used to handle different demands on a distribution system?

A second major approach to handling variety in demands on a distribution system was shown to be modularisation and customisation. This means matching a higher degree of customisation with increased modularisation or that a higher degree of customisation often requires increased modularisation. The description of the degree of use of these two concepts will be part of the answer to RQ 1, but as in the discussion on hybrid arrangements, we will also want to know how modularisation and customisation contributes to meeting these demands. This will feed back into the discussion of modularisation, customisation and the state of the customer demands.

Research Question 1b (RQ 1b): How are the modularisation of products and different degrees of customisation to consumers used to handle different demands on a distribution system?

We should note that in a study, this will only apply to a particular setting, so that we cannot expect to answer this in a general way. It can, however, be answered quite comprehensively with regard to the specific setting.

Finally, we come to more specific features of the system as discussed in the section on postponement and speculation. We see here that the question can be applied directly, and gives depth by discussing one particular mechanism for handling the tensions in the distribution system. The advantage of this is that we have a number of dimensions in the postponement and speculation concepts on which to draw.

Research Question 1c (RQ 1c): How is postponement and speculation by making-to-order, making-to-inventory and placement of inventory in the distribution system used to handle different demands on a distribution system?

The structure of these research questions, with one overall question on alternative arrangements borrowing from the three sub-questions in terms of terminology, gives us a good opportunity to explore variety in the distribution system. Through them, we can describe both the main alternative arrangements used in a contemporary setting, and then delve into this in greater detail through the three headings of hybrid distribution, customisation and modularisation, and postponement and speculation. These questions are interesting in their own right, and can be used to develop an understanding of the remaining two blocks in the theoretical framework.

2.3 Coordination and interdependencies

The previous section, which discussed the structure of the distribution system and the role of intermediaries, showed that there is a considerable need for coordination in distribution systems. The challenges of coordination keep appearing in different contexts. Postponement may be a useful principle for guiding a distribution channel, but not all channel participants can postpone all their activities. Modularisation can be useful for creating more variety for the customer, but then requires a high degree of coordination to put the modules together quickly. Hybrid channels can serve the customer better, but can quickly descend into dysfunctional conflict if their activities and incentives are not coordinated properly.

The structure of the distribution system affects both the need and opportunities for coordination. For example, a distribution system based on high degrees of postponement and customisation requires different coordination compared to one based on speculation and mass manufacture of a small range of standard products, with the degree of dependence between activities much greater in the first case.

The concept of roles for intermediaries has not been discussed in detail since this will be covered in section, 2.4. However, the core issue is that the need for coordination becomes inter-organisational since tasks are split up among a number of firms, many of which do not own the goods in the distribution system, but rather simply provide services. The more tasks that are given to intermediaries and the more fragmented the tasks become, the more complicated and problematic is the inter-organisational coordination. Intermediaries can contribute to the system by carrying out certain

specialised functions. Some of this contribution results from the dynamics of specialisation itself, i.e., by carrying out activities at an appropriate scale (Gadde, 2000). This specialisation can only work if it is accompanied by appropriate coordination mechanisms. In terms of coordination then, any framework must be able to show the coordination of activities in the distribution system, and also relate the coordination to intermediaries. The question of coordination for intermediaries is a main focus here since intermediaries are a mainstay of the dissertation.

In discussing coordination, it is necessary to first answer the question "coordination of what?" The short answer is that we are interested in the coordination of activities necessary for distribution of a product to a customer. At the basic level, these are physical activities. It will be important to keep the focus on these activities, since the way they are organised among different firms is of interest in terms of the role of intermediaries.

A second point to make about the concept of coordination is in terms of the specialisation observed in the distribution system. This makes coordination increasingly relevant. We can go to Adam Smith's (1776) description of a pin factory to see this point. In his exposition, Smith describes how a craft approach to producing pins, i.e., each worker carries out the whole process of making single pins, can be replaced by a mass-production logic where each worker carries out only a specific, repeated operation. The mass production logic results in substantial increases in output, but requires coordination between the workers. While the loss of one worker in the craft production setting only reduces the output by the production of that worker, the risk in a mass production setting is that work stops altogether (at an extreme). Coordination is thus necessary to capture the benefits of specialisation, and this should be equally relevant in distribution.

It is helpful, at this stage, to go into more explicit detail about the types of activities we are discussing. For the purpose of this discussion, it is instructive to look at the concept of marketing flows, since these are broad categories of tasks that have to be carried out and coordinated. Figure 2.4 below summarises typical marketing flows:

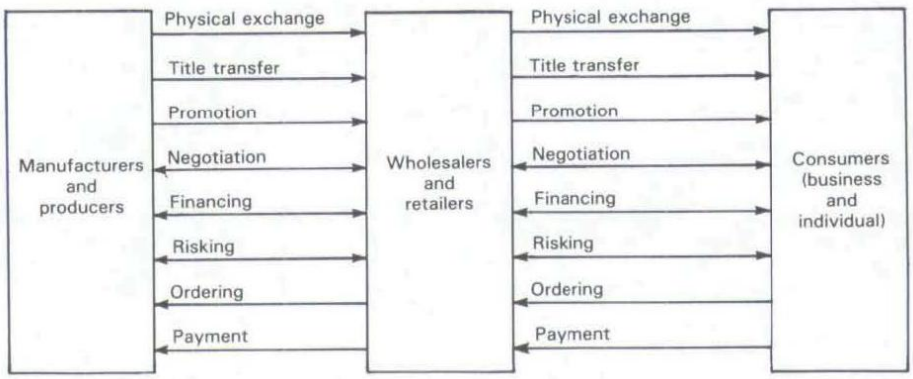

Figure 2.4: Marketing flows
(Bowersox and Morash, 1989) p.58.

In terms of simplifying this framework, Flygansvær (2006) suggests that flows can be separated into physical and commercial flows, where the physical deals with the actual physical operations carried out on products, and commercial flows cover the various information and financial transactions carried out. This classification is quite useful here, since it helps to focus the discussion. The physical flow is fundamental to our discussion since we are considering how intermediaries assist in delivering physical products (and in some cases services); thus we need a good description of how these activities are carried out. This also fits with the theme of specialisation in that how efficiency is achieved in physical activities is central to how specialists and intermediaries operate, especially in this context. A final aspect is that the availability of good coordination mechanisms or ways of handling these flows will encourage the use of intermediaries in the first place (Ghosh and John, 1999).

This gives us a concept of commercial flows that covers financing, risking (risk-taking is used here for clarity), ordering and payment. Payment, in this case, applies both to services rendered as well as the actual products transported. A core aspect of this concept is to include the informational component necessary to coordinate the physical activities, i.e., we largely include these aspects in the commercial flow. Categorising the different flows, we can then say that the physical flow represents only the physical exchange in figure 2.4. The commercial flow represents financing, payment and ordering since these can be related to intermediaries (see also the discussion of roles for intermediaries in section 2.4). Finally, the relevance of title transfer, promotion and negotiation will be handled differently depending on whether ownership is transferred or whether a firm delivers

only a service. This may also help in finding the customer order point to see how this affects the coordination in the system.

Physical flow
Commercial flow • Financing • Risk-taking • Payment • Ordering
Commercial flow but dependent on type of transactions • Title transfer • Negotiation • Promotion

Table 2.2: Grouping of flows

Both the physical flow and the commercial flow may require different types of coordination, but the primary focus in terms of coordination will be on the physical flow, while we use the commercial flow to give additional depth. The study need not describe all the different aspects of the commercial flow – the intention is, rather, to use the above as a guide to structure different activities.

2.3.1 Activity interdependencies and coordination framework

Here, Thompson's (1967) framework on interdependencies and coordination is used. This work is grounded in the organisation design literature, which has dealt extensively with the issue of coordination (Galbraith, 1977, Mintzberg, 1980, Richardson, 1972). The literature looks at organisational design from the starting point that most organisations are not natural systems, and that they require artificial mechanisms for their members to perform (Galbraith, 1977). Limits on organisational effectiveness can come from theoretical bottlenecks (it is unclear how to achieve a goal), resource bottlenecks (limited access to certain critical resources), or organisational bottlenecks (the capacity of the organisation for example in terms of management). Organisational design, dealing with the latter of these bottlenecks, is appropriate to the current study considering that we are looking at a particular type of actor in a distribution system.

Thompson's framework is strongly based on activity interdependencies and underlying technologies. Compared to some of the other organisation design frameworks, which are clearly descriptive of single firms (Galbraith, 1977, Mintzberg, 1980), it is quite universal in that although many of the examples used by Thompson are for a particular organisation, the principles can be

applied to inter-organisational settings as well. Furthermore, this framework has been expanded and discussed extensively by recent authors, making it both robust and current. For example, it has been applied in a number of settings such as expanding on Porter's value chain work (Håkansson and Jahre, 2005, Stabell and Fjeldstad, 1988), and supply chain management (Håkansson and Persson, 2004).

Thompson (1967) discusses organisations from the point of view that there are at least 3 different basic technologies affecting the appropriate way to structure an organisation. These technologies are intensive, long-linked and mediating. Although there is no direct, one-to-one correspondence in Thompson's work, the three types of technologies are related to three types of activity interdependencies. Activity interdependencies can be classified as pooled, sequential and reciprocal. Pooled interdependence is a situation "in which each part renders a discrete contribution to the whole and each is supported by the whole" (Thompson, 1967, p.54) Serial interdependence is also based on pooled interdependence, but with the added requirement that "direct interdependence can be pinpointed between them, and the order of that interdependence can be specified" (Thompson, 1967, p.54) Finally, reciprocal interdependence "refers to the situation in which the outputs of each become inputs for the others" (Thompson, 1967, pp. 54-55) Each type of interdependency is, in turn, best handled by one type of coordination. Pooled dependencies should be handled by standardisation, sequential by planning, and reciprocal by mutual adjustment.

Some clarification is necessary regarding this classification. As mentioned before, Thompson speaks about three types of underlying technologies, long-linked, mediating and intensive. The long-linked refers to a typical manufacturing setting. It "…involves serial interdependence in the sense that act Z can be performed only after successful completion of act Y, which in turn rests on act X, and so on." (Thompson, 1967, pp. 15-16) The mediating technology refers to the fact that "Various organisations have, as a primary function, the linking of clients or customers who are or wish to be interdependent." (Ibid, p.16) Finally, the intensive technology refers to a situation where "…a variety of techniques is drawn upon in order to achieve a change in some specific object; but the selection, combination, and order of application are determined by feedback from the object itself." (Ibid, p.17)

It is these three types of technologies that have been related to Thompson's three types of activity interdependencies – pooled, sequential and reciprocal. According to Thompson, however, the three types of interdependence form a Guttman scale as shown below, so that a situation characterised by

reciprocal interdependence will also include sequential and pooled interdependencies.

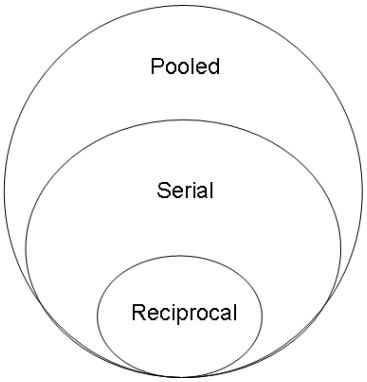

Figure 2.5: Guttman scale adapted from Thompson (1967)

The implication of this is that there is no direct one-to-one match between the type of technology and the interdependence in Thompson's work. The matching of long-linked to sequential technologies, pooled to mediating and intensive to reciprocal is well-known, but is based on an interpretation of Thompson's work rather than a specific listing by Thompson himself (Fjeldstad and Haanes, 2000, Stabell and Fjeldstad, 1988). In an empirical setting, an organisation may employ several technologies, which complicates the picture further: "…although we have for simplicity purposes treated organisations as if they employed only one type of core technology, we must recognise that expanded organisations may employ combinations of them." (Thompson, 1967, p.44)

An updated and perhaps more precise use of the pooled interdependency can be found in the SCM literature: "Pooled interdependence between two activities means that they both are related to a third activity, or are sharing a common resource and are only indirectly dependent." (Håkansson and Persson, 2004, p.13) This takes the definition beyond the activity-based thinking, which is central here, and allows for the importance of resources. In the same study, Håkansson and Persson make predictions about the types of economies pursued given different types of interdependencies. Two of these are particularly relevant here:

Economies of integration will be pursued and exploited by solutions supporting coordination and adaptation, where serial interdependencies in the supply chain are perceived by management as representing a major driver for economies. (Håkansson and Persson, 2004, p.24)

In terms of the current study, this means that distribution tasks, characterised by serial interdependencies, should show a tight integration in the entire distribution system, and that this should also be the case for intermediaries. Tight scheduling and planning should be expected for these activities.

Economies of scale and scope will be pursued and exploited by solutions supporting standardisation, similarity and specialisation, where pooled interdependencies between involved companies are perceived by management as representing a major driver for economies. (Håkansson and Persson, 2004, p.24)

Here, we would expect a number of the large, fixed resources needed for a distribution system, such as investments in equipment, to be associated with standardisation in use and the use of similar equipment, where possible. Specialisation, in this connection, would mean that certain actors make large investments in specialised equipment and focus on getting maximum efficiency from the equipment.

This review of the work of Thompson and more recent uses gives us a relatively robust general framework as summarised in table 2.3:

Type of interdependency	**Appropriate type of coordination**
Reciprocal	Mutual adaptation
Sequential	Planning
Pooled	Standardisation

Table 2.3: Interdependencies and coordination (Thompson 1967)

It also gives us a number of more specific predictions about how different types of activities, and in some cases resources, will affect coordination in a system. In the last part of this section, we use this to formulate research questions.

2.3.2 Research questions regarding interdependencies and coordination

As discussed in the introduction to this section, the two main interests are in describing coordination in a distribution system as a whole, and how this pertains to intermediaries and their roles. The two questions are partially overlapping. Nevertheless, the same framework should be able to cover both these issues.

A model of interdependencies and coordination from the organisation design literature, presented by Thompson, is used as the main framework for this section. The model is based on three types of activity interdependencies and three types of corresponding coordination. More recently, the framework has been used by other authors, who have developed it further. The topic of pooled interdependencies has been discussed in ways that are relevant to distribution (Håkansson and Persson, 2004).

In terms of research questions regarding coordination, then, we want not only to cover interdependencies and coordination mechanisms, but also to cover the system and intermediary level, as well as specifying the resource use issue more exactly. The first research question in this section, which is similar to the overall question in section 2.2, deals with how these interdependencies are handled in a complex system. The mechanisms for handling this must necessarily be the coordination mechanisms described in the framework.

Research Question 2 (RQ 2): How are the coordination mechanisms (standardisation, planning and mutual adjustment) used in complex distribution systems to handle activities with different interdependencies (pooled, serial and reciprocal).

Additional issues are explored by adding two research sub-questions. The first of these follows naturally from the discussion in that we want to see how the structure and coordination mechanisms in RQ 2 impact on intermediaries and their specific roles. This addresses how the interdependencies and coordination mechanisms analysed using research question 2 impact on the intermediaries. The focus here is on how this can create or limit opportunities for intermediaries, and we can formulate the research question to make it somewhat more general.

Research Question 2a (RQ 2a): How do the different types of interdependencies among activities (pooled, serial and reciprocal) affect intermediaries and their roles?

The final part of the discussion in 2.3.1 showed an additional issue that can easily be ignored when employing an activity-based framework, namely the importance of good use of core resources. That is, in a distribution setting, there will be some large-scale resources that must be used well to achieve good performance. This is particularly relevant here, since a distribution system with many participants will still have to use the same common resources and must find useful ways of doing this. Physical distribution tasks are a core of the dissertation, and looking at the resources necessary for distribution and how this pertains to coordination is important for the study

as a whole. The use of resources requires coordination, especially when these resources must be used across different firms. An understanding of how these resources are important for the distribution system and how their use is coordinated across firms is a vital complement to the activity-based understanding of resources covered by the other research questions. In accordance with the theoretical framework, such resources represent a pooled interdependence. Such interdependencies should be coordinated by standardisation, which is a large topic in many distribution systems (see for example (Biederman, 2001, Joppen, 2006)). This leads us to research question 2b.

Research Question 2b (RQ 2b): How does the need for the use of common resources and consequent pooled interdependencies affect intermediaries and the coordination mechanisms used?

These three research questions will cover the overall coordination in the system. They also specifically cover coordination and intermediaries, as well as the important issue of joint resources and their use in a distribution system.

2.4 Intermediaries and roles

The previous sections outlined some of the major alternatives and variables that are important in describing distribution systems, as well as a framework for coordination mechanisms. This showed the overall structure of the systems and lead to a set of research questions specifically about distribution. It also showed some of the major changes taking place, for example, with systems based on hybrid distribution being more dependent on the use of specialists. These specialists are called intermediaries in the hybrid distribution literature, and the term is also used throughout this paper. However, the full content of the term “intermediaries” is not immediately clear. In particular, the concept has traditionally only covered firms taking title to goods (Alderson, 1965), whereas here, it is more broadly defined.

This section draws on the literature already presented and other work on intermediaries to arrive at a more specific, but more encompassing concept of intermediaries, and to consider the roles that these intermediaries can take on in distribution systems. This is supplanted and expanded with literature on third-party logistics (3PL), since this has a great deal to say about intermediaries and distribution.

2.4.1 The concept of an intermediary and a role

The concept or definition of an intermediary and a role are theoretically distinct, but they are discussed in the same section because the two are interrelated, closely tied in the dissertation itself, and are central concepts for this section.

A broad concept of an intermediary is that it covers all those firms placed between the manufacturer and the customer. Historically, this referred to a traditional channel structure with a vertically integrated manufacturer, a wholesaler, retailer and then the consumer (Alderson, 1965, Shaw, 1912). However, as has been seen by the previous discussion in this chapter, for the types of distribution systems we are considering here, it is more likely that the intermediaries consist of a larger number of more specialised firms providing services. These may or may not own the goods they are handling, and their area of responsibility can be limited or broad, depending on the structure of the distribution system. All of these firms, however, still carry out tasks that are essential to bridging the gap between the manufacturer and consumer.

Intermediaries can carry out a range of tasks, including payment processing, transport, transport planning and management, storage and handling, and increasingly, light manufacturing and assembly (van Hoek, 2000). This means first that the fairly clear division between the manufacturer and "others" in a distribution channel is becoming less clear. Second, it means that the definition of an intermediary itself is becoming far less clear – i.e., the collection of firms between the manufacturer and end customer may not have much in common and carry out quite diverse and sometimes unrelated tasks.

A further point is that the manufacturer can be thought of as an intermediary – assembling systems from a network of suppliers and only carrying out some manufacturing. This view is increasingly relevant considering the increased amount of outsourcing and contract manufacturing in many industries such as logistics (Bot and Neumann, 2003, Lieb and Randall, 1996).

Fundamental to any discussion of roles, is the definition of a role or a discussion of how the label is used in this context. The concept adopted here should be useful with regard to the literature, relevant in terms of an empirical study and thus subject to theoretical development. It is not, however, taken directly from the literature, since the focus is on the way it is used in the context of the study. Here, we define a role as the following:

”a role is a set of activities carried out by a firm to fulfil particular needs of a specific, counterpart firm.”

This exact definition is not found directly in the literature, but is based on several core issues closely tied to achieving economic benefits for the customer firm. A traditional definition of roles in the literature is that roles deal with the expectations of behaviour from other firms in the distribution system. That is, a wholesaler is expected to act in one particular way, and may create conflict if it behaves in another (for example by selling directly to end-customers) (Merton, 1957, Stern, 1969). This concept of role is sufficiently pervasive in the literature that it is worth referring to, but here the interest is, to a much greater degree, on how the division of roles can contribute to the activity structure.

Using a role concept that deals with services provided to other firms can easily be connected to specific activities. This also fits well with the theme of increased specialisation in distribution systems. Expectations are relevant to this concept, but only as a comment on how the activities are performed. The present concept of roles, therefore, is narrower than the traditional definition in the literature, but it is also much closer to what is called a “function” in the functionalist literature, which enables us to draw on this literature. Note, however, that although the concept of a function and role are largely the same here, the functions in the functionalist literature are not written as roles, and so some adaptation is necessary. It should be very clear that we are making use of these functions to construct roles for a particular purpose in this study. The concept of functions in the functionalist literature is also different from the marketing functions discussed in the coordination section, so it should be made clear we do not refer to those specific functions that are rather about the management of essential flows of information and physical goods. Intermediaries may, of course, be used for these flows, but we do not want to equate the two types of functions, and thus proceed with those discussed in the functionalist literature. The discussion of these functions will make it clearer why the two are not the same.

For the purposes of this dissertation then, intermediaries are firms placed between the manufacturer and end-customer, typically providing specialist services to the manufacturer and other firms. Their role is defined by the needs they fulfil for their customers, which are the manufacturer and other participants in the distribution system. The needs may be a service or a more general economic need; the next section will discuss this in greater detail using the functionalist literature as a base. This allows us to go from a relatively general concept like needs into more specific issues such as achieving advantages of scale or reducing operational risk.

2.4.2 Functions of intermediaries in the literature

The purpose of this section is to draw together functions of intermediaries using the functionalist literature as a base. The general label "intermediaries" is used in a wide range of literatures; however, there is no intention of giving a general review here.

In the functionalist literature, Alderson discussed the economic rationale for middlemen at some length, both in an article dealing specifically with the development of distribution channels (Alderson, 1954), as well as elsewhere (Alderson, 1957, Alderson, 1965). Here, the discussion is organised in accordance with four main headings that reflect Alderson's discussion: reduction of business ties, scale advantages, specialisation and risk redistribution. Other literatures can certainly contribute to each of these areas, but only some references are made here in the interest of not broadening the literature scope too much. Before proceeding, we should note that the four headings are not labels assigned by Alderson to intermediaries, but rather main topics of discussion when dealing with intermediaries found in Alderson's work. As a backdrop, the following passage is highly relevant:
Let us assume initially that a sale is made directly by the supplier to the ultimate consumer. Now let us assume that a single intermediary intervenes between these two. If the exchange between the supplier and the intermediary is optimal, it means that the supplier prefers this exchange to dealing directly with the consumer. (Alderson and Martin, 1965, p.122)

In Alderson's thinking then, the supplier or manufacturer makes a decision as to whether it is preferable to work directly with the customer or through an intermediary. It follows, that this decision may be different for different suppliers. The issue of interest is then, why would it be more attractive to use an intermediary than to deal directly with the customer? (Presumably the same question is relevant as to why the customer might want to use an intermediary.) Since intermediaries are already in place in most industries and the choice between using an intermediary and not doing so may not be realistic, the operative question in this study is what types of intermediaries are used and how are they used. This does not mean that there are no tasks the manufacturer can choose to carry out itself or turn over to a specialist, but that many tasks have already been turned over and cannot realistically be taken back by the manufacturer. It should be noted that although we are not looking for optimisation in this study, it is still highly relevant that customers will choose the arrangements they see as superior.

Table 2.4 below, a summary of functions of intermediaries, builds on the functionalist literature as discussed, as well as other literatures. The purpose

of the section is to provide additional discussion of the specific functions of intermediaries.

Functions of intermediaries
a) Reduction of business ties
b) Achieving scale advantages
c) Task and skill specialisation
d) Risk sharing

Table 2.4: Summary of functions of intermediaries
Adapted from Alderson (1957)

a) Reduction of business ties

Conceptually, the reduction of the number of business ties when a set of customers want contact with a set of suppliers and use an intermediary is a mathematical function of the number of actors involved. In the example below, the number of ties is reduced from 16 to 8 when an intermediary is introduced. The effect is much stronger for higher numbers of actors (it can decrease from 400 to 20 for 10 customers and 10 suppliers etc.). In an empirical setting, the effect will not be as strong because it is highly unlikely that all actors maintain ties to everyone else, but the example shows the reasoning clearly. These examples assume that all business is conducted through a single intermediary as an extreme case.

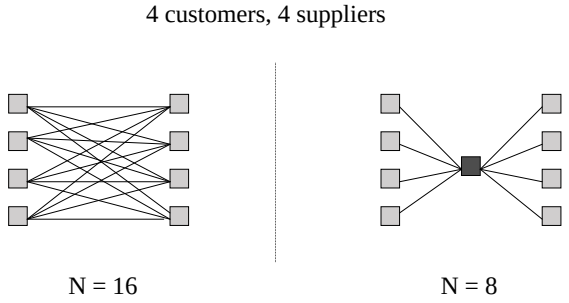

Figure 2.6: Number of business ties
Adapted from (Alderson, 1954), Chart 1-1 and 1-2.

The role of the intermediary in reducing business ties is based on some strong assumptions. There is a significant cost associated with any business relationship. This cost can stem from time spent in meetings and negotiation with the business partner, promotional activities in relation to a number of potential partners and adaptation to the partner's particular requirements (this point is explored extensively in the TCA literature, for example (Williamson, 1981, Williamson, 1975). The cost is assumed to increase with the number of relationships, but probably not linearly.

The introduction of an intermediary into this system will then reduce costs because the number of business relationships is decreased, given some additional conditions. It must be possible to conduct the same kind of business through an intermediary as the customer would be able to conduct in direct dealings with the supplier. This raises a host of questions both with regard to the intermediary as an agent of the customer or supplier, and in terms of whether the intermediary will conduct business on behalf of the customer with the same force as the customer would itself. There is, of course, a danger that the intermediary will make arrangements more beneficial to itself than its customers. Another potential danger depends on whether it is actually possible for the intermediary to understand the needs of the customer and to bring these to the supplier in a meaningful way. It may be that the intermediary will only have this function where arms length dealings are sufficient to carry out business. Certainly it is possible for an intermediary to have this function for certain types of business, with firms doing business directly with each other where required, i.e., a differentiated system (Wilson and Danile, 2006).

Alderson summarises the benefits of an intermediary in this way "Exchange arises out of considerations of efficiency in production. Exchange through intermediaries arises out of considerations of efficiency in exchange itself" (Alderson, 1954, p.9) One of these benefits is simplifying the amount of interchange taking place among different firms. A converse point, mentioned in recent literature, is that the value of having a large set of business ties may be substantial, and particularly so, for an intermediary (Mudambi and Aggarwal, 2003). In this formulation, it is the access to a large set of customers in itself that is valuable. At a conceptual level, if the value of having business ties exceeds the cost of maintaining them substantially, then firms should not be willing to give them up. However, this also means that an intermediary, already in the possession of such ties, is in a strong position *vis-à-vis* potential customers. Since firms do not exist in a vacuum, the historical development of a distribution system may determine which firms possess these important customer ties.

In terms of activities, this may be thought of as a structural phenomenon, i.e., either all actors must continually communicate with each other, or the intermediary takes care of at least parts of the regular communication, making the activities more concentrated and reducing the overall activity somewhat. Note that in a setting where intermediaries are already established, this effect will not be obvious since the gains have already been made and alternative intermediaries give the same benefits. Here the existence of a number of strong ties from the intermediary to potential customers may be more valuable.

b) Achieving scale advantages

In the previous section, it was briefly mentioned that the cost increase in maintaining a large number of business relationships might not be linear. Rather the cost may be decreasing at the margin. A second important role for a distribution intermediary is to achieve scale advantages for its customers and suppliers.

In a distribution setting, there are two ways of achieving scale advantages that seem particularly important.

The first pertains to achieving scale in certain basic operations such as goods handling, order processing, transport planning and so on. This requires pooling orders from a number of customers to achieve a certain critical mass. This may simply lead to transporting full containers leading to lower per unit transport costs, or it may be by obtaining enough volume to change the distribution system to a more efficient one, for example employing cross-docking principles (Mudambi and Aggarwal, 2003).

Several authors have pointed to the important feature of many technologies that certain operations or processes are, for practical purposes, indivisible below a certain scale (Richardson, 1972). A machine for making a particular product may have a certain capacity, and using it below this capacity leads to a loss of advantages of scale, either because the machine itself is not operating efficiently, or simply because the capital invested in the machine is not being fully utilised if it is not working at maximum efficiency. Conceptually, achieving scale can be thought of as both substituting capital for labour through investing in specialised machinery, and achieving minimum efficient scale for the machines used (Chandler, 1990). Normally this means operating the machines at near full utilisation. It is easy to see that equivalent features exist in distribution, for example, the use of reloading terminals, use of transport facilities such as ships or trucks and finally, in light manufacturing carried out in the distribution system. If this minimum capacity is much larger than that required by any particular firm,

then it may be advantageous to let a specialist undertake this operation, and also take on the problem of finding other customers to ensure full use. Alternatively, the manufacturer must find a way to balance its distribution capacity to manufacturing, which might prove quite difficult (Chandler, 1990). It is important to note, however, that this type of feature is not always present – some activities do not give the mentioned benefits of scale, at least not to an appreciable degree. The minimum scale of operations argument should not be ignored in distribution, because it may be as salient as in manufacturing.

Overhead may be reduced by merging what would be a large number of smaller logistics operations into one large operation run by the intermediary. This is, of course, a form of outsourcing. It is also closely tied to sorting. If an intermediary is allowed to sort goods across the categories used by its customers, then there are significant gains to be had. A simple example is allowing an intermediary to load products with similar characteristics together in order to use transport capacity better, even if the products have widely different uses and come from different manufacturers (Heskett, 1977).

Using Alderson's concept of sorting, then sorting is a mental process that assigns products on the basis of similarity in time, form and place (Alderson, 1965). Economies can then be had, even if the intermediary is not allowed full control of the sorting process. For example, a transport operation that is allowed some control on how to organise the assignment of goods to trailers based on destination and required time of delivery can already obtain some economies of scale by running full trailers. This is the case even if the intermediary has no real control of the logistics flow – i.e., final delivery dates or sales campaigns affecting the volume of goods. Indeed, Alderson states: "Sorting might assign some goods to transportation by vehicles suitable for long hauls and others to vehicles designed for short hauls." (Alderson and Martin, 1965, p.123)

The second way of achieving scale advantages relates to purchasing. Aggregating demand from a number of buyers allows the intermediary to act on behalf of all of them when carrying out purchasing, which can fundamentally change the purchasing process. Rather than a number of relatively small buyers dealing with a particular manufacturer, the intermediary becomes a very large customer who is able to negotiate reduced prices for its customers.

Whether most of the concessions are passed on to the customers or kept by the intermediary is an important issue, but the exact split does not affect the basic function served in this case. An added point is that this may reduce the

amount of effort expended to agree on prices because individual buyers do not have to engage in negotiation processes with the manufacturer (although they do have to negotiate agreements with the intermediary). Figure 2.7 below illustrates an extreme situation with only one large manufacturer. The point is, however, the same whether the intermediary purchases products or services, and its customers again are of small to medium size. If the customer itself purchases much larger volumes of a service or good than the intermediary, then this effect clearly does not apply.

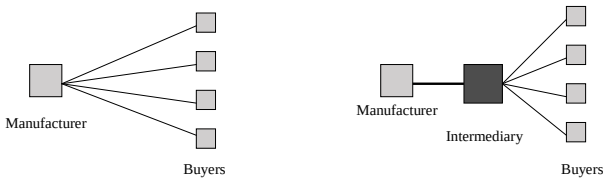

Figure 2.7: Achieving scale advantages

The benefits of size have been explored extensively in the literature to study its effect on power in distribution channels (Reve and Stern, 1979, Stern and Reve, 1980). The core issue is that a manufacturer or service provider becomes more dependent on a large buyer, thus creating more power for the buyer. This should then be reflected in concessions on prices.

The two sources of scale advantages presented here are quite different – one relates to improved efficiency because activities are carried out at or near their appropriate scale; the other relates to the redistribution of benefits in the distribution system because the intermediary accumulates power.

c) Task and skill specialisation

The third basic function of an intermediary is to provide task and skill specialisation. This point may be similar to the economies of scale and

reducing business ties argument in that the intermediary has a specific role with regard to certain tasks. However, while the previous two functions did not assume any superior competence on the part of the intermediary, task and skill specialisation is based on competence. In a distribution setting, the intermediary would specialise in certain distribution tasks, such as coordinating orders, transport, financing or warehousing operations. A second dimension could be the customers served or the specific products or services provided (Porter, 1996). Alderson points to sorting as a fundamentally important skill for the intermediary: "The justification for the middleman rests on specialised skill in a variety of activities and particularly in various aspects of sorting" (Alderson, 1954, p.14) The impact of IT systems, however, may mean that some of the sorting operations are now more easily performed, i.e., represent a less significant part of what the intermediaries provide.

To have a useful role, the intermediary will have to either carry out operations with greater skill and efficiency (if this skill is due to experience curve effects, it is admittedly very close to the advantages of scale argument), or it must represent a qualitatively better way of doing business. That is, the intermediary may organise the distribution system in a different way more suited to achieving the goals of its customers. The existence of superior competence can be based upon core competence (Prahalad and Hamel, 1990) or resource-based view arguments regarding sustainable competitive advantage (Barney, 1991, Conner and Prahalad, 1996). A more detailed exploration of these points is not appropriate here, since it would detract from the focus on distribution.

Interestingly, Alderson also states: "The opportunity for a firm to specialise in marketing activities obviously depends on the existence of other firms. The development of one type of intermediary changes the marketing structure and may prepare the way for still another type" (Alderson, 1954, p.18). This increasing specialisation is seen as a recent trend in distribution channels, leading some authors to recommend a network approach for describing the firm structure (Gadde, 2000).

Regardless of the approach used to describe the changes, the need for inter-organisational coordination and relationships increases. As stated by Gadde:

The theory of non-proportional change explains why specialisation tends to increase when new technology is implemented. The reason is that specialisation makes it possible to undertake each activity on its optimum scale. (Gadde, 2000, p.13)

In other words, specialisation contributes to efficiency through each activity being carried out at an optimum scale in terms of plant size or machinery. This makes it much harder for individual firms to carry out all the operations in-house since they no longer "fit" together in terms of scale. The tendency for separate actors to carry out activities means that coordination is no longer just intra-organisational, but also inter-organisational.

d) Risk sharing

The final function or area for an intermediary, building on the functionalist literature, is risk sharing and distribution. Generally, the concept of risk is used to deal with a largely known probability distribution of outcomes for a process or activity, and assigns a certainty equivalent or set sum that a firm or individual considers equivalent to such a distribution, based on their tolerance for risk. Typically, a firm with a low risk tolerance will settle for a lower immediate payout rather than take the chance of a poor outcome (Bazerman, 1994). This leads to the conclusion that poor risk management and badly distributed risk in the system is costly.

Alderson gives three general strategies for handling risk

a) The shifting of risk
b) The pooling or hedging of risk
c) The elimination of risk through control of the operating situation

(Alderson, 1954)

The shifting of risk means moving risk from one actor in the distribution system to another. There is a great difference between, for example, getting a fee for the handling of a car and having the same car in inventory with tied-up capital if it does not sell. The shifting of risk from other actors to the intermediary is only advantageous for the system if the intermediary is better able to tolerate the risk. This does not mean that risk is always shifted to those most able to carry it, since powerful actors may move risk to other actors as a means to protect themselves rather than to minimise the overall distribution costs (see for example Helmers (1974) on the development of automobile franchising).

The pooling and hedging of risk refers to basic risk handling mechanisms. A typical example is a central storage facility holding stocks of goods upon which local retailers can call when local demand fluctuations means that they are sold out. If local demand variation is at least partially independent, then the aggregate variation is small at the central storage facility, and the total amount of inventory needed in the system to achieve the same level of availability is smaller than if every local retailer were to hold the entire inventory (Heskett, 1977, Alderson, 1965). Historically, this role was taken

by wholesalers who bought and held inventory for sale to retailers (Gadde, 2000). It may be, however, that the same effect is achieved even if the intermediary does not own the stock, but is simply responsible for managing its distribution to regional storage facilities.

The advantage of a large wholesaler, who can absorb fluctuations in local demand for the benefit of all, has already been described. This is a pooling of risk leading to reduced inventory for handling that risk, i.e., a net gain in the system. Hedging of risk refers to diversification into other areas that are not expected to vary in the same way – i.e., operating in several industries, or financial diversification into different industries. For an intermediary, particularly one that is specialised, to obtain some of the benefits described above can be a difficult tactic since diversification would mean moving into areas where the intermediary is not as strong. We do, however, observe such moves in the third-party logistics industry, where service providers try to move into value-added services to avoid cutthroat competition in the basic transport segment (Berglund et al., 1999, Hertz and Alfredsson, 2003, Persson and Virum, 2001, Marasco, 2008, Selviaridis and Spring, 2007).

The third point, the elimination of risk through control of the operating situation, is particularly interesting here. In effect, it means that an intermediary can reduce the risk of error in the system by taking over important operations, and making these more reliable through the application of standards, knowledge and competence. This refers back to the discussion under part c here - task and skill specialisation. If the intermediary is able to carry out operations better through specialisation, then this is a fundamental justification for employing the intermediary. Theoretical justification for such an argument can be found in core competence arguments, but for the purposes of intermediaries, an important question becomes whether intermediaries are operationally more efficient than manufacturers who carry out the same tasks themselves.

2.4.3 The third party logistics (3PL) literature and its relevance to roles

Alderson quite succinctly describes four basic functions for intermediaries. These are very useful for the analysis of intermediaries, but there are also a number of issues with which one must deal. The first is that Alderson describes functions rather than roles. However, it also seems quite possible that each of the functions can be related to one or more roles.

The challenge in this dissertation is taking the four functions described so succinctly by Alderson, combining them with more recent literature and applying the results in a contemporary setting. The expectation is that some of the descriptions will be highly relevant, while some will be less so.

However, the combination will enable us to create a classification of roles relevant to the setting. Considering the discussion of each of the four functions in particular and the previous discussion about changes in distribution systems, we can make the following initial remarks.

Contrary to the setting described by Alderson, many current distribution systems involve many actors, so that an intermediary may only be performing some of the activities described as part of a role. This is quite a significant change, since it begs the question of whether the roles remain the same, just for a smaller set of activities, whether they effectively disintegrate, or if they can only be carried out by a combination of several firms. Another possibility is that firms will try to combine the roles in new ways to obtain enough business, or perhaps achieve some type of economies of scope by putting together slightly different variations on the roles for different customers.

Some of these issues can only be addressed by studying a current distribution system; and some recent literature has addressed similar issues. In particular, the 3PL literature describes many of the issues mentioned for current distribution systems. A basic definition of 3PL is given by Lieb: "the use of external companies to perform logistics functions that have traditionally been performed within an organisation." (Lieb, 1992, p.29) There are many versions of the definition emphasising different levels of management support and length of contracts (Marasco, 2008). This basic definition should be sufficient for discussion here however.

Before seeing how this applies to the question of roles, we should note two important limitations. The 3PL literature follows closely from the outsourcing trend in business and is closely tied to the development of a specific industry (Marasco, 2008, Selviaridis and Spring, 2007). Much of the literature is descriptive and quite heavily empirically driven, but there are also relevant classifications of firms that can be used. The 3PL literature also focuses exclusively on logistics providers and specific types of services: "Typical services outsourced to TPL providers are transport, warehousing, inventory, value-added services, information services and design, and reengineering of the chain." (Hertz and Alfredsson, 2003, p. 140) Considering this description, it is clear that such 3PLs can be described as intermediaries. However, 3PLs do not cover all conceivable types of intermediaries in the descriptions.

In relation to the four functions presented above, 3PLs are very significant because they are only service providers and thus do not take title to the goods, unlike the intermediaries in Alderson's setting. A typical 3PL setting is described as follows: "The third party is a firm acting as a middleman not

taking title to the products but to which logistics activities are outsourced." (Hertz and Alfredsson, 2003, p. 140) Putting this differently, the 3PL firm provides a resource or a service. There is, however, no great agreement as to whether a 3PL has a "natural" role *vis-à-vis* other firms in a distribution system: "…the nature of each 3PL function is conditioned by the extent to which client firms encourage third-party involvement as well as their underlying reasons for outsourcing." (Bolumole et al., 2007, p. 45). Other authors have pointed to the need to secure resources as an important reason for considering the 3PL a strategic partner (Selviaridis and Spring, 2007).

The need to secure resources can be a direct consequence of outsourcing of certain activities, which, although not core activities for the firm, are, nevertheless, integral to serving their customers. Distribution activities can clearly fall in this category. Alternatively, changing distribution systems can result in certain specialists having control over critical resources that many firms are dependent on without actually having outsourced these at any stage. A typical example here would be specialised transport resources such as refrigerated containers that a manufacturer may or may not wish to own, but which are, nevertheless, critical for transporting certain types of goods to the customer (Burnson, 2008).

The relevance of resources and the importance of securing access to them in the 3PL literature have certain implications for the concept of resources used. These implications match well the assumptions in the resource-based view (RBV). In the RBV, resources are broadly defined: "…firm resources include all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness." (From Daft, 1983, in Barney, 1991, p.101). The concept of resources is both extensive and positive in this case, i.e., the possession of a resource, according to this definition, is a definite asset of the firm. Furthermore, resources are heterogeneous and their value cannot be completely defined. In the RBV, resources must have VRIN qualities to give competitive advantage - that is, they must be valuable, rare, inimitable and non-substitutable. Although we do not focus here specifically on the concept of competitive advantage, we can use the VRIN argument briefly to show the qualities of the resources:

> *(a) it must be valuable, in the sense that it exploits opportunities and/or neutralises threats in the firm's environment (b) it must be rare among a firm's current and potential competition, (c) it must be imperfectly imitable, and (d) there cannot be strategically equivalent substitutes for this resource that are valuable but neither rare or imperfectly imitable. (Barney, 1991, pp.105-106)*

Comparing this argument about resources with the functionalist literature, it acts as a complement to the task and skill specialisation function, where the intermediary or third party bases its superior performance on the possession of certain resources. The 3PL literature suggests that beyond simply specialised skills, the ability to provide important resources to customers may be tied to the role an intermediary takes in a distribution system. The argument is partially that the intermediary takes on the task of making the necessary investments in such resources and is responsible for their efficient use. Furthermore, using the RBV definition of resources as a guide, we see that such resources can contribute unique value because of complexities in the way they are used, meaning that it is not just a temporary shortage of resources (such as trucks for transport) that creates an opportunity for the intermediary. This argument about resources should then be relevant in terms of the discussion about roles in Chapter 9.

The 3PL literature discusses a fourth possible category of lead logistics provider or logistics consultant, often called 4PL (Marasco, 2008, Selviaridis and Spring, 2007). These labels, however, cover many other aspects as well. A common theme is the ability to organise a part of the distribution system, and thus to create effectiveness by doing the right things, not just superior operational performance. This is highly important for an intermediary because it means that the rationale for the use of the intermediary is taken to a higher order construct, i.e., knowledge of the distribution system allowing it to better organise the system as a whole. This need not mean organising the entire system, but at least significant parts of it. Clearly such a remit is not unlimited and will most likely be subject to a number of restrictions. The ability to organise parts of the system goes beyond the obvious ability of traditional intermediaries to organise their internal operations, and can be also undertaken by intermediaries that do not take title to the goods (Persson and Virum, 2001). Indeed, some of the intermediaries most heavily involved in re-organising the distribution system do not take title and have very few resources. This could reflect quite a different role to the discussion about resources above, since it is partially the lack of resources that makes it possible for the intermediary to act as a neutral, third party in organising the system.

The purpose in drawing on the 3PL literature here has not been to obtain finished roles to use in the framework. The entire point of the concept of roles is that they will be emergent in a setting using the building blocks of the literature discussed. Thus, the advantage of the 3PL literature is that it handles exactly some of the settings that are not studied in the older functionalist literature, because this type of setting was not available at that time. This means that there are aspects of the more variable contemporary

distribution settings that are reflected in the 3PL literature. As in the functionalist literature, these aspects will be building blocks, but since they are not formulated precisely as functions, it is necessary to start with a broader discussion to get at the relevant aspects of the literature. It is clear that problems tied to the issue of resources are important in the 3PL literature, as are new arrangements such as 4PLs where intermediaries can take on much larger responsibilities. What is not as clear, however, is how these concepts will fit in with a role framework here, but this is a challenge that can only be answered through studying an empirical setting. This, in turn, depends on well-formulated research questions.

2.4.4 Research questions regarding intermediaries and roles

The discussion of roles for intermediaries started with the four main functions from Alderson, which have been extended and broadened by combining them with newer literature concepts, primarily that of 3PLs. This has shown that there are potentially many roles that an intermediary can take. However, we have not yet arrived at a final classification of roles, since the intention is to use an empirical setting, in combination with the quite extensive building blocks available, to arrive at such a classification for the specific setting in the study.

This presents us with a somewhat different problem than the previous two sections because the theoretical framework is not in place to the same degree, and will be affected to a much larger degree by the specific setting we study. A better approach for the research questions in this section then, is to construct the questions starting with the setting and using the relevant theoretical building blocks. This is heavily tied to the way roles are conceptualised here – if roles are relevant to one particular firm in one particular setting, then the study of that setting itself must generate the relevant roles. This is also the only way to use the empirical material to develop further the understanding of roles. We cannot say anything specific about the empirical setting, since this is a matter for the methodology chapter, but it becomes obvious that the choice of an appropriate empirical setting is important for the way we answer the research questions in this section. The first research question is made relatively simple to allow us to operate in a context of discovery and lean on the study, but it should be quite clear now that the theoretical baggage and concept of roles has been formulated in this section. The roles arrived at have been suggested by the functionalist literature and the 3PL literature, but there may be new roles not suggested by either of these. By starting with the empirical domain, we make it possible to study all of these alternatives. This empirical domain should exemplify some of the variety discussed in the theoretical chapter, and should, of course, be a contemporary setting.

Research Question 3a (RQ 3a): What roles for intermediaries can be derived from contemporary distribution systems?

This research question covers a classification of roles for one setting, but as the concept of roles used here suggests, it is possible for a firm to take on several roles, either *vis-à-vis* one counterpart or different counterparts. The challenge for the firm is to combine these roles in a meaningful way and to make them work in the distribution system. There are two aspects to this. One is whether the roles conflict with each other, making it difficult for the same firm to take on certain roles. The second is whether the roles can reinforce each other, essentially whether the whole set of roles taken on by a firm is greater than the sum of its parts. The answers to these questions will depend crucially on the roles from the first question.

Research Question 3b (RQ 3b): What challenges and opportunities exist for intermediaries in combining roles in contemporary distribution systems?

Together, these two relatively open research questions will give a very good understanding of how roles operate for one firm in a specific setting. The entire point in keeping the research questions open is that it allows the setting to "speak" in terms of roles and allows us to use the building blocks from various literatures discussed above without imposing too many constraints on the setting.

2.5 The framework

At this stage, it is useful to integrate the three main parts of the research framework to give a general research model. As was shown in the introduction, the parts themselves could be defined early on, but the content of each was not clear. Now, we can enhance the framework by drawing on the most important elements from each section of the discussion to give us an overall framework for use in the study. This framework has too many aspects to be fully explored in this study, but the combination of the research framework and the specific research questions gives us a starting point for the empirical study. Table 2.5 below shows the research questions. As is seen from the table, most of the research questions formulated deal directly with points of interest from the theoretical framework. These are important for the understanding of the whole distribution system, and to make additional contributions to the literature beyond the focal problem statement. Some research questions such as RQ 2a deal directly with the connections between the main blocks, which is a central theme in the dissertation, but the framework also implies a further discussion of these issues, which is revisited in Chapter 10.

Research Question 1: Structure of the distribution system
Research Question 1 (RQ 1): What alternative distribution arrangements can exist in a particular industry in terms of hybrid arrangements, customisation and modularisation, and postponement and speculation? *Research Question 1a (RQ 1a): How are hybrid distribution arrangements used to handle different demands on a distribution system?* *Research Question 1b (RQ 1b): How are the modularisation of products and different degrees of customisation to consumers used to handle different demands on a distribution system?* *Research Question 1c (RQ 1c): How is postponement and speculation by making-to-order, making-to-inventory and placement of inventory in the distribution system used to handle different demands on a distribution system?*
Research Question 2: Interdependencies and coordination
Research Question 2 (RQ 2): How are the coordination mechanisms (standardisation, planning and mutual adjustment) used in complex distribution systems to handle activities with different interdependencies (pooled, serial and reciprocal). *Research Question 2a (RQ 2a): How do the different types of interdependencies among activities (pooled, serial and reciprocal) affect intermediaries and their roles?* *Research Question 2b (RQ 2b): How does the need for the use of common resources and consequent pooled interdependencies affect intermediaries and the coordination mechanisms used?*
Research Question 3: Intermediaries and roles
Research Question 3a (RQ 3a): What roles for intermediaries can be derived from contemporary distribution systems? *Research Question 3b (RQ 3b): What challenges and opportunities exist for intermediaries in combining roles in contemporary distribution systems?*

Table 2.5: Research questions

Some main points can be made regarding the framework. The framework comments on the relationships between the three blocks studied here. Because this is not a causal study and although we believe there are interactions between the different concepts, the most important point of the framework is to show the main variables used to describe each concept. We see that the structure of the distribution system is an important departure point, with several features such as customisation and modularisation defining the technology of production required, and also provides opportunities for forming the technology of use. It is also here, that many of the features of contemporary business settings manifest themselves, since

these can often be described in terms of either the user or manufacturer technology. The model, as presented, is also static, in that it does not describe effects over time, although we will make some comments on this in Chapter 10 regarding the interactions among the elements. Combining this logic with the main elements from the literature discussed in the previous sections, we propose the research model shown in figure 2.8, using the most relevant parts of the framework.

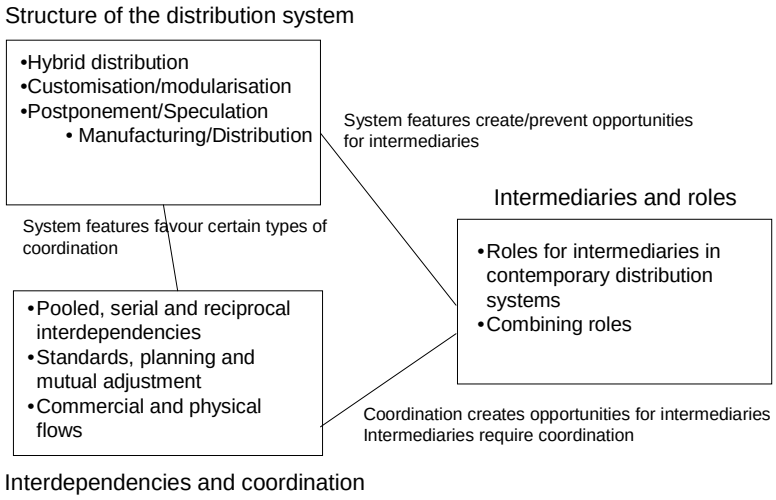

Figure 2.8: Research model

The model shows the main connections simply as lines in order to focus on the interaction between them, although we could formulate many specific effects in either direction. The framework shows the main blocks and the main variables in focus, and the empirical study must then match this in a general sense. For each section, there is an extensive backing literature, and this allows us to discover nuances in the actual study. Research questions cannot be formulated specifically to cover all the possible relations among the variables here, but the model itself is only a selection of variables that could be used to describe the distribution system and coordination, so, in itself, this is not a problem. That is, we do not claim that the model is exhaustive for describing distribution systems, but rather that it is useful for the problems discussed in this study.

The model can be summarised as saying that features of the distribution system tend to favour certain ways of coordinating. The same features create opportunities for intermediaries, who can take on a number of roles or combinations of roles, successfully. The resulting splitting of activities, however, creates a considerable need for coordination, the appropriate type being dependent partially on the features of the activities themselves.

Chapter 3: Method

3.1 Introduction

The choice of method and research approach should follow from the research question and objective of the study (Morgan and Smircich, 1980). It also crucially depends on basic assumptions about knowledge, i.e., epistemology and ontology (Halldorsson and Aastrup, 2003, Lincoln and Guba, 1985, Mentzer and Kahn, 1995). This choice is clearly not automatic since a phenomenon can be studied using several approaches. Particular streams of research tend to prescribe specific research approaches, and the researcher's preferences, and in some cases the appearance of particular phenomena, can also affect the choice in practice (Goulding, 1999). Consistency among the objectives and methods used to reach these remains important however.

This study addresses the role of intermediaries in distribution systems with the main focus on activity structures. To examine different roles, it is essential that the empirical context studied shows some variation in these structures and the roles. Variation, in terms of structures, is captured by some selected variables such as hybrid distribution, customisation and modularisation, and postponement and speculation. A critical point of departure for this study is that the literature suggests that tasks previously carried out by firms labelled intermediaries are now divided up among a large number of specialists. It is an important question how this changes distribution systems, and also what options exist in terms of structuring such a system, e.g., what variety is available. In the theoretical framework, this also included the issue of how coordination is carried out. The role of traditional intermediaries has been described extensively by previous authors (Alderson, 1954, Alderson, 1965, Morris and Morris, 2002, Mudambi and Aggarwal, 2003, Shaw, 1912), but the changes in distribution systems, especially with regard to increased specialisation, begs the question of whether new roles have appeared and what features these have. Regardless of how roles are defined, it is probable that there are a number of possible roles for intermediaries depending on the distribution system.

3.2 Research assumptions

The purpose of stating the research assumptions used herein is to establish the nature of the study, and importantly, to set the quality criteria to be used

for the study. This section presents the basic assumptions made in this study.

The most fundamental research assumptions regard ontology and epistemology. Ontology is perhaps the most basic of the two: "Ontology concerns questions about the nature of reality – whether an objective reality exists or not." (Bolumole et al., 2007, p.186) Epistemology "deals with how we perceive the world, and the relationship between the researcher and the known." (Ibid) The view of epistemology will often be described as to whether it is possible to obtain objective knowledge about reality, and to what extent the researcher affects the knowledge obtained both through the act of gathering it and in formulating it.

Both ontology and epistemology can be placed on a scale from a subjectivist to objectivist understanding of science. In this dissertation, we will be proceeding from the basic position that both ontology and epistemology are largely subjective, i.e., that there is no fully objective reality to be described, and further that the methods used represent an interpretation of reality that depends on the researcher. This point deserves some elaboration.

The traditional approach used in much of distribution research has been strongly positivist, implying a belief that there is an objective reality, and that this can be described in an objective manner (Gattorna, 1978, Halldorsson and Aastrup, 2003, Williamson, 1981). The attraction of this approach is obvious since the study of distribution is usually tied to the movement of actual and tangible goods. However, the concept of roles and variety is several times removed from a particular product being shipped by a trailer. A firm is a social construction (Berger and Luckmann, 1966), and its role in terms of particular activities and resources is similarly also a construct (Kvale, 1995). The consequence of this assumption is that any description of roles in this study should be considered more or less useful rather than more or less real.

The challenge for the researcher is to be specific enough to obtain meaningful data given limited resources, whilst not being so specific as to miss relevant aspects the researcher had not considered in advance. This is referred to in the literature as allowing "active data" to emerge, i.e., data volunteered by informants[5] as relevant to the setting without specifically asking for it (Dubois and Gadde, 2002).

[5] In this chapter interviewee and informant are used interchangeably since the two were the same for practical purposes in the study.

3.3 Choice of case study as an approach

This study is interpretative in nature, and although such studies are often carried out through a case study, the two terms are by no means synonymous. Significantly, a "Case study is not a methodological choice but a choice of what is to be studied." (Stake, 2000, p.435) Although Stake describes a case as having natural boundaries, other researchers such as Ragin (1992) point to the necessity of defining the boundaries of the case. That is, unless the researcher defines such boundaries, the case will expand beyond a manageable size, and it may not give any meaning as a unit. In this section the choice of a 'case approach' for the dissertation is discussed.

A case study is most suited to focusing on a particular phenomenon where the researcher cannot control events or manipulate outcomes. It is useful for obtaining "rich descriptions" for detailed exploration of phenomena. Although case studies can be written in a variety of ways, it should be possible to answer the question of what something is a case "of."

Here, as detailed in section 3.4, we have a case of an intermediary providing a range of services to several car importers, each of which represents a distribution system of its own. This provides considerable variation within the case. It is essential to find detailed information on what the variation is, to be able to describe this along some broadly defined dimensions based on the theoretical framework, and not least, to be able to describe how the intermediary fits into the different systems. This is best done through rich descriptions of the system along several dimensions such as activity structures, resources and the nature of the actors involved.

The next question to answer is whether to carry out one or several case studies. A core reason for doing a case study is interest in the individual case (Stake, 2000). Thus, in this sense, the first purpose in carrying out a case study is to understand the individual case. This feeds back to the question of bounding the case, which is discussed below. However, it also begs the question of why the researcher is interested in the individual case. The case can be intrinsic, instrumental or collective (Stake, 2000). An intrinsic case is undertaken to understand a particular domain. An instrumental case is undertaken to provide insight into an issue or generalisation, while a collective case study is carried out to study a phenomenon or population. The case here is best described as instrumental in that the interest is in the phenomenon of variety in distribution and intermediaries. It is also this that makes a single case most appropriate. An intermediary is, by its very nature, likely to be part of different systems, and to understand these, it is imperative to delve deeply into the case centred on the intermediary. Multiple cases would then probably involve multiple

intermediaries, but this would mean a very extensive project and it is not clear exactly what comparisons could be made from such an approach. Rather, the overlaps in the single case show more clearly the variety and role of the intermediary in different systems.

Finally, a case study describes both a process and an end result. The present research will be presented as a case study using a focal firm, and bounded by the distribution system for cars in Norway, and to some extent, in Europe. Since the nature of the distribution system is that manufacturers are highly important, three different manufacturers or importers are included in the case study. The presence of three different manufacturers represents the main source of variation which is a main topic here. The exact limitations or bounding of the present study is presented below in section 3.5 of the study.

We can make some final remarks in relation to the case. Variation is achieved through including elements of several systems in the case, and also through the use of a previous literature on intermediaries which also has something to say about roles. This gives both an empirical variation and a connection to a theoretical baseline (Normann, 1980). An important component of the theoretical framework is the description of roles, and this will have to be done through confronting the existing work on roles with the framework. It is the integration of these two that will lead to a new typology of roles, and for this, a rich description of the domain is needed where particular behaviours or structures can be related to roles.

3.4 Empirical setting

To be able to study different possible roles for intermediaries in a distribution context, it was essential in this study to find a distribution system with sufficient variety to have an empirical basis for study. Car distribution was chosen as an empirical setting for a number of reasons. As a starting point, it is a setting with sufficient scope for variation, in that there are many different manufacturers from different parts of the world, and cars are distributed in many different ways, at least from the point of view of the customer.

It was decided to focus mainly on the distribution of cars in Norway, since this would still show elements of the different manufacturers' systems, whilst limiting the scope in practical terms. That is, it would show the variation from the different manufacturing systems within the Norwegian setting, although for one of the systems studied this also included the regional Scandinavian system. Furthermore, the presence of Autolink, a Norwegian (expanding into Scandinavia) car transport and logistics firm as a large player in the Norwegian setting, opened up a number of possibilities with

regard to the purpose of the study described above. In order to show why Autolink was chosen as the focal firm, a short description of the empirical setting is useful.

Car distribution in Norway deals with inbound traffic since there is no domestic production. Most cars arrive in Norway either by railway or road from Sweden, or by ship from many countries. The majority of ships land at either Oslo or Drammen, with good proximity to the main markets in southern Norway. Most major car manufacturers sell cars in Norway, with such brands as Toyota, Volkswagen and Mercedes having strong market shares. The approaches of the various manufacturers are somewhat different, with some having regional systems centred on ports in Sweden, while others have local operations in Norway. In general, each brand has an importer in Norway to deal with customs handling and to act as a support for the dealers. Some manufacturers, however, simply have national sales offices.

Car manufacturers do not normally own or operate car transport systems, and so direct transport services are purchased from other firms. The same is true for additional services such as repair work, to varying degrees. In Norway, Autolink has a roughly 80% market share for the transport of new cars, making it a dominant actor in this setting. This means that the firm has most of the large importers as customers, and covers the entire country in terms of delivering the finished cars to dealers or customers. Figure 3.1 below shows the major firms involved in the distribution of cars to Norway.

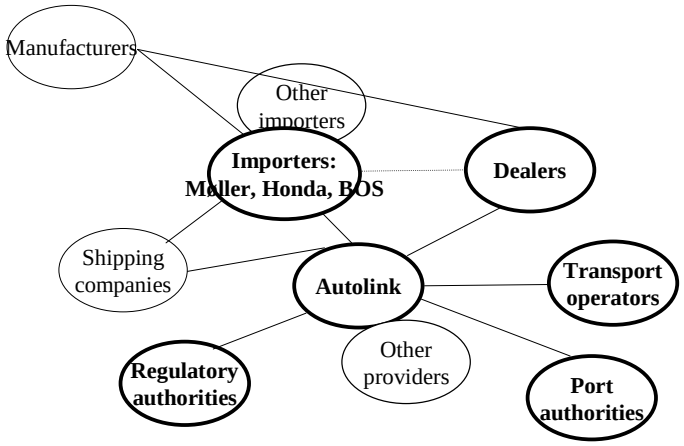

Figure 3.1: Autolink and the distribution system
(Actors in boldface represent the main focus)

Autolink offers a variety of services to its customers from basic transport to modifying or rebuilding cars (modifying is used throughout here since the changes made to the cars do not normally change the car fundamentally). Each customer picks the appropriate services from a "menu" and agreements are made according to this. Customers are typically importers or dealers, but this is always tied to a specific manufacturer's distribution system since this sets the rules for the dealers and importers given the large influence of the manufacturer on these systems. For some manufacturers, the dealers are obliged to use Autolink for all services, while for others using Autolink is simply an option.

This short exposition on the Norwegian distribution system and Autolink shows us some critical factors. The major factor is that there is very likely a high degree of variation in this system, due to the different manufacturers, different distribution systems bordering on the Norwegian one, and due to the options Autolink gives its customers in terms of picking from a range of services. Since Autolink has such a large part of the distribution of new cars in Norway, it is also involved with a number of different importers, and as such, it is reasonable to expect that it must somehow deal with a variety in terms of each manufacturer's system. In this sense, Autolink and the

Norwegian distribution system is an excellent point of departure for studying variety and the role of intermediaries, of which Autolink is a clear example. The exact bounding and limitations of the study are discussed further in the section below on case studies. The reasons for choosing the particular importers studied are also discussed below in section 3.5.1.

3.5 The empirical study

3.5.1 Selection and bounding

The choice and nature of the empirical field for the study has already been described. Here, more details about exactly what the case in this dissertation constitutes are shown, and some of the choices made with regard to bounding the case.

The scope of the current study is limited in a number of dimensions in order to make the case manageable and relevant to the research questions investigated. The study was tied to the Distribution Networks in Transition (DNet) project at BI Norwegian School of Management. This project covered three different industries (one of which is car distribution) and ran from 2003-2007. The time period covered reflects the duration of the project as well as the data collection period (the two are largely overlapping). Since data collection is largely interview-based and the interviews were carried out in several phases, this means that observations will be more heavily clustered in certain time periods. Although it is, of course, possible to ask interview subjects about what has happened before and after, this is different from constant observation throughout the period. As will be shown in the case itself, the period covered involves some significant changes, but clearly this would be the case both for the period immediately before and after the project. The case must necessarily be a snapshot or a number of combined snapshots.

The second major issue is how much of the distribution system to cover. The main focus of the study will be on the distribution system in Norway, partially because of access to firms and project resources. A description of the distribution system in Europe as a whole is a very extensive proposition involving a large number of interviews (See e.g., Hallstrôm (2005)). The distribution system in Norway cannot be described without some reference to the general distribution system in Europe, however, and such references will be made where appropriate. Certainly the interview subjects also made such references during the interviews and some interviews took place in Sweden since some manufacturers with distribution hubs in Sweden treat Scandinavia as one unit. It is also relevant to ask what this is a case of, i.e., with a focus on a particular firm providing transport and other services in

Norway, albeit to large manufacturers, it seems reasonable to limit the case to this firm and a set of its most important counterparts rather than extend the case to the entire car distribution system, which is extremely large and global in nature.

This dissertation considers the distribution of new cars in Norway, i.e., cars produced elsewhere and imported into Norway for distribution to end customers. The used car distribution system has a different flow altogether, and although it is not entirely separate from the new car distribution system, it is sufficiently different that exploring it as well would make the study too large and diverse. The system for distribution of spare parts for cars is of course linked to the new car distribution system, since the number of cars distributed affects the need for spare parts; however, these systems are not closely linked otherwise. Spare parts are therefore also excluded from the case study. Clearly the three areas of new cars, used cars and spare parts could be made into separate cases describing roles in distribution. New car transport, however, most clearly demonstrates the variation this study investigates since various car manufacturers have somewhat different distribution systems.

The case however is not only Autolink itself, since this would not give any meaning to the concept of a role, nor show any relevant variation. That is, a firm can only have a role relative to other firms or more conceptually within a distribution system. Within car distributions, most systems are heavily dominated by the manufacturer. Thus, it makes sense to talk about how Autolink is placed within the distribution system of a particular manufacturer, as well as to look at how it operates as a link among the systems of several different manufacturers. This is perhaps the central challenge in terms of defining a case in this study. That is, the focal firm is Autolink, the case is Autolink in the distribution system for cars, but this system is made up of a set of somewhat different, manufacturer-dominated systems. In this sense, Autolink overlaps with the manufacturers' systems but remains the focal firm (Hailinen and Törnroos, 2005).

In this study, a potential approach is to look at Autolink's role *vis-à-vis* all Norwegian car importers since this would cover all possible observations of Autolink's role in car distribution systems. This would be too extensive a task in terms of this study however, although the total number of importers is not so large as to make it an impossible task in general. In this case, three importers are explicitly included. The reason for looking at three importers is partially due to resource constraints and partly due to research strategy. The resource constraint issue is fairly straightforward in that with the time and resources for the project, it was felt that including three importers and thus manufacturers' systems was a reasonable balance between depth and

variation. The research strategy issue was that this number would allow for sufficient variation on central parameters to make the study interesting. Although authors such as Eisenhardt (1989) and Perry (1998) recommend 4-10 cases for comparison purposes, the purpose here is a more basic one of obtaining variation for the analysis within the context of a single case. Since, as will be seen later on that there is also variation within each manufacturer's system, it is felt that the goal of including variation was achieved.

For practical purposes, the importers were used to define which manufacturers' systems to include. The importers function as Autolink's main counterparts in most contract and daily operations. These importers are the manufacturers' representatives in Norway, and although the manufacturer defines standards for their distribution systems in general, it often falls to the importer to make sure these are followed. A second reason for using the importer as a central actor for defining each distribution system is that some importers represent several makes (Mercedes, Peugeot, etc.) of car and in such cases negotiate with Autolink on behalf of several manufacturers at the same time. Focusing on only one manufacturer may lead to missing crucial aspects of the case. As will be seen in the cases, however, the position of the importer itself in relation to the manufacturer varies so that it is not possible for the descriptions to be identical. This should be seen only as a practical modification to the point that Autolink must relate to the distribution systems of a number of manufacturers – these systems are still there but for some of them Autolink does business with one importer instead of several manufacturers. The inclusion of importers naturally means the inclusion of the corresponding dealer network. The dealers are the natural delivery point for cars since this is where the customer normally picks up the cars (although some cars can be transported directly to the customer), and this was considered as a good "end-point" for the car. That is, no customers have been interviewed in connection with this study since the dealers represent the final handover point for distribution.

Having established that three importers were a reasonable figure, the next step in the actual research process was to identify which particular importers to include. This process was sequential, carried out in several stages, and to a certain extent, adaptive. This means that the first stage of data collection primarily sought to establish familiarity with the setting. This included interviews with several importers that were not included as cases in the final study. This familiarity made it easier to select importers and select which manufacturers' distribution systems to use. In the second stage, the particular importers to approach were identified, and data collection was pursued in a largely sequential manner – the first importer was interviewed, then the second was contacted, and so on. This is not to say that there was

no overlap in the contact of importers, but a great deal of time was spent on the first importer in particular before proceeding to the next two.

The criteria for selecting the importers were not absolute in the sense that there was a limited number to choose from. A number of concepts were already present from the literature, and the overall purpose of the study helped in choosing the most appropriate of the available importers. Some important factors also emerged in the initial data collection. First, the size of the importer in terms of how many cars it handles is important since this could say something about relative power, the opportunity for making specialised systems, and of course the type of operation. A second potentially important issue is whether the importer represents one or many manufacturers. This may have to be qualified in terms of whether the cars are "related" allowing similar operating procedures to be employed for handling them. A third factor that could be important is whether an importer or the distribution system is domestic or regional. The main reason for this is that a regional system might have a different task distribution than a domestic one and this could affect Autolink. Note that the term "domestic" in this connection means one in which Norway is a separate system for the manufacturer since there are no domestic manufacturers. This will be tied to the European system directly. A regional system is one where a regional hub is placed centrally for Scandinavia and the national importers have reduced areas of responsibility. Finally, the main production locations for the car manufacturers differ and this could be relevant to the study in terms of basic lead times.

The first importer selected was Møller logistics. The case had several features to recommend it. Møller is one of Autolink's largest customers and imports, amongst other cars, Audi and Volkswagen. Volkswagen is the largest or second largest make of car sold in Norway depending on the year, so the case satisfied the criterion of size. Møller is an independent importer and domestically owned. Volkswagen has a distribution system organised at the European level with Norway as one unit, satisfying the criterion of being "domestic." This may then be said to represent one large domestic importer serving one main manufacturer. An additional noteworthy feature of the importer is that Møller has a significant operation for receiving and handling cars, so that Autolink is used only for transport. Additionally, Møller was a project participant which makes it easier to come back to Møller and ask for more data;, it was also used to allow a case structure to emerge, making it easier to know what issues to cover with regard to subsequent importers.

The second importer, Honda, is quite different from Møller on several of the criteria. Relatively speaking, Honda is a small car brand in Scandinavia, with sales in Norway of approximately 4,000 per year. Like Møller, Honda

represents a single manufacturer's system, but it purchases a wider range of services from Autolink, such as interim storage. Notably, Honda has a regional system with a Scandinavian hub in Malmö, and this is the main reason for looking at Honda in this study. Certain distribution tasks are carried out at this hub for all Scandinavian cars, and some joint services are provided by Honda's headquarters near London as well. Since Autolink has started expanding into Sweden and the car hub in Malmö has grown significantly in recent years, this choice represents variation in distribution arrangements.

The final importer, Bertel O. Steen (BOS) is a large domestic importer with a number of manufacturers such as Mercedes and Peugeot in its portfolio. The presence of a large volume from a number of different manufacturers is the main difference from Møller, since both are large importers and neither is tied to a regional system. This difference is thought to be quite significant, since each of the different manufacturers is expected to have particular standards for their distribution systems, and this must somehow be reconciled both by BOS and Autolink. Discussions with key informants also suggested that the BOS system was organised differently.

Table 3.1 below summarises the main features of the three systems chosen.

	Møller	**Honda**	**Bertel O. Steen**
Size/volume	Large	Small	Large
Type of system	Domestic/national	Regional	Domestic/national
Number of manufacturers	One main	One	Several
Production locations	Mainly Europe	Some Europe, Asia	Various, mostly Europe
Scope of services purchased	Narrow	Wide	Wide

Table 3.1: Features of the three selected systems

The table shows clearly that each of the importers varies in several regards relative to the other two, and inclusion of all three covers many of the possibilities in the system. However, since only three importers are included in this case and a number of others are not, it is clear that the study cannot capture all the variations in the setting. The alternative would be to include all importers in the Norwegian setting, but as discussed previously, this would make the case too large to handle. Indeed, in terms of Autolink and importers in Norway, there is a limited number to select from, so the number chosen must reflect some compromise between covering enough ground and

the resources available. The three importers chosen represent significant variation, but are still similar enough (all deal with the import of new cars to Norway) that Autolink is well represented in each. The three distribution systems are very similar at a general level – they deal with the distribution of new cars to Norway, and Autolink is used to supply a number of transport and logistics services without taking title to the goods transported. Thus one would expect that the systems were similar, and it is of interest to both note any differences, and to analyse why these differences arise and how this affects the role played by Autolink in the respective distribution systems.

All three importers are part of the Autolink case (the case is labelled Autolink for convenience although it, of course, includes more than just this firm). There is a difference in the amount of data available on each system, in that the Møller chapter is based on considerably more data collection than the other two. The Møller system was particularly important in creating an understanding of the setting and establishing reasonable criteria for selection. This was also helpful in understanding Autolink, and so the descriptions of the other two importers naturally tend more towards additional insights obtained and additional variation. That is not to say, however, that these did not contribute to the overall understanding of Autolink.

It should also be noted that the opinion of Autolink was enlisted in selecting the importers because of their knowledge of the features of each relationship. In both of the latter cases, introductions from Autolink were important in setting up interviews and gaining access to data. Data were generally collected on Autolink concurrent with data collection on Møller, as well as independently. In this sense, each additional importer also contributed to the understanding of Autolink as a whole. In the narrative, each importer, along with parts of its manufacturer's distribution system, is presented separately. This is done to show the variation better than if all the information were merged in one description.

The selection of these three particular importers does not mean that there were no alternatives available. Several other importers were considered, in part as a result of the initial data collection, which included interviews with several importers that were not repeated in the second round of data collection. These importers were not pursued either because the ones finally chosen seemed more appropriate, or because of difficulty in obtaining interviews and data within the time-frame required.

3.5.2 Data collection

The data collection may usefully be divided into two parts, a first, initial round connected to the DNet project, and a later second round more specifically dealing with data collection for the PhD. Both rounds of data collection are, however, relevant to this dissertation. The first, broad data collection provided a familiarisation with the setting and made the later second data collection possible and more meaningful.

After initial meetings to explain the scope of the project and obtain agreement from the firms, we proceeded with interviewing key personnel in the participant firms. Interviews were made according to an interview guide using the main categories of actors, resources and activities (the main components of the ARA-model (Håkansson and Snehota, 1995)), but this was mainly used to structure the interviews when necessary and to operate as a checklist of which topics to cover, rather than as a specific set of questions for the firms to answer. The firms were asked to identify their most important counterpart firms, and in this sense identified the network surrounding the firm. Any such conception is naturally limited by what has been called the "network horison" (Holmen & Pedersen, 2003), i.e., the firm is only aware of and only deals with other firms that are reasonably close to it in network or distribution system. Thus a steel manufacturer is important to the production of cars, but the car importer in Norway is unlikely to have any interest in direct contact with it. A second advantage is that the position of the importer in this network gave us access to interviews in several of the other firms identified, based on which ones were considered most relevant by the firms and project group.

Interviews were then carried out with one or several individuals in each firm, in a free flowing format, with the main aim being to gather as much information as possible about the business, whilst touching on all the elements in the interview guide mentioned above. The interview notes were then typed by one person, and circulated so the other project members could add from their own notes or comment upon the interpretation. Finally, this document was translated into a "case background" document in English, where the information was reformatted according to a set structure covering general information and the elements covered in the interview guide. In this document, we constructed both a network of actors and an activity structure to act as a summary and departure point for analysis.

It is also relevant to mention that we used a number of secondary sources describing trends in car distribution in Europe to obtain a better understanding of the overall industry, which enabled us to compare any

trends in Norway to more international movements. This is particularly useful since the car manufacturers themselves are obviously not Norwegian.

As a final step in the first round of data collection, we compiled data from all the interviews, identified trends from the secondary data and gave a presentation of our understanding of the industry to the participating firms. This gave us a further opportunity to obtain additional information from the firms, and to verify our understandings so far.

The second round of data collection differed from the first in several respects. The topic to be investigated was now much clearer, as well as the idea of looking at Autolink's role *vis-à-vis* different manufacturers' systems in order to uncover and analyse variety. This meant that it was easier to identify important interview targets. A new "topic structure," similar to the interview guide used in the first round, was formulated. However, in the interest of obtaining "active data" (Dubois and Gadde, 2002), this was formulated in a general sense to make sure that important topics were covered. It was never shown to interview subjects nor used directly during the interviews. It is a relevant issue to what extent creating such a document can create bias, but it was equally important to be clear about what were the main issues to be investigated. This document (Appendix A) did not make any attempt to structure directly the concept of "roles" at this stage. The purpose of this guide then was to help make sure that important topics were covered. Some topics such as insurance had proved important in the first round of data collection, and were used as "triggers" for interview subjects, i.e., they were useful in opening up new lines of questioning during the interviews.

A series of interviews were first carried out at Autolink, and then at Møller Logistics, and represent the most extensive data in the dissertation. Some time was spent on this importer before moving on to the other possible importers. The purpose of this was first to obtain enough richness to analyse as well as create a useful structure for obtaining information from the other importers. The corollary to this is that it was clear from the outset that data access would be more limited in the other cases, and that the purpose here was not to create three identical cases, but rather to use three different importers to analyse variety within the Autolink case. The understanding was anchored with the involved parties through presenting versions of the case back to both Autolink and Møller. This served both to control and verify specific data as well as to improve the understanding of the distribution system through discussing the picture presented.

For the second and third importers, introductions were provided by Autolink, who had also given their impressions of the different manufacturers/

importers in previous interviews and communications. Interviews were then carried out with Honda Nordic and finally Bertel O. Steen. For Honda Nordic, interviews were carried out in Sweden because of the regional distribution system positioned in Malmö. An interview was also carried out with CMP (Copenhagen Malmö Port) to gain a better understanding of the car port itself.

Unlike the first round of interviews, the second round was carried out by a single person. The interviewer tried to ensure that all relevant topics were covered, but the aim was for the interviewee to actively provide data and to describe the setting as they saw it. In several interviews, the interviewee provided brochures and reports as supplements to the interview, as well as giving general presentations of the firm and setting as an introduction.

In general, interview notes were then typed shortly after each session. Where possible, the interviews were recorded with a digital dicta-phone and transcribed. For the latter two importers, the transcribed interviews were sent back to the interviewee to let them make comments or corrections. For Møller and Autolink, data verification was, to a large extent, based on presenting the case made to the firms. This served the dual purpose of getting feedback with the possibility of discussion, and keeping in contact with project member firms. The most important interview subjects are shown below in Table 3.2.

Autolink
Managing director
Head of marketing
Head of domestic transport section
Head of services
Sales manager
Head of logistics
Møller Logistics
Logistics manager
Car dealer – manager
Logistics manager
Administration manager
Other systems
Sales and logistics manager, Honda
Head of sales, Honda
Logistics manager, Bertel O. Steen
Managing director, Toyota
General manager cars, Copenhagen Malmö Port

Table 3.2: Selected interview subjects
For a complete list of interviews and durations, see Appendix B.

3.5.3 Use of interview data in the study

Since the study made extensive use of interview data in the data collection described above, it is appropriate to make some further comments on the use of interview data here. Interview data can be of many types depending on how an interview is conducted. At one extreme, an interview is simply a case of going through a questionnaire rather than giving the subject a written version. A focused interview, on the other hand, is a very common tool limiting the interview in terms of the scope to be covered, the specificity (answering questions related to concrete perceptions), the depth and personal context. "Focused interviews…have a number of advantages, including the possibility of combining a reserved, non-directive management of a conversation with an interest in very specific information and the opportunity for an object-related explanation of meanings." (Hopf, 2004, p. 206) Typically, a focused interview is carried out using an interview guide, which can be either fairly specific, or broader in terms of what themes to cover.

In relation to the present study, a focused interview is an appropriate starting point for fieldwork. Considering the need for uncovering roles and how firms work together, in-depth information is needed, and much of this information is necessarily held by participants in the industry. At the same time, this study is not only about the personal context of the participants – there are clear questions to be answered with regard to how activities are structured and what tasks are assigned to different participants in the distribution system. In this sense, the interview guide should not be entirely open since there is a danger of losing some of the focus if participants only speak about the issues relevant to them. At the same time, participants are professionals within the specific industry studied, meaning that their focus will likely be close to some of the main themes in the study. They are not, however, likely to be using the same framework presented here, so there is a challenge both with regard to not imposing the framework too obviously, and in translating respondents' answers back to the framework in a meaningful way.

The advantages of having a semi-structured interview approach are numerous – it allows for an understanding of some of the jargon used in the industry, it brings out some of the issues of main concern, and it allows the interviewees to express issues in their own words. There are, however, corresponding pitfalls in this type of interview. Since the interview is face to face and largely with an unknown interviewer, it seems obvious that interviewees will not present all possible information (Hermanns, 2004). This need not be a problem where the information requested is more

objective, but can be a problem where it cannot be checked and is largely opinion-based. This is not to say that opinions about, for example, other firms are not important, but they are sensitive when based on only a single informant and not corroborated by other types of evidence. Further, the jargon used and a lack of familiarity with the details of the industry can lead to misunderstandings that are not easy to catch initially. To compensate for this, the device of presenting the findings back to the firm rather than just having interviews with some key personnel is helpful.

3.6 Evaluation of the study

3.6.1 Quality criteria - trustworthiness

For a study that is interpretative in nature, there may be several different quality criteria depending on a researcher's position on ontology and epistemology (Halldorson + Astrup, 2003). Here the trustworthiness criteria presented by (Lincoln and Guba, 1985) are used. These are placed somewhere in the middle of the realism/relativism scale since this matches the assumptions in the present study. Similar concepts are discussed by other authors (Creswell and Miller, 2000, Halldorsson and Aastrup, 2003, Kvale, 1995). The main purpose of the trustworthiness criteria is to ensure that the study is both of high quality with regards to processes, and that external parties can follow the study and be confident that the version presented to the reader is reasonable. Since the study is interpretative, the version presented to the reader will not be the only version possible and the specific interpretation is open to debate, but it should still be possible to agree that what the researcher has done is one reasonable way to deal with the data collected. It should be noted that these criteria are general in nature, i.e., they are not tied to whether the study is a case study.

According to Lincoln and Guba (1985) there are four components of trustworthiness: credibility, transferability, dependability and confirmability. These four criteria are said to correspond roughly to the classical positivism criteria of internal validity, reliability, external validity and objectivity (Halldorson and Astrup, 2003). However, because the criteria are not based upon the same assumptions, they cannot be said to correspond in any real sense – that is, for an interpretative study, the trustworthiness criteria are a complete set of criteria. Their value lies in describing the interpretative study, not as substitutes for the criteria used in positivist research. Here the study is discussed in terms of these four criteria, and also a number of recommendations from Lincoln and Guba (1985) for strengthening the study in terms of the criteria. Since the list is quite extensive and not all the techniques are appropriate, the focus here is on the most relevant ones.

Credibility refers to whether the interpretations and concepts used by the researcher are appropriate or make sense in the setting. Immediately we may ask “make sense for whom". A crucial group here are those who are operating in the setting, primarily the informants the researcher has interviewed, but also others who are working in the industry. Clearly, it should also make sense to others working in the field. This has also been expressed as a “truth value.” Working from the assumption that there is no absolute truth, it becomes important for the researcher to demonstrate that all possible care has been taken to increase credibility.

A large number of techniques have been suggested for increasing credibility; these are listed in table 3.3 below.

Project phase	**Technique**
Data Collection	Prolonged Engagement
	Persistent Observation
	Triangulation (Sources, methods, investigators, theories)
Data Analysis	Peer Debriefing
	Negative Case Analysis
	Referential Adequacy
	Member Checks

Table 3.3: Techniques for building credibility

Below each of these is discussed in relation to the study, emphasising those techniques that have actually been used. Note that these techniques can also help strengthen the other components of trustworthiness, but this will be discussed under each concept. The first technique, data collection, has three elements: prolonged engagement, persistent observation and triangulation.

Prolonged engagement means spending significant time at a site to learn the codes and to gain familiarity with the setting, ideally so that informants do not react to the researchers’ presence. Since this study is mainly based on interviews, there is clearly no prolonged engagement in this sense. It is furthermore very clear that the researcher was obviously an outsider both when visiting the site and during observation, even where access was freely given. The second point, persistent observation, regards keeping the object of study under observation long enough to be able to recognise the atypical. Again, since the study is mainly built upon interview data, this is not a particularly relevant technique. However, the length of the study (over 4 years from initial interviews) should allow for familiarity with the setting, making it more likely that the researcher will notice unusual observations at

later stages or when reviewing early observations. The length of the study also made it possible to observe changes during the study, and to make some judgments with regard to the significance of these. This has affected what parts are included in the final case.

Triangulation is the final data collection technique, and is an important way of increasing the confidence in data. There are four possible modes of triangulation: sources, methods, investigators and theories.

Triangulation of theories concerns whether there are different theories that can explain the data, and in particular if these will give similar predictions. In this study, there is no such use of alternative or overlapping theories in a general sense, although some of the distribution literature and organisation design literature have touched on some of the same issues. It is not considered a major point, however, since the purpose here is not theory testing.

Triangulation of sources is the primary and probably also the easiest way to check the data, and refers to cross-checking the answers of different informants to questions about the same issues. In this study, considerable triangulation of sources occurs in that interviews are carried out both with the central car transport firm and also a number of their business partners, who also made comments about their competitors. There is therefore reason to believe that at least some of the findings that were repeated from different informants are fairly reliable, and at least reflect some common understanding among the informants. In a few cases, the informants disagreed on some points, which made it more important to explore these further and try to corroborate the points with external data where possible.

Triangulation of methods means collecting different types of data through different means, for example combining survey data with interviews. There is limited triangulation of methods in the study, although some of the interview data are complemented by numerical data on each of the distribution systems. This is, however, closer to triangulation of interviewees since the numerical data are only used to complement the case study and not to build a separate quantitative model.

Triangulation of investigators is meant to overcome some of the inevitable bias of a single investigator looking at a particular domain over time. Ideally, this triangulation means that separate investigators look at the same domain independently. In practice, however, this is very difficult in a study of this nature because the project described in this dissertation is related to a PhD and so focuses on one person's work. What is done in this study, however, is that the initial investigation into the empirical area was carried

out with several investigators in each interview, with one taking the lead regarding the interview, one responsible for notes, and with feedback and discussion about findings after the interview. Later stages of the study were carried out by a single investigator. This goes some way towards achieving triangulation of investigators, although the point should not be overemphasised, especially since a study with an interpretative approach will necessarily be closely tied to the interpretations of an individual researcher. In this sense, the real benefit to the multiple investigators in the initial phase was to create an understanding of the field, and this proved useful in later discussions regarding the dissertation work.

Prolonged engagement, persistent observation and triangulation increase credibility at the data collection stage. Lincoln and Guba suggest four techniques to increase credibility once data is collected. Peer debriefing is recommended to get independent comments at various stages of a study, with the main purpose being to get honest feedback about the relevance and quality of the work. This was not specifically pursued in this study as there were a number of other venues for getting feedback on various drafts, i.e., through the doctoral committee and department seminars. Negative case analysis is a process by which the researcher updates hypotheses in order to explain all observations seen during a study. This was not seen as appropriate to this project, especially since it is based on a single case. The final two techniques for increasing credibility are referential adequacy and member checks. Referential adequacy means recording some part of the study, not including this in the study, and then making it available for outsiders to check relative to the study itself. This was not seen as viable because of resource limitations. Some effort was made in carrying out member checks, the final technique for increasing credibility.

Member checking means testing data and interpretations on the interviewees or others involved in an empirical setting. This was done in several ways. Raw data were frequently “translated” to intermediate documents summarising processes and activities and these were shown to the informants for feedback. Finished or working copies of cases were sent to key informants to provide the opportunity for additional feedback.

Transferability regards the degree to which it is possible to use the findings from a study in a different setting. The researcher must always be careful with regard to transferability since the purpose of an interpretative study is not to generalise to a population, but rather to theoretical propositions. Furthermore, the researcher does not claim that such propositions are universally applicable, but advances them so that they may be applied to other settings. In this sense, it is applicability that is of interest “depending on the degree of similarity between sending and receiving contexts" (Lincoln

and Guba, 1985, p. 297) A high degree of specification of the features of a particular setting may make it reasonable to think that findings may be applicable to another, very similar setting. Any such claim is limited in an interpretative study, however, by the basic assumption that no two settings are identical, and that even the same setting studied at different time periods may give different insights. The goal is not to achieve as much transferability as possible then, but rather to specify the conditions and limitations of transferability so that other researchers may use this in formulating new studies.

The concept of **dependability** is related to the quality of the measuring tools used by the scientist. For research in the interpretive tradition, this must answer the question of whether it is possible to track and to some extent verify what the researcher has done. Lincoln and Guba (1985) suggest a dependability audit to achieve this, and present a detailed procedure for carrying out such an audit. Ideally the researcher makes available all relevant case materials, such as original interview tapes, transcribed interviews and also a log of the research process, if available. Although time-consuming to go through, such materials are very rich in details. The researcher may have had more discussions with peers and informants than can be detailed in such an audit, but a log of central interviews and presentations should allow the committed reviewer to gain a much better understanding of the setting than is normally the case when reviewing, for example, a correlation table. The researcher's findings will still be open to interpretation, but it makes it far more likely that conclusions are founded in data.

In the present study, a number of such materials are available in the form of raw interview data, recorded interviews and typed versions of the interviews, as well as intermediate data documents. However, no particular audit was carried out. The presence and availability of these documents, however, are akin to making raw data available in a survey-based study, i.e., they go as far as is possible in an interview-based study, with the *proviso* that not all conversations were recorded electronically.

Confirmability pertains to whether the findings in the study are primarily the researcher's own biases or reflect the opinions of the interviewees. In an interpretative study, the researcher must necessarily accept that all conclusions are interpretations, so the issue here is primarily that the interviewee's voice should be central in much of the study. It is the researcher who decides what to include and exclude, but this must be checked with the informants so that they recognise the setting. Typically, this is done through presenting the case or study back to the informants to allow them feedback and to evaluate whether the researcher's interpretations

seem reasonable compared to their own. This was done with regard to the focal firm through presenting summaries of the case for discussion. This implies a certain amount of negotiation, especially since different informants may have different perceptions of what is important in the setting. It is also important that the researcher makes the choice clear, i.e., why certain items were not included and others were focussed on. To achieve this, it is important to strive for transparency in the study.

3.6.2 Overall evaluation

Some of the strengths and weaknesses of the study are tied to the research approach and others to the specifics of the study itself. Most of the issues tied to the research approach have already been raised in the discussion of quality criteria, so they will not be repeated here. Rather the focus is on the specific strengths and weaknesses of the study in more general terms.

A main advantage of this study is that it focuses on an important intermediary firm that is well placed to effect economies across different distribution systems. In describing the distribution system in Norway, a firm that is responsible for roughly 80% of the traffic is clearly very central, and describing this firm and 3 of its most important counterparts covers the main parts of this system. This, coupled to the fairly extensive background research on car distribution tied to the research project, gives a very good overview of some of the most important elements of the distribution system not only in Norway but in its larger setting. The interviews carried out have been largely with personnel well-positioned in terms of the distribution system and problems related to distribution. It is possible that more information could be gained from a greater understanding of the marketing function in terms of a background for some of the decisions made, since the logistics department in several cases consider the incoming flow of cars as largely exogenous shocks they have to deal with. However, this must be balanced against the additional use of time and resources to carry out such interviews.

A possible criticism of the interview approach is that it differed in the two rounds – i.e., the first rounds were carried out with a broader interview guide and were not taped, whereas the latter interviews had an interview guide more directly related to the theoretical framework, and were generally taped. In this sense interviews were not entirely consistent, but this was not the intent since they represented different phases in the project. Nevertheless, recording the early interviews fully would have been an advantage later since this would have made it possible to go back and relate the full content of these interviews to later issues. It could also be argued that the heavy influence of the Møller system in the empirical case can skew the result.

However, this is balanced through considering several other systems, through the focus on Autolink itself, and notably by Møller itself since it only purchases a limited number of services. The other chapters in the empirical section then show aspects not covered in the Møller chapter, adding balance to the overall picture.

Although the data collection was focused in certain periods, the length of the engagement allowed for the observation of several changes during the study. The opportunity to present understandings back to some of the central participants strengthens the validity of the study. This is also the case because some of the central informants remained in the same or related jobs throughout the study, which made it possible to maintain contact. Several of the changes during the period, such as reactions to extreme weather, regional expansion and the expansion into the railway business also served to illustrate the limits of the system. Seeing how the firm handled these pressures and some of the reactions to them strengthens the study even where these were not followed on a day to day basis by the researcher.

Introduction to the empirical section

This empirical section describes the case used in this dissertation. In the first chapter two of the main models used in car distribution are shown, to act as a background for the later discussion about make-to-order and pick-from-stock systems. The focal firm in the empirical section is Autolink, and the second part of the first chapter in this section describes the firm in more detail, as well as the main services performed and the resources held by the firm. In order to show different aspects of Autolink in terms of different distribution systems, the systems of three importers are presented in subsequent chapters. Each of these covers an importer or manufacturer, and is tied to the distribution system of one or more major car manufacturers. There is naturally some overlap between the chapters, Autolink being the connection between them, but each chapter also shows how Autolink provides services under somewhat different conditions. The final part of the empirical section goes back to Autolink and describes some remaining issues tied to the way it deals with customers and suppliers. This could be included in the first chapter, but the information is more appropriately presented after the descriptions of the three systems.

The chapters are not symmetrical, although they cover many of the same elements. This is because the systems they describe are not identical and different aspects are more or less relevant to answering the research questions. This is clearly a choice made by the researcher in order to describe the parts of each system which were seen as most relevant. This also means that the structure of each chapter varies somewhat, although each starts with a short description of the operating environment given by the manufacturer. The services and structure of the system is then described and the connection with Autolink is elaborated upon. Each chapter ends with a discussion of the importer's system with regards to Autolink. The analysis chapter will build on this in the next section.

Chapter 4: The Setting and Autolink

4.1 The setting - General models for car distribution

The activity structure of a particular distribution system will in general vary over time to match technological or other changes, and will also vary in accordance with the operating environment of the firms involved in the channel. It is, however, still possible to present typical structures in any particular industry to some level of abstraction. For the basis of discussion, a generalised car distribution activity structure is used. This may be seen as a general structure for the distribution of cars in Europe, although the distribution system for any particular manufacturer will have unique features. In the subsequent cases, part of this structure will be described, but the local or unique features will be elaborated upon to a much greater degree than what is shown here, especially as the focus is the distribution system in Norway.

The two models presented here are pick-from-stock (PFS) and make-to-order (MTO), reflecting a push-based and pull-based system, respectively. These are highly relevant to the discussion in Chapter 2, but are shown here because they are well-known concepts in car distribution.

4.1.1 Pick-from-stock

The push-based distribution system or pick-from-stock is akin to the traditional channel. As can be seen from the figure below, production is initiated based on forecasts. These forecasts are related to feedback from dealers with local market knowledge, but also to strategic plans of the manufacturer as well as general market prognoses.

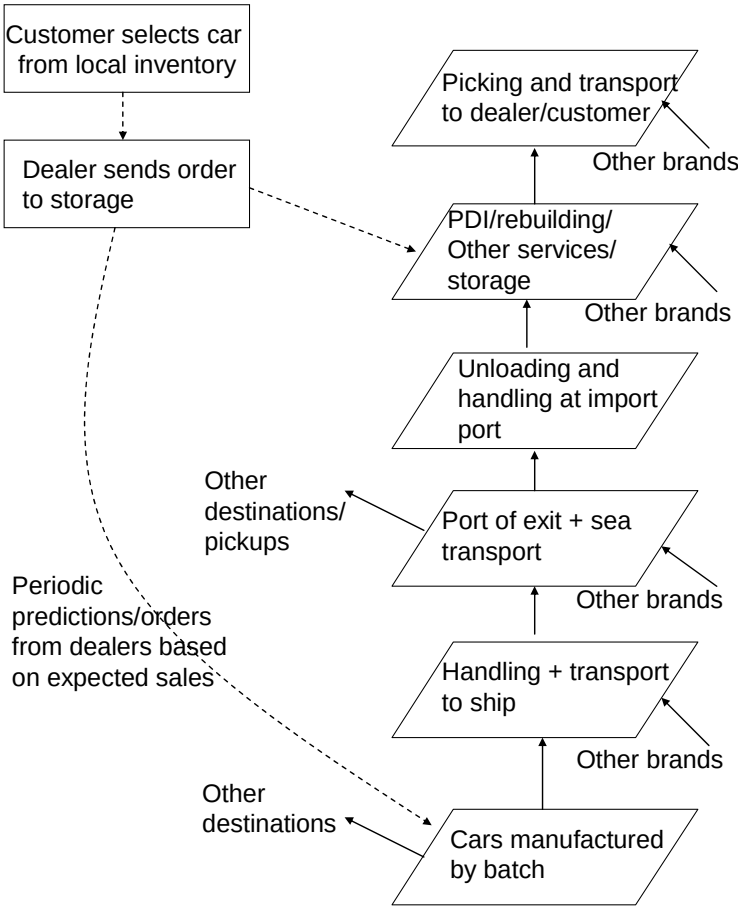

Figure 4.1: Car distribution, push (pick-from-stock)

The flow of cars is summarised above. Since the cases will exemplify parts of this flow at a more detailed level, the descriptions are kept relatively general.

Usually, cars are manufactured in batches to achieve economies of scale. Manufacturing is followed by assigning cars according to the appropriate transport (i.e., other destinations as well as the focal route in this figure). The finished car must then be loaded onto local transport and moved to a port. Depending on the destination of the car, sea transport may not be necessary, but for Norway the vast majority of cars are transported at least

one leg by sea. At the port of exit the cars will be joined by other brands and other manufacturers' cars in order to fill short-sea ships which may have several pick-up and drop-off points. When the short-sea ship reaches the destination, the particular cars are unloaded. Cars are then merged with other manufacturers' cars and sent to various destinations within Norway. An intermediate stage may exist here where necessary operations are carried out on the cars to prepare them for the final customer. Finally, the cars are transported to the dealer or directly to the customer along with other cars. The customer then takes over the car, and the delivery is complete. Service to the cars, repeat purchases and customer satisfaction in general are outside the scope of this model.

Between each major operation in this system there are clearly important decisions made regarding sorting. Cars are collected in terms of destination after manufacture, and sorted upon arrival at the port. Further, once unloaded from the ship, they are assigned to local destinations (including workshops for various operations before delivery to the customer). At all these stages other cars may be added to create economies of scale, mostly in the form of full transports. Cars are not assigned to a specific customer before they are picked from storage by the customer.

4.1.2 Make-to-order

The make-to-order or pull-based system for car distribution is based on postponement, i.e., cars are not manufactured until an order for a specific car is received at a central manufacturing facility.

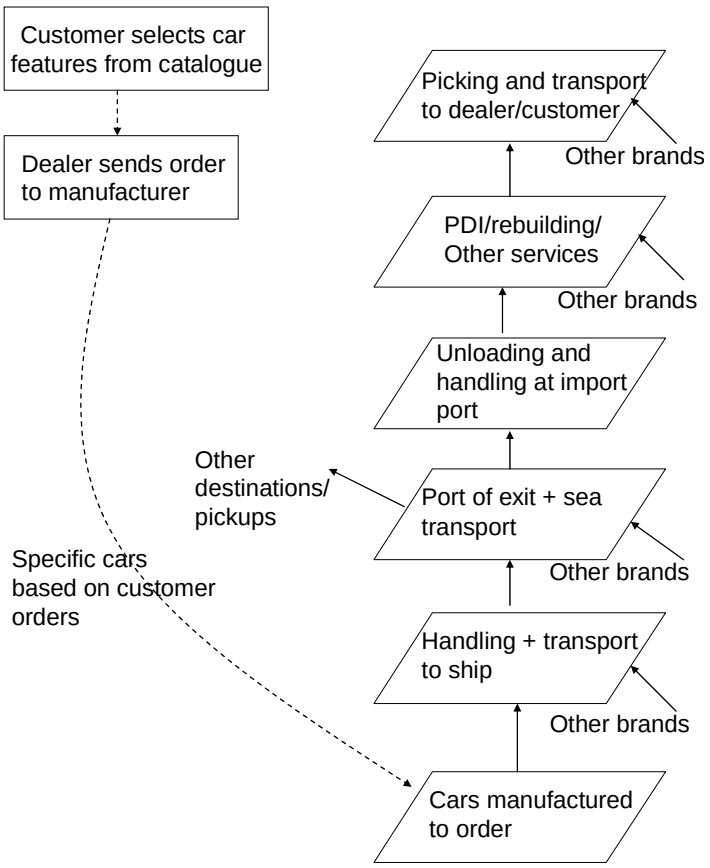

Figure 4.2: Car distribution, pull (make-to-order)

There are two main differences from the push-based system. First, manufacturing is based on actual customer orders. Production may still be batch-based, but this depends on being able to merge a number of similar orders to manufacture only slightly different models. Note that a pull-based system does not require that the customer chooses from a range of standard models, but that instead the actual orders are used as the base for manufacture. In practice, however, the two systems are associated, and the ability to provide the customer with wide choices has been seen as a selling point.

Second, there should be no need for anything but temporary storage in this model, and cars are transported to the next stage in the distribution system as soon as possible. This is quite different from the push model where cars

can remain in storage for a long time and indefinitely if they can not be sold. Some of the intermediate stages are however similar to the push-based model, and the actors at these stages may not notice significant differences since they are dealing with the same incoming cars and similar deadlines. This will be highly relevant for the case, as is seen in the discussion. The pull system is, however, more sensitive to delays as each customer is waiting for a particular (usually non-substitutable) car. Further more, when the customer is allowed to specify the features of the car in detail, any deviation from what is specified can easily be interpreted as not delivering what is promised.

These two stylised versions of car distribution will serve as an important guide in the discussion of the import systems. They clearly illustrate that the activities involved in both distribution models have similarities, but the availability of information and limitations, especially in terms of assigning cars to specific customers, are very different, leading to radically different opportunities in planning and providing customer-specified features.

4.2 Autolink introduction

The focal firm in this dissertation is Autolink AS, a Norwegian company providing transport, storage and associated services to the car distribution sector.

This case will describe Autolink broadly in terms of the categories in the theoretical framework, but adapted to the setting. This Chapter starts by describing the background of the company and some important recent changes that have bearing on the study. Then, the services provided and related activities are described, followed by a description of some of the important resources held by the firm. The Chapter finishes with a brief discussion of the way in which the firm is organised, followed by a summary.

The discussion of other actors in the distribution system is introduced in the final Chapter of this section (Chapter 8), as well as when discussing the three car importers. This will make it easier to relate to Autolink in terms of the three specific importers in the subsequent Chapters – Møller (Chapter 5), Honda (Chapter 6) and Bertel O. Steen (Chapter 7). It will also enable a general discussion of Autolink. The main purpose of this case is to provide broad empirical material for discussion in terms of the theoretical framework and the research questions formulated previously.

4.3 Background of Autolink and significant changes

Autolink was established in 2003 through the merger of Motortransport and Drammen Bilhavn (Drammen Car Port). The company is owned by Autolink Group AS, established in 1999. Autolink Group AS again is owned by the private investment companies Mansun and Okser. These two groups have been in control of Autolink Group (and its predecessor Autogruppen) for 25 years, indicating stable ownership and a relatively long term perspective on its development.

Since the merger Autolink has had a 75-80% market share of new car transport within Norway. New car transport and storage are the most important activities for Autolink. However, the company also provides additional services such as PDI (pre-delivery inspection, essentially the final preparation of the car for the end customer). It also has a smaller operation that handles transport of used cars from dealers in Europe to Norway. This is organised through Motortransport (the brand name of one of the two merged companies was reactivated for this purpose).

4.3.1 Regional expansion

In 2006 the company expanded into Sweden through the purchase of Copenhagen Malmö PDI (CMP PDI) at the Car Port in Malmö. This is a large facility which is well situated at the car hub in Malmö. This allows Autolink to provide services to car manufacturers using Malmö as the main port for bringing cars into the Scandinavian region. Currently, the facility can handle roughly 2,000 cars a week. The services offered are fairly similar to the ones offered at Drammen. At the current activity level the facility is considered very spacious. The facility has approximately 40 employees. The hub at Malmö is discussed in more detail in Chapter 6 on the Honda system and is not detailed here.

4.3.2 Railway expansion

In 2007 Autolink bought 40% of Ofotbanen. The main reason for this was that Autolink's main supplier of railway transport, Greencargo, had announced a substantial increase in prices for railway transport of cars (approximately 35% across the board). This was seen as a result of Greencargo putting greater emphasis on container traffic, having purchased around 300 new railway container wagons. In addition, the frequency of car transports was reduced. Autolink was also of the opinion that the changes would mean lower priority for car transports in the railway network, further exacerbating the expected problems.

Autolink was not satisfied with this development, and as a direct response bought a share of Ofotbanen, a relatively small Norwegian rail carrier. Significantly, Ofotbanen has the competence to operate railway traffic in Norway. Perhaps even more importantly, the company has a license to operate railway traffic in Norway and in Sweden. Since Autolink already owns a number of specialised car transport railway wagons, it was possible for them to change over to using Ofotbanen as a supplier quickly. It required, however, some competence transfer in terms of knowledge related to car handling.

The change in supplier has also lead to another major change. Rather than loading single railway wagons and turning these over to the railway company, Autolink is now "building" full trains for specific locations. These trains depart with lower frequency than previously, which can be a disadvantage in terms of speed of delivery. However, advantages include better control of when a car will arrive and better priority for the cars in the railway system. Previously, there had been incidents of cars being left at changeover stations because the railway company assigned higher priority to other cargo. The cars were then assigned to a later train leading to delays and an element of unpredictability for Autolink.

In order to achieve the necessary capacity, Autolink has both used its existing railway wagons, but also rented some specialised car transport railway wagons. The company has also ordered 70 new railway wagons which are custom-designed. These are well suited for car transport, but also have collapsible floors that can be lowered to convert them into general-purpose transports. This increases the flexibility of transport of the cars, in particular with regard to return transports. Typically, railway wagons have not carried any significant return transport of cars making the return journeys a pure expense.

Other services, such as rust protection treatment, are offered when there is a demand for it. The logic behind this is fairly obvious – if Autolink already has a car for PDI and other services, it is easier to add one more service than send the car to another service provider. However, the exact nature of the services required, is not always obvious in advance. As an example, many manufacturers include extensive rust protection with their cars. However, dealers in certain parts of Norway may find that their customers still want additional rust protection treatment, perhaps believing that the weather is particularly harsh in their area. For Autolink it is generally advantageous to offer such services since it increases the volume of business.

The description of Autolink here focuses on the car transport and associated services, but also makes reference to more recent developments when

relevant. Autolink's counterparts are described in general only, since the three following sub-cases describe these more thoroughly.

4.4 Services provided and activities undertaken

Autolink provides a number of services, in part dependent upon emerging customer requirements. The services can be grouped in a number of ways and are presented in two groups – one consisting of car transport, storage and associated services, the second consisting of PDI, modifications to cars and similar services. The reason for this separation is that organisationally these are handled by two different systems, and the activities within one set of services are separated from the activities in the other set of services. At the same time activities can be divided into two main types – those related to the physical flow of goods (cars), and the administrative or commercial activities supporting this. In the three systems discussed later, the division into administrative and physical activities is emphasised to a greater degree since this seems more meaningful.

Autolink does not provide one standard "package" to all its customers. Each customer decides which services are required, with basic car transport as the common denominator (in most cases, although even this is not a requirement). The services provided may be likened to a menu, with the customer choosing the relevant ones in each particular case. It should be noted that both Autolink and the customer may benefit from some standardisation of choice even if there are options to provide greater flexibility. For example, although some importers allow all their dealers to choose which services they require, others negotiate a set package for all their models with Autolink, while others have a basic package and dealers can then choose additional services. The three subsequent chapters will show this in more detail. Although profitability data on particular services is difficult to obtain, Autolink generally considers all of them profitable, and so expanding the range of services provided to any particular customer, is seen as advantageous.

4.4.1 Car transport, storage and associated services

The logistics activities related to a specific car start when Autolink receives an order from the manufacturer, importer or, for specific cars, sometimes from the dealer. Normally manufacturers send orders for a group of cars at a time since cars are transported in batches.

The list of cars in each batch is written in several different formats to a transport document which is generally sent electronically. The exact format and transfer system used are determined by the manufacturer or importer.

The manufacturers do not normally create special adaptations in their system for Norway, so Autolink must adapt to the standards they use. Documents are as a rule imported into Autolink's systems, either through entering data from an email or text file, or through a specially designed "platform." For each car there is an order, divided into a transport and additional services section – this enables Autolink employees to see what services must be performed on a particular car. For Autolink it does not matter at this stage whether a car is made-to-order or pick-from-stock, although the number of cars in each category can affect the overall flow.

The figure below shows an overview of the activities carried out on cars handled by Autolink. Note that these are potential activities since each importer stipulates which services are required. The general activities are detailed below.

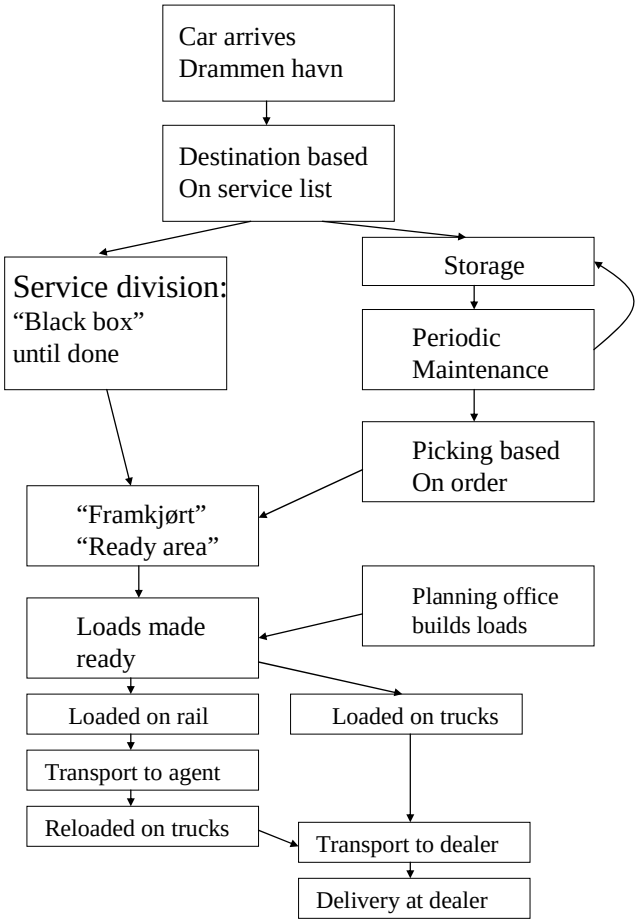

Figure 4.3: Autolink general activity structure

Cars arrive at Drammen Port either by feeder ship, railway or trailer. Upon arrival at the port, cars are unloaded and placed in Autolink's "48 hour zone." The unloading from ships is carried out by a firm with an exclusive contract with the port authorities. Once cars are in the "48 hour zone", they are sorted and moved to transport, storage or services within 48 hours. The destination depends on whether the cars are intended for a specific customer, and whether they need PDI or other services. For some manufacturers, PDI has already been carried out at this stage, whereas others use Autolink for a full set of services. Autolink provides storage services at the site in Drammen. The required destination and services for each car are based on the service list provided to Autolink by the customer.
For storage and maintenance Autolink operates car-parking facilities with a total capacity of 11,000 cars of which 4,500 covered. Billing for cars in storage is carried out once a month for each customer. In general, it is not necessary to categorise the cars since each car is allocated the same space. The price for storage is agreed through the customer contract. If a car is stored for a lengthy period of time, it is necessary to recharge the battery, re-inflate tyres and run the engine periodically.

Cars in storage will in general remain there until an order for transport arrives. The car is then picked from storage based on the order and moved to a "ready area" for transport. Since cars are periodically maintained while in storage, it should not normally be necessary to carry out maintenance once a car is picked from storage. Note that a car picked from storage may be assigned to specific services, in which case it will be passed on to the service division before being moved to the "ready area."

Cars are ready to be transported either when the service division has finished, an order has come to transport a car into storage, or the car does not require specific services on arrival on the feeder ship.

Some cars are issued with a specific delivery date, but most operate on a system of lead times. Autolink has an agreement with a particular importer that its cars (or specific models) should have a lead time of a certain number of days, and are able to plan according to this. A general principle of FIFO (first in first out) is applied to decide which cars to move first, if there are no other restrictions.

Autolink operates a number of set railway and road routes with fairly similar capacity. Railway is used for transport to the major cities (Bergen, Stavanger, Trondheim). Railway transport normally includes transferring the cars onto road transport for distribution to the dealer. Reloading is handled by agents who have contracts with Autolink. An exception to this is

when the dealer is so close to the railway station that cars are simply driven to the dealer.

It is the responsibility of the planning office to "build loads" i.e., plan the composition of transport so that cars arrive according to the lead times and with the best possible utilisation of trailers. There is limited spare capacity in the system to deal with peaks, although there is some flexibility related to overtime and second drivers on cars. On a day-to-day basis, however, an important task is to ensure that the trailers going out, are as full as possible, with cars matching the specific trailer features (there are several different models) to accommodate different car features. There is limited return traffic, since the dealers do not normally return used cars. Both the secondary market and scrap dealers handle this flow. However, it does happen that dealers trade cars creating some cross-traffic.

Cars are divided into three categories for the purpose of transport, with fees according to space needed. The average size of cars is, however, increasing, making it difficult in many cases to have two car layers on the trailers. This greatly reduces the number of cars per trailer. By replacing certain types of trailers, this problem may be partly solved over time. However, much of it will persist because closed trailers and railway carriages have to conform to size limitations imposed by the road and railway infrastructure.

Autolink has hired an extra employee to take the "built loads" and pre-sort the cars so that each load is ready with the full set of cars when the driver arrives. This employee can also help the driver load the trucks. The change is intended to reduce the time and error rate. Loading times are now typically 45 minutes, whereas they were often one and a half hour previously.

When a car load has been "built", it is registered in the system, and the order is sent to the driver through a terminal in the trailer. The driver's job is then to take the trailer to Autolink and load the cars from the "ready" area. This is a source of potential error, since the volume of cars in storage means that it can be difficult to find a particular car. An error in loading may result in either that a car does not arrive at its destination, and/or that an erroneously picked car is not available for its intended transport. The extra employee who works on preparation of car loads helps to alleviate this problem. When the cars are loaded, the trailer is driven to the (one or more) destinations and unloaded. This should preferably be done during business hours, although a few customers will allow delivery at other times. The normal procedure is for local deliveries (Oslo area) to be carried out first, with more remote deliveries taking place later. Autolink has some smaller trailers (space for 6 versus 8 cars on the normal trailers) used for shuttle deliveries mainly within

the Oslo area. Autolink can also carry out transports for the dealers (i.e., dealers swapping cars), but in general there is little return traffic on the longer journeys.

Railway transport is used for some of the major cities (Bergen, Stavanger, Trondheim). Previously, the actual transport was handled by Cargonet, but as shown in section 4.3.2, Autolink now schedules these in cooperation with Ofotbanen. Because the railway tracks go all the way to Autolink's facilities at Drammen Harbour (havn), loading the cars is relatively quick. On arrival at the railway station, the cars must be reloaded on trailers for the final leg. This means that there is extra handling involved for cars sent by railway.

4.4.2 PDI and other services

The services division is a separate organisational unit from logistics and transport. It has a separate IT system, and direct communication with logistics is limited (the IT systems are not integrated). The activities within the services division are more production oriented than transport and warehousing. The head of the services division is responsible for taking the orders for incoming cars and ensuring that the facilities are used efficiently.

Pre-delivery inspection is a set of activities that involves making the car ready for the customer. Pre-delivery inspection consists of removal of transport protection on the car (such as plastic strips to protect corners, de-waxing as some cars are covered in protective wax when they leave the factory), washing and polishing, as well as internal cleaning. It also includes installation of optional extras such as hi-fi systems, or equipment such as tow bars in addition to various interior details. These operations are relatively simple and often included in the PDI operations, but they are not technically part of the removal of transport protection.

PDI must by its very nature be carried out close to the final customer to avoid the car being unprotected for a significant period of time. There is, however, a trend towards carrying out PDI at a regional level. Therefore, the last leg of transport needs either to be closed (closed railway wagons or trucks), or a final cleaning by the dealers is needed. Long transports and long time in storage are more risky when the protection is removed. On the other hand, certain types of damages to the cars are much harder to spot while the transport protection is still in place. If damage is not spotted by one actor in the distribution system, they are still liable for it if it is found by the next actor in the system.

The market for PDI services is fragmented. Mainly, the dealers perform these services themselves, because there is a great potential for additional

turnover through sales of additional equipment. However, there is a growing market for buying these services. All new cars must, however, undergo PDI, so that the volume is directly related to new car imports. Autolink wants to increase its market share for these services.

Autolink has made a significant investment in specialised equipment for PDI. For example, they have purchased an automated machine for de-waxing cars. This machine has a capacity of 30,000 cars a year and recycles 85% of the water and 70% of the chemicals used (including the removed wax). The recycling percentage is considered an environmental selling point, because smaller providers of PDI services are generally unable to recycle the spillage water as effectively, leading to the release of more chemicals and removed wax. A final point regarding PDI is that each major manufacturer tends to have fairly precise standards for how the process is to be carried out. This means that Autolink must familiarise itself with all these different standards. In addition, not all the standards are fully compatible, so that there may be a conflict between compliance and achieving economies of scale in PDI operations.

Another category of services offered at Autolink is **car modifications and rebuilding**. Modifications to cars are firstly carried out in order to comply with the prevailing tax regime. Changing the number of seats or the size of the luggage compartment, can allow the car to fall into a more advantageous tax bracket, making it more attractive for the customer. A second group of modifications is cars for handymen or car fleets for firms, mounting workshop tools, extra windows and other special equipment. A final category is special equipment for certain regions, such as extra heaters for cold climates. Some of these operations are very simple and are carried out as part of the PDI process, since they do not require a specialised workshop. For this type of process, the installation is not included in the regular production process because it is only relevant for a small percentage of the factory output (i.e. Scandinavian volume is relatively low on a European scale). Furthermore, since the operations are quite similar and can be done for a number of different manufacturers using the same equipment, a service provider such as Autolink, is likely to achieve similar economies of scale in these operations as those of the manufacturer.

Autolink has a workshop at its site in Drammen, where it can carry out various modifications to different car models. Car modification is far more specific than for example PDI, and requires specific spare parts and specialised knowledge (and to a lesser degree equipment). Some car components are interchangeable between models, but the manufacturers have extensive requirements in terms of what parts may be used in their cars. Due to recent legal changes, the car manufacturer now remains responsible

for the quality of the car even after it is modified, making it essential that the firm carrying out the modifying is competent and trusted by the manufacturer. In other words, if a car is sold with a significant defect tied to the modifying, it is not only a liability for the manufacturer's brand image, but also in legal terms for the manufacturer.

4.5 Resources and investments

Autolink's investments and facilities can be divided into a number of areas and support services. The main categories are location, investments in trucks and railway wagons, branding, warehouse and storage facilities, IT system, training of drivers and agent network. Each is briefly described below.

Autolink's location at Drammen Port is a significant advantage since this is a major shipping port with limited space. The port authorities are, however, quite eager to expand the port. Whether a competitor could find space at the port, is an open question. The threat from other ports is, however, seen as more significant, since the location can become a liability if car manufacturers wish to use other ports. This is especially relevant as several car manufacturers are considering consolidating car distribution to a single point of entry for the whole of Scandinavia. Malmö is an obvious car logistics hub, experiencing strong growth, and Autolink has already bought facilities here to expand their operations.

Autolink owns a number of specialised trailers (22) and railway wagons (12). These represent a significant percentage of the car transport capacity in Norway. Between Autolink, the competitors Autotransport and Cargonet, most of the transport capacity for cars in Norway is covered. The fleet is not uniform, i.e., the trailers have a number of different specifications. For the short and medium terms, it is very difficult to increase capacity significantly in these areas.

Autolink's trailers are painted in blue Autolink colours with the Autolink logo. This is also true for a number of small (1 or 2 person) privately owned trucking companies, but the agreement with Autolink includes painting of the rigs. This is, however, more relevant as a branding exercise rather than having an effect on the distribution system and logistics.

Autolink has invested 35 million NOK in a large warehouse at their site in Drammen. The facilities have a total capacity of 11,000 cars, of which 4,500 are indoors. The warehouse is of a standard type for parking cars.

Autolink has one specially made system developed for the production system (PDI etc.), and from 2005 another for dealing with the transport system. Before 2005 the transport system was manual. The implementation of the new system has been fairly lengthy and difficult, and there are currently no specific plans to connect the PDI and the transport logistics systems.

Autolink spends some resources training new drivers, and has a set of standard operating procedures for its drivers. It also has a number of designated drivers working for Motortransport. This allows for benchmarking the costs between different agents working for Autolink. Motortransport, however, deals mostly with the transport of used cars. This is a different flow compared to new car transport.

Autolink has agreements with a number of different agents. Some are small transport firms of 1 - 2 employees who own one rig and carry out transport jobs for Autolink. There are also agents at all railway destinations to receive the cars and transport them to the dealers. The quality of these agents is important. In several locations Autolink and Autotransport actually cooperate and use each others agents for improved dependability.

4.6 Organisation and coordination

The organisation of Autolink is relevant for describing internal coordination, but also for inter-organisational coordination with customers and suppliers. Here the main focus will be on the internal coordination before delving into the three manufacturers' systems. Since many of the important points regarding coordination are related to inter-organisational coordination, the section on internal coordination will be brief.

The organisation of the logistics department responsible for transport and the production department responsible for PDI and associated services has changed several times since the foundation of the company. Currently, logistics has one manager with responsibility for the department as a whole. Production is a separate department, resulting in a need for coordination between the departments requiring both PDI and other services, as well as transport. Furthermore, logistics is no longer the responsibility of the marketing department which previously hosted it, thus leaving management with capacity for focusing on logistics activities.

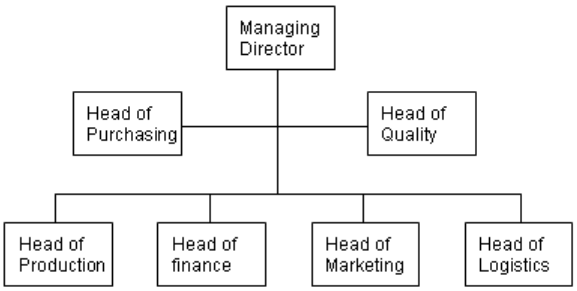

Figure 4.4: Organisational summary

What is evident from this structure is that the activities detailed above, are handled by different groups within the company. Whereas it is quite common for negotiations and administration to be separate from operations, here the two types of operations – car transport and PDI and modifications - are handled by two separate units, and coordination is necessary between these in order to avoid bottlenecks.

4.7 Summary

This chapter has discussed the two main distribution systems employed in Europe – pick-from-stock and make-to-order. It has also shown the main services carried out by Autolink, and given an overview of the main resources required to carry out these services. It is significant that Autolink does not provide one standard set of services for all its customers, but rather allows each customer to choose the services to match their requirements. In the following three chapters it is shown how each of three importers matches the services to their specific requirements. It is then appropriate to return to Autolink in Chapter 8 to show how Autolink is tied in to the distribution system as a whole. The next three chapters also highlight the differences in the pick-from-stock and make-to-order distribution systems.

Chapter 5: The Møller System

5.1 Introduction and background

This chapter describes the Møller system and its connection to Autolink. The chapter is based on the most extensive empirical background of the three importers' systems. It also describes in detail how Autolink and the importer fit together. First, the Møller group and its main manufacturer are described, followed by a description of the primary activity structure, which is complemented by showing some of the most important steps in the actual flow of cars, and the primary administrative links between Autolink and Møller. Møller's resources and how these relate to Autolink are then considered. Finally, the different levels of interaction between the two firms, is shown. The chapter ends with a discussion of the system characteristics and shows how Autolink fits into the system.

The Møller Group is the primary importer of Volkswagen, Audi and Skoda in Norway. A total of 32,503 new vehicles were registered for these three brands in 2006 (www.moller.no). The Møller Group covers several business areas, but this case only deals with car sales and operations. Where data is brand-specific, this case will mostly focus on Volkswagen for easy reference. Volkswagen is the largest part of Møller's portfolio, and the Volkswagen Group also owns the other brands. The main source of data and focal part of the Møller Group has been Møller Logistics, which is the logistics department of Møller Cars. This is not a legally separate unit, but it is part of Møller and deals directly with logistics and Autolink. Clearly, it is not possible to describe the distribution system without referring to at least some of Møller Cars' other activities and those of the manufacturers.

The Møller Group was founded in 1936 and operated as an agent for Dodge and DeSoto (Chrysler). Møller was awarded the agency for Volkswagen in 1948, Audi in 1974 and Skoda in 1991. From 1989-2003 Seat was also part of the portfolio, but sales were below expectations. Seat now imports their cars to Norway themselves.

Møller is a privately owned importer, which is uncommon in the VW system. There are other private importers in Austria and the Netherlands, but apart from these, VW owns all its country import operations. This means that although Møller is very much part of the VW system, it is not integrated to the same extent as systems in some of the other countries. A further point is that the VW system in Europe is largely country-based with

an importer in each country, and a European-level logistics organisation (Volkswagen Transport) is responsible for the overall flow of cars.

5.1.1 The Manufacturer in a European setting

Volkswagen has over 325,000 employees and sold 5.7 million cars worldwide in 2006 (Volkswagen, 2006). Investment in production capacity in China is considerable (697,548 cars produced in 2003). In addition, factories in South-America are being updated to produce more recent car models. This leads to substantial shifts in the flow of cars between continents. However, cars for the European market are still largely produced in Europe. Cars are transported to their destinations partially by railway and partially by trucks. Cars are also shipped to Scandinavia using short-sea shipping. The ships used for this transport, are highly specialised. In total, Møller Logistics receives cars from 18 different European factories which shows some of the complexity in the system. Standard delivery time for a fully specified car is 6 weeks, but this can be reduced to 2 weeks if a car is already in production and the customer order only requires changes to optional extras. This is seen as a sales advantage, especially because the profit margin on optional extras is usually much higher than on the basic car model.

The Volkswagen distribution system is based on a combination of cars made to customer order, and cars manufactured according to expected customer demand. Yearly, the importer, dealers and manufacturer meets on a per country basis to agree on a sales quota for the coming year. The plan is reviewed twice a year. As the plan is based on a market share, no major adjustments need to be made unless there are big changes in new car sales. A detailed sales plan is developed down to the level of the number of cars for each model (e.g. Golf). The proportion of cars ”made to customer order” varies. At the beginning of the study this proportion was approximately 50%, whilst towards the end, it was closer to 70% due to growing new car sales mainly through pre-orders. The residual between the pre-orders and the agreed quota has to be decided upon by the importer. Since these are now specific cars to be manufactured, the importer has to predict which configurations will be sought. This is based on the importers’ market knowledge, but since there are many configurations available, these cars will either have to be sold to customers who are not concerned with specifying exactly what features they want, or will have to be sold at a discount. Note that there tend to be a few “volume” models with similar setups that are easier to sell. Importer cars tend to have fewer specifications than customer ordered cars, meaning there are fewer optional extras.

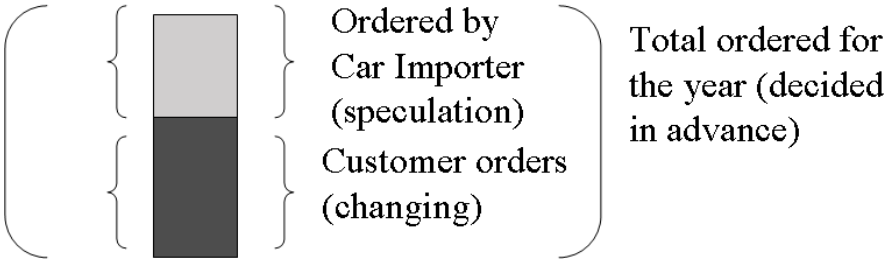

Figure 5.1: Split of car orders for the manufacturer

Furthermore, the manufacturers tend to reserve factory capacity for certain countries at certain times, so that production is more batch-oriented than continuous for each country. It is also possible for the importer to get discounts from the manufacturer if too many units of a particular model have been produced. This batch-style production can also mean that a much larger than usual quantity of cars is shipped to Norway at certain times. A typical example is when the factory allocates extra time to a country after a holiday in order to catch up with a backlog, leading to a large number of cars arriving at the same time. Such decisions are made by the factory and VWT and cannot be changed by Møller.

5.1.2 Møller Logistics

Møller Logistics (ML)[6] is the logistics department of Møller and is not a separate legal unit. For practical purposes, however, it is the unit that deals directly with Autolink and which is responsible for the flow of new cars once they arrive in Norway. ML is divided into two parts, one dealing with new car logistics, the other with spare parts. ML Bekkelaget (the part of ML dealing with new cars) has 23 employees. ML Skedsmo deals with the storage and distribution of car spare parts in Norway and has approximately 80 employees. ML Bekkelaget has a head of car logistics and ML Skedsmo a head of parts logistics, who is also the director of Møller Logistics. This case deals only with new car logistics and will, therefore, not detail the activities at ML Skedsmo.

In Norway there are 71 VW dealers, 35 Skoda dealers and 41 Audi dealers. Of these, approximately 25 are owned and operated by the Møller Group[7].

[6] Throughout Møller Logistics is used for Møller Logistikk and Møller Synergy for Møller Synergi since these are direct translations from the Norwegian unit names.
[7] Car distribution in Europe is largely organised through a franchise system for car dealers, with varying degrees of exclusivity in terms of brands, and different standards requirements for the dealers. All the car manufacturers in this empirical

These are mostly situated in the larger cities and account for roughly half of the turnover.

5.2 Activity structure - services

Møller purchases a limited range of services from Autolink, but the volume is quite large. This section describes several aspects of the services provided. The first part shows the main physical activities carried out from when a car arrives at Møller's Bekkelaget facility, until the car is picked up and transported by Autolink. The second part summarises and simplifies this activity structure, but adds data as to time and volume for a number of the main activities. This should be seen as a complement to the first part. Finally, this information is related to the flow between Møller and Autolink, since much of the actual coordination takes place through this flow.

5.2.1 Physical flow

The physical flow is represented in two ways. First, a detailed description of the activities carried out from the arrival of a ship until Autolink picks up the cars, is presented. This focuses on the physical activities carried out, but also refers to several important information points during the process. The purpose of the description is firstly to expand on the two generic models presented for car distribution in Chapter 4, and secondly to show how the Møller and Autolink systems match each other. The second part of the description of the physical flow is a more simplified representation of the connection between Autolink and Møller, with added focus on the extent and time needed for the activities. This representation should be seen as supplementary to the first.

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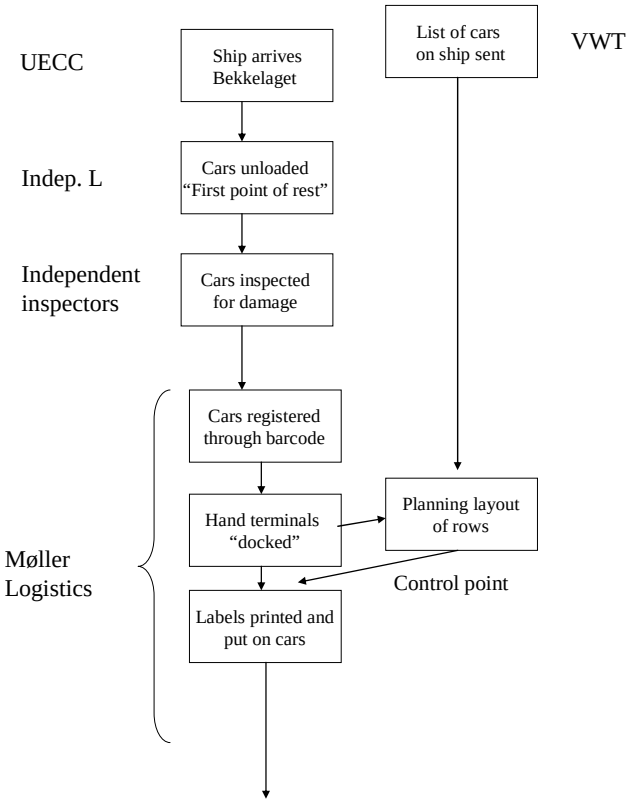
part use variations of the franchise system as their main channel. Since the focus is not on the dealers in this dissertation, the franchise system is not elaborated upon.

The figure below shows the main activities related to the arrival and handling of cars at Bekkelaget, the main facility of Møller Logistics.



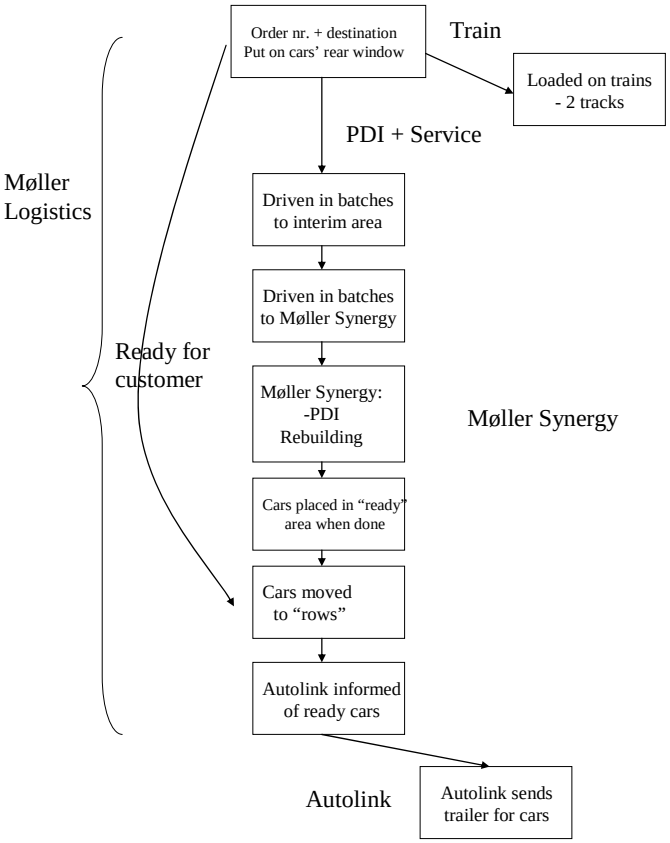


Figure 5.2: Activities related to ship arrival

Several days before a ship arrives, VWT notifies Møller Logistics as to date of arrival and cars onboard. The list of cars is auto-generated and sent per mail in a free text format which is converted and loaded into Møller's IT system.

Normally, a ship arrives during the night and is ready for unloading at 7am. This is not always the case, however. When the main data was collected, it showed that the previous 6 months had been particularly problematic. This was partly caused by the use of a new ship which was marginally slower and harder to load/unload than the ship previously used. The decision of which ship to use is entirely up to the carrier.

Unloading is carried out by a separate firm owned by a constellation of shipping firms. This firm has an exclusive contract for unloading ships in Oslo Harbour. On arrival, the cars are placed at "first point of rest" inside a security zone. Depending on the load, the ship may have enough cars to fill this area several times, and so the firm cannot finish unloading until Møller has registered and moved cars to its own facility.

An independent firm inspects all cars after they have been unloaded to the "first point of rest". Each car is inspected from all angles, and damages, if any, are noted. The inspection firm usually has 1 or 2 people on site when a ship arrives. The general principle is that each party in the transport chain checks the car for damages – the previous party is then accountable for any damage unless it has already been registered.

The list of cars arriving on the ship is merged with the list of other cars already at the docks, in addition to cars from Møller Synergy (detailed later). A number of "rows" are marked at Møller's facility, generally assigned to cars according to destination. An Excel sheet is used for planning, and the cars are then moved to the assigned rows. Updates are carried out as needed, with a new layout for rows made each time a ship arrives. All Møller Logistics personnel on the docks have access to this "target" layout.

The first operation for Møller Logistics at the docks, is registering the cars. This is done by reading a barcode attached to the wind screen of each car with a hand-held scanner. The scanner can read the codes from many cars, but must be brought back to the Møller Logistics' office and "docked" in the computer system to download its data. When a car is registered, this information is merged with existing information in Møller's IT system including end customer information for subsequent processing of services to be carried out on the car. A more extensive label for local use is then printed. After all cars have been registered in this manner, this of cars actually unloaded is compared to the shipping list sent by VWT.

A new label is then attached to the car. The destination and order number (local information) are written, usually on the rear window of the car (in chalk). In some cases a delivery date is also written on the rear window. Depending on the services required and the final destination of the car, there are three possible destinations at this stage:

First, the car goes directly to transport by road. The car requires no further service from Møller and is set up on a destination row. Once, or several times daily if needed, Møller Logistics sends Autolink a list of the cars ready for transport, allowing Autolink to plan the loads. When Autolink receives

such a message, it plans trailer loads dependent on the availability in their transport system, and dispatches the trailer(s).

Second, the car goes directly to transport by train. Trains run by Cargonet arrive periodically and with set destinations. Møller reports requirements for transport on a continual basis. There are two tracks at the Møller facilities. The train will arrive at one of these and leave a number of open railway wagons. These railway wagons can transport any type of car. The locomotive then moves out and returns on the second track with closed railway wagons. Both railway wagon sets are then loaded and the open cars are reattached to the train. Cargonet is now responsible for the train until it arrives at its destination. The spare capacity for railway transport is an important issue. A recurring problem has been that the demand for railway transport has not been coordinated between the main users, Møller, Autolink and Autotransport. It may thus occur that all may request transport of their cars to the same city on the same day, exceeding capacity, whilst trains going to other cities are under utilised.[8]

Third, cars requiring PDI operations or technical modifications by Møller are assigned to Møller Synergy. Møller Synergy is located in the same building as Møller Logistics. Cars for Møller Synergy are, therefore, simply parked in an assigned area in the building (which encompasses significant parking space). The cars then become the responsibility of Møller Synergy until service/modifications have been completed and the cars having been moved to another area in the building. Møller Logistics picks cars from this area continually, registers them as complete and places them in the rows ready for transport. A message is then sent to Autolink. Møller Synergy offers services to Møller dealers in Oslo. The same services, however, are not available to dealers in the rest of the country. Typically these dealers carry out services locally.

5.2.2 Møller flow and traffic

The figure below shows a simplified set of activities for Møller, grouped in terms of timing. It shows both the main grouped activities and the main routes taken by cars until they are picked up by Autolink. In the description below, the focus is on the timing and volume of activities, to give a better

[8] The recent changes to the way Autolink carries out railway transport have not been included in this particular description since their impact on Møller was not clear during data collection.

understanding of the processes described and complement the more thorough description in 5.2.1.

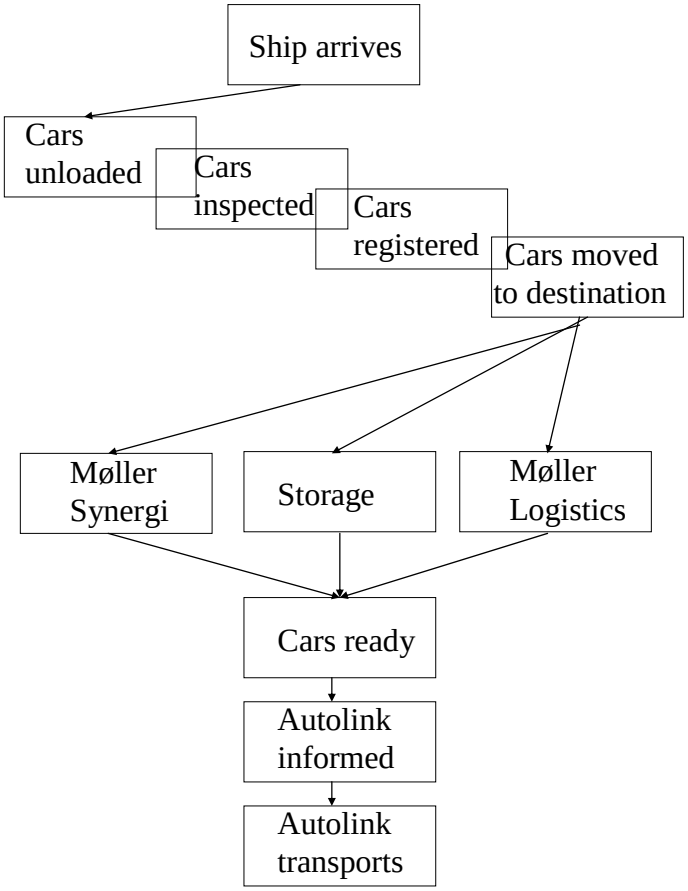


Figure 5.3: Simplified activities and flow

For a ship docking at 7am, unloading should normally commence by 8am. Recently, the shipping company has been using a slower ship on this route. Although it is only one knot slower, this makes delays more likely.

Once unloading starts, the four processes - unloading, inspection, registering and moving cars to their destinations - take place simultaneously. The local flow at the site, however, ideally moves in batches, i.e., personnel move cars to a particular destination and the personnel are then transported back together to reduce the number of return trips. In a normal week, there will be 2 feeder ships. 350 cars (a fairly typical number) can be unloaded, inspected, registered and placed in 4 - 5 hours. Even unusually large loads

(highest to date is 968) can be processed in one day, but this requires extra preparation, in particular with regard to clearing space at the facility. Such a large influx of cars may, however, create problems later in the week due to the extra load on PDI, modifying and other services.

At the next stage, where cars are either put in storage or operation, there is great variation in how long cars remain. Typically, the cars are put in storage because they are not yet assigned to a customer, and spend much longer in the system than customer specified cars. This effect is compounded because the order system allows a customer to pick and modify an in-production car up to two weeks prior to delivery in contrast to the regular delivery time of six weeks. For such cars the general model and some features are fixed, but there is still considerable flexibility for the customer to specify smaller features. This combination of a short delivery time and also being able to specify features close to time of delivery is attractive to many customers, and such cars are often sold instead of cars in stock. The features of cars in storage at Møller's are already largely finalised and, therefore, these cars risk ending up in a "backwater". The ability to pick cars from production is based on VWs "Showglass" system which is linked with the production system.

Møller Synergy cars requiring PDI and technical modifications, in practice disappear into a "black hole", until they reappear and are re-registered in Møller Logistics' system when the modifications are complete. Møller Synergy has a planning horison of 8 days. Møller Logistics carries out a few modifying operations, in particular mounting of interior walls in utility vehicles. The production time for these cars is 2 - 3 days. The planning horison is roughly the same since there are too many changes to the incoming cars to extend it successfully

Once operations are completed by Møller Synergy and/or Møller Logistics, cars are placed ready for transport (or in storage), and Autolink is informed at the end of the day (as a rule, although updates can be sent several times a day, if necessary). In general, Autolink will incorporate the transport order in their system, and cars will be picked up the same or the next day. The main limitation at this stage is that Autolink must continually try to fill trailers for its various destinations. This can lead to delays, especially for remote dealers with low volumes.

The total volume in the Møller system was more than 32,500 vehicles in 2006. The numbers are not identical to sales, because not all cars are processed in the same year they are sold. Sales have increased in the last several years (2006-2007), but so far the capacity at Møller's facility has not

been expanded. As a general rule, the delivery time from when a car arrives at the docks, until it arrives at the customer, is 5 days (barring modifying).

75% of cars are assigned to a customer or dealer on arrival. (This number increased throughout the study from about 50%) 25% of cars go directly to storage and become the responsibility of Møller Cars.

Insurance is based on a cost paid to principle, i.e., when a particular actor takes over a car, this actor becomes responsible for damages unless existing damages are reported within 24 hours. In order to protect themselves from claims, all major actors will typically inspect cars on arrival. However, this introduces a number of extra operations in the distribution system. Roughly speaking, each inspection of a car introduces a cost of about the same level as the average cost of damages to cars for the entire distribution process. For transport to Norway the car insurance cost is 1,500 NOK. For the inland transport in Norway the car insurance cost is 5,000 NOK.

5.2.3 Administrative/commercial flow

This section does not describe the entire administrative flow involved in the distribution of Møller cars, but focuses on the new incoming cars and the interaction with Autolink. The activities follow in part from the description of the physical flow above, but are not described in such detail.

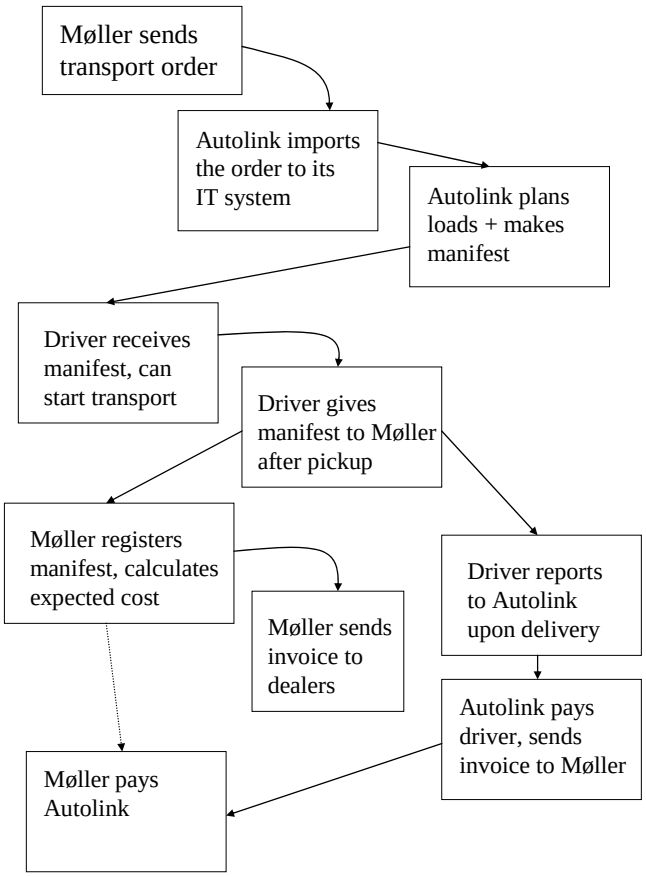


Figure 5.4: Information and payment flow

The information and payment flow is complementary to the physical flow discussed above. The focus is on Møller, Autolink, the drivers and the payment steps. The inclusion of the drivers is important, since it is Autolink's responsibility to coordinate and follow up driver performance, even though most drivers are not Autolink employees.

Initially, Møller will issue a transport order with an identifier for a car, including model number, features and chassis number (usually the chassis number is not inspected at this stage, even though it is the unique identifier for any particular car). At this stage cars do not generally have license plates. The transport order usually covers a batch of cars, and it is only sent when the cars are ready to be picked up.

This order is then imported into Autolink's IT system. Previously, this was a manual process based on a relatively standardised format. Now the IT systems of Autolink and Møller interface through a common platform, so that orders are imported directly and automatically. This speeds up the process, but does not change its nature.

Based on the information from Møller, Autolink plans loads and then issues a manifest which is a description for a driver, stating the collection and drop-off points of the cars. The manifest is then sent to the driver's hand terminal, so he can start the transport. Møller does, however, prefer to meet new drivers before they start working routes involving Møller cars. Once cars are picked up at Møller's site, the driver gives the manifest to Møller allowing them to register the transport in their system.

The terms of payment in this system are quite significant. Autolink only sends Møller an invoice upon completion of the transport. Møller then has 30 days credit, leading to a long delay from the initial transport order to payment. The drivers are paid directly after completing a transport, since they are mostly small private firms. Dealers have a 60 - 90 days credit after the car is picked up, with more remote dealers having longer credit, in part because the transport takes longer. In essence, Møller tends to have positive cash flow in this system, although this depends to a degree on the dealers. Autolink, however, generally operates with a negative cash flow, since it has to pay drivers and only later receives payment from Møller. This in itself is an important point because the small firms represented by the drivers, are not financially strong. It is, therefore, more advantageous for them to receive their payments through Autolink than from the end customer. It is also quite clear that if both Autolink and Møller were not part of the process and the drivers had to deal directly with the dealers, this would complicate the payment system considerably. However, at some locations dealers do hire drivers locally. In order to manage the entire system of payment, it is, however, an advantage to have a larger actor assuming some of the risk of payment.

5.2.4 Additional comments – physical and commercial flows

Drivers in a hurry sometimes forget to give the manifest to Møller (which is brought physically by the driver and handed over upon completion of loading). Although the cars have clearly been moved, Møller needs the manifest for entry into their own IT system, and may have to wait until the driver physically brings the manifest on the next trip. If the manifest is still missing, Møller contacts Autolink directly for further action. Note that in cases where there are many cars ready for loading, it can be difficult for

Møller to know whether cars have been picked up or not. Autolink trailers arrive and load cars frequently during the day, so it is not normal to monitor their activities.

Once the manifest has been registered, it is routine to calculate the expected cost and register it in the system, since it can be some time before the actual invoice arrives. An invoice for the dealers (who pay for the actual transport) is also issued. The driver reports to Autolink upon completion of the assignment. Autolink then pays the driver, and only then issues an invoice to Møller.

It is not always clear how long a dealer has to wait for a car. Møller's system states 5 working days as an "ideal" for delivery, but this is not always the case. For Møller, there are no formal obligations in terms of delivery time. This can lead to customer dissatisfaction. Autolink's need to operate with full trailers can also be frustrating for dealers, if they feel they have to wait too long while Autolink tries to put together full loads.

Some significant errors may occur at this stage: The driver may load the wrong car (takes the wrong key). In this case a car is usually transported to the wrong destination (or to the right destination but not as planned), and another car is left at the docks but registered as loaded in the system.

A possible remedy for this situation is for all cars to be fitted with identification tags which the driver can read with a portable scanner to register all cars which have been loaded. The correct (scanned) cars must be loaded according to the manifest issued to the driver, to be accepted by the system (i.e., the driver will not be paid for the trip unless the cars are loaded correctly). This is largely related to Autolink's IT system.

During the winter of 2006 there were particularly heavy snow conditions in the Oslo area. This led to extremely difficult transport conditions. Both Autolink and Møller Logistics had problems due to the snow, which covered the cars at the docks. Problems were two fold: First, it was difficult to identify the cars because of the snow cover. Second, it was very difficult to move the cars because the snow first had to be removed. This naturally created problems because the usual lead times could not be met, and customers complained that the delivery times were lengthened.

5.3 Resources and investments

A particular feature of the Møller – Autolink connection is Møller's considerable investments in logistics capabilities in Norway. This section

describes these resources and some of the more important investments in order to explain the choice of services and the way Møller works with Autolink.

Most new cars in Norway enter through Autolink's facility at Drammen. However, Møller has a separate facility at Bekkelaget at the main port in Oslo. Effectively, this represents an additional node in the car transport system which Autolink must incorporate in its transport planning. It is also the reason why Møller carries out most of the activities required for new cars, such as PDI and modifying itself, rather than buying such services from Autolink.

Møller's facility at Bekkelaget is rented from the Oslo Port Authority putting Møller in a unique position as long as the Oslo Port Authority does not change the use of the area. The facility consists of total parking space for 3,500 cars. The building also houses the administration of Møller Logistics, as well as several workshops and space for Møller Synergy. A double railway track leads up to the building, allowing trains to be divided for easier loading. Ramps at the end of each railway track enable cars to drive directly onto railway wagons.

The actual berth for ships and first point of rest (i.e., the unloading area) are controlled by Oslo Port when ships are unloading. However, once the ship leaves, this area remains open. Due to safety regulations, the area must have a guard when it is in operation. This may simply be considered an operating cost and is not different from other ports used for car imports.

5.4 Organisation and coordination including contracts

The contact between Møller and Autolink can be divided into three parts representing different time scales and types of interaction. Only the long term time scale is defined by a formal legal contract. The three scales are a) long term contracts, b) monthly meetings and c) operational/daily contact. Each is discussed below.

a) Long term contracts

Møller and Autolink use a 3 year contract to regulate their activities. The contract is "standard" – specifying terms and general conditions, but it does not regulate the details of their interaction. The contract includes specification of renegotiation, both with regards to extension of the contract, and yearly price adjustments. Currently Autolink is seen as the only obvious partner for Møller in terms of transport services. The contract includes the

provision that cars should be handled in accordance with the Volkswagen handling regulations. It is Autolink's responsibility to make sure that their contracted drivers follow these regulations. In this sense the relatively simple contract is considered a framework, and there is considerable scope for organising the actual day to day activities. Normally, it is only during renegotiations that the contract itself is considered in detail and subject to change.

b) Monthly meetings

Monthly meetings are held between Autolink and Møller. The main purpose of these meeting is to raise operational issues which cannot be handled on a running basis. Performance issues and customer (often dealer) feedback are typical topics. Recurring issues are tied to the handover between Møller and Autolink, since the two firms have different internal systems.

These meetings are also the normal forum for raising changes to systems, developments in the infrastructure and so forth. Autolink and Møller have started a project to make the data transfer between their systems more automated.

Depending on the issues to be discussed, 1 - 3 senior representatives from each firm are generally present at these meetings. The meetings are either held at Møller Logistics or at Autolink.

c) Operational/Daily

The daily car transport operations are based on messages initiated by Møller once a car is ready for transport. Autolink does not in general provide storage, PDI or modifying services for Møller, and does not have access to the "pipeline" at Møller, only receiving messages when the cars are ready. Thus, Autolink cannot plan transports until after being advised by Møller that the cars are ready.

The status for ready cars is sent to Autolink once or twice daily, with the last message sent no later than 15:30. Autolink uses this information in conjunction with information of other transports in its system to "build loads." The driver then arrives at Møller, picks up the car keys from a special shed, loads the designated cars and leaves a manifest detailing the cars loaded.

The manifest is a list of the cars which have actually been picked up. This is used both as an input to Møller's system which can then register the cars as moved, and for Autolink, since their invoicing is based on the manifest.

Autolink, however, must wait for the driver's transport completion report before issuing an invoice to Møller. As a result, Møller has to keep track of expected invoices for accounting purposes. On the other hand, this practice is advantageous for Møller in terms of cash flow.

5.5 System characteristics

For the analysis of this case, it is useful to summarise some of its main characteristics. These may be divided into characteristics related to the manufacturer's system, and characteristics more closely related to Møller, Autolink and the distribution system located in Norway.

Most of the VW cars sold in Europe are also produced in Europe. A large proportion of these are made-to-order cars. This is especially true under high demand conditions. The system is particularly well adapted to meeting high demand conditions where customers specify optional features, because such cars can be delivered in a matter of weeks. It is not as well adapted to handling large increases in the general demand for cars, since there is less stock available than in a pure build-to-stock system. However, the compromise of making some cars for inventory provides some flexibility.

This type of system, however, also affords a shorter planning horison because only general types of cars to be produced are specified in advance, and it is necessary to adapt to incoming customer orders continuously. This issue is compounded because customers are allowed to pick cars on the production line, thus bypassing cars in inventory. The compromise also allows the customers to specify detailed requirements. However, in terms of logistics this means that a very high proportion of the cars are assigned to a particular customer when leaving the factory. In other words, they are no longer interchangeable, since it is very unlikely that two cars are identical when the product variety is as high as in the VW system.

The Møller system is a national-level organisation, reflecting the general way VW is organised with one main regional logistics organisation and national-level organisations for sale and logistics. In terms of the Norwegian market and Autolink, however, there are some additional features which must be seen in the context of the well-established, but small Norwegian market, as compared to the total turnover of VW. VW is, however, one of the largest car brands in Norway, and as a consequence Møller represents a significant proportion of Autolink's business. On the other hand, Møller only uses a few services from Autolink, notably transport and handling. This is largely tied to the fact that Møller has a high level of resources in its organisation, and carries out many of the basic activities related to the

preparation of cars itself. Therefore, the case exemplifies the core activities carried out by Autolink. Table 5.1 below summarizes some of the most important characteristics of the system, expanding on the initial reasons for choosing Møller in Chapter 3.

Characteristics in relation to Autolink	
Regionalisation	National
Production	Mainly Europe
Volume	High
Range of services purchased	Narrow
Size of client organisation/resources	Large/high
Type of agreement	Exclusive
Dealer network	71 VW, 35 Skoda, 41 Audi. 25 owned by Møller. Most only carry Møller brands.
Order model	Make-to-order balanced with pick-from-stock

Table 5.1: Møller system characteristics

This chapter has shown some of the general activities and types of services discussed in the basic Autolink case, but also points to other important reasons for using Autolink. Two of these are financial stability and being a professional counterpart.

The terms of payment, which are described in more detail in the Møller case than in the basic Autolink description, show clearly that Autolink is important in terms of absorbing financial risk. It does not do this as a financial intermediary, but simply because the payment terms remove some risk from the drivers (they are paid directly from Autolink on completion). It does the same vis-à-vis Møller, but since this is a larger and financially solid actor, this may be seen more as a service than as absorbing high levels of risk.

Møller uses Autolink's services partly to monitor the standard for some of its activities. This is not done directly in a pure numerical sense, since the facilities are not equivalent. However, looking at Autolink's facilities, not only in Norway but also in Sweden where the facilities are new and spacious, gives a good understanding of how its activities are organised. This is useful for Møller in terms of understanding what types of efficiency are possible. It is also instructive for Møller to see the differences caused by the differences in the facilities – for example, where Møller has to find creative solutions to overcome a lack of space which is not the case to the same extent for Autolink.

Chapter 6: The Honda System

6.1 Introduction and background

This chapter deals with the Honda distribution system in Scandinavia in general and in Norway in particular. In order to obtain an understanding of how Honda operates in Norway and its relation to Autolink, it is necessary to also look at the regional system. This means that the structure of this chapter differs slightly from the previous one.

The chapter starts with a background description of the total Honda system. The regional system is then described, including an overview of the Honda distribution system in Europe. The particular provisions for the Norwegian system, which are somewhat unusual, are then shown. Finally, the system characteristics and interaction with Autolink are discussed.

6.2 The manufacturer

Honda has a relatively small but increasing market share for automobiles in the Scandinavian countries. The company also sells a substantial number of motorcycles and other power equipment (engines, lawn movers etc.), but this is done through a separate organisation and is not included here. Historically, Honda has had a very strong position in motorcycles, and has developed its car business more recently. Total automobile sales in 2006 were 3.2 million, making Honda one of the smaller volume brands worldwide. European sales were 292,000, making this one of its smaller markets (Honda, 2006), with the main volume in Asia and North-America.

Honda is organised according to a regional model with a European headquarters. There are several regions in Europe, with Scandinavia as part of Honda North. Each country has a country office for sales and handling of dealers.

Honda has a "service provider" located in Malmö. This is not the head office for the Scandinavian region, but it provides a number of common functions such as HR, logistics, accounting and order handling. Honda's head office for logistics in Europe (HLE) is located outside London, in the United Kingdom. The principle is that where services can be centralised and carried out more efficiently at one location, they shall be provided by the regional hub. The HLE office does assist the regional hubs with respect to logistics quality, i.e., common standards for the handling of Honda cars. Furthermore, the service provider is tied to the growing car logistics hub in Malmö. Because of the relevance of this hub to Honda's distribution

structure, it is discussed separately below. It should be noted that Honda's decision to move its regional hub to Malmö, was made partially as a result of Toyota deciding to place its regional hub there. According to a logistics manager at the Honda hub; "Sometimes the best policy is to wait to see what Toyota does." (Author's translation.)

Honda's European cars are sold on a "pick-from-stock" basis. The essential point for the manufacturer is, therefore, to estimate what type of models the customers will request. During the last 2 - 3 years sales have been particularly good. This is attributed to a particularly popular selection of car models. The level of optional equipment delivered with a standard Honda is significantly higher compared to that of other brands, especially those selling a proportion of their cars on a make-to-order basis, which is one way of overcoming the difficulty of predicting exactly what features the customer requires. It is also the perception of Honda (interview with Honda's Logistics Manager) that a high proportion of customers are interested in getting their new car quickly (especially in the Baltic region), so that the losses incurred by not having cars immediately available, are substantial. Put differently, a substantial proportion of customers want a particular type of new car quickly, but are not very brand-sensitive, making it essential to offer them a satisfactory car quickly. This should not be understood to mean that Honda does not wish to build its brand in the Nordic region, but it cannot base sales on having an established brand such as Volvo.

6.3 The Malmö Logistics Hub

The car logistics hub in Malmö handled 345,000 cars in 2005 (these numbers indicate "handlings[9]" rather than unique cars). In 2001 this number was only 31,000 resulting in an increase of roughly one order of magnitude in five years. One reason for this increase was the opening of the Øresund bridge, resulting in reduced ferry trips and associated traffic, and freeing up substantial capacity at both the Copenhagen and Malmö ports. The two ports have joined forces through the company Copenhagen-Malmö Port (CMP). Substantial investments in infrastructure make the port attractive for car transport. Toyota's decision to move its Scandinavian hub to Malmö gave the port a large base volume of cars and was a critical point in making the port attractive for other car manufacturers. Currently CMP houses four

[9] A "handling" refers to a single action such as receiving a car from one ship and moving it to a smaller feeder ship. Cars can be sent back and forth by the manufacturer, or put into storage and then sent to the final destination at a later date, so the total number of unique cars is normally smaller than the number of "handlings."

PDI centres and 600,000m^2 for handling and storage of cars. It has not yet been necessary to build multi-storey facilities.

Company	Size of operation
Malmö	
Autolink	85,000 m2
Motortransport	190,000 m2
Toyota (operated by Skandiatransport)	255,000 m2
Copenhagen	
Skandiatransport	100,000 m2

Table 6.1: Car terminals at the Malmö hub

There are currently plans to expand the car port to increase capacity, both by filling in sections of the sea around the port, and by replacing old buildings.

In addition to Toyota's Scandinavian volumes, Malmö port is used as a transhipment port for the large volumes of new cars going to the Russian market (this applies to several brands). Cars are generally unloaded from large deep-sea transport vessels carrying 3.000 - 4.000 cars, and reloaded to feeder ships. These take the transhipment volumes to Finland where they are shipped by trucks to the main destinations in Moscow.

The effect of the large volumes going through Malmö is that the frequency, both of deep-sea and feeder ships going to and from Malmö, is now very high. Ships from Bremerhaven arrive at Malmö 7 times a week, and from Travemunde/Lübeck 4 times a day. This frequency itself leads to savings through reduced lead times. Reloading cars onto feeder ships enable the deep-sea vessels to return directly to shipping ports overseas, leading to significant cost savings for some manufacturers. The cost of running car operations through Malmö is not particularly low, as the price of services at the port is not the lowest available. However, the savings on deep-sea vessels outweigh the costs of operating out of Malmö.

Route	Frequency
Bremerhaven-Malmö, CMP	7x a week
Lübeck/Travemünde - Malmö	4x a day
Malmö-Norway (train)	5x a week
Malmö-Finland/Baltics/Russia	5x a week
Copenhagen – Oslo	7x a week
Malmö-Northern Sweden (train)	5x a week

Table 6.2: Some main routes in the regional distribution system

6.4 The Honda distribution system

Honda takes advantage of the benefits of this structure. Its Scandinavian volume is handled at Malmö and then forwarded to other destinations, including the Baltics. Cars for Norway generally go directly to Drammen from Bremerhaven and are not handled through Malmö. The figure below shows the regional system in terms of the main physical nodes. The description of the Honda system is largely tied to these physical nodes and the geographic distribution of the system, since this is a unique aspect illustrated by this system.

6.4.1 Regional flow

Figure 6.1 below shows a summary of the regional flow in the Honda system, focusing on the physical nodes involved since this illustrates the choices made in this system. The significance of each location is discussed in turn.

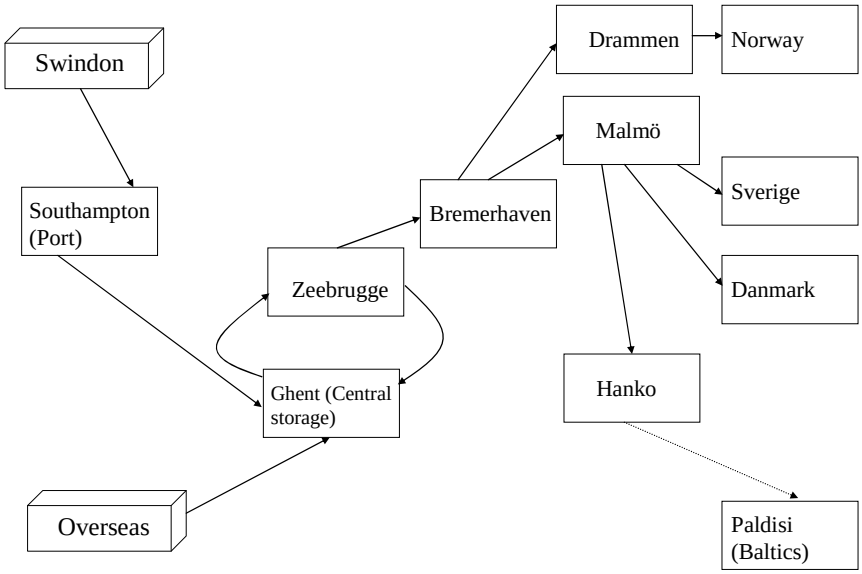


Figure 6.1: Regional flow of cars, Honda

Honda has a number of European factories, with several placed in the UK. Swindon is only used as an example here. It is one of the primary production locations in Europe. The UK production consists of Honda CR-V and Honda Civic. These are typical volume cars and make the flow far

less complicated than the overseas production with respect to number of different car models. UK produced cars are loaded onto feeder ships at Southampton for shipment to Zeebrugge.

Overseas production is generally production from Japan, arriving on deep-sea vessels with a large numbers of cars and different car models. Honda does not own deep-sea vessels. The lead time for these cars is relatively long (see the discussion below on flows). Japan-produced cars first reach port in Europe at Zeebrugge after 28 - 35 days.

Ghent is the main storage facility for Honda in Europe. Honda has a large, long-term contract here, and it is an overall policy that all cars go via Ghent. Zeebrugge is the shipping port associated with Ghent. For cars destined for Scandinavia, the general policy is, however, that the cars remain on the ships where possible, to reduce the cost and risk of an extra handling.

Cars go from Zeebrugge via Bremerhaven. There are no significant activities in Bremerhaven for Honda, as it is simply a normal stopping point for many of the feeder ships. In terms of Honda this is simply an extra stop.

Malmö is the regional hub for Scandinavia. Volumes for Sweden, Denmark, Finland and the Baltics are received here. PDI for Sweden and Denmark is carried out in Malmö by SMT (Skandinavisk Motortransport). PDI for Finland and the Baltics is done locally. It is possible to send cars to Norway via Malmö, by swapping between the stocks meant for different countries. This, of course, involves additional administrative work.

Hanko is the import port for Finland, but also handles volumes going to the Baltics and Russia. Cars for the Baltics can be unloaded at Paldisi and handled in a common storage and PDI facility. The generally large flow of cars to Russia means that the frequency of ships to the Baltics has also increased.

Drammen is the import port for Norway. Cars are transported to Drammen on separate feeder ships that come directly from Bremerhaven. This is a separate flow from the cars going through the regional hub at Malmö. Cars may go to Malmö first and then by railway to Oslo, but this only applies to cars that are redirected and not part of the main flow to Norway.

Honda does not own any car dealerships. There have been discussions as to whether Honda should own some dealerships, for example in the larger cities. The dealers are both exclusive and non-exclusive. In the Baltics about 50% of the dealers are exclusive, in Sweden 75% and in Norway 67%. Sweden also has relatively fewer dealers than the other countries. There are

no specific restrictions on what cars the non-exclusive dealers can sell, but typically they also sell Citroen, Audi and Ford. In Norway there are roughly 35 dealers selling Honda cars.

6.4.2 Insurance and damage

Honda uses a normal car distribution insurance system where the recipient of a car has a set time to inspect it and report any damage in order to claim for damages against the previous service provider. This system has already been explained in the Møller and Autolink Chapters, so we will here focus on some unusual aspects of the Honda system.

The Scandinavian setting is considered a "favourable working environment" by Honda, in that the overall damage rate is very low. This may be surprising, considering the climate conditions, but is no surprise when taking into account the heavier traffic and higher general accident rates in other parts of Europe. In Scandinavia, Norway is considered the most difficult region in which to operate because of the terrain (in particular the rugged coastal region). Honda cars transported within Norway are covered by additional insurance from the importing port facility, including delivery to the dealers. This insurance covers all damages to the cars under normal conditions. It has two main effects. First, the cars are actually covered by two insurances part of the way. For example, if Autolink loads a trailer with both Honda and other cars, the Honda cars are covered both by Autolinks' carrier insurance and the general Honda insurance for Norway. Another main effect is a great reduction in the amount of time and effort spent on determining liability for damages, since Honda's overall insurance covers all damages.

It is an open question whether this system is sufficient to keep damage rates low. However, this must be seen in the context of Honda having a relatively low volume, so that the company's influence on actors in the distribution system might be limited. Honda, like other manufacturers, requires compliance with its standards for handling, transport and PDI.

6.5 The Honda System in Norway and connection to Autolink

Honda has a regional office in Norway. The primary responsibility of this office is operational control of the dealers and market situation, as well as complementary services in terms of repair shops and service. The dealers use a common Honda IT system for placing orders. This system shows the available cars in stock. For each country, a specialist at the hub in Malmö will handle the incoming orders. Order processing and relevant paper work take place in Malmö, while the actual Norwegian stock is situated at

Autolink's facility in Drammen. Likewise, for the other Scandinavian countries, there is a regional or country office dealing with ongoing sales and support.

However, volumes for Sweden and Denmark are physically processed and stored at the hub in Malmö. These are co-located, and all operations on these cars are carried out by the same PDI operation. The same firm (Nordisk Motortransport - NMT) handles transport in Sweden. Honda Nordic generally separates the services it buys into PDI and transport operations, since these are two different types of services . This is the case even for those countries where one firm (such as Autolink in Norway) provides both of these services, because it facilitates a switch to a different provider, if required. For Honda it is relatively easy to change the transport company (due to the nature and not capacity of the service provided), whereas PDI is far more difficult because of the PDI standards Honda requires. The PDI operation at Malmö was built by NMT in order to conform to Honda specifications, resulting in slightly lower damage rates to the Honda cars (according to Honda Logistics Manager). In Norway the PDI operation by Autolink conforms to most of these standards, but some conditions, for example relating to spacing between the cars, have been waived for practical reasons. Although Honda considers changing a transport provider to be relatively unproblematic, it has used both Autolink and SMT continuously for at least 10 years.

Autolink has two main contacts for interfacing with Honda. One is the service provider in Malmö who is responsible for managing the contracts, sending Autolink information on cars to be transported and keeping track of the stock of cars at Autolink's facilities for its own dealers. This means that Norwegian dealers send orders picking-from-stock through the Honda stock management system, and the service provider in Malmö then informs Autolink to process the cars. The agreement with Autolink stipulates that all Honda cars of a specific model are to receive certain services, with PDI as a core but not mandatory. A further consequence of this system is that dealers should not need to have any direct contact with Autolink when receiving the ordered cars. Dealers who require additional services to their cars (for example certain types of additional rust protection) communicate directly with Autolink and are allowed to make their own agreements covering such services. These are exceptions rather than the rule. Since Autolink is able to "attach" certain services to specific dealers in their production management system, this is not difficult to handle in practice.

One additional point which should be noted in terms of the service provider is that the information sent to Autolink is slightly different from that used in Sweden. Rather than being processed according to the Honda standards

which are used in for example Sweden, the orders are sent as a separate file adapted to Autolink's IT system. This is of interest since it shows that the car manufacturer or importer is adapting to Autolink's system rather than the other way around which is usually the case.

The Honda volumes are not large compared to Autolink's overall volumes. This means that Autolink is not particularly concerned to know in advance exactly how many cars Honda needs to transport. Consequently, a significant percentage increase in Honda's cars for one month does not translate into a significant load change for Autolink, as is the case with the other two importers described here.

In describing the connection between Honda and Autolink, it is important to consider the state of Honda's regional concept and to what degree this is implemented. The concept is, therefore, briefly described below.

Honda's ambition is to keep a full common stock at a regional level for Scandinavia. This implies that stock is held in one central location and then distributed directly to the dealers or end customers. It also includes a common ownership and management of the cars. Such a full common stock system is thought to give a number of benefits. Some of these accrue from merging the operations and avoid duplication of activities and minimising overhead. A second source of savings is the improved scale of operations, which can also help in terms of the quality of operations carried out with one central facility specifically designed to carry out handling, storage and added operations, such as PDI, in accordance with Honda standards. This also means using the same IT systems and operating procedures for all the cars. Work on implementing new and better IT systems to facilitate this has been extensive and already partially successful. There is, however, still much to be done before it can support a full common stock system.

Finally, in terms of operations, the total amount of stock needed to keep the same availability to the customer could be lower, as distribution from a central facility can better meet customer demands in terms of delivery time. Such a central stock furthermore gives each customer a greater choice of car models, which is very important with Honda's pick-from-stock system, and this in turn should increase the chance of further sales. There are, however, a number of reasons why the full common stock system has not yet been fully implemented.

For easy reference, we can divide these into four main topics: the historical organisation of the Honda distribution system, the market for different car models, issues regarding ownership of cars and cost issues. The historical organisation of the distribution system refers to the fact that Honda, although

it has not had a large European car market share, has generally been organised by country and had a substantial part of its car distribution activities in each country. Although there is a European headquarters, and the service provider is now at Malmö, this still means that there are practical implementation challenges in making all the country units use the same systems, as well as transferring activities to a regional level. This country organisation should not be exaggerated in that it is completely owned by Honda, but in practice it means that changes take a considerable amount of time. Implementation of a common IT system for a number of different countries, would represent a considerable organisational change.

The market for different car models is similar in Scandinavia, with roughly an 80-85% overlap. This does, however, mean that even with a fully integrated common stock, a significant percentage of the cars will still only be relevant to one particular country. This is not an insurmountable problem, but requires tracking of cars for specific countries.

The issue of ownership is highly relevant to the common stock, since only a common ownership will allow the cars to be interchangeable vis-à-vis customer groups. As long as cars are imported to their final destinations, they will have to be re-exported if they are first moved to dealers in another country, creating a significant cost. If, however, there is a common stock, it should be possible to avoid this extra step. Customers are able to choose from the full range of cars, and the amount of administration can be greatly reduced. This, however, requires that it is possible to define which unit is responsible for owning the cars, whether this is done formally (with the country organisations responsible for the cars) or whether such a unit also carries the risk for these cars in terms of having to absorb any loss involved when selling at a discount. Implementing such a common ownership is considered to be the last step in setting up a full common stock, and is unlikely to take place before the other elements have been fully resolved.

Furthermore, there are legal barriers associated with import to each country. If cars are moved to another country, import operations have to be redone for that country. This is a general problem in Europe, especially because a number of countries have non-standard rules for re-importing cars. Even within Scandinavia with relatively clear import rules, this means additional work. There are also some differences in customer preferences within the countries, so that a car destined for the Swedish market might be unsuitable for the Norwegian market. For most cars, however, the fit is good and similar models are sold in all the Nordic markets[10]. An ideal situation for

[10] A logistics manager in Honda estimates roughly 80-85% of cars are directly transferable between the markets.

Honda would be to collect all PDI and import operations in one country and hold a common stock, but this is unlikely to happen in the near future.

The current status of the system is that there is a common stock in terms of storage and operations for Danish and Swedish cars, (with some storage for Finnish) and a common PDI system for the Baltic States. In principle, it would be most logical to place Norwegian cars with the Danish and Swedish ones, and to transport these first to Malmö and then to Norway by truck or railway. However, largely due to the current cost of this transport leg, Norwegian volumes are treated entirely separately and are shipped directly from the main port, (Bremerhaven) to Drammen, using the same routes as most of the incoming cars to the port. This is a departure from the regional concept and differs from the other flows of cars which go through Malmö. It also means that the Norwegian volume does not benefit from the PDI facilities and preparation at Malmö. At the same time the Norwegian organisation is essentially a sales office. Therefore, it is necessary to use a third party, such as Autolink, for both transport and associated services. Furthermore, since the regional concept is important to Honda, it does not make sense to build up the Norwegian organisation, since it is possible that these volumes will later be merged with the main flow through Malmö. In this sense, for the time being, Autolink fills a gap in Honda's local organisation.

Tentatively we can say that if the regional concept is fully implemented, Autolink will most likely lose PDI and associated services in Norway, but may gain additional transport services from Sweden to Norway and possibly other destinations. Honda does not, however, have a policy of using the same providers for transport and other services in all countries. This is not surprising, as there currently are no transport and logistics service providers with this type of geographical coverage. Whether such service providers would have an advantage, is still a question at this stage. However, given competitive prices which are an essential part of the industry, it makes sense to use the same provider for every region in a regional concept.

6.6 System characteristics

The distribution system in this chapter is different from the one previously discussed. The distribution system is organised regionally so that there is an additional organisational level between the final customer and the factory. A number of central tasks are carried out at a regional hub, and in terms of the distribution flow, the majority of the regional flow goes through this hub. Since the hub is in Sweden, another leg of transport would be required to bring the cars from Malmö to the Norwegian distribution system. However,

this leg is eliminated by having the Norwegian flow go directly to Norway. This means that the Norwegian volume cannot benefit from having PDI and modifying operations carried out at the hub, and that these operations, therefore, are generally assigned to a third party (i.e. Autolink).

Since the organisation is regional, Honda has a light presence in Norway, and focuses on a national sales organisation and support for dealers. They can, however, draw on a number of services at the regional level. In practice and in terms of Autolink, this means that quite a broad range of services are purchased. This is the case as the actual flow of cars to Norway bypasses the hub in Malmö. In effect, the standard services purchased for all cars passing through Malmö, are not available for Norwegian cars, leading to a much wider set of activities for Autolink. The main reason for Honda not using the existing regional hub with its facilities in Malmö for Norwegian cars is the additional transport cost for the Malmö-Drammen leg.

Another main difference is that the European system is based on picking cars from stock. Clearly this is necessary for those cars transported to Europe from Japan. This is independent of the original factory's ability to build cars to specifications and should be seen in terms of lead time. That is, if a customer has to wait 6 months for a customised car, it is very unlikely that they will make a purchase. It is better to spend energy on getting the prognosis on which models and features the customers want correct. It is currently an open question whether there will be changes to this system with more factories being built in Europe. The practical issue might be to mix customised orders with build-to-stock orders in a meaningful way. Allowing a few customers to order customised cars from factories in Europe might be difficult to accomodate without major changes to the system. This might be especially difficult in a situation where Honda is doing well with the current system and experiencing increasing car sales in Europe.

Characteristics in relation to Autolink	
Regionalisation	Regional-Scandinavia
Production	Mainly Japan but considerable in Europe for specific models
Volume	Low
Range of services purchased	Wide
Size of client organisation/resources	Medium in region, small in Norway
Type of agreement	Exclusive deal in Norway
Dealer network	Dealers not owned, majority exclusive
Order model	Pick-from-stock

Table 6.3: Honda system characteristics

Honda uses Autolink for a nearly full range of services in Norway. This makes Autolink important in terms of carrying out almost all the physical tasks related to the distribution of Honda cars once they arrive in Norway. It is, however, the regional service provider that deals directly with Autolink. Since the regional service provider is responsible for many of the distribution tasks in Sweden, it has a major influence on how tasks are to be carried out. The fact that Autolink is not held 100% to the standard Honda operating procedures for practical reasons, does, however, show that Autolink has been given considerable room to make efficient arrangements. This may be strongly related to the volume of Honda cars in Norway, which although significant, is much lower than that of Autolink's largest customers.

A more general point is that Autolink works to complement the regional system which is Honda's way of organising its distribution. Since the Norwegian volume is not handled through the regional hub, Honda is unable to use its regular service providers for PDI and transport, and must find others. Autolink represents a good alternative, especially because the company already handles a large volume, and the additional volume represented by Honda does not present a problem. This enables Honda to benefit from the scale advantages Autolink already has achieved. This is particularly the case within PDI, where Honda considers it more difficult to switch providers quickly. It should be noted that Honda does not consider it an option to let the dealers themselves carry out PDI operations.

Chapter 7: The Bertel O. Steen System

7.1 Introduction and background

This chapter describes the Bertel O. Steen (BOS) system. Since this system is not based on one particular manufacturer, less time is spent on discussing the manufacturer's system. The chapter starts with an introduction of the BOS system, before showing the standard activities in the BOS distribution system. Similar to the Autolink system, this can vary considerably for different car types. The interaction with Autolink is then investigated. The chapter ends with a discussion of the system characteristics.

Bertel O. Steen is a privately owned Norwegian car importer. It currently holds the contracts for importing Mercedes-Benz, Peugeot, smart®, Daihatsu, Kia, Chrysler, Jeep and Dodge to Norway. The contracts cover both regular cars and trucks. The company Bertel O. Steen has a number of car related businesses, as well as some in different areas altogether. BOS businesses include spare parts, financial services, Snap Drive (a chain of repair shops), property, industry and Asics Scandinavia (sportswear). This case only covers the car importer although reference will be made to other areas where necessary.

Bertel O. Steen has a total of 2254 employees. Of these, six, including the Logistics Director who is also responsible for car parts, work directly with car logistics. However, some general support functions, in particular legal competence, are important to car logistics as well. The company was founded in 1901 as part of a budding car retail sector. In 2005, the company represents a market share of 11,30% of all new cars sold in Norway, or 13,132 private cars and 3,880 trucks (Bertel O Steen Annual Reports, 2005, 2007). The market share remained the same in 2006.

Unlike the other cases BOS is not tied to one primary manufacturer, but deals with a number of brands. The split between the different brands and groupings according to manufacturer is shown in table 7.1 below.

Brand/Manufacturer	**Passenger cars**	**Vans/Trucks /Other**	**Total**
Mercedes-Benz	3 521	2 400	5 921
Peugeot	6 599	2 609	9 208
Kia/Daihatsu	1 946		1 946
Chrysler, Jeep & Dodge	733		733

Table 7.1: Number of cars sold by brand 2005
(Bertel O. Steen Annual Report 2005)

7.2 The manufacturers and system

Since BOS does not have an exclusive deal with a single manufacturer, it must accommodate several different systems. However, Mercedes and Peugeot are the most important in terms of volume, representing the premium and mass market, respectively. This chapter focuses on the importer and not the manufacturers, so the characteristics of the manufacturers are not explored further.

7.3 The Norwegian setting and background for BOS Logistics

BOS has approximately 150 car dealers carrying one or more of the BOS brands. Approximately 20 of these are owned by BOS, mostly in large cities or in areas where there is a clear need for a dealer but where the previous independent dealer had struggled. A final motivation may be to expand the number of brands carried by a particular dealer. Investing in dealers is not a general strategy for BOS, but rather pursued according to market conditions.

When the relatively small logistics department of BOS was established in 1998, the main issue was the very high damage rate of incoming cars, especially within Norway. Although the cars were insured for damage as is normal in car distribution, the high damage rate led to excessively high insurance premiums. This significantly impacted profitability, so reducing the damage rate was given high priority. A major problem was that it was difficult to ascertain where the damage took place. Two main approaches were taken to improve the situation. First, focus was placed on the assignment of damage responsibility. The new logistics department essentially made those legs in the transport chain that created the damage pay for them. This alone is accredited with reducing the damage rate from 16% down to 5 - 7%. The second major approach was working with transporters and suppliers to introduce procedures to prevent damage from occurring. BOS has regular meetings with its drivers to reinforce this message and to exchange experience. It is important to do this since some new car models are particularly vulnerable to damages. For example, the Peugeot K 207 model has a particularly long front which is prone to damage when driving up steep ramps. If the drivers are not aware of this, it can result in a much higher damage rate. Many such issues are only discovered after a new car model has been in the distribution system for a while. In total, these improvements have brought the damage rate down to 2 - $2^1/_2$%, which is considered to be close to the point of diminishing returns for BOS.

7.4 Activities in the distribution system

The details of how cars are distributed in the BOS system vary depending on the manufacturer and place of origin, making it difficult to cover all the alternatives. This is similar to Autolink's problem with fitting into a number of different manufacturer distribution systems. Figure 7.1 below shows only a generic summary of the typical structure since more detailed descriptions have already been given in chapters 4 and 5.

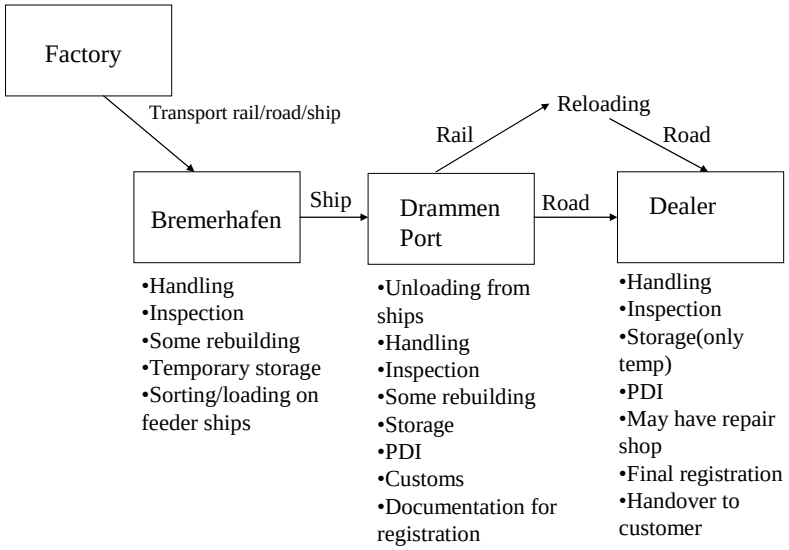


Figure 7.1: Normal transport route for BOS cars

The way the different brands of cars are ordered differs somewhat. With such a wide range of brands, from mass-market oriented Peugeots to premium market Mercedes, the degree of customisation of cars also differs. Thus, it may be more likely that a Mercedes customer is willing to pay extra for the ability to specify car features, and is willing to wait longer for this than are mass market car customers.

The factory producing a car may be located in a number of countries, such as Korea, Japan, USA, Germany, Austria or France depending on the brand and specific model. Accordingly, there is a substantial difference in lead times for cars according to brand and model. Large trucks and buses are often

driven part of the distance by their own power, for example through Kiel. As they are part of a separate flow they are not further discussed in this case.

Transport from the factory can also vary between railway, road and ship. This does not make a big difference to BOS' activities since they are largely extraneous factors which the company accepts. In other words, BOS has no influence on the distribution system from factory to Norway, apart from ordering cars in accordance with manufacturer procedures. Being able to handle a number of different requirements from different manufacturers is clearly important for BOS.

Bremerhaven is the main European port for the brands handled by BOS, and most cars are transported here from the factory and inspected upon arrival. They may then be subject to modifying operations according to final destination and customer requirements. The need for modifying depends on whether adaptations are more easily carried out directly at the original factory or in Bremerhaven. The brand of car including facilities for customisation and customer requirements, determines whether modifications are carried out here. Temporary storage of cars may be necessary at Bremerhaven. These services are obtained as required from third parties. Finally, the cars destined for Norway are loaded on feeder ships and transported to the Drammen Port.

There are two important exceptions to this process. Daihatsu cars are purchased with free delivery to Drammen, so that BOS has no real contact with the cars before arrival. In the normal system they at least obtain some information on car progress. Kia cars are transported to Walhamn in Sweden and then sent to Drammen. This flow is handled by Kia.

The ship transport from Bremerhaven to Drammen port is carried out by feeder ships. Feeder ships run regularly between Bremerhaven and Drammen Port, carrying both cars for BOS and other brands (as seen in the other cases). The combination of cars carried, affects the efficiency of the transport. If there are a number of large cars, for example minivans, the feeder ships may not be able to carry cars on as many levels reducing the overall capacity of the ship. The standard height for a car is 1.60 metres, so that a significant deviation from this may create problems for the shipping company in terms of maximising the use of their feeder ships. BOS, however, pays a standard fee for each car carried based on its foot print and not its volume (height). It is the shipping company's responsibility to maximise the use of a ship. BOS is aware that this can be a problem for the shipping company. However, this is considered the shipping company's responsibility, and BOS states that "this is what they are good at." (Logistics

Manager, BOS). BOS cars arrive in Norway at Drammen Port, normally twice a week. Once unloaded, they are processed by Autolink.

For transport within Norway, BOS uses both Autolink and Autotransport, which is Autolink's main competitor. In addition, several of the larger regional dealers use local transport operators for their own cars.

7.5 Connection to Autolink and changes

BOS uses several different suppliers for transport services, with Autolink and Autotransport as the two main suppliers. Both of these have framework agreements which are also available to the dealers. They also account for most of BOS' volume. However, BOS is unusual in that several local dealers have long-term agreements with local transporters. These agreements do not pass through BOS centrally and are managed by the local dealer. Typically, such agreements are based on personal contact between the local dealer and the transport company. More importantly, the service levels provided by the local transport companies tend to be high, because of the personal contact. Since the local operations are relatively small, they are also flexible in accommodating changes to transport orders. It is often possible for a dealer to order a specific car and then have it exchanged for another.

This is, of course, more difficult for the large operations, since it would make planning very difficult. Furthermore, since Autolink has a large number of customers, it would generate significant extra work if all the customers could call them directly for updates. BOS has the possibility to check Autolink's IT system on line for status of cars, which is meant to be the main channel for informing the customers. However, for dealers who want more direct and continuous contact, this may not be sufficient. Using local transporters, therefore, seems advantageous for some local dealers.

Ideally BOS would have liked to include all dealers in its main contract network. However, since several of the dealers using local transport are very successful in selling cars, BOS does not want to disrupt their operations. Finally, BOS believes that there will be practical problems in standardising transport practices, i.e., its dealer network is not ready for such a change.

In effect, this means that BOS controls perhaps 90% of its transport, the remainder being controlled by local dealers. The primary performance indicator for BOS is lead time. "We are continually keeping track of lead times – what is important for us is that we always know when to expect cars." (Logistics Manager, BOS). Their general approach is to negotiate

framework agreements with the two main providers and compare their performance with respect to lead times. If the transport provider serving a particular route does not perform, BOS will raise this issue with him. If no improvement is seen, a second transport provider is brought in to take over the route. In order to monitor the transport providers performance and status of incoming cars, BOS has access to Autolink's IT system. The system is not currently fully automated in that the cars cannot be tracked through RFID or similar solutions. It does, however, show, where the car was last registered, indicating its place in the system as described above and in Chapter 4.

In terms of transport BOS uses Autolink for about 45% of its volume, Autotransport for 45% and local providers for the remainder. The framework agreements are negotiated periodically. Price is, of course, an important component in these negotiations, but BOS does not use price as the primary criterion for selecting transport providers for single routes. Obviously, BOS wants to obtain a good price, but is aware that the transporters "need to stay in business". Accordingly, price is considered an indicator rather than a major competitive factor. This must, of course, be seen in light of having two major suppliers with similar pricing structures. The lead time criterion is only used for transport routes.

There are three other major services purchased by BOS – PDI, modifying and storage, and these are handled somewhat differently. Modifying, being technically more advanced in terms of specialised equipment and skills, is generally centralised. It is either carried out before the car arrives in Norway, or by Autolink. For example, all Peugeots requiring modifying are handled at Autolink's facility in Drammen. Accordingly, modifying is the most centralised activity vis-à-vis BOS. For road-safety reasons, any modifying must be accepted by the authorities, and it is common to work closely with the manufacturer to ensure that specifications are not violated. This issue has become even more important because manufacturers are now directly responsible for rebuilt cars – i.e., if modifying of a car has been accepted by the manufacturer, and this leads to an accident, the manufacturer is then held liable.

PDI is also handled through a framework agreement. However, the agreement is only with Autolink. Dealers then decide whether to use the agreement resulting in PDI being carried out at Autolink's facility, or whether to carry out PDI themselves. PDI can also be carried out at local garages, but this is not generally the case. A number of the dealers have their own facilities for PDI, sometimes associated with a workshop. This creates a certain amount of inertia in that even if it is cheaper to carry out PDI somewhere else, this would mean disbanding a current operation and

probably firing employees. A second issue is that many dealers like to get cars "on location" – they prefer to have a car which needs PDI a little earlier rather than a finished car a little later. This is not surprising from the point of view of flexibility of the dealer – in case of any problems it is easier to carry out PDI on a car earlier and to change priorities in a relatively small local operation. This type of changing place in the queue is more difficult in the Autolink system which is based on accepted lead times and production efficiency for the PDI facility (detailed in the Autolink chapter).

The final service provided is storage. Storage is related to transport and PDI since these activities determine where and when storage is needed. In the BOS case, storage is bought from Autolink and takes place at Autolink's facility in Drammen. Cars are then "called" by dealers and transported directly. For higher volume cars, such as Peugeot, cars are generally sold from inventory so that a period of storage is necessary. There are no direct competitors to Autolink for storage, but local dealers can, of course, order cars earlier and store them at their own facility. The difficulty with this is that the dealers then have to pay for the cars earlier, so unless they are already sold, this creates an extra cost for the dealer.

7.6 System characteristics

The BOS case has a number of overlaps with the previous cases but also a number of unique features. The organisation is Norway-only rather than regional. The volume of business is high in that BOS is one of Autolink's larger customers, and they represent a significant share of car sales in Norway. However, since BOS uses several transport companies rather than Autolink exclusively, this reduces volume. The range of services purchased is however large, so the total volume of business is significant. Since BOS does not carry out many logistics tasks itself, it must necessarily buy these from other providers.

Characteristics in relation to Autolink	
Regionalisation	Norway only
Production	Majority in Europe but also US, Japan
Volume	High
Range of services purchased	Wide
Size of client organisation/resources	Overall large but very small on logistics
Type of agreement	Framework agreement
Dealer network	Owns a number of dealers, several brands for most
Order model	Make-to-order and pick-from-stock – brand dependent

Table 7.2: Bertel O. Steen system characteristics

The structure of the BOS dealer network is significant. Whereas BOS owns a number of large dealers, there are also a number of very successful regional dealers that are privately owned. The spread and nature of the dealer network, in particular the fact that BOS has more brands than the other cases presented here, may to a certain extent explain why BOS does not exercise more direct control over the dealers. In other words, BOS centrally negotiates frame agreements with transporters and offers these to its dealers. The dealers may choose to employ these or not, and are free to make use of local agreements if they so wish. If the dealers perform badly, BOS may, however, buy the dealer and take direct control. However, a poorly performing dealer may not be performing poorly solely because of logistics, so that there is no direct link between poor logistics performance and any corrective action on the part of BOS.

Since there are several manufacturers in BOS' portfolio, both made-to-order and pick-from-stock options are available. These tend to be related to the brand of car the customer buys, but this is not always the case.

Autolink is employed in several ways in the BOS system. First, Autolink is employed, as a pure service provider for transport services. BOS mainly uses one KPI (lead time) to measure performance, and the services purchased will naturally have to be seen in the light of this. This is not to say that BOS is not concerned with quality (in terms of damage rates) or price, but these factors have to be in an acceptable range rather than being the primary competitive factor. This is, of course, difficult for Autolink in terms of fitting this very strong requirement into its general system where lead time is important, but does not have the same level of focus as in the

BOS case. This is especially so as efficiency for Autolink often means a certain level of flexibility on lead time. After BOS introduced a strong focus on lead time in 2004, Autolink lost part of its volume transport business to competitors.

For modifying of cars, Autolink has a strong competitive position in that it is chosen as the main rebuilder for certain car types (notably Peugeot). This is based on competence and fits better with Autolink's general profile in that previous experience modifying a wide range of cars, is a benefit when faced with new models. This is a better fit with Autolink's regular way of operating.

Chapter 8: Autolink and the Distribution System

The case presented so far has shown the two main models employed in the car industry. It has also presented Autolink in terms of the company and the services it performs for customers, as well as three importers and their distribution systems, emphasising different aspects of interaction with Autolink. The purpose of this chapter is to cover some remaining general aspects of the distribution system involving Autolink. This means filling in some of the gaps that were not covered in previous chapters, but which are relevant to the theoretical framework. The setting as a whole was introduced in Chapter 3, and Chapter 4 gave a description of Autolink and the main models for car distribution. Three individual importers were shown in the subsequent chapters. This allows us to complete the picture here with some final points on Autolink and the distribution system as a whole. Two aspects require more attention, the first being the actors in the distribution system. The second aspect relates to the coordination or the different contracts used with regard to suppliers and customers.

8.1 Actors in the distribution system

Figure 8.1 below shows an overview of some of the most important actors in the distribution system. This particular figure only shows the connection to Autolink, i.e., it is not a complete network picture.

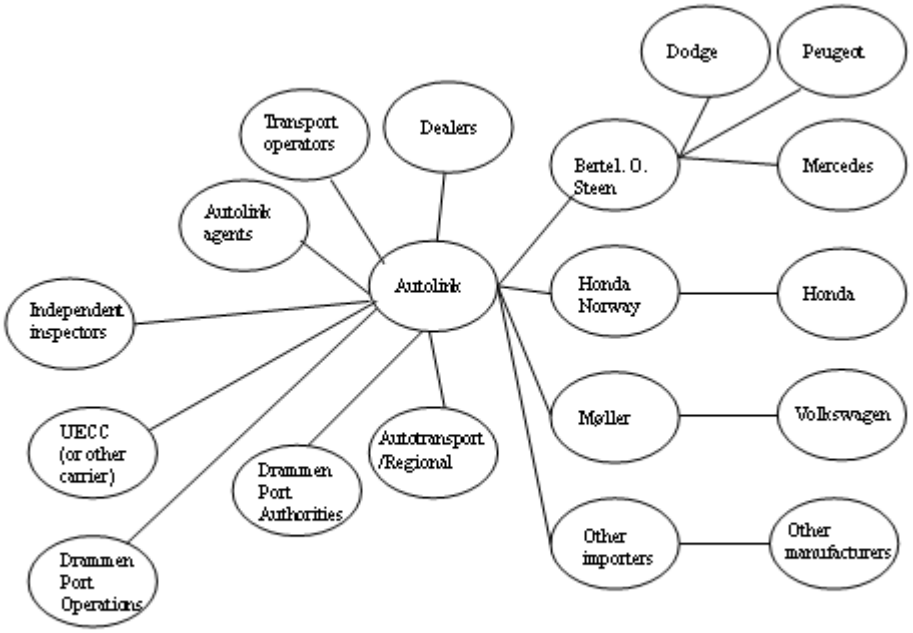


Figure 8.1: Autolink and main counterparts

This picture does not show direct links from the manufacturers to the importers, but rather the main brands or manufacturers represented by each importer. These manufacturers are clearly important in structuring the distribution system, but their influence is often indirect in terms of standards and decisions about the flow of cars made beyond the normal scope of Autolink's operations.

The two most important groups are the main subcontractors and customers. The main customers are the car importers and car dealers, and it is the pooled demand from these that is the principal basis for the operation of the Autolink system. That is, the aggregate demand for transport and associated services enables Autolink to operate a large distribution system, and even out some of the inevitable fluctuations in demand. The planning office of Autolink is responsible for dealing with order planning on a daily basis, and in this sense it is a core activity for Autolink. The main subcontractors are the small transport operators, Autolink agents, which are local or regional, and railway providers, recently represented by Ofotbanen in which Autolink has an ownership interest.

The remaining two actors in the simplified picture are Autotransport and the regional transport firms representing competitors, and the Drammen Port Authority which is an important counterpart in terms of Autolink's location at Drammen Port and the expansion of the facilities there. The flexibility of Drammen Port in allowing Autolink to expand and modify their operations is, of course, important since it would otherwise present a very significant obstacle for the firm. Autotransport is a direct competitor, but as mentioned, Autolink and Autotransport sometimes use each others' agents in order to ensure delivery reliability, meaning that there is some cooperation as well.

The most significant aspect of this picture is that Autolink very clearly organises a large part of the distribution system vis-à-vis the main customers, both in terms of daily operations and system maintenance. Their customers range from quite small to large in size, but none of them are large enough to efficiently organise their own distribution system. If Autolink was removed from the picture (and not replaced by an equivalent firm), the amount of inter-organisational contracting and communications necessary would increase greatly, since every dealer or importer would then have to deal with many different transport firms, railway contractors and agents. It is not, of course, possible to say exactly what such a system would have looked like, but it is very clear that only having to deal with Autolink rather than all the subcontractors is advantageous for its customers. It is also advantageous for Autolink in the sense that it both cements the position of the firm in the distribution system, and makes it a natural provider of additional services since so many of the basic services are already in place. This does not in any sense mean that Autolink is the only alternative, but rather that its position makes it well placed to obtain new business, especially where the importer does not have a large organisation to carry out for example PDI, modifying and storage.

During the interviews with the car manufacturers it became clear that they preferred a single logistics interface for distribution and other services, especially one which operates regionally. This applies especially to where the manufacturer has a regional concept. Clearly this counteracts the considerable splitting of activities seen above, but it is not obvious here how strong the trends are. If this trend becomes stronger it will favour larger firms such as Autolink, given that it can achieve more regional coverage.

Figure 8.1 shows some of Autolink's main counterparts, but it does not fully explore how these business relationships are handled. The next section will look at contracts and coordination, both in terms of customers and subcontractors.

8.2 Suppliers, customers and contracts

Autolink has two main types of contracts – contracts with their own suppliers and agents, and contracts with importers and dealers.

8.2.1 Suppliers and agents

Autolink's contracts with suppliers are typically of 3 year duration. The agents' trucks and trailers are painted according to specifications with the Autolink logo, and hand terminals are installed in the trucks for communication with drivers. Suppliers are small firms owning one or a small number of trucks, and with few drivers (less than a man year on average).

The owner of the firm is responsible for recruiting drivers, and is frequently a driver himself. This means that an owner may not have an incentive to recruit additional drivers to ensure full coverage because this would reduce his own income, i.e., it is more profitable for the owner to have work than to split it with a hired driver even if this could generate more work and is better for the distribution system. This is seen as a potential problem, since it can lead to trucks standing idle if the owner/driver is sick or away. Autolink tries to overcome some of these problems through operating a "driver pool" in order to match available drivers to trucks. Autolink also provides training for new drivers in order to teach them the procedures.

The distribution of cars may not appear to be particularly specialised in terms of driver skill, but Autolink's experience is that inexperienced drivers are more likely to damage cars when loading and unloading. This may be due either to improper handling of the equipment or accidents. Even if the damage to the car is relatively minor (scratches in the paintwork, minor bumps etc.) repairs are relatively expensive. Combined with the low accident rates to start with and the low margins on each car, this means that hiring an inexperienced driver may not be worthwhile even if it only leads to a minor increase in damages. This type of knowledge is clearly much easier to obtain and maintain for a specialist working within the field than a non-specialist customer such as a dealer or small importer. It is also very specific in nature, for example, knowing that a particular model of car has a long front-section requiring extra care in handling. Such knowledge results in a substantial reduction in damage rates.

Autolink is also responsible for "maintaining" its population of available drivers. That is, Autolink is responsible for making sure that the drivers follow manufacturer procedures and general operating procedures so that the cars are handled correctly. This also means that drivers that under perform

or make serious errors, can lose their contract with Autolink. In a setting where there is a general lack of drivers, it is generally better to help drivers to improve their performance rather than simply terminating their contracts. Since Autolink is held responsible by their customers for driver performance, however, it is very important that standards are upheld. This is reinforced by the Autolink logos even on those trucks Autolink does not own and operate themselves. Complaints will typically come from the importer to Autolink rather than directly from the drivers.

In one or two locations with limited numbers of cars, Autolink and the competitor Autotransport use each other's agents. This is not done for capacity reasons, but because of the importance of an agent's proven high performance and reliability.

8.2.2 Customers

Autolink's contracts with importers/manufacturers and dealers vary in duration from 1 - 3 years. They are generally based on tender documents. Since Autolink already has a majority of the importers as customers, they are naturally well placed to respond to the periodic tender offers. Autolink has constant contact with the customers as to information needed to manage the daily flow of cars. However, the detail and quality of information provided by customers vary. This depends both on the customer's internal IT systems and on the degree to which manufacturers are willing to share information.

Contracts cover a set of standard services to be carried out. This means that all cars from a particular importer or cars going to a particular dealer are to have a set of standard services carried out. Additional services for particular cars may be added. Orders are sent to Autolink electronically or by fax. The orders usually originate from the importer or particular dealers.

Each service has a standard price for each customer, i.e., the contract includes a specification of these prices. The prices are stored in the service management system allowing correct invoicing. Prices are negotiated individually, but there are, of course, base line data such as costs for other types of specialised cargo available.

The pricing for the transport system is based on the type of car and the number of zones through which the car is moved. A matrix table with source and destination zone then gives the price for a particular car. Pricing is thus per single car from point of origin and to a particular destination.

To improve relations with customers, Autolink sometimes gives tours of its facilities for customers. This means for example presenting one facility such

as the new PDI facility at Malmö for a number of employees of an importer. Such guided tours are not scheduled regularly, but are considered quite important to customer relations. From Møller's visit to the Malmö facility in 2006, it was quite clear that this was used as an informal benchmark in seeing how activities are structured and carried out in the facility.

8.3 Autolink in the system

The aspects of Autolink's place in the distribution system discussed above, show features which are only partially explored in the previous Chapters.

One area is related to specialised competence. Autolink has specialised competence in modifying certain types of vehicles. They communicate with the importer and manufacturer in terms of what is possible technically and have the local knowledge to provide an optimal solution with respect to the Norwegian tax law. Their experience may also be seen as a major factor in terms of handling the cars in accordance with the many diverse and possibly conflicting standards of the various manufacturers. Autolink's competence and experience allows them to handle cars in efficient ways which are still acceptable to the manufacturers. To this end, there are several alternate approaches. One is using a form of "lowest common denominator" for the standards. This, however, is not always possible since the standards may be conflicting, and simply satisfying the most exacting one, may not be sufficient. A second approach is to compromise, but this requires the acceptance of the manufacturer as in the Honda case. A final possibility is to divide the tasks up so that cars requiring widely different standards are handled at different times, but this may lower overall efficieny since it reduces the pooling and scale effects.

A second area is pooling demand from customers for services with scale advantages. An example here is PDI, where Autolink's investment in a large automated machine means they can carry out some PDI more efficiently, assuming the machine is sufficiently utilised. The size of the transport operation itself should also lead to some economies of scale.

A third major area is maintaining links and contracts with the truck drivers who supply most of the actual transport labour. Here Autolink is a go-between, making it easier for its customers (i.e., importers and dealers) to access the transport companies without having to deal directly with a large number of them. This is particularly important considering that some of this maintenance involves terminating contracts and ensuring that suppliers adhere to a set of different standards for different car brands.

A final major element for Autolink is to build capacity for the central services provided. For any firm scaling its capabilities to the services provided is important, but in this case there are some additional points. Autolink is the major new car transport supplier within Norway. Its competitors have some capacity, local transporters have some capacity, and there is some capacity within the system for used car transports (although there is some overlap with the local providers here). This does not alter the fact that there is normally limited spare capacity for transport. Providers of other transport services cannot substitute their services for those of Autolink's because of specialised trailers required for car transport. Furthermore, these providers are currently themselves struggling with obtaining enough drivers. The result is that Autolink must ensure that capacity is available through renting or buying trucks and maintaining a pool of available and experienced drivers. This becomes more important because of the limited slack in the system. At the same time, building up excessive slack would lead to poorer efficiency during normal operations since maintaining extra capacity is costly. If Autolink lacks capacity, however, this will create an opportunity for competitors.

Perhaps the most obvious indicator of Autolink's position is that many of its customers - such as dealers - do not have an innate appreciation of the problems Autolink faces in certain situations. This was made clear from the heavy snow falls in 2006 and the large volume of new car sales in 2007. In both of these situations the customers (dealers and importers) did not appreciate that the changed conditions created problems for the distribution system as a whole. In the latter instance, Autolink had to spend a considerable amount of time and energy visiting and informing dealers in order to get an understanding of the problems causing delays in the system. This shows very clearly that not only is Autolink responsible for the distribution system in Norway vis-à-vis a number of distributors, but also that the firm has considerable autonomy and responsibility. This is probably an advantage for the firm since it gives better possibilities for making its own arrangements, but it is a disadvantage in that customers are not as aware of external factors such as changed operating conditions.

Chapter 9: Discussion and Analysis

9.1 Introduction

In this chapter, the theoretical framework and research questions from Chapter 2 is connected to the empirical case in Chapters 4-8. The structure suggested by the research model is followed, with the main discussion divided into the structure of the distribution system, interdependencies and coordination mechanisms, and finally the roles of intermediaries. The discussion of the links among these is largely carried out in Chapter 10. The most important issue here is to consider the answers to the research questions presented in Chapter 2. In each of the three sections then, the answers are structured partially according to the research questions. As we will see, some of these questions are closely linked in terms of the empirical study, so that they are grouped together where convenient, to ease the exposition. The overarching issues leading back to the original purpose of the dissertation are also discussed in Chapter 10. All the empirical observations referred to herein are found in the context of chapters 4-8, but in the interest of contributing to the theoretical discussion and the discussion of research questions, some of them are interpreted or summarised in different formats here.

Figure 9.1 below recaps the research model.

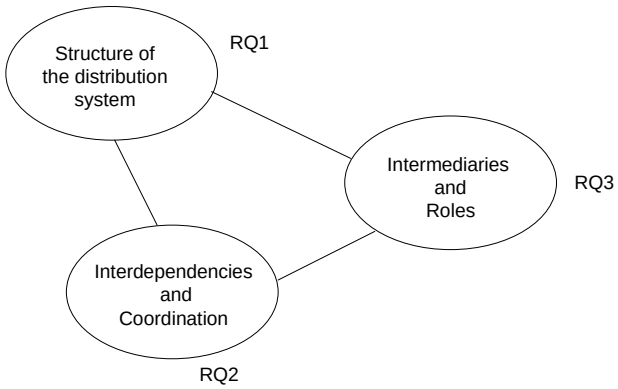


Figure 9.1: Theoretical model and research questions

9.2 Structure of the distribution system

Structure of the distribution system questions
Research Question 1: What alternative distribution arrangements can exist in a particular industry in terms of hybrid arrangements, customisation and modularisation, and postponement and speculation? *Research Question 1a: How are hybrid distribution arrangements used to handle different demands on a distribution system?* *Research Question 1b: How are the modularisation of products and different degrees of customisation to consumers used to handle different demands on a distribution system?* *Research Question 1c: How is postponement and speculation by making-to-order, making-to-inventory and placement of inventory in the distribution system used to handle different demands on a distribution system?*

Table 9.1: Research question 1

The possibilities for different distribution arrangements naturally depend on the nature of the product being sold, representing the technology of production. In general, motorcars are finished when leaving the factory door, although some modifying and operations such as PDI have to take place in the distribution system. Although there are some experiments with more modular design for whole cars, this is not the situation with the brands studied in this particular case. What is clear, however, is that the capacity for flexible manufacturing, i.e., producing to specifications, exists within the industry. This has been the case for a long time with Japanese JIT and lean systems, allowing a high number of product varieties already in the early 80s, although the efficiency of these systems will vary among manufacturers. The first research question on alternative distribution arrangements must be viewed according to the characteristics of the particular industry studied.

Research Question 1: What alternative distribution arrangements can exist in a particular industry in terms of hybrid arrangements, customisation and modularisation, and postponement and speculation?

The discussion of the car industry in Chapter 4 shows that there are two dominant distribution arrangements – make-to-order and pick-from-stock (MTO and PFS). These two types are similar to the initial postponement/speculation based models discussed in Chapter 2. MTO and PFS represent the customer's reality, and are not absolute quantities. The two extremes may be described as follows: in MTO, the customer orders a particular car specifying its features from a full range of possibilities. The

car is then made and transported to the customer. Normally there is little modularisation in the terms discussed in Chapter 2 – that is, the cars are still made in the manufacturer's factory. The degree to which manufacturer assembly is based on modules and delivery by sub-suppliers is beyond the scope of this dissertation, however, since the focus is on distribution from factory to customer. To a large extent, however, it seems that the technical basis for the different manufacturers' systems is similar.

In PFS, the manufacturer, usually in cooperation with the national importers or sales organisations, determines which cars will be made. These are then manufactured and moved to national or regional storage areas. The customer then picks a car from storage and this car is transported to the customer. There is, however, an element of postponement in terms of distribution, since only a few, finished cars are stored at dealers. Most are stored centrally at the country level, either by an independent third party or by the importer, as in the case of VW Norway. Others are stored at a regional level, although these systems are not as integrated as is possible.

In terms of the present study, the location of the factories and resulting length of the distribution system to market is a major limiting factor in determining which of the options are chosen. Manufacturers with most of their production overseas cannot normally offer a make-to-order system because the lead time is too long. European manufacturers (or manufacturers with a sufficient manufacturing presence in Europe) have the option of offering a make-to-order system, although they may have other reasons for not doing this.

The relatively small number of different basic arrangements is somewhat surprising, but may be reflected by the fact that this is not a complete study of car distribution in Europe. It is also likely to reflect the state of technology in car manufacturing – the sector is relatively mature and major changes are very expensive, making it risky for manufacturers to experiment with radically different distribution systems, at least on a large scale.

This brings us into interesting territory since the relatively limited number of basic distribution systems must still deal with somewhat conflicting requirements from different customers. This leads us to the next research questions, which are discussed together because hybrid arrangements, multi-channels and customisation and modularisation are very closely connected in the study.

Research Question 1a: How are hybrid distribution arrangements used to handle different demands on a distribution system?

Research Question 1b: How are the modularisation of products and different degrees of customisation to consumers used to handle different demands on a distribution system?

The number of basic alternative arrangements in car distribution within the setting studied is limited, as seen in the discussion of research question 1. This is partially a stylised representation however, and in practice the distribution arrangements are somewhat more complex. As has been described with regards to the individual systems, none of the manufacturers have a completely pure strategy in terms of PFS and MTO, although some are relatively close.

We can see different degrees of postponement and speculation in chapters 5-7, and different approaches to serving the customer segments. In terms of describing these alternatives, it can be useful to consider them as deviations from the two pure strategies. The most notable variations seen are the following:

1. Combination of both PFS and MTO in the same channel
2. Dynamic updates and picking from works in progress
3. Making to order in a PFS setting if customer has a long horison
4. Minor modifications to finished cars by service providers

1. Combination of both PFS and MTO in the same channel.

This is most obvious in the case of Møller where a number of cars are made according to customer specifications. The exact number varies as discussed in Chapter 5, depending on how well the various models are currently selling, but typically half to three quarters of the cars ordered are made to specifications, or assigned to a customer (the distinction is important since dealers can order cars to specifications, but this still represents speculation). The cars are sold and transported in the same system since the cars that are picked are from stock, the only difference being that these cars must be specified by the dealers rather than the customers. As detailed in the case, total sales volumes are negotiated for a year at a time. Since the result is specific monthly volumes, dealers have to predict customer demand for those cars where they have not already linked the car to a specific customer. This leads to several important effects on the channel.

1. The volume passing through the distribution channel is smoothed
2. Different customer segments can be served using the same channel
3. Variation and flexibility becomes a more important requirement than a pure PFS channel

Note that manufacturers, who mainly base themselves on PFS (such as Honda), have a largely consistent distribution channel in that they do not have to balance the two types of production. That is, some Honda cars may be made-to-order, but the volume is sufficiently low for this not to be a major consideration.

2. Dynamic updates and picking from works in progress.

Some manufacturers allow customers to pick from and modify cars that are in production or part of the production planning volume. These are normally cars that have been ordered by the dealers as part of the general speculation. Rather than becoming inventory, such cars then acquire the identity of a specific customer and are modified to customer specifications. The leeway for the customer is smaller in these cases, since the car model and some major specifications may not be changeable. This is, however, a useful compromise for both the customer and the manufacturer. The customer gets exactly the car they want much faster than they would otherwise, given that a car of the right type is in production.

Here, of course, the customer may decide to compromise and take a car that is in production which is very close to their ideal specification. The manufacturer is then sure that the car will be taken and avoids problems of mis-specification, at the cost of some changes to production planning and perhaps adjustments to the scheduling with regards to planning and logistics. In terms of the cases, this type of picking from works in progress is only seen at Møller. A possible reason for this may be that the lead time for most Møller cars (i.e., VW) is significantly shorter than for the manufacturers where a main part of the volume is manufactured overseas. Although it is not directly described in this dissertation, one possibility is that overseas manufacturers use the European market in order to smooth some of their production. The main hindrance however, seems to be that the time in transport is so long that it is impractical to allow customers to make changes to cars in production, for example in Japan. Organisationally, it is also difficult to achieve this type of coordination when the unit that sells the cars is different from the one that manufactures them. That is, Honda Europe and Honda Japan are different regional organisations, whereas Volkswagen has its main base of operations in Europe.

3. Making to order in a PFS setting if customer has a long horison.

As an aside, it should be mentioned that all manufacturers can make cars directly to customer orders if the customer is willing to wait longer than normal. However, there are several strong limitations that do not encourage the customer to use MTO if the channel is mostly based on PFS. The range

of selection is likely to be reduced, especially where cars are destined for specific regional markets. That is, a European customer may not be able to order directly a car with specifications for the American market. Generally speaking, these types of cars are handled by special imports and not through the regular, new car distribution system. Most importantly, the lead time tends to become very long in these systems – waiting times of 4-5 months are not unusual. This is a consequence of the system not being designed to handle this type of traffic.

4. Minor modifications to finished cars by service providers.

In all three systems, it is the case that Autolink or other service providers may, in some cases, carry out modifications to the finished cars. For certain specific car models, this means some degree of technical modification. It can include adding a warning triangle, spare tire or even the installation of a winter package or heating equipment. These modifications are, however, local adaptations to the country or to specific customer wishes that are relatively easy to install. Some of them, such as installation of a heater, are quite general for the Scandinavian setting, so that rather than losing scale because the operations are not carried out at the factory, the manufacturer gains scale because the service providers carry out the same types of modifications for other manufacturers. Furthermore, although quite attractive for the service providers, the modifications do not, in general, represent a large fraction of the production and logistics cost for a new car.

This number of modifications and departures from the pure MTO and PFS systems shows that there are clear 'tensions' in the distribution system, regardless of which of the two are chosen. The different departures from the pure systems can certainly be called hybrid distribution systems, but it is still quite clear that compared to some of the hybrid distribution literature, the empirical setting here does not generally show a great deal of different ways of distributing. This may be related to the manufacturer control of the distribution system, i.e., both control over the retail system through franchises, and the general organisation of the distribution system in terms of how to serve the customer. This being the case, it then becomes difficult for alternative distribution arrangements to appear without the direct participation of the manufacturer. Nevertheless, we see that the pressures to serve the distinct customer groups lead to significant compromises; these are generally handled within the same system and are more a case of tweaking the existing system than establishing new distribution procedures. This is not to say that such new ways of distributing are impossible or have not been tried in the car distribution sector. A number of alternative ways of distributing have been tried historically (Helmers, 1974). However, in the

current empirical setting, the two pure systems using the existing transport and dealer structure are quite dominant.

Research Question 1c: How is postponement and speculation by making-to-order, making-to-inventory and placement of inventory in the distribution system used to handle different demands on a distribution system?

The extensive treatment of postponement and speculation in the theoretical framework shows the importance of these concepts here. Many aspects of postponement and speculation have already appeared in the discussion of how hybrid distribution systems apply in car distribution. Since this is considered to be sufficiently clear already and not helped by further discussion of postponement and speculation, we consider only two specific instances in more depth. One is the three order-point system described in Chapter 5, and the other is the regional system described in Chapter 6. This is highly illustrative of the tensions inherent between the two principles. It also shows a great deal about the car distribution setting. In terms of terminology one point is particularly important here. The pick-from-stock system identified when discussing RQ1 above is essentially equivalent to the making-to-inventory strategy in RQ1c. However, since the research question was formulated from the point of view of the postponement literature, this lead to a focus on the manufacturer. For consistency, we refer to the PFS system throughout here, but this is essentially based on making-to-inventory.

The first example discussed is drawn from the presentation of the VW system since similar solutions were not observed in the other distribution systems. This can be because the level of detail in the description of these systems is not the same, and is especially likely in the BOS system which represents a number of manufacturers. It is also the case that where, for example, Japanese manufacturers operate a pick-from-stock system, this choice of variation was probably not present to the same degree. There is some variation in these systems as well, but it largely relates to whether the customer is picking from local or central stocks. This is discussed in relation to the regional system below. However, as factory capacity in Europe increases, it is quite possible that similar variation will be observed in these systems.

The VW system has been described previously, but here we will go into more detail analysing the exact variation and customer order points. The challenge for the distribution system has two levels. There is a general level where the two principles of postponement and speculation have to be balanced. That is, car manufacturing and transport is subject to the same issues as industry in general. Speculation, that is larger production runs,

producing to stock and working according to a plan, gives a number of savings in both production and distribution. Postponement, that is waiting with production until demand is known gives advantages related to less obsolescence, less waste and a more exact fit to customer requirements. For the VW system, several important conditions need to be considered. Factory production is very flexible so that a large number of car varieties can be made in a relatively short span of time, and it is important to make use of this advantage, especially in the European market where customers are close to the factories and can be reached in 6 weeks from production start. At the same time, a number of customers want their cars faster than this, which can lead to a substantial loss of business if they are not served. Finally it is important to use factory capacity – making all cars to match customer orders is still inefficient if the total volume demanded is highly volatile since this means going from idle factories to not being able to meet demand. These conditions are the same for other manufacturers, the biggest difference being the highly adaptable factory production in the VW system.

The system of pre-allocating a certain number of vehicles to the different markets where importers become responsible for ordering volume that has not already assigned has been described in Chapter 5. However, in terms of the customer, we can represent this as three clear order points reflecting speculation, full postponement and an intermediate model. All of these are included in the same distribution system, however. Figure 9.2 below illustrates the order points, here simply labelled Order Point 1, Order Point 2 and Order Point 3:

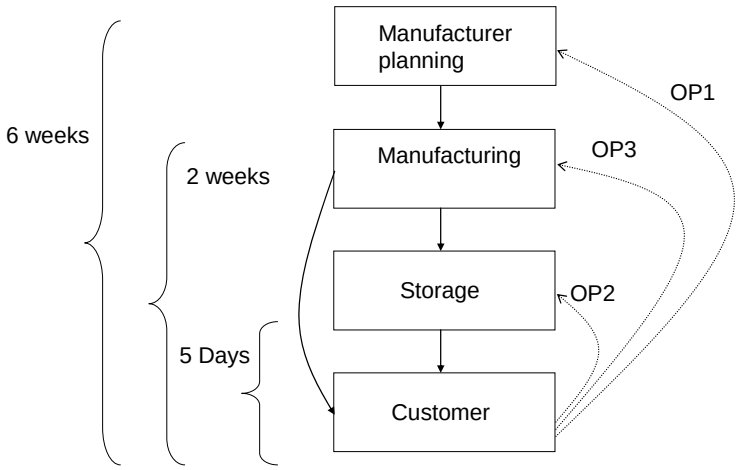


Figure 9.2: Three order points for the VW system

Order point 1

Order point 1 deals with customer pre-orders. This is a make-to-order configuration where the customer orders the car and the car is then planned, manufactured and transported directly to the customer. This is very efficient in terms of use of resources and, because of the flexibility of the factory process, the loss when producing slightly different cars consecutively on the assembly line is relatively small. In addition, this makes maximal use of the competitive advantage inherent in this type of factory setup. For the manufacturer, the ideal setup is most likely to have most production fall into this type. However, the problem with only using this type of setup is twofold. First, the pre-orders do not come in early enough to carry out all production according to this setup, so some type of buffer must be used. Second, if factories were simply rescaled to match the pre-orders coming in, VW would lose a considerable number of sales. Although this varies for all European countries, it is on the order of one third or more of sales, depending on market conditions. Clearly this is far too large a proportion of sales to ignore. Note that there are variations on this type of order where the customer picks from a full range of options. Certain car packages are quite popular and are offered as a special deal for the customer, but not made until

ordered. This is essentially a marketing issue – there is a reason why a customer picks particular features, and marketing is an important aspect of this. Such considerations are beyond the scope of this dissertation, however.

Order point 2

Order point 2 deals with picking from country stock. In those cases where pre-orders are not made, the customer generally picks from stock. More specifically, the customer picks from in-country stock. This stock can be of two types – either centrally held stock at the pre-VAT store at the importers facilities, or stock a dealer has already purchased. Note that dealer purchased stock can be held at the importers facilities. Neither type of stock normally has an end-customer assigned when it arrives in the country, so the difference is largely that a dealer has decided to secure a particular type of car because they believe they can sell it. Clearly this has a cost for the dealer, but since the payment conditions are quite favourable (with long lead times for paying for cars) it is one way of reaching the customers quickly. Stock is not generally exchanged between countries for administrative and tax-reasons. This type of order point is appropriate for customers who want their cars quickly or for customers who are not as concerned about specifying the exact setup of a car (conceivably this may be considered a chore for some customers who just want a "good" setup). The lead time is theoretically 5 days from the Møller facility at Bekkelaget, but there may be some additional time if the order includes minor modifications. This is only relevant because some tasks such as installation of a hi-fi system are not always carried out at the factory. In other words building some cars for stock can take from 5-6 weeks off the time a customer has to wait for a new car. It also allows for production efficiency to be maintained through a smoothing of production. Even in this system, however, there is a considerable distribution postponement even though the cars themselves are finished.

Order point 3

There is a third order point possible for customers, which is to a certain extent a compromise between the two previous ones. Of course, allowing both the two previous order points is already a compromise in terms of either a full pick-from-stock or make-to-order system, but this final order point goes a little beyond this. The possibility to order and modify stock in production upsets the traditional dichotomy between pick-from-stock and make-to-order, although in terms of speculation and postponement this is simply another constellation. However, for VW, it makes it possible to tap that part of the market which wants a car reasonably fast and wants to specify certain features of the car. For some, this will be a complete match

with what they would otherwise have specified because they would have picked a car similar to one in production and the differences can be added in production. For others, this will be a compromise that provides, more or less, their almost ideal car with a short waiting time.

The real compromise, in terms of the order points, is made possible by a small number of features in this particular distribution system. The flexible production system makes possible both the make-to-order and the compromise order from production. The integrated IT system, which allows dealers to show customers cars in production, is also essential to realistically sell cars from production volumes. The closeness of production to the end customer makes MTO viable. On the distribution side, the fundamental issue is that the same transport resources are used to distribute cars whether they are ordered by the customer from order points 1, 2 or 3. A car made-to-order has exactly the same route from the factory as one based on picking from stock.

The difference in terms of distribution is essentially in terms of information and exchangeability. That is, a car made-to-order for a particular customer cannot normally be replaced with a similar one (since the setup is likely to be somewhat different). On the other hand, exchange of cars is to a much greater degree possible for pick-from-stock cars since tiny variations in setup are less likely to be a deal-breaker for a customer picking from stock. This is not necessarily because such customers are less discerning since we know that if a customer orders a particular configuration and does not get it, the customer easily sees this as a breach of contract by the manufacturer. More importantly, for cars made-to-order, the final destination is known earlier in the process. However, this information is often not available to Autolink, so that it is not possible to plan accordingly. In this sense, the intermediary function of Autolink becomes even stronger – i.e., without needing to know the details of the different order arrangements, Autolink's ability to deal with frequent changes and fluctuations due to the way the system is set up makes it easier for it to function. The same is true for other actors in the distribution channel – as long as the volumes from VW are roughly constant, it is not relevant whether cars are made-to-order or pick-from-stock. The *proviso* is that the distribution system must handle all cars as individual units since some are assigned to a particular customer very early on. This is potentially easier in a pure pick-from-stock system; however, because the various actors in the distribution system normally deal with a number of car manufacturers with different systems, they must all be able to handle different order models.

To summarise, the three order-point system provides a number of advantages in a real-world setting, and represents a workable compromise. It allows for

constant factory production while serving customers both in the make-to-order and pick-from-stock markets. It also uses the same resources for distribution, at the cost of a large number of minor, ongoing changes. In this sense it can be seen as less efficient than the "purer" system, but much of this is compensated for through the capabilities of intermediaries such as Autolink who, in effect, absorb some of the changes. Cars need to be uniquely identified to work in the make-to-order system since many of them are assigned the identity of an end-user before production is started. This identification is not a large issue since cars already have a unique chassis number and documentation has to follow the car for tax and import purposes. The main factor for Autolink is that having more accurate information in advance regarding incoming cars could make it much easier to plan for transport of or minor modifications to the identified cars in advance.

The second main aspect of postponement and speculation is illustrated by the regional system described for Honda in Chapter 6. The model in Figure 2.3 is relevant here. The regional system for Honda is based on speculation in terms of manufacturing (i.e., form speculation) since almost all manufacturing is done to forecasts. Only minor modifications are carried out in the distribution system. However, in terms of logistics or physical distribution, the picture is more complicated. Dealers generally sell from stock meaning there is a central storage facility for each country, which represents a limited amount of geographical postponement – i.e., cars are not sent to the final customer until they are ordered. The second level achieved in this system in which Honda places cars at a regional level is an even greater degree of geographical postponement, even if the cars have already been assigned to a country. The advantage here is that services can be centralised, but with the cost of postponing transport to the end customer. For Honda, which is a relatively small manufacturer in Scandinavia, this could be a disadvantage since it means transport might not be as efficient when sending cars more frequently to meet requests. However, as has been shown in the empirical chapter, Honda "piggybacks" on existing transport systems and so this problem is largely eliminated.

The third level described in Chapter 6, where both stocks and ownership are centralised at a regional level, gives additional advantages, believed to be greater than the previous levels. In postponement terms, this means that cars are exchangeable. That is, whereas the second level largely gave advantages in terms of centralising services, the third level requires a significantly lower level of stocks since it is not necessary to keep separate stocks for the different countries. The problem in these terms for the second level is that the cars still belong to the different countries, thus creating barriers between the stocks. Although it is possible to transfer from one stock to another, it is costly to do so and thus it is not truly a common stock. With common

ownership, the advantages of postponed distribution are actually achieved, but we see that this is dependent on using an existing system for transport. A final potential level in these terms is to let a third party handle the central stock and services so it can be combined with other flows of cars. This would not reduce the stock needed for Honda, but potentially make the operations more efficient due to volume advantages.

In terms of the discussion above on the various research questions, table 9.2 below summarises how the different cases and the overall setting for Autolink reflect on the different research questions. The contribution of the different importer systems to answering each question naturally differs, but all have some relevance to each question. The table draws together relevant observations for the importers and presents them in terms of the research questions in the setting to give an overview that is more easily visualised. It is seen that all importer systems have relevant observations for the research questions, although not all have been explicitly referred to here either because they are duplicated or the discussion is better carried out at a more general level. The overall column represents either lessons from the description of Autolink specifically or from the entire empirical case (all of Chapters 4-8). In this sense, the table is both a summary of the most relevant lessons from the case, and a way of structuring the empirical material.

Research question	Møller	Honda	Bertel O. Steen	Overall
Structure of the distribution system				
Research Question 1: What alternative distribution arrangements can exist in a particular industry in terms of hybrid arrangements, customisation and modularisation, and postponement and speculation?	Pick-from-stock and make-to-order	Pick-from-stock	Several different but merged at the importer administratively. Intermediary does not see this.	Two clear arrangements in car distribution - pick-from-stock and make-to-order, the latter involving high customisation. One determinant is the placement of factories.
Research Question 1a: How are hybrid distribution arrangements used to handle different demands on a distribution system?	Combining PFS and MTO in the same system.	System is not hybrid but high level of specifications for cars is used to compensate for some of the disadvantages of a make to stock system.	Both make-to-order and pick-from-stock in the same importer here. Individual systems not explored.	Tendency for all distribution to be carried out through the same central system due to the large costs of operating the system. Compromises in terms of the pure systems.
Research Question 1b: How are the modularisation of products and different degrees of customisation to consumers used to handle different demands on a distribution system?	High degree of customisation to one consumer segment	High specifications but relatively low customisation on average	Degree of customisation varies according to brand.	Little modularisation observed in any of the systems (modular designs tend to happen pre-factory). Winter package may be considered a small module.
Research Question 1c: How is postponement and speculation by making-to-order, making-to-inventory and placement of inventory in the distribution system used to handle different demands on a distribution system?	50/50 MTO/PFS system. 3 order points system - combination in the same system. Moving demand to importer	Pure postponement system as a base. Different levels of centralisation of regional stock as one way of dealing with this. Secondly, high specification in terms of extra features for cars to compensate for lack of MTO.	Different systems operated depending on manufacturer. BOS itself must deal with some of these tensions. Use the same standards when operating in general. Strong control on lead times may be a way to handle this.	Postponement and speculation are far less obvious to intermediaries since these carry out the same services. However, the degree of changes tend to be different in the different systems.

Table 9.2: Research question 1 and empirical data

Some additional comments are pertinent in relating the table to the discussion above. In the discussion, we have drawn most heavily on the VW/Møller system in describing the three order point system, and Honda in describing in more detail how the regional system shows different types of distribution postponement. However, the BOS and VW systems also show some distribution postponement with central storage for unsold cars, and Autolink is part of this system by providing warehousing capacity. Elements of the two main distribution arrangements seen in car distribution are found in all three cases, but especially where the real systems depart from the two main arrangements of make-to-order and pick-from-stock, which were necessarily somewhat generalised. Specifically, the core distribution system from factory to the dealer is similar in all cases, yet different ways of using the core distribution system make it possible to handle both MTO and PFS within the same general distribution system. We observe a small degree of modularisation with the winter package and some of the modifications carried out on cars. The main reason more modularisation is not observed is presumably that we are only observing the finished product from factory door to delivery, and the current state of car manufacturing means very little assembly in the distribution system. Other studies have, of course, shown extensive use of modularisation in the car industry, but this is closely tied to the manufacturing system which is not studied here.

9.3 Interdependencies and coordination

A significant part of the empirical description has been devoted to the activity structures of the car distribution system with emphasis on the physical activities. Here the focus is on the interdependencies and coordination so that the discussion will be structured to deal with the research questions for this section. The approach taken is to first discuss the primary activities carried out and relate these to the issue of interdependencies and coordination mechanisms observed as a way to connect to the theoretical framework. This will then be related back to the research questions. The research questions in this section (see table 9.3) are very closely tied together with one overall question and two more specific ones, so that the discussion is necessarily overlapping.

At the same time, we should note that talking about coordination mechanisms in this setting means they could potentially be relevant at several levels as discussed in the method chapter. One level is the overall car distribution system, limited mostly to the Norwegian and European setting. Another is the level of each individual car manufacturer's system, which clearly intersects with the overall system where common services are

used. Finally, there is the level of the intermediary itself and how it 'fits in' with the other systems.

This initial discussion of activities and interdependencies is somewhat extensive, so it is helpful to have the initial research question in mind. The discussion necessitates revisiting some of the descriptions from the empirical case, but the purpose here is to link these explicitly to the interdependencies, rather than simply repeating them.

Interdependencies and coordination research questions
Research Question 2: How are the coordination mechanisms (standardisation, planning and mutual adjustment) used in complex distribution systems to handle activities with different interdependencies (pooled, serial and reciprocal). *Research Question 2a: How do the different types of interdependencies among activities (pooled, serial and reciprocal) affect intermediaries and their roles?* *Research Question 2b: How does the need for the use of common resources and consequent pooled interdependencies affect intermediaries and the coordination mechanisms used?*

Table 9.3: Research question 2

9.3.1 Main activities, interdependencies and coordination mechanisms in the case

The discussion in Chapter 2 suggests that there may be a number of different interdependencies operating among activities in a complex system. That is, activities may be characterised by more or less different types of interdependencies, and activities undertaken by the same firm may have several types of interdependencies operating on them. In this sense, it seems clear that any discussion of interdependencies here is necessarily a selection based on some central activities that have been judged to be of importance to the study, specifically where the dominant or most important interdependencies are emphasised. As was seen in the theoretical framework, the interdependencies form a Guttman-scale so that the higher types necessarily include the lower ones, but the discussion here will focus on the higher type of interdependency for each set of activities.

Broadly, we may classify the activities carried out by Autolink into three main groups corresponding to the three interdependencies identified as pooled, sequential and reciprocal. Here we start with the serially dependent activities, since these are most easily identified, and use the following classification:

1. Primarily serially dependent activities - PDI, modifications, warehousing and direct transport
2. Primarily reciprocally dependent activities - Modifying development and competence
3. Primarily pooled activities – Storage and common resources

Each of these groups of activities is discussed separately, bearing in mind that they are not necessarily carried out independently. There is, however, a second dimension that should be kept in mind here. Whereas the Thompson framework on interdependencies and coordination should apply both inter- and intra-organisationally, it is important in the discussion to be clear on which of these two is being discussed. The focus here is on the activities carried out by Autolink, and the interdependencies can be described in these terms, i.e., PDI operations have certain characteristics that are important for how Autolink plans and executes them. However, it is not possible to consider these entirely in isolation, since Autolink is essentially a service provider to a larger system. Thus the transport operations carried out by Autolink are part of a much larger transport system for carrying cars from factory to consumer. This means that, for any set of activities, it is useful to start by classifying the activities and discussing what these mean for coordination and how Autolink can handle these. However, this must be supplemented by a discussion of how this impacts on and is limited by the distribution system as a whole. The result is that we obtain both the intra- and inter-organisational dimensions that are inextricably linked in the case.

1. Primarily serially dependent activities - PDI, modifications, warehousing and direct transport

A number of the activities carried out by Autolink can be aptly described by a serial dependency, meaning that the order in which activities are carried out is important. These are characterised by a substantial time-dependency and are usually carried out in a sequentail order.

For example, PDI (pre-delivery inspection) operations are relatively simple even if they sometimes include limited modifications to cars. Efficiencies in PDI operations are often tied to scale (reflected for example through Autolink's investment in a machine for de-waxing as described in Chapter 4) and a high level of equipment utilisation. Even so, much of the PDI volume is carried out in smaller workshops be they at the local dealers or by independent workshops. This arrangement does not seem to be mainly for efficiency reasons. Some local dealers already have workshops (because of the structure of the distribution system all dealers were previously required to have workshops for repairing the cars they sold), and it is advantageous to

give these business through PDI operations. These operations are also closer to the end customer, so that if PDI is carried out in a more centralised location, dealers still have to carry out a final wash and polish before the customers get the cars. Since they already have the facilities to carry out PDI, this is then done to avoid having the extra step, even if the efficiencies in pure PDI operations are higher at some centralised locations. In this sense, the serial dependency of PDI operations is consistent for a particular constellation, but it is not absolute. The dealers may be said to be balancing efficiency with control for PDI. Importers and dealers that assign Autolink as their main source of PDI thus have a slightly different activity structure to those that carry it out at the final stage or give the tasks to a different third party. Some importers, such as BOS, have a mixed system where some manufacturers assign PDI operations to Autolink, while others handle this through the dealers or others. It is probable that this type of mixed system, although perhaps fitting better with the resource structures of the dealers in terms of making use of their workshops, will give, on average, a less efficient PDI operation. As has been discussed, however, this is not the only relevant criterion for assigning the tasks.

Car modifications are also characterised by serial dependency, but like PDI, it is not absolutely given at what stage in the distribution channel these should take place. However, because of the higher level of specialisation required to undertake car modifications, it is perhaps less likely to be fragmented. That is, several actors have the capacity to carry out the modifications, but once it is decided which actor is assigned the task, that actor normally retains all the business for that brand or model. We see several different models in the case – Autolink carries out all modifications for Honda in Norway, whereas VW carries out modifications to its own cars. Both of these are centralised in a single operation. To a small extent, dealers use local workshops, but the tendency is for this to be done for more exceptional modifications – it does not represent a large part of the volume of cars. Many of the modifications carried out could clearly be done at a much lower cost if the modifications were part of the regular factory manufacturing process, but they only represent a small percentage of factory output and are in some cases unique to Norway, meaning that there is a limit to the scale that can be achieved. The best that can be done in many cases is then to centralise Norwegian modifications in one operation.

Storage has some elements of serial dependency in logistics terms because a car must be transported to a storage facility before it can be stored, and it must be placed at the storage facility before it is transported further. Some cars are, however, immediately moved to PDI, modifying or directly to further transport, so the storage element can be avoided. In general in the systems described, only one main location exists for storage, either at a

central facility for the country, or in some cases as stock at the dealers. There are a number of intermediate holding areas such as the 48 hour unloading area at ports, but these are only transit areas and are not meant to serve as long-term storage.

A final type of activity is single car transports. That is, if the car transports are considered simply as legs from A to B, they are clearly sequential in nature. The fact that these do not represent production operations does not matter since they represent transformations in time and space.

According to the theoretical framework, serial dependencies should be coordinated through planning. The discussion here combines the activities discussed above because they are all part of the same system. Exceptions are highlighted where relevant. Looking at the activity structures shown in Chapters 4-8, we can draw a few conclusions.

There are some clear examples of planning being used to coordinate the various forms of serial dependency discussed above. The manifests sent to drivers and the documentation sent to Autolink regarding incoming transports are clearly related to planning. However, it is also clear that the planning is divided among a number of actors, and that the information flows do not correspond to what the different actors would ideally like. In a real setting, this is of course impossible, but there is still room for improvement in the current system. In practice, the car manufacturer or the car manufacturer through its central logistics unit is responsible for the flow of cars in Europe. This means that the manufacturer has the most complete information on what cars are transported at any one time, and also what changes are required to existing orders.

Cars are generally moved in batches, and thus it is the content of these batches and when the batches arrive that is the important information for other actors. In general, this information is not available as early as is possible for the other actors. This can create problems in planning and increases the demands for flexibility. We can propose three main reasons for the lack of complete information. First, the information is valuable in terms of maintaining control of the flow of cars, and so the manufacturer may not want to release the information too early. Second, the information systems may not be sufficiently well developed to make use of this information and third parties may not be properly connected to the manufacturers' systems, making it more difficult to provide the information even when it is available. Third, and finally in some systems the information itself may be very changeable. The destinations of cars and the exact dates for specific cars may change, and other third parties, such as shipping companies, may have their own issues such as delayed ships, etc. In sum, both the quality and

availability of information can mean that getting more information earlier is not always helpful. An example in this regard is Møller Logistics carrying out the light modifying of cars. Planning these processes a long time in advance proves difficult in practice because of the many changes to incoming cars. Therefore, it is better for the operation to work with a shorter planning horison to better adapt to potential changes.

2. Primarily reciprocally dependent activities - Modifying development and competence

A second and smaller group of activities carried out by Autolink can be classified as reciprocally dependent. These are activities that require mutual adjustment according to the theoretical framework. Typically this applies to the modifying of cars, but at the planning stage. A new model of car may require some specific modifying in order to fit favourably with the Norwegian tax system. This modifying is seldom carried out by the manufacturer since the volume of cars requiring it is too small to make changes in the process at the original factory, and because of Autolink's high competence in terms of knowing the rules and possibilities for such modifying in Norway. In this case then, there will be some mutual adjustment between the manufacturer and Autolink so that the final, rebuilt car is appropriately equipped. The changes made with respect to the tax system or for a particular customer must correspond to changes that are acceptable to the manufacturer.

This is even more so since the manufacturer is now responsible for the quality of rebuilt cars (i.e., the rebuilder is not directly responsible for this with regards to the authorities meaning that the manufacturer must be totally satisfied with the quality of the rebuilt cars as discussed in in Chapter 4). Some manufacturers, such as VW, carry out modifying within their own distribution system. Where a third party, such as Autolink, carries out such activities, the manufacturer must ensure that quality standards are upheld. In terms of the customer, it does not matter at what stage a car is rebuilt or who rebuilds it, any problems will necessarily reflect back on the manufacturer and the brand.

The importance of this type of interdependency should not be overemphasised, since it only applies in the phase where Autolink and the manufacturer effectively use their respective competences to arrive at a setup for a new car model. Once this has been agreed, modifying becomes largely a factory process. It has however also been related to development processes in distribution and supply systems and might have more relevance to describe these processes. In the case, the only such process referred to was the development of new IT platforms for cooperation between Autolink and

customers. However, this process was not followed in this study so we cannot reach any further conclusions on this basis.

In terms of coordination, some mutual adjustment is seen in this case, although it is fairly limited. The manufacturer is able to check the work done and will also get feedback from the customer, but adjustments should, of course, be made before the customer sees the final product. An additional point is that in a mutual coordination setting, the provider's reputation is essential (Stabell and Fjeldstad, 1988). Here it is Autolink's reputation for previous modifying work that means the manufacturer can have confidence that new changes will be handled well. This is partially a reflection on the competence acquired doing previous modifying work, but also a general reputation effect based on good experiences with the company.

3. Primarily pooled activities – Storage and common resources

The most basic type of interdependency in the framework is pooled activities. This is discussed last since there are a number of issues to deal with and, according to the framework this is a pervasive type of dependency. In particular, this is not only related to the organisation of activities, but as some authors have pointed out, the use of common resources and ways of coordinating these resources (Grandori, 1997, Håkansson and Persson, 2004).

Car parking and storage is a case of a pooled use of resources where the degree to which the parking facility is utilised says something about the degree of efficiency of use. This type of pooling is a very simple example since the cars stored in the parking house are not specifically adapted to it. In other words, there is a standard size for a parking space, which is sufficient for all normal cars, and the standards applied are followed only because it reflects a reasonable size for normal cars and does not require any adaptation on behalf of the manufacturers. In addition Autolink controls all access to and handling in the warehouse, so that the example is marginal in terms of pooled resource use.

We can, however, make a universal point here, remembering that the pooled interdependency is a basic one in the theoretical framework and so will be relevant in terms of most activities and the resources required to carry them out. Most of the major resources used in the distribution of new cars have some aspects of common use. Trucks and railway wagons have to adhere to certain standard sizes in order to hold automobiles, as well as having to comply with regulations to operate on a national infrastructure. Some of the major nodes in the transport and logistics system are relatively fixed (for example Bremerhaven port) and cannot be replaced in the short term.

Additionally, transport resources such as feeder ships are often so large that their efficient use is important for all participants in the distribution system. The challenge in terms of the distribution system, as a whole, is making efficient use of these resources.

According to the framework, pooled dependencies should be coordinated through the use of common standards, and established communication and decision procedures. This last point is useful since it illustrates that the existence of a set of common standards does not mean that all problems can be immediately solved by referring to written manuals. Rather, the standards can also involve resolution procedures and communication/information requirements.

The need for common standards throughout the distribution system is a major challenge for Autolink since a major part of its business is ensuring that its operations are consistent enough to achieve advantages of scale, whilst still fulfilling the requirements for the importers' and manufacturers' systems. Since these standards are, in most cases, defined at a much higher level (world or European in terms of general handling instructions), Autolink normally cannot influence the standards themselves. In other words, Autolink does not contribute by finding a good workable standard and offering this as the way to operate. Rather it must take all the different standards and find workable compromises where standards conflict on such things as distance between parked cars, etc. If no such compromise can be found, other solutions, such as handling different cars separately, are possible, but this is clearly not as advantageous in terms of achieving savings due to scale.

The different levels of analysis are very useful when talking about pooled interdependencies in this case. The overall system level is here clearly illustrated by the use of common resources at the European level, e.g., large feeder ships, major car ports and logistics infrastructure. Although some of the resources are owned by specific firms, the need to adhere to certain standards in order to use the infrastructure efficiently affects all involved firms. To an extent, even the large car manufacturers have to take some of these standards as given because they are part of a much larger system than even the car manufacturers. We see this reflected in the standardised ways of handling customers at the large car ports, but more universally in terms of truck and railway sizes and infrastructure.

At the manufacturer level, we typically see global standards that work in accordance with manufacturer strategies, and which remain the same for different countries because this is better for the manufacturer. This creates a

second layer of standards for such activities as car handling, PDI and IT systems.

Finally, the intermediary must balance the standard requirements that are in place from higher levels as well as each individual car manufacturer system. In addition to finding compromises where the standards are not compatible, the intermediary also must define standards in terms of its own suppliers and the use of its own resources such as trucks and warehouses.

9.3.2 Relating the findings to the research questions

The discussion above is relatively lengthy and goes a long way towards addressing the research questions, but we can make some of the points more explicitly. Considering Research Question 2, we see that the coordination mechanisms are used much as expected, with the pooled dependency and the development and flexible use of standards as a dominant theme. That is, the pooled dependencies are handled through the extensive use of standards both by Autolink and the different manufacturers. Serial dependencies are handled through planning and a fairly complex scheduling for incoming cars and transporting these to final destinations. Reciprocal dependencies are handled through some degree of mutual adaptation in finding possibilities for modifying, for example, that are compatible with both the Norwegian tax system and manufacturer approval, although this is less obvious in the case.

Since the discussion in section 9.3.1 is directly relevant to addressing research question 2, the elaboration here is not extensive. The remaining two research questions, however, need some additional discussion.

Research Question 2a: How do the different types of interdependencies among activities (pooled, serial and reciprocal) affect intermediaries and their roles?

This question may be interpreted as how the main interdependency for important activities carried out by the intermediary affects its opportunities and thus its roles. The concept of roles will be further explored in the next section, so the comments here relate more to specific opportunities than specific roles. The interactions between the main concepts are discussed further in Chapter 10.

The discussion has shown several significant effects on intermediaries as represented by Autolink. As can be expected from the theoretical framework, the interdependencies are coordinated in different ways, and the

nature of this coordination is important in creating opportunities for the intermediary.

Pooled interdependencies should be handled by standards and this is illustrated well in the case through the use of standard operating procedures for handling and PDI. The need to create compromises between different standards creates a tension that can limit the opportunities for the intermediary, largely because it can prevent the intermediary from achieving advantages of scale if all its customers demand what may be effectively called 'special treatment'. This can also favour the intermediary when it manages to create economies of scale through finding good compromises between two (or more) different standards. It is reasonable to think that the intermediary's position as an outsider makes this more possible than if part of the manufacturer's system tried to achieve the same objective. For example, if an importer that is tied to one particular manufacturer tried to take on the business of others and then pool the standards between them significant internal problems could be created. However, if a large and powerful intermediary presented the standard, this would by no means guarantee acceptance, but could more readily be accepted as coming from a neutral, third party.

According to the framework, serial dependencies should be coordinated primarily through planning. In the case, planning is relevant to many of the activities since most deal with delivering products within limited time-frames. We saw that in terms of planning the spread of information and tasks across firms mean the intermediary has to deal with shorter time horisons and more variability than it would like. It is conceivable that more information would be shared making planning easier if all activities were carried out in the same firm. At the same time, the very variability and short planning horisons mean that intermediaries, which build up the capacity to deal with the less than ideal coordination situation, are favourably placed and quite essential for the operation of the system as it is today. Intermediaries able to handle the differing demands of both the PFS and MTO systems described in section 9.2 and the resulting planning requirements are important for the smooth functioning of the system. It is quite conceivable that the efficiency of the system would be improved if intermediaries were given more timely information on scheduling in the distribution system as a whole however, since this would enable better planning. In the present system, the degree to which information is available must, to a large extent, be taken as a given for the intermediary.

The last type of interdependency, reciprocal, should be coordinated through mutual adaptation. This is mainly seen in the modifying of cars and is an issue with limited scope in the case. However, we see quite clearly that

Autolink is well situated to handle this modifying because of its competence and ability to balance knowledge of local rules with manufacturer requirements. This capability can be likened to technological development although the time-scale for the latter is much longer.

Research Question 2b: How does the need for the use of common resources and consequent pooled interdependencies affect intermediaries and the coordination mechanisms used?

The discussion of activities with a pooled interdependency went part way towards dealing with this research question. The findings can be summarised by saying that the distribution system is characterised by a number of large and fixed resources and several layers of standards which any intermediary will have to adhere to whilst trying to impose its own standards on those parts of the distribution system it can influence. Thus, Autolink takes more universal and manufacturer standards, combines them with needs tied to its own facilities, and translates this into operating procedures for its drivers and suppliers. We should comment here that some of the universal standards are either enforced from without (standards bodies, etc.), or are so completely embodied in the system already that there is no need for individual actors to spend additional time enforcing them. The BOS system described in Chapter 7 illustrates the problems when some of the requirements are incompatible, i.e., BOS as a customer leads to fragmentation of activities and demands such as lead time which are difficult for Autolink to meet while making good use of its specialised resources.

The need for stringent standards is not unique to car distribution. There are, however, characteristics in the system illustrated by the case which make the need for standards very clear. Many of the transport resources such as trucks and ships are specialised for car distribution, giving the dual challenge of particular operating requirements for efficient use and high utilisation to reduce costs. For an intermediary, this is a challenge, but at the same time, creates two opportunities. One opportunity is to find good operating standards and create compromises among existing standards. The other is to make investments in specialised resources and ensure high utilisation of these in order to bring down costs and thus improve the competitiveness of the intermediary. Both of these opportunities will typically mean using standards for coordination, but the latter adds a further layer of complication. That is, if the intermediary owns the transport resources, it must not only follow standards, but also ensure utilisation to spread the cost of investment in the resources. This poses the challenge of whether the intermediary can manage to coordinate the load on the central resources, and may be a case where it is not enough to simply ensure similar operating procedures when

using the resources. It may be that planning the load is also necessary for better use of the resources. This discussion shows how considerations that are typical of serial dependencies become relevant since some of the common resources are employed in the transport system as a whole.

The most relevant empirical findings are shown in table 9.4 below and have been used in the same manner as the previous section, i.e., both summarising and organising the most relevant empirical observations in the case.

Interdependencies and coordination				
Research Question 2: How are the coordination mechanisms (standardisation, planning and mutual adjustment) used in complex distribution systems to handle activities with different interdependencies (pooled, serial and reciprocal).	Planning in schedules for incoming cars and info from Møller to Autolink. Autolink must adapt to manufacturer standards.	Cars to Norway are a separate flow and are handled mostly apart from the rest of the regional flow, creating some issues since back-office functions are carried out at Malmö. The Norway office only deals with sales.	Lead time as the main measure - how does this fit in?	Need to create compromises across the different standards in order to share resources. All 3 types of activities are observed (detailed in discussion). Basic coordination is relatively predictable based on this.
Research Question 2a: How do the different types of interdependencies among activities (pooled, serial and reciprocal) affect intermediaries and their roles?	Need the ability to deal with short and changing time-constraints.	"Piggybacks" on existing system. Fits into intermediary system.	Planning is made more difficult by heavy focus on one measure. Opens for alternative providers?	Continual challenge in terms of operating satisfactorily according to the standards.
Research Question 2b: How does the need for the use of common resources and consequent pooled interdependencies affect intermediaries and the coordination mechanisms used?	Reduced need for common resources since many activities carried out by Møller itself. However, the transport issues are very significant themselves.	Need to use Autolink due to lack of own resources, but uncertain situation due to regional system not fully implemented. i.e. the common resources made for the region not fully utilised so Autolink is used instead	Use of several different transport providers reduces common resource impact. System is more fragmented, but consistent with lead time focus.	Several overlapping standards in the system. Creates opportunities for intermediaries able to bridge these. Inherent advantage since cars have to be uniquely identified to start with.

Table 9.4: Research question 2 and empirical data

The empirical findings in the table have been discussed quite thoroughly in this section, so only a few additional comments are necessary. The coordination requirements in the different systems vary somewhat. Since the Møller system carries out more activities than the others, more of the planning required is carried out internally in this system. The Honda system also creates a challenge since the logistics provider in the regional system placed in Malmö carries out many of the administrative tasks, but Autolink is tasked with most of the actual operations in Norway. Finally, the Bertel O. Steen system uses lead time which is a different main KPI, which creates an integration challenge with the other systems. The fact that Autolink has chosen to make significant investments in specialised resources for transport, PDI and handling means another challenge in achieving high and efficient use of these resources. This also creates an opportunity, and is highly relevant to the issue of roles discussed in the next section.

9.4 Intermediaries and roles

The presentations of each of the three manufacturer systems studied here, as well as the summary of Autolink's overall influence in Chapter 8, has shown that Autolink provides different services in the different systems. A core set of these are recurring, and some are very much dependent on what we can call "bridging" the different systems. The empirically based summaries and short discussions in Chapters 4-8 have, however, been somewhat specific in focusing on the main needs served by Autolink for the different manufacturers. These needs can be related to roles, and the way they are presented is clearly affected by the presentation of roles in the theoretical framework. They have not, however, been explicitly tied to specific roles.

The purpose of this section is to use the discussion of roles in the theoretical framework and combine this with observations relevant to roles in the case in order to formulate a proposed set of roles. These roles will be most directly relevant to the particular case studied, but should also have more general relevance in the theoretical framework. The formulation and discussion of these proposed roles comprise the main part of this section, and are then related to the research questions through the theoretical framework. The research questions concerning roles are presented in table 9.5.

Intermediaries and roles research questions
Research Question 3a: What roles for intermediaries can be derived from contemporary distribution systems? *Research Question 3b: What challenges and opportunities exist for intermediaries in combining roles in contemporary distribution systems?*

Table 9.5: Research question 3

9.4.1 Proposed roles

The concept of roles used in this dissertation is that a role is based on a set of activities that fulfil some need or provide some specific service to a customer. A service here need not refer only to a specific service such as PDI operations, but can be more generalised such as carrying operational risk. The roles have been developed by taking the observations in the case relevant to the section in Chapter 2 on theory, and combining these to create a categorisation of roles. Thus an observation that some importers use Autolink as an informal benchmark might be relevant to roles, but of course some degree of researcher discretion and judgment cannot be avoided and, it is indeed desirable to do so in creating the roles. When thinking about these roles, it should be borne in mind that they are created with regards to one particular intermediary in one particular setting, although this is reinforced by using existing theory where appropriate. Furthermore, these roles are based on the observations in this case synthesised with existing theory, but this does not mean that there may not be more roles in the system. The combination of studying three different importer systems and Autolink's overall placement in the distribution system means that the roles have some degree of robustness.

For ease of exposition the section begins with a listing of the proposed roles (table 9.6) according to their labels. The labels are descriptive in nature, showing the main idea behind each role, but it is the discussion of each in turn which should fill these with content. Some of the labels may be similar to other classifications in the literature, but the aim here has been simply to find labels with a certain intuitive appeal for each role. In this sense the "broker" role, for example, does not necessarily correspond to the concepts of broker used elsewhere. Starting with the full list should make the discussion easier to follow.

Proposed roles
1) Hub
2) Broker
3) Specialist competence
4) Risk carrier
5) Resource provider
6) Organiser

Table 9.6: Proposed roles

1) Hub role

The hub role is based on the firm being a central node in the distribution system in terms of information exchange, physical transport routes and possibly decisions. The type of distribution setting studied is likely to be closely tied to the physical structure of the distribution system, but this need not always be the case, especially if the main service is information exchange. The role as a hub means that the firm can create economies in terms of reducing the number of business ties as described by Alderson (1957, 1965), but also that it is able to absorb fluctuations in transport volumes from different manufacturers. These variations will tend to happen *vis-à-vis* the individual customers or suppliers to the hub, and so the aggregate variations should be smaller. Both of these arguments are clearly strongly related to the function called "Reducing business ties" discussed in the functionalist literature. In this literature, the ability to absorb variations from different sources is a typical function of the intermediary in terms of a wholesaler, but here we suggest that this can also be tied to the hub role.

In terms of the case, an important element of this task is to have a number of customers, which results in a greater efficiency in organising the hub. Very closely tied to this is the ability to absorb variation. This is partially a scale argument as well as recognising that sources of variation cancel each other out. For the smaller importers with volumes such as Honda, Autolink's role as running the large hub controlling a large number of vehicles makes it important also because this means that any variation in its own need for transports is likely absorbed by this larger system. This means that the information needs from Autolink with regards to smaller players are smaller than its needs with regard to the larger players. Such an effect only works with regards to normal variations – if new car sales jump across the board, then the strain on the total distribution system becomes large. This was clearly seen in 2007 when sales volumes for cars were at an all-time high in Norway.

The absorbing variation argument and the role of organising the hub is partially related to resources in that Autolink must have the systems and competence to coordinate daily and long-term flows. However, it is based primarily on the way the activities and actors are structured, with a number of importers having varying volumes, and a very large number of small one or two person firms carrying out the main direct transport operations. Other transport firms carrying out only local transport for some importers do not have the same kind of role with regards to running the system or acting as a hub.

Furthermore, if Autolink is a central actor in the distribution system and acts as a hub for a number of manufacturers, then it is also well placed to offer additional services to those manufacturers in need of these, and it is also well placed to act as a broker (described immediately below). In this sense, one would expect that it is easier for the manufacturers to choose Autolink for these services beyond the fact that it has competence in providing them, i.e., it has an additional advantage since it is already used for a number of critical services. Similar developments, where transport firms expand into third party logistics, have been seen for a number of other actors (Hertz and Alfredsson, 2003, LaLonde, 2001, Persson and Virum, 2001)

2) Broker role

The broker role as defined here is closely tied to the achieving scale argument in the functionalist literature, i.e., a broker creates different types of advantages of scale by acting as a go-between for different suppliers and customers. This applies both where the intermediary quite clearly is placed between a customer and supplier group, and where the accumulation of scale allows the intermediary to offer services in a different way because it achieves scale.

As mentioned in Chapter 2, the two main pillars of this argument is that achieving scale leads to economies of scale in operations, and increased power in terms of purchasing services and influencing other actors. In this sense, the broker role follows directly from these two arguments, and is really about accumulating business in the distribution system for those types of operations where scale matters. That is, if there are no economies of scale in operations or purchasing to be had in a particular type of activity, then there is no broker role available for those activities.

In the case, most of the activities carried out have some potential economies of scale so that the broker role is very much a relevant issue. Purchasing of services is helped by scale, for example the size of operations in handling and warehousing, and not least, scale in PDI services quite clearly creates an

advantage for Autolink when sufficient business is accumulated. PDI services, which are not provided by subcontractors, can be seen as relevant to the broker role because the alternative is for them to be carried out by many smaller providers. Autolink is able to offer an alternative based on accumulating volume and changing the nature of the operation (i.e., a large specialised machine rather than small, manual-oriented workshops). This is included under the role because functionally it is the equivalent of the intermediary accumulating all the demand for PDI, turning this over to a supplier and reducing prices through representing large volume. Differently put, whether Autolink accumulates PDI volume and uses this to press for better prices from a supplier, or whether it accumulates it and achieves scale in its own operations, should not matter to the customers.

It seems clear from the case that the hub and broker role are very closely tied together, and so the broker role cannot be properly discussed without referring to the hub role. The broker role is most obvious in terms of some of the scale advantages achieved as an effect of accumulating customer volume. The hub role is, to a large extent, informational and physical, with Autolink taking on the considerable task of communicating with the small transport providers, the large number of dealers and a moderate number of importers. As the discussion in Chapter 2 showed, this has the effect of greatly reducing the amount of communication needed. What is more obvious from the empirical case than the theoretical conceptualisation of these roles is how closely the two roles are connected. Autolink's hub role is strengthened because it can use the size given by additional business to be a broker. At the same time, the ability to absorb customer variation under the hub role is greatly facilitated because the firm is large and has a large proportion of the new car transport in Norway. This is not to say that these two roles are always so closely connected, but this clearly is the case here.

3) Specialist competence role

Here, the specialist competence role is proposed as an intermediary that focuses on carrying out certain specialised tasks with particular efficiency. This competence should ideally be difficult for other firms to match. An example is the day to day operation and matching of the many different transport routes with different incoming cars, different transport materials and different conditions as described in Chapter 4. However, since roles are not meant to be absolute, this argument is not to say that no other firms have similar competencies or that the competencies are entirely unique in their nature. It should, however, be the case that it will be costly for others to develop the same competencies. The role is partially based on the task and skill specialisation argument from the functionalist literature. Essentially, if an intermediary specialises in certain tasks, then it is expected that the

specialisation will enable it to carry these out more efficiently than other firms. It is also likely that other firms will expect this and will defer to the specialist in terms of certain decisions.

In our case, this is most clearly seen through the way certain importers use Autolink as a professional counterpart and benchmark. Since Autolink has a number of important customers in the car distribution business, it is subjected to a number of different demands and heavily exposed to competitive pressures. Although Autolink has a strong competitive position, there are alternative providers in the Norwegian market, and also alternative ways of organising distribution systems (i.e., regional systems) if the Norwegian system does not prove satisfactory. In fact, some of the importers in the Norwegian system carry out many of the same operations as Autolink. This may mean that they do not buy these specific services from Autolink (such as Møller which has its own PDI operation). It may also mean that Autolink is one of several providers (as seen in the Bertel O. Steen system).

Since this is the case, Autolink, by having a large market share, becomes a natural benchmark for a number of operations. Specifically where Autolink has made investments in larger facilities, it is interesting for others to observe its operations. Autolink carries out tours of its facilities for importers. This has a number of purposes including customer relations and marketing, but it also allows such importers to make some judgments about the organisation of the Autolink facility and how well their own operations compare. This can then be taken back into their own organisation for either their own use, or for support in choosing Autolink as an intermediary.

This role is related to the specialisation of an intermediary discussed in the theoretical framework. If an intermediary or a third party in a distribution system is to carry out certain tasks, then it would be expected that these tasks are carried out more cheaply and/or more effectively than the actors themselves. There are clearly other possible criteria such as a general wish to outsource activities, but this is a main point for an intermediary, and certainly a main point for Autolink. At the same time, such a firm becomes a source of information for other actors who either use the firm as a benchmark to improve their own operations or test the firm against their own operations to see whether it is operating more efficiently or is there a potential for re-assigning the tasks.

4) Risk carrier role

The risk carrier role means that the intermediary takes on some of the risk inherent in the distribution system as part of its business. This may also

imply that the intermediary is particularly well suited to carrying this risk. According to Alderson (1965), there are three main aspects of risk sharing – shifting, pooling or hedging and elimination through control of the operating situation. Shifting risk can be a part of the role in that the intermediary takes on additional risk, but here it is equally interesting to consider why the intermediary can carry this risk. The second part, pooling or hedging of risk, is inherently tied to the hub role where variation is evened out. This does not eliminate risk in the system but means that one central actor such as Autolink can handle the risk better because it evens out in terms of that particular firm. Elimination of risk through control of the operating situation is clearly a major theme for an intermediary and hinges in part on the intermediary's competence as a specialist. That is, if certain distribution operations are inherently risky in that they can damage the goods transported, a specialist is more likely to be continually working to improve these operations, thus reducing the overall transport risk.

In our case, there are several examples of the risk carrier role. The most obvious one is the hedging of variation in transport volumes among the different importers, leading to fewer problems of running out of capacity on a day to day basis which applies to each of the three importers. That said, it is also the case that some of the variation is systematic, and it becomes problematic for Autolink to absorb this. This shows that there are clear limitations to the risk carrier role. There are, however, a number of other mechanisms for handling risk in the system – in particular the general handover rules where any firm taking charge of cars has to inspect them within 24 hours of receipt or potentially bear the cost of any damage as well as the quite extensive insurance by financial third parties, especially in the Honda system.

The BOS case illustrates the opportunities for operational improvement; there was an extremely high damage rate initially, followed by improvements that made the different parties in the distribution system more responsible for any damage incurred. This shows that for larger operators, it is not sufficient to simply rely on insurance for incurred damage, since poor operations simply lead to prohibitive insurance premiums.

The risk carrier role is also seen clearly through the way Autolink stabilises the financial transactions for a number of the smaller firms involved in the actual transport operations. That is to say, the way Autolink charges for transport helps to smooth the system. As was shown in Chapters 4 and 5, invoices are only produced when a driver has completed an assignment, and payments are sent more directly to the driver. The drivers, although most are technically independent firms, do not end up in a cash squeeze, which is an advantage considering they are not financially strong. The dealers are also

favoured by this agreement, since they tend to pay for transport directly to the importer as part of the total price of a car, and are often given quite a generous amount of time before payments are due. Since Autolink does not immediately calculate the price, this means that there is no bill directly from Autolink on a different time schedule than the other payments. This is financially advantageous for the importers as well, since bills from Autolink tend to come some time after the transports have been made and payment received from the end customer. For the large importers, these are quite advantageous payment conditions. For the small transport firms, it means that Autolink absorbs some of the risks and handling related to payments. Although strongly tied to Autolink's main activities, this is a financial intermediary function. This role, with regard to financial risk, shows that there are several types of risk in the system – here we observe both operational and financial risk. A whole typology of risk could of course be used here to develop the role, but we will stop at the two observed in our case as a first step.

This function should not be overemphasised in terms of Autolink's role as it is a consequence of the way the payments are structured rather than an explicit financial function. Nevertheless, it is significant for the transport firms affected by it. It is possible for Autolink to take on this role because it is a large firm and has sufficient financial strength. The role, in a wide sense, can have a much greater scope since financial intermediaries such as insurance companies also play a role in most systems. It is stretching the framework, however, to call the insurance companies distribution intermediaries.

5) Resource provider role

The resource provider role as presented here means that the intermediary provides specialised resources in which the customer cannot or does not want to invest. There are two aspects to this role. One is that the intermediary makes substantial investments in specialised infrastructure or equipment. The efficient use and high degree of utilisation of this equipment is then an important issue for the intermediary. If successful in obtaining high and efficient use, the intermediary can provide services at a relatively low cost. In the literature, this has been called an asset-based approach (Persson and Virum, 2001). The second aspect, albeit related, is an outsourcing argument in that even if the resources are not greatly specialised, they may be especially useful to a customer because they provide resources that the customer does not have. Conceptually, this can be likened to moving important but not core resources outside the firm – the firm is still dependent on these, but they do not represent the core business of the firm.

The resource provider role is reflected in several ways in the case, but is most clear when looking across the different importers to see the differences among them. In terms of some of the importers, it is clear that Autolink does not only provide basic transport services, it also provides associated services that the importer is not able to provide. In this sense, there is a fit between the resources and services provided by Autolink and those held by the importer. Honda's regional system is not fully extended in terms of Norway since some of the flow, which would normally run through the hub at Malmö, goes directly to Drammen. Because Honda does not have a Norway operation equivalent to that in Malmö and because the volume of cars is not very large, it is logical to make use of the existing resources for services such as PDI, modifying and transport within Norway.

This argument is largely made from a resource point of view in that Autolink has a fairly comprehensive set of resources for providing car transport and associated services. The investments in the site at Drammen port in terms of warehousing facilities, the PDI machine and, even more significantly, a trailer and railway fleet specialised for car transport, fits very well in this case with the concept of a resource provider role. Efficient use of these resources is, of course, essential for Autolink firm.

It is possible for an importer to integrate this concept with its own resources and use certain Autolink services, thus removing the need to develop such resources themselves. As we saw in Chapter 4, Autolink obtains exclusive contracts for some importers meaning it carries out all the transport or all the modifying for a particular brand of car (these deals are usually made at the level of a car brand, depending on the structure of the importer). What is interesting in terms of resources is that whereas in most cases Autolink must make adaptations and compromises with regards to the standards of the different manufacturers, there is some evidence of adaptation going the other way with regards to resources. Honda has made some adaptations to Autolink's operating conditions in Norway based on already existing facilities, whereas the equivalent operation in Sweden is held to a slightly different standard that matches Honda's standards more exactly. Similarly, Autolink and Møller have been working for some time on an IT-platform to make information transfer more efficient. This is a compromise between the IT systems of the two firms. In this sense we can say that although some of the tasks taken by Autolink are made for strategic reasons as well as for price, some tasks are also performed with the available resources of both Autolink and the importer strongly in mind, and these show definite adaptation to local resources.

Autolink is also making investments to secure increased capacity for specialised resources such as railway wagons. This is not surprising in that it allows Autolink to serve its customers better, but the nature of the investments (for example railway carrying capacity) also reflects the need to make the distribution system work. That is, large-scale problems in railway distribution of cars combined with price increases made it important for Autolink to secure both capacity and control in the railway sector to maintain its freedom of action as shown in Chapter 4. This further increased Autolink's responsibility since any problems were now more directly attributable to Autolink rather than the railway company. This added responsibility, however, is balanced against the increased ability to organise departures better (full trains rather than single wagons). Here we can see a transition to the organiser role discussed below.

The alternative would be for Autolink to simply refer to the railway companies for railway transport and keep offering its customers its regular services to the degree possible given its resources. This type of behaviour is clearly acceptable for a smaller transport provider (for example the local transporters that only provide transport services and only in a limited region), but it is not consistent with securing resources to fit with the importers. In terms of this role, it is the dual challenge of obtaining a good fit with customers' resources while maintaining high and efficient use of specialised resources that is essential. This can be likened to achieving optimum scale for equipment in a situation where even functionally identical customers (i.e., dealers or importers) use different parts of the intermediary's resources.

6) Organiser role

The organiser role is the last role proposed here, but it is not the case that this role should "fill in the blanks" regarding roles overall. Rather, it is important to delineate and focus on the content of this role in itself before the various roles can be discussed relative to each other. The organiser role is perhaps the role least tied to the theoretical framework and, in this sense, draws more on what is observed in the case. However, it is tied to some of the arguments made regarding 3PL and 4PL firms in the wider 3PL literature. We can define the organiser role as having the responsibility for making a substantial part of the distribution system work, beyond the detailed services that the firm itself provides. This can include organising and monitoring one or more suppliers, akin to the concept of tiering used by, for example, automobile manufacturers (Womack et al., 2007). The difference from the previous concepts of intermediaries and the 4PL concept which has been quite well developed is that this responsibility exists without having control of the overall flow of goods and without taking title to the

flow. So we see that although the traditional intermediary takes on title to the flow of goods and thus organises its part of the distribution internally and the 4PL does not take title but is given some control over the flow of goods, the organiser uses elements of both descriptions.

In the case, the organiser role is closely linked to the resource provider role in that some of the observations could also be explained by the expectation that Autolink will provide certain types of resources. It is also related to the hub argument in that acting as a hub for many of the actors involved in the distribution system supports the organiser role. However, there are some unique features of the role that come through quite clearly in the case. For example, a number of the actors in the distribution system expect Autolink to take care of capacity for the system as a whole. This may not be reflected in contracts, but it is not difficult to understand considering Autolink's market share for new car transport as well as its strategic position at the port in Drammen. The expectations are best seen whenever the distribution system experiences external shocks.

When an external shock leads to problems in distribution, many of these actors do not expect delays and know exactly who to blame if delays take place. This issue is the same whether the outside shock is a country-wide increase in new car sales, heavy snow or a structural change such as a significant price increase for railway services. As can be seen in the Møller case, this issue is the same for other actors charged with the responsibility for the flow of cars, e.g., Møller Logistics. In this sense, the role is in relation to a particular actor rather than a universal quality of a particular firm. It is possible to speculate that similar issues apply for other actors implicitly charged with the responsibility for making a part of a system work however the point here is that Autolink is specifically expected to provide a continuous flow of cars, even in difficult conditions.

To a certain extent, this is not only because the actors are unaware of the problems, but also because they are not thinking about logistics and transport problems since this is seen as "Autolink's problem." From the point of view of Autolink, this has both positive and negative effects.

On the negative side, Autolink may be faced with a lack of understanding when external factors affect operations. Customers that do not focus on and are not involved in logistics operations may not be aware of the problems a particular change can cause. In fact, they may not be aware at all of the types of problems that the provider is experiencing. Part of this is logical with regards to the division of labour in that buying services from an external provider means the firm does not have to worry about these tasks. It also creates a strong incentive for a service provider like Autolink to perform

because they know they will be held accountable for problems. However, there is a substantial downside when problems are too large to handle without interruptions.

First, Autolink risks being blamed for external shocks which the firm cannot control, and it is important in such cases to actually inform the customers why there are unusual problems with service. Second, if customer cooperation is important in order to handle the situation (for example if lead times are expected to be longer than normal), it is important to get acceptance from the customer. This may be difficult if actors do not have an understanding of logistics problems. As an example, an actor with its own logistics operation using only some services from Autolink might be more understanding in carrying out temporary mutual adaptation to deal with an external shock than one which has no such operation. This does not preclude the presence of strains, but the degrees of understanding and adaptation from the business counterpart are likely to be different.

There are, however, considerable positive effects from this situation. Most notably, it allows Autolink to make decisions regarding operations under its designated role. This type of autonomy makes it possible to compromise among the different requirements from various manufacturers and customer groups. Within the limits imposed by standards from the different manufacturers and other organisations such as the EU, it is possible for Autolink to organise distribution in the best way it can find, making use of its considerable scale in operations. It also anchors the firm very strongly in terms of competitive position – if it is one of the main actors making the distribution system work, then it is likely to retain its competitive edge for some time. This competitive strength is presumably enhanced if the firm has strong ties to suppliers and the skill in making the suppliers perform.

In relation to the resource provider role suggested by the 3PL literature and discussed above, we find that the expectation of the intermediary is considerably more than simply being a dependable resource provider. There are certainly limitations to the role described in this section in having the overall responsibility for certain services. Since the role is not written into any particular contract, there are limits to how far it can be pushed, but this is also a finding, that is, the expectation of fulfilling the role goes well beyond the exact contract terms, even though it is explicitly tied to them. If Autolink does not perform sufficiently well in its day-to-day activities, other actors are prepared to take over its business, and a number of actors in the distribution system are competent enough to evaluateAutolink's activities. In addition, some actors may have their own strategic reasons for having additional requirements that interfere with Autolink's ability to organise the distribution system. Typical examples are short warning times with regards

to incoming cars allowing the manufacturer more flexibility. Another is the BOS system emphasis on lead times in Norway, which is far more important in this system than in others. This reduces the value of having the organiser role since it imposes more restrictions, or rather the choice between losing some business in the BOS system and operating efficiently overall. It is also worth noting that this organiser role only currently applies to the setting in Norway, and it is not obvious to all the importers. That is, some importers with large operations have less of a need for Autolink to organise the system. Nevertheless, the importers benefit from this.

As in the other sections, it is possible to show the main empirical observations that were used as a basis for formulating the roles, although there are two restrictions. First, table 9.7 below does not relate observations to the research questions directly, but rather relates them to the roles showing what observations were most relevant in formulating each role. Second, it is not possible to fully illustrate the interpretations of the roles that are obtained from the observations. This interpretation could have several results, but the roles formulated here are considered reasonable and useful given the context.

Role	VW/Møller	Honda	Bertel O. Steen	Overall/System
Hub	Common IT platform under development. Transport.	Direct communication to Autolink.	Can "see" Autolink information including some information from Autolink's suppliers	Carries out transport activities for many importers, able to absorb local variation. Placed at an important transport hub.
Broker	Autolink only for transport.	"Piggyback" - taking much of system as granted and taking advantage of large volume in system.	Autolink for transport and PDI. Less focus on achieving scale given competitive prices.	Scale in operations makes purchasing easier - more "weight" *vis a vis* suppliers. PDI operations show an "internal" effect of accumulating
Specialist competence	Explicitly considered a highly professional counterpart. Informal benchmarking/visits.	"Piggyback" - taking much of system for granted	Core services. Change in damage rate shows relevance of operational control to the setting.	Professional counterpart and benchmark for several of the other firms. Specializing in certain distribution tasks - e.g., day to day running. Rebuilding competence.
Risk carrier	Responsible for cars while handled, no explicit risk function. Important to assign responsibility.	Honda's additional insurance reduces impact on Autolink	Responsible for cars while handled, no explicit risk function. Important to assign responsibility.	Payment risk is reduced and absorbed by Autolink as an intermediary. Most relevant for small actors in the system, especially small transport providers.
Resource provider	Considerable own investments reduce the need for resources. However, transport and handling is essential. Also potential for additional storage and PDI capacity. This has been considered but not yet used.	Small organisation in Norway. Very clear resource provider role. Fits into regional concept but vulnerable over time depending on how this develops.	Specificially for transport and PDI. Looser organisation with greater use of alternative providers means the role is significant but not as strong.	Investments in large set facility at Drammen port, investments in railway, specialized trailers and railway carriages for car transport.
Organiser	Less scope here since importer carries out many activities itself. However, important for the fit and specifically for transport and handling. Autolink enforces standards in terms of suppliers.	Organising role for Norway only - important since a lack of local organisation and dealing directly with the regional provider in many cases.	Organising role for transport and handling is to a certain extent accepted. However, the strong emphasis on lead times is an additional constraint on organising which affects how it fits with Autolink.	The way the system is organised with a large set of customers and sub-providers makes the organising role very important. Autolink essentially organises and runs this system within limitations defined by the customers. Expectations when high demand makes it difficult to deliver made it necessary to have a series of meetings with dealers.

Table 9.7: Roles and empirical observations

The roles and their formulation have been discussed extensively. Table 9.7, however, shows that different importer systems place an emphasis on different roles, and that Autolink appears to have at least several of the roles in each of the cases. Since an important purpose in this section has been to construct the roles given some variation in the different importer systems, the differences in the way the systems are described has proven useful. Furthermore, some of the roles, such as Hub, cannot be adequately described without referring to the distribution system in Norway as a whole, providing insights that were not available from each individual importer system.

Some final comments should be made on the observations with regards to the roles. There are several observations in the case where the hub role is related to information access, and this access should not be underestimated since it makes it possible to adequately fill the role – i.e., the placement of Autolink at the physical hub, coupled with the information access with and for other actors in the system, seems particularly relevant in this case. We also see radically different approaches as to how some of the roles impact the other firms. For the specialist competence role, Møller uses Autolink to a much greater degree as a benchmark than for example Honda, which relies on Autolink maintaining a high level of competence but essentially "piggybacks" on the system. For some of the roles however, the motivation and use of Autolink is identical across the systems, showing an interesting degree of consistency.

In addition to summarising the empirical observations relevant to the roles, we can end this section by summarising the roles themselves (table 9.8), in terms of the main features of the role, and the most salient observations in the overall case for each of the roles. This gives a synthesis of the roles that is more amenable to later theoretical expansion and for discussion in the next section on how the roles can be combined.

Role	Main features	Observations in case
Hub	Reducing business ties Placed at central physical location	Connecting numerous customers and suppliers Physical location at Drammen port
Broker	Scale advantages Power through aggregating demand	PDI machine for scale Scale of Drammen and Malmö operations
Specialist/competence	Specialising in certain tasks necessary for distribution/taking on outsourced activities	Day to day running of system/sorting competence in using transport resources Modifying competence
Risk carrier	Taking on risk in the distribution system, improving operations to reduce risk	Insurance system and clear responsibility takes care of most of risk Importance of operational risk seen in BOS case Carrying financial risk for small providers
Resource provider	Matching resources Making investments	Different matches in the different cases Large investments in warehousing, PDI, railway and trucking
Organiser	Partial 3PL/4PL argument – organising a part of the distribution system, but no real control of flow and does not take title Organising involves performance of other actors	Making the system work across different standards Ensuring day to day operation and maintaining population of suppliers Some influence in determining structure of the system Handling shocks to the system and ensuring capacity

Table 9.8: Roles and foundations

As table 9.8 shows, when summarising the roles more generally, we see again some of the theoretical foundations from Chapter 2. The first four roles have similarities with the four functions from the functionalist literature, but they are not equivalent and have been defined more precisely using the empirical observations in our case. The physical component of the hub role has been added, since the case clearly demonstrated the importance of location for this role, i.e., a match between the more abstract parts of the role in tying together different actors and information as well as the physical. The specialist competence role was illustrated through several different observations such as competence in day-to-day use of complicated transport resources and modifying. An expansion into looking at types of specialist competences was not possible within the scope of the present study. The resource provider role added to the largely activity-based understanding in this dissertation through showing the importance of securing and utilising capacity in a system where substitutability is low because car transport equipment tends to be highly specialised. Finally the new organiser role built on a combination of seeing how Autolink was given scope in structuring some of the operations of the distribution system and the way other actors expected the firm to take responsibility beyond the formal contracts.

The proposed categorisation above answers Research Question 3a on roles. The discussion shows that the four functions from the functionalist literature broadly support four roles, but that these also include other elements for them to fit as roles here. The competence and risk carrier roles are quite well supported, with the competence role being more important. The risk carrier role is only relevant with regard to some of the smaller actors in the distribution system, partially because there are already good mechanisms in store for dividing the risk of damaging cars which is the main issue in this system. Where risk is not divided, insurance companies have the risk carrier role. The competence role is shown through the way customers use Autolink as a professional benchmark.

The 3PL literature supports the resource provider role quite well, and this shows the importance of strategic investments in resources for the intermediary to take on this type of role. Finally the organiser role is least supported by the literature and seems tied to the combination of extended responsibility with a non-title-taking intermediary. This is the closest to observing a new role not suggested by the literature in the case. The way roles are conceptualised here then suggests that each role is tied to one or two basic functions that have to be carried out in a distribution system for it to work with some degree of efficiency, but not all of these are necessarily useful in all distribution systems. For example, in all distribution systems the risk inherent in the system must somehow be shared among the

participants, but it is not given that an intermediary should carry all or the major portion of the risk.

9.4.2 Combining the roles

Answering Research Question 3b on the combining of roles raises some central issues about the proposed categorisation of roles. The fundamental issue is that in this categorisation, it is possible, and indeed expected that a firm can take on several roles, especially when these roles are considered in relation to a number of different customers or other firms. In this sense, the presence of Autolink in several roles in the same distribution system is not a problem for such a division of roles, and can be related to the concept of a role-set (Merton, 1957). That is, each role taken on has a justification in terms of customer needs or some fundamental economic purpose served, but it is expected that each firm serves several such purposes. The roles pertain to intermediaries because they are derived from a setting where we study a firm that is clearly placed between the manufacturers/importers and the end customer. Several of the roles are also closely tied to the previous literature on intermediaries, and the way they are tied together may show that although there is some fragmentation of the distribution system, some of the basic roles carried out are very much related.

In the present case, the number of different roles observed is not surprising for a relatively centrally placed firm with a mixed customer offering. Indeed, the very reason for picking Autolink as an object of study was its placement in relation to a number of quite distinct manufacturer systems, combined with its large and dominant position in the Norwegian market. Thus, finding a number of different roles for various customers is expected. The second part of this question is whether the roles are tied to each other – that is if Autolink simply takes on a set of different roles in different contexts, or whether these roles enable and reinforce each other. The latter is definitely the case in the empirical study.

The broker and hub roles are, in this case, very tightly knit together both in terms of the actual services offered (Autolink's ability to offer scale advantages through acting as a broker) and connecting the numerous small providers and customers in the distribution system. This is closely tied to the need to reduce the number of business connections that would otherwise be necessary. Because of the inherent dynamics – bringing together many customers tends to bring advantages of scale, bargaining power and reduce the number of business ties where there are significant groups of both providers and customers - this is likely to recur in similar settings. In this type of setting, we are likely to find the two roles highly dependent on each other. The large number of one or two person transport providers that carry

out transport operations with Autolink branding makes the hub role significantly more useful in this case. At the same time, we should not ignore the significance of being at one of the important transport hubs in the system – i.e., Drammen port which means there is a matching between the commercial and informational hub role and the physical hub.

The discussion of the resource provider role proved to give some interesting insights. The basic purpose in the role – providing resources the customers do not have was seen throughout. This went beyond simply providing services the customers do not themselves carry out, but it was also very clearly the case that the resources required and services bought reflected a fit with the resources of the customers, in particular the importing organisations. This had a clear historical component – for example, Møller has a unique resource situation with a facility at Oslo Port, and because of this, Møller has different requirements compared to the other importers studied.

Directly linked to the discussion of the resource provider role, the organiser role was seen as a new role in terms of the literature. We saw from the discussion that in many cases customers expected Autolink to take a more strategic responsibility for the operation of the system. That is, Autolink was expected to provide uninterrupted services despite outside shocks. The observed solutions to this were both making strategic moves to increase control, such as in purchasing a railway company, and information exchange in pointing out difficulties related to external shocks. Some of this was handled through managing expectations or cooperating with customers to find better overall solutions. These effects are of course confounded with the basic expectation of performance for Autolink as a service provider, and it shows a high level of expectations for a non title-taker in the distribution system. This may not be surprising considering recent developments in business, but it is very clearly different from its concept in the original functionalist framework. Since Autolink has no formal role in organising its suppliers, the nodes and control over the overall flow of goods, this is a new role and should be the subject of further study.

The remaining two roles of risk carrier and specialist competence were not as closely tied to others as the previous ones, but here too we see some strong ties. The risk carrier role is partially based on the specialist competence role – if Autolink's specialist competence as a distribution intermediary means it improves the quality of operations, then it reduces the overall risk in the system. The hub role is also tied to the risk carrier role since it allows Autolink to aggregate and absorb risk tied to short-term fluctuations in volume across its customer base. The specialist competence role seems quite fundamental in that any customer would expect an

intermediary such as Autolink to have high competence in the core activities it carries out – here exemplified by managing day to day operations of a large trucking fleet, matching incoming cars to transport resources and some added services such as modifying. This role is again closely tied to the resource provider role since naturally the specialist competence of the firm is typically tied to the efficient exploitation of large physical investments. There is, however, a clear distinction. For example, warehousing operations may not require the same degree of specialised competence as modifying, but it is even more heavily dependent on investments, in this case in warehousing facilities at the physical hub in Drammen.

Figure 9.3 below shows the main connections among the roles observed in the case. Note that this does not relate the roles at a theoretical level, but rather takes the links discussed above and illustrates these relative to the roles. The arrows used indicate particular connections rather than general theoretical links, and this also explains why there are arrows in several directions between some of them – they reflect different observations. This should be seen as an illustrative rather than a causal model. The implications are discussed below.

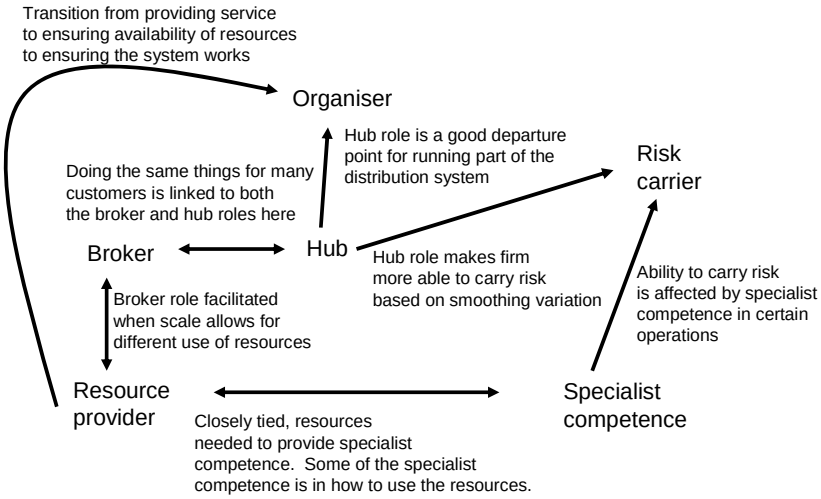


Figure 9.3: Connections between the roles from the case

The figure shows the six roles derived from the case and the main connections between them observed. Most of the connections have already been discussed above in answering research question 3b, but the figure can be elaborated upon. The resource provider and specialist competence roles seem to be quite basic in the case. There are specialist skills in core activities such as the knowledge of transport resources, scheduling and planning transports that are the basis of Autolink's activities. Without this knowledge, we cannot say that the firm would not exist, but we can say that it would present a very different set of activities. Similarly, the resource provider role is core to the way the firm operates, making investments in transport resources with limited alternative uses. Good use of the resources requires specialist skills, and the resources are themselves important in using the specialist skills. This, then, serves as a good foundation for Autolink and these roles can be observed for all the importers although they have not been equally emphasised in the discussion.

The next two roles, broker and hub are seen to be closely tied to each other. The general advantage in doing the same things for many customers is strongly present here – the more importers and dealers that buy services from Autolink, the easier it is to create scale advantages, the greater the power of Autolink *vis-à-vis* suppliers, and the stronger the hub role in absorbing variation. Since creating scale generally depends on investments (Chandler, 1977), there is a close tie to the resource provider role.

The risk carrier role builds on both specialist competence through improving operational effectiveness in the system, and through the hub role since this allows the firm to absorb some of the local variation. Even so, this may be the role that is the least tied to the others since there are many other arrangements in the system that handle the distribution of risk, not least of which is the insurance system for operational damage.

The "top" role in the figure, i.e., organiser, builds upon the hub role in particular since this gives access to information and means interaction with many other actors. It can be argued that most of the other roles feed into this role. The ability to organise a part of the system requires specialist competence, it can be based upon providing special resources (although it need not be), and it is facilitated by a certain scale. There are numerous possible connections to elaborate on, but the figure focuses on the most important ones tied to observations in the case.

The figure, although based on a particular case, does show some connections among the roles which may reflect more typical patterns. It is reasonable to suggest that the organiser role is a development where a service provider

performs well in several of the other roles, and then “grows” into the new role by taking on more responsibility.

9.4.3 Roles and types of actors

The section on roles is concluded with a discussion on the roles themselves beyond the specific research questions, since the concept of roles is at the core of the dissertation. The roles described here cover a range of concepts from risk to basic scale advantages. However, they do not cover all the possible roles for intermediaries since they are based upon a study of a single firm in a particular setting. The analysis here also focusses on roles with regard mainly to customers since the variation is in terms of car manufacturer systems or importers which are customers of Autolink. The roles are also relevant for other actors in the system such as suppliers in the risk carrier role, or most of the involved actors for the organiser role. Nevertheless, the focus on importers naturally creates a bias. Furthermore, in the setting there may be more roles for intermediaries covered by other firms. In terms of the discussion here it is interesting to go beyond the basic point that it is not possible to exhaust the possible roles for intermediaries since there are always further possibilities.

One point in particular is clear with regard to the type of intermediary studied here. The focal firm Autolink does not take title to the goods, and although it has made considerable investments in equipment it is essentially a service provider to the car industry. This means that it is unlike the type of intermediary in the older functionalist literature. These intermediaries would always participate in the title flow and take title to the goods. To quote Bucklin (1966, p.5) ”Most studies of channel structure can probably be resolved satisfactorily by study of title and physical movement.”

This statement reflects a different distribution reality to the one in the present study. Two points can be made in this regard. First, part of the reason we are able to expand on this literature can be tied to using a different type of intermediary from the ones described in the literature. That is, insights are tied to considering actors that would previously not have been included in the channel. Second, it is quite possible that a title-holding intermediary would show us quite a different set of roles. Put differently, it is possible that there is an important boundary between those intermediaries that take title to goods and those that do not, and that this is reflected in the types of roles they can take on.

The point that Autolink is at core a transport provider then shows us an underlying issue with regard to the conceptualisation of distribution systems.

In the traditional literature to which we refer extensively here, the distribution system or channel tends to be composed of only those actors that take title to the goods. Other firms such as transport providers are not completely ignored, but are not seen as important to the channel. It may be exactly this conceptualisation which now allows us to expand on the literature. In modern distribution contexts with high variety, the tasks carried out by this type of actors are changing and increasing in importance. To capture the features and importance of this type of firm, it then becomes essential to include this type of actor in the theoretical models employed to study them as well. That is, if this type of firm previously provided commodity-type services then their role was less important. However, as they take on more tasks especially within coordination, and the distribution system becomes dependent upon them, then it is much more important to include them in the distribution system conceptually as well. The final chapter in this dissertation will contribute in this regard.

Chapter 10: Contributions and Further Research

10.1 Introduction

This chapter serves a dual purpose. One is to discuss the framework and the study as a whole in order to contribute at a theoretical level. The second is to explore areas for future research. The chapter starts with a discussion of the interactions between the main blocks beyond the specific research questions in Chapter 9. Next, the concept of a position as a complement to roles is explored. The third part of the chapter returns to the concept of variety to explore more fully some of the tensions in the complex distribution systems studied here. Finally, areas for future research are discussed.

10.2 Interactions between the elements of the theoretical framework

As a consequence of the original problem statement, we explore the interactions or interplay between the main concepts in this dissertation. This is particularly the case between three elements; the distribution system structure, the coordination and the role of the intermediaries. As mentioned in the theoretical framework, the main motivation and interest are how features of the distribution system can create or give opportunities for intermediaries through roles, but all of the connections can be assumed to work both ways over time. It can again be stated that the division of the distribution system structure and coordination is useful for the present study. There are many alternative ways of representing the distribution system. Furthermore, the roles of intermediaries are also part of the distribution system, but are kept conceptually distinct. In this section, the interactions between structure and coordination, structure and intermediaries and coordination and intermediaries are discussed. Each of these is discussed separately, and some overarching comments are then made regarding the issue of bridging. Examples from the discussion in chapter 9 are used where relevant to guide the discussion which is also tied to the theoretical framework.

10.2.1 Structure and coordination

The structure of the distribution system guides the type of coordination that is required. At the same type, the structure is not independent of available and practical coordination mechanisms. That is, the presence or absence of

certain types of coordination can be a prerequisite for certain types of distribution system structure.

The impact of distribution system structure in terms of modularisation can be observed in car distribution. The coordination required when only limited additional modifications are necessary to produce the final product (cars), is also reduced (simplified) compared to a more modular system. The distribution system is capable of tracing each car from the factory to the customer, and it is not necessary to coordinate large modules that have to be assembled immediately before delivery. This simplifies planning of transport since most automobiles use the same resources for transport purposes. In contrast, if cars were assembled from modules located very close to the consumer, the timing and tracing of these modules would significantly complicate the system and probably require more detailed coordination mechanisms. On the other hand, we see that the combination of slightly different car sizes and different transport resources (adapted trailers) creates continual operational challenges. These are handled by the intermediary through considerable adaptability, but could also have been coordinated differently. A tighter integration of information systems for example, could probably enable more efficient planning to be carried out in advance. This efficiency, however, would only apply to the distribution within the Norwegian system. It is not clear what the global results would be.

The fact that this does not happen, is evidence of intervening factors, for example the considerable power of the manufacturers and reticence in releasing information to other actors in the distribution system. This is reflected by the division of activities between many actors in the distribution system. It can also illustrate the general point that a single structure will not necessarily lead to identical coordination in all cases, both because of other factors and because one type of structure may have alternative coordination arrangements that work well. A final point here is that a poor choice of coordination mechanism is not necessarily eliminated immediately even if it leads to poor performance over time.

The reverse effect is also seen in the empirical study. The implementation of coherent IT systems is an important enabler for Honda's regional concept, without which it would be considerably more difficult to make this structure work. However, these effects may not be as obvious as the effects going from structure to coordination, since they may simply mean that certain types of distribution system structures are not even considered because there are no workable coordination mechanisms available. The argument is, however, analogous to that found in the governance literature stating that valuable economic opportunities are only exploited if the governance

mechanisms to protect the participating parties exist (Ghosh and John, 1999).

These points can be made at a theoretical level, i.e., mutual adaptation which is one of the main coordination mechanisms in Thompson's framework makes it possible to handle reciprocal activities. In the case we see that the close contact between Autolink and some of the main manufacturers makes modifying or rebuilding work possible. Here manufacturer specifications (requirements) and Autolink's competence in modifying and their knowledge of the Norwegian regulatory system, lead to development of acceptable solutions. If Autolink did not have the trust of the manufacturers, this process would be much more difficult. More generally this illustrates the point that any type of technical development involving an intermediary tends to require inter-organisational cooperation, and operates to a different time-scale than the regular activities in the system. For the distribution system we can make the point that development in the system will tend to take place outside of the regular running of the system, but has consequences for other types of coordination. The development of technical solutions or new standards becomes embodied in the system itself and has consequences for coordination of pooled and sequential activities later (See e.g. (Dubois et al., 1999, Shimokawa, 1994)).

The selection of major transport nodes can have the same effect as technological development in creating important ties which affect day-to-day coordination for a long period of time. These effects may be of two types. First, the main nodes in the system tend to be fixed in the medium to long term, so that all involved actors in the system have to plan according to the existing nodes. Second, the structure of the nodes may also determine ways of coordinating. Whether the infrastructure is constructed so that all relevant distribution tasks are carried out at the same nodes or split between nodes clearly affects the route a product takes to the consumer and how this is coordinated. The facility at Drammen port in the case with the ability to carry out a number of additional services is a typical example of bringing together as many activities as possible in this regard.

A final point with regard to the structure of the distribution system and coordination is that structure can be defined at several levels. This is an obvious point to make with regard to various standards as a coordination mechanism in a distribution system. These can apply to a firm, industry or region such as Europe, creating overlapping standards that may not be fully compatible. In this regard, it becomes important what standardisation mechanisms (i.e. operating procedures, conflict resolution procedures) are used and which actor has established them. This means it can be useful to

view standardisation as more than a monolithic concept and trying to expand the concept in the direction of the dimensions of standards.

10.2.2 Coordination and intermediaries

The need to deal with intermediaries and the following inter-organisational issues was a main reason for considering the issue of coordination in this study. It is, therefore, of great interest what can be said about this issue in general. When considering coordination and intermediaries, the greater issue in terms of the problem statement, is how this creates opportunities for intermediaries (described as roles here). However, the issue of how intermediaries enable coordination is equally valid in the study.

It is impossible to avoid discussing the interaction of coordination and the role of intermediaries, since these are so closely related. This is part of the basic challenge of using an intermediary. The use of an intermediary reflects specialisation, and specialisation begets the need for coordination (Richardson, 1972). When this specialisation takes place within a firm (i.e., through specialised units), it is still possible to keep control using the firm's own control mechanisms. Access to the required information is relatively easy. When specialisation is spread across different firms, this can increase the efficiency of tasks both according to core competence thinking, and because tasks can be carried out at their appropriate scale (Richardson, 1972). The case illustrated that the framework used can be applied both inter- and intra-organisationally, and has described many of these inter-organisational coordination mechanisms. There was extensive use of standards to ensure efficient use of large investments in resources, planning or scheduling to deal with the transport links and modification processes, and some mutual adjustment in development tasks. However, there was also evidence that the inter-organisational setting made this type of coordination significantly more difficult. Standards established for different manufacturer systems carrying out similar operations, were not necessarily compatible. Information was not passed on early enough for all parties to plan optimally in terms of their own systems, and indeed the interfaces between the different firms were quite obvious, especially when viewed from a distance.

Some efforts were being made to overcome these problems, partially in terms of defining information requirements, and partially in establishing IT platforms allowing for more seamless data transfer between different firms, in particular between Autolink and Møller. This reflects the two most obvious ways of improving coordination in the system studied. One is to create compromises between the different manufacturer standards, either through finding lowest "common denominators", which in this case would actually mean finding standards that are acceptable to all manufacturers, or

through defining a third party standard that is acceptable to all manufacturers. The second main improvement is to increase the integration of IT systems, providing early information flows to the different actors, allowing them to plan activities more easily. It should be noted that the most likely obstacle to this is not the actual development of IT systems, although this has presented considerable difficulties, but gaining access to the right type of information at an early stage. That is, it seems clear that there is information available at an early stage that would be useful for all actors, but this information is not necessarily released by its holders.

On the other hand, intermediaries and their impact on coordination are also very much present in the study. In the study we considered the existence of appropriate coordination mechanisms as an important enabler for the use of intermediaries, but also found that the intermediary itself served a crucial function in enabling compromises between the standards in the different systems. Generally, these compromises were tied to familiarity with the standards and developing operating procedures consistent with different manufacturers' systems. However, it also involved policing the standards, finding ways of working around inconsistent standards in order to still achieve economies of scale and scope, and finally in limited cases having importers adapt their own standards. It seems clear that a third party or intermediary in this case, is much better placed to propose and find such compromises than the manufacturers themselves. This is in part a function of the intermediary having to ensure compliance with all the different standards on a day to day basis, and in part a function of the structure of the distribution system. That is, manufacturers or their importer representatives are in direct competition with each other, and it may not be so easy to either obtain the required access or to find compromises that are seen as neutral. The intermediary on the other hand is clearly a third party, and although it has its own interests, these are less likely to be seen as favouring a particular manufacturer.

Conceptually, working across the different standards can be described as achieving similarity on certain parameters as described by Alderson (1957, Alderson, 1965). In the discussion above we are mainly dealing with handling operations, i.e., certain activities to be carried out in the same or similar ways. A second main way of achieving similarity in the system is the use of certain central nodes or locations throughout. This naturally forces the flows together and makes it much easier to achieve scale. Clearly, this is not fully tied to intermediaries, since the location of central transport nodes in the system is tied to the huge costs of infrastructure, but it is also the case that certain other intermediaries in the system, such as shipping companies, operate on a set of nodes which are difficult to change. Even car manufacturers normally have to accept these as given, although as we saw in

the Honda case, certain large manufacturers, such as Toyota, may change the node structure. For smaller manufacturers, however, much of the node structure has to be accepted even for the long term.

In the Norwegian system, the challenge is to determine the local nodes in such a way that they fit with the European system and also work well with regard to the various destinations. For the intermediary, the challenge can be to obtain acceptance for using certain nodes or locations in a local system. Whether the nodes are determined by the intermediary or others, physically occupying them can in itself be an advantage, since it can mean that the intermediary is physically well placed to receive the different manufacturer flows. More generally, we can make the point that for distribution systems where large specific investments are necessary in terms of facilities, then the placement of these becomes part of the coordination of the system (see e.g. (Jahre et al., 2006)). The coordination decision is then made long-term and constrains the options for short-term coordination. Effectively this can be thought of as a matter of economies, for example the benefits of good use of a specialised storage facility outweigh the desire for all actors to be flexible in daily operations, so the facility is placed at a central location and managed according to a strict set of standards.

10.2.3 Structure of the distribution system and intermediaries

The structure of the distribution system and the roles of intermediaries represent a main link in the dissertation, both in terms of the theoretical framework and the empirical study. The premise of the basic problem statement is that the structure of the distribution system is expected to create or destroy opportunities for intermediaries and their roles. This is a main incentive for the study, but there are several additional points. First, the structure of the distribution system as presented here, is only a subset of the "the distribution system" as a whole and deals primarily with hybrid distribution, customisation and modularisation, and postponement and speculation. Second, over time the reverse effect where intermediaries enable certain structures in the distribution system is also expected to be strong. This was not expected to be as obvious in the case, since the influence seemed more likely to act over time – i.e., certain distribution arrangements can only be chosen if certain intermediaries are in place. This is, of course, also a matter of causality, in that the study is not designed to investigate the direction of the main connections in the theoretical framework.

However, the role of intermediaries in enabling different distribution arrangements was actually quite clear along certain dimensions of the case, particularly in terms of enabling different degrees of postponement and

speculation for the different manufacturers' systems. Some of the variation in structure between the different distribution systems did not seem to have great effects on the intermediary. For example, the features of the car in terms of transport are identical whether it is built to order or made to stock. Likewise, the modifications that Autolink carries out tend to be on the "outside" of the regular manufacturing system, dealing with additional features that are not handled in the basic production process. In this sense the effect of postponement and speculation in the system is only seen indirectly through the frequency of transport requirement changes of some of the manufacturers.

The number of specialised tasks in a distribution channel is a major issue in the literature Many firms have a limited number of tasks resulting in the need of many actors to complete the distribution. Sometimes tasks are divided between different firms for legal reasons – i.e., the inspection of cars is often carried out by neutral third parties. Much of the specialisation is related to the division of tasks among participants in the distribution system, so that there are many specific tasks requiring separate capabilities. Many of these tasks benefit if an intermediary can execute them together with similar tasks from other systems. As a result, increasing specialisation favours the use of intermediaries. Successful bridging of different distribution systems is one example of how pooling can result in advantages of scale and scope.

The observed increased use of intermediaries favours the use of additional intermediaries, i.e., specialisation begets more specialisation. An obvious example is 4PLs, developed to control the flow of goods in a distribution system through negotiating and organising other intermediaries. This dynamic creation of opportunities for other intermediaries is restricted, since there are limits to how many firms can usefully contribute to a distribution system. However, it is not yet obvious if this limit has been reached in today's distribution systems.

The trend towards specialisation is at times overshadowed by other concerns. For example, the case where several manufacturers prefer to deal with a "one-stop-shop" and regionalisation of their logistics and distribution needs. Thus the trend does not address exactly how the tasks are carried out, but rather the cost and convenience to the manufacturer which is dominant in the distribution system in dealing with a large number of small players, even though these may achieve some economies of scale in very limited domains. This presents an interesting challenge for intermediaries, since in order to operate effectively, they must both achieve volume in very specialised tasks, but also have a broad enough geographical coverage and service offering to remain an interesting supplier to the manufacturers. The "menu" approach offering some basic common services together with investments made to

offer additional services to different customers as needed, may be seen as a consequence of this. The combination of different roles and the way these are combined may also be tied to the need to both offer specialised services and meet other demands. This is not to say that all intermediaries must offer such a broad range to be successful, but that this is one way of achieving success for an intermediary.

Referring back to the case discussion we may raise two final points. First, the overlaps in the system (many manufacturers using the same shipping companies and the same large car ports, resulting in congestion and limited flexibility at some of the largest nodes), mean that third parties have to be able to handle a system where there are a many changes and where planning horisons are quite short. Shipping companies are dependent on large car ports like Bremerhaven with very large volumes and little scope for giving extra service for individual cars in this part of the system. This in turn means that other third parties, such as Autolink, must be adaptive, or agile in a broader sense (van Hoek et al., 2001). This means that the system can handle the additional flexibility needed for a make-to-order system. Second, this is achieved because regardless of the exact product in terms of customisation, the cars generally use the same distribution resources to reach their destination. This is certainly tied to the nature of the product. A car is sufficiently costly and large, so that tracking single cars does not incur excessive additional costs, and is also legally required in most countries. Therefore, although there is a need for many control points and checking lists of cars, the early requirement of customer identity in an MTO system is relatively easy to achieve. For a different and smaller product such tracking might be more difficult and perhaps not as relevant. In PC distribution, for example, assembly typically takes place much closer to the customer making the components interchangeable until a much later date.

The PC case is apt because it is a clear example of an industry where many different distribution methods are in use (Curry and Kenney, 1999). Traditionally, this has not been possible in car manufacturing because the assembly plant has provided the largest volume of work. None of the systems studied here have significant assembly as part of the distribution system (although the manufacturers are known to experiment with this). There are, however, several examples of making modifications in the distribution system. Both making modifications in the distribution system and changing orders during production are compromises. There may be production advantages in this type of model. Even so, it seems clear that one of the main effects of such compromises is to overcome some of the inherent shortcomings in the MTO or the PFS system.

In this sense we can say that a fundamental issue is whether elements of the firm strategy or other factors reflected in the structure of the distribution system, are only relevant to the intermediary if they impact on crucial variables for the intermediary. In this case, whether a car is going to storage or to a customer does not change the distribution tasks, but merely the destination. Whether or not the car can be handled and transported together with other similar cars has a large impact, since the efficient use of transport resources is a core business for the intermediary.

This can also be related to hybrid distribution. In general, we can say that where the intermediary is able to or allowed to create similarities in the distribution services it provides to several firms, this presents an opportunity for the intermediary. Where regulations or other considerations such as firm strategy or standards makes this impossible, such opportunity is limited. This point is discussed further in the next section.

10.2.4 Bridging and the levels of analysis

The dissertation has in several places referred to the concept of bridging without developing this as a theoretical proposition, but rather kept it as part of the discussion of certain types of roles, and of how an intermediary can fulfil these roles by encompassing different distribution systems. The discussion can, however, be further developed by looking at the discussion of several levels of analysis in the method chapter. Viewing the distribution system from three different aspects: a) distribution in Norway as a whole, b) distribution as seen by the manufacturer and, c) distribution as seen by the intermediary, we can to some extent give a picture of how this bridging comes about. In short, we can say that the function of the local system is aided by any actor being able to bridge the different manufacturer systems. This is often done by intermediaries. This is not to argue that only intermediaries can do this, but that we observe intermediaries bridge the systems effectively.

We can, therefore, say that we have found that many of the core activities of the intermediary were dependent on their acting as a bridge between several different distribution systems. That is, each manufacturer's system comes with its own rules and regulations. In the study, these rules and regulations primarily pertain to the handling of cars and PDI operations. This may be considered a limited set of activities, but it is absolutely fundamental to the flow of new cars through the system. We observe a number of new car flows, and it is the ability to bring these together that creates opportunities for the intermediary. This could be likened to pooling flows of goods from different sources in order to obtain volume. This is different from simply buying from different suppliers in that the intermediary firstly does not own

the goods and, secondly, must contend with different standards and working systems on a daily basis. Consequently, the different importers do not only have different standards dictated by the manufacturers, but they also have completely different schedules and sometimes ordering systems, which means that the flows are not identical even if they employ some of the same core resources during parts of the flow. We do not argue that this is unique to car distribution, but it is nonetheless a defining characteristic of the setting.

In terms of the intermediary itself, this implies that it must develop capabilities that enable this bridging. Such capabilities are seen in the study to involve a good grasp of the different standards that must be followed, as well as good working relationships with the customers to enable negotiation in terms of the standards where applicable, and the ability to deal with a relatively limited planning horisons because the bridging is done without control of the overall flow of cars. Much of this is done through the coordination of the flows and how standards are handled, which will be discussed below. However, we can also say that this is only one particular way of handling the bridging.

An alternative way of handling bridging would be for the intermediary to use its knowledge of existing standards and understanding of its own needs to develop a good compromise solution. It could then offer the manufacturers a common solution. This could improve the efficiency of the local system, since it would cause consistency in operations whilst being formed as a compromise between intermediary and manufacturer requirements. If the standard and quality of operations are sufficiently high, the gains would probably outweigh disadvantages for those manufacturers with the most exacting standards having to accept the common standards. The operational gains could also potentially benefit manufacturers with less exacting standards. The challenge for these would be not paying extra for a higher standard than they require. These benefits are currently difficult to achieve because the manufacturers are very strong in the distribution systems and will probably not accept an intermediary standard at a particular location. This does not mean that such standards cannot be introduced in the system by larger intermediaries. We should also be aware that superior performance in a local system by following a standard more adapted to the operations of an intermediary, is not necessarily realistic for the manufacturer, if this implies conflict with universal standards. In this sense, it may not be rational for the manufacturer to accept a different standard for an isolated part of the distribution system, even if this could lead to more efficient operations and lower prices.

10.3 Position

The last section discussed bridging and showed the importance of understanding how an intermediary is placed in the distribution system as a whole. In this section the concept of "position" as relevant to this study and to the theoretical realm, is discussed. The discussion of roles showed that understanding the basis for some of the roles was dependent on knowledge of what the intermediary does for several counterparts in order to gain an understanding of why it was able to fulfil the role well. Both the hub and organising roles in the discussion were characterised by a need to carry out the same tasks for many customers in order to be valuable. This, however, is only an expansion of the role concept, and the purpose in this section is different. A role describes a need or an economic function served with regard to one counterpart. The concept of position as used here refers to the intermediary in the distribution system as a whole. That is, using roles to describe a firm gives a good understanding of its capabilities and economic purpose, but only indirectly shows how the firm fits into the distribution system as a whole. Understanding the position of the firm in the distribution system as a whole requires a broader background if we are to say something meaningful about why a firm is successful or not.

The challenge is then how to describe a position in terms of the distribution system as a whole. Here we suggest that this can be done through the three main theoretical blocks employed in this dissertation; the structure of the distribution system, the interdependencies and coordination, and the roles taken on by the intermediaries. That is, the building blocks of a useful concept of position can be found within these theoretical blocks. This means that the definition of a position is affected by how the distribution system is conceptualised here, and therefore clearly a theoretical contribution.

The framework in this dissertation has primarily been used as a tool to describe the variation in contemporary distribution systems and the ways these are coordinated as a means to explore the roles of the intermediaries. It seems evident that the elements of the framework are relevant for describing a position. Thus each part is considered in turn in order to determine what parts are most relevant for the concept of a position. This also enables reference to existing conceptualisations of position in the literature. The basic assumption is that the three blocks used to describe the structure of the system and relate this to intermediaries, will also be relevant when developing a concept for positioning an intermediary in the system as a whole.

The definition depends on the activity structure in the distribution system, the choices of other firms in the system, and the existing capacity of the firm. In the following discussion we deal with two aspects of these theoretical blocks. One is how the theory can be used to describe a position for a focal firm which is viewed as an intermediary. The second is to consider how this affects opportunities for the intermediary. This is a first step towards exploring the question of what features can define a position. Ideally, a concept of position should also say something about the strength of a position, but this requires a clear concept of position to start with.

10.3.1. Distribution system structure and position

When describing the position of a single firm, the organisation of the distribution system is a key consideration. This is both because it says something about what positions are possible, and also because position as a concept has no meaning if it is not connected to the particulars of the system it is a part of. The three main aspects of system structure as discussed were hybrid distribution mainly in terms of multiple channels, modularisation and customisation, and postponement and speculation. Each of these has relevance to position.

Hybrid distribution is a description of a channel structure where each channel represents one way of reaching the customer, i.e., franchised outlets, internet, retail stores and so on. It is the increasing number of different channels combined with increasing fragmentation of customer demand that make hybrid distribution interesting, since it is a way of reaching more customers or serving existing customers better through multiple channels. However, it often becomes difficult for one firm to support all the activities required to keep these channels in-house. This is firstly because different channels require different skills which may be difficult to develop within one firm and, secondly, because achieving sufficient scale in the myriad of activities required by many channels often becomes difficult without subcontracting many firms. As seen in Chapter 2, this argument makes it quite logical that intermediaries will take on many of these tasks. It can be asserted that the more complicated such a system is, the more potential opportunities there are for intermediaries, and so a good description of the system in terms of the channels used, is a first step in describing the position for a single intermediary. Furthermore, it is of particular interest how much control the intermediary is given in these channels – i.e., does it simply deliver services necessary for the channel to operate or does it actually control the channel? If the intermediary controls the channel, it is reasonable to assume that it has more contact with the customer and obtains more control and a stronger position.

Modularisation and customisation are closely related concepts. Modularisation is a way of structuring both the manufacturing and the distribution systems in order to enable greater customisation to meet end-user requirements. This can also have relevance to distribution intermediaries, especially when it means that assembly tasks are moved to the distribution system rather than to the manufacturing system. When modularisation takes place for a product, this affects the activity structure for making that product, which in itself can either create or destroy opportunities for intermediaries. This concept may not be as relevant for position as the other two parts in this section, because it may only be indirectly reflected in the channel. However, if the intermediary is important in making a modular system work, i.e., in assembly of the final product, then this can be important for describing the position. This suggests that the theoretical block can be very important in some cases, but in systems without extensive use of modular concepts it will be less relevant.

Postponement and speculation have been explored extensively in this dissertation. Although it should be clear that the different blocks in this section are closely coupled and cannot be separated in a real system, for discussion purposes, the main effect of a move from a speculation to a postponement-based system is an increased need for flexibility and reduced buffers. This increases the demands both on the manufacturers in the system and service providers such as intermediaries. Combined with the previously mentioned structural elements, i.e., the structure of channels, modularisation and customisation, this greatly increases the opportunities for those intermediaries that can deliver. The requirements in terms of timeliness and accuracy are increased by all the elements – the more channels that are used, the greater the degree of postponement, and the more exact the customisation. This presents a difficult working environment, but it also presents the chance to create a strong position for the intermediary. The degree of postponement and speculation in a distribution system then may show important aspects of a position and is part of the description of the full system. This describes the importance of the intermediary and thus the strength of its position. In a speculation-based system where an intermediary holds inventory, for example, this will be an essential part of its position.

An aspect of the three theoretical concepts discussed above, is that they reflect the variety in the distribution system and the variety offered to the end customer. The latter can be tied to a second approach to position which is found in marketing, which is also very much oriented to the end customer, segmentation and finding the appropriate features for a product (Bennion, 1987, Mühlbacher et al., 1994). This is highly relevant in terms of variety in consumer preferences being an important driver for the variety in the rest of

the distribution system. However, it does not seem necessary to include this in position as a concept, since it would expand it well into the realm of consumer behaviour. At present, it suffices to say that marketing literature is available if the concept of a position is to be expanded further, and that it can give a great deal of insight into the nature of variety in consumer preferences. This is the reason for not exploring this definition of position further.

A final comment in terms of structure is that the three main elements discussed above do not cover all eventualities. That is, there may be other significant elements such as legal restrictions, or the influence of dominant firms which override some of the economic logic. For example, it may be advantageous to separate activities between actors in terms of the structure of a distribution system, but a dominant actor may choose to keep this in-house for strategic reasons. This type of information may be a necessary complement to the system structure, but it should not change the basic conception of position as used here, since this cannot be all-encompassing and is built on the theoretical streams identified in the literature review.

10.3.2 Coordination and position

The first section on structure has described three main areas related to position. It is important to separate this from the overall discussion in the dissertation, since the main themes are the same but the implications in terms of position are made specifically for the purpose of exploring the concept. Likewise, for coordination the main themes have been discussed in the theoretical framework, while only issues with relevance to position are explored in this section.

Coordination was described in the theoretical framework through activity interdependencies (pooled, sequential and reciprocal) and matching coordination mechanisms (standards, planning and mutual adaptation). This framework is also relevant for describing position. However, regardless of how coordination is formulated, there are two underlying issues that describe whether or not there are significant opportunities for an intermediary. One is that the coordination mechanisms used for the intermediary's activities, offer or curtail opportunities. For example, if a distribution system has a strong focus on planning, this may restrict an intermediary's opportunities to use its competence to make certain parts of the system work better. If the intermediary did not have this quality, as we have seen in the Chapter 2, there might not be a need to use an intermediary for these activities at all. Thus, the way the system is coordinated might reduce opportunities for intermediaries because they are not allowed to fully exploit their strengths in order to fit in with the coordination of the system as a whole. This need not

even imply that the system overall works better if the intermediaries are given more autonomy (although this is a possibility considering the arguments above), but only that their opportunities are reduced. For an individual firm this does not mean a lack of a position, since by definition the firm has a position, but it might determine how many intermediaries are successful and how well they can defend a position.

A second and related issue is that the need for coordination is increased in more complex systems, and the intermediary can base its position on being able to deliver this coordination. This can mean a wide range of tasks from simply taking over activities which have a high coordination component, such as keeping a transport network flowing, or specifically obtaining authority to coordinate others, as exemplified by 4PLs in the literature (Selviaridis and Spring, 2007). A possible paradox in a system with increasing specialisation is that the efficiency gains due to specialisation, may be lost if excessive coordination is required between the firms carrying out different activities. In this sense, it may not always be advantageous for a manufacturer to maintain control of all the coordination required to keep the distribution system running.

Indeed, the appropriate choice of structure and coordination mechanism may depend upon the availability of intermediaries with the requisite skills. If the entire distribution system is based on the ability of an intermediary to coordinate major sections or to manage the difficulty of coordinating others, then this is the basis of a strong position for the intermediary. The difficulty in having others carry out coordination, may be tied to the issue of independence, i.e., many firms may want to have an independent firm taking care of coordinating part of the distribution system because they do not trust competitors to carry this out equitably. A typical example of this is a common service where each of the users is too small to achieve advantage of scale on its own, thus making it better to use an intermediary. This is based on the assumption that the intermediary is better placed to make decisions that are good for the system as a whole rather than for example a specific manufacturer.

These arguments are similar to those made for intermediaries and roles, but here they serve to say that intermediaries can be important in coordination by being third parties. Whether intermediaries are central to how the distribution system is coordinated or whether they are heavily curtailed by it, is a central pillar of the position in the system. In terms of defining position, however, what we need to know is implied by the discussion above. First, the types of activities and general ways the system is coordinated, is important. This will also show whether or not intermediaries generally have to adhere to coordination in the system carried out by others, through for

example following a master schedule developed by the manufacturer. Second, if the intermediary is given the opportunity of coordinating other firms and a part of the distribution system, this is an entirely different positition.

10.3.3 The roles of intermediaries and position

The two parts discussed so far, the structure and coordination of the distribution system are, of course, artificially separated, since the structural components and coordination are both part of the distribution system. In the same way, the roles of intermediaries are also part of the distribution system because intermediaries themselves are part of the system. However, compared to the two previous parts, roles as used here, say much more about the intermediaries themselves and less about system structure. The concept of a role as used here refers to fulfilling a specific need or delivering a related economic benefit for a specific customer. When talking about roles in the context of position, we should be aware that the range of roles is most likely wider than what is shown in this dissertation, since this only studies one particular intermediary in one limited context. The exact roles available will depend on the setting and the firm studied. Likewise, the concept of a position here is deliberately limited to intermediaries in distribution settings, since this is the framework under discussion, but it should be feasible to expand this to other settings such as inbound logistics (i.e., raw materials or components to factory rather than factory to retail) and to other types of firms. Here it is natural to start with a concept of position described in the literature and type of firms studied in the dissertation because a wider concept would require a wider theoretical framework.

The basic idea of a role will remain the same for other firms or settings. A role essentially describes what a firm does to fulfil others' specific needs. Roles may reinforce each other as we saw in the discussion on multiple roles, but it is the sum of the roles possessed by the intermediary in a distribution system that establishes its position. In a very broad sense this may be used to describe the economic contribution of the firm to the distribution system. This is similar to the firm's capabilities, but with the caveat that it only pertains to what capabilities other firms are currently using. That is, using the role concept will not give us insight into redundant or spare capacity of the firm per se (unless new roles are defined with specific relevance to this), but it gives a very good picture of what the firm actually does at the time. Including this in a position definition is useful for making the definition of a position not only dependent on others and structural factors, but also on the firm itself. Some of the role definitions work across systems, but even the organiser role is limited to coordinating specific other firms. In this sense, a wider definition of a position may give

us additional insights beyond those given by the role concept. Just using the role concept in this context is insufficient, because it does not encompass the overall system and coordination, underlining once again that in order to describe the position of a firm in a system we need all the three blocks defined.

Since roles are defined in terms of other firms, it is relevant here to bring in a final concept of position as used in the industrial network literature; "… the concept of network position is used to describe how the individual actors in the network are related to each other in a network structure." (Johanson and Mattsson, 1992, p.205). In other words, it is the business ties between the firms that define the position. Mattsson (2003) also points out that the concept includes both the firm's internal resources and access to external ones.

We also see that the purpose of the network definition is similar to that in this dissertation, i.e., placing the firm in a context and dealing with the structure of a system. However, the means of doing this are somewhat different. The industrial network position approach is more structural relying more on the actual network of actors, whereas, in this study, it is the features of the distribution system including coordination mechanisms and the firm's capabilities and needs served through roles, which are central.
Although some of the underlying assumptions are similar in the network approach and here, there are also significant diffences. We do not here employ the structural aspects of the network definition of a position fully. Rather, the importance of roles in terms of specific other firms can be included in the definition of position. This does not require a full description of a network picture, but an overview of the most important customers and roles for a focal firm. This allows for a better understanding of bridging and roles. Using this concept of a position, the roles used in this study become part of the definition.

10.3.4 A preliminary framework for position

Each part of the theoretical framework has contributed to the understanding of a position as defined in this section. We have also seen that although each of the parts gives important insights, they are not sufficient in themselves and must be complemented by the others. Using all three parts of the framework, the basic organisation and coordination of a distribution system can be shown in light of how intermediaries contribute to the system through roles. This concept of a position points to two main issues.

First the opportunities for intermediaries are based on many factors with some more important than others. This also means that what may be an

opportunity for one intermediary may not be so for another. The discussion here has focused on some of the most important elements in creating opportunities, because this gives more meaning to the concept of a position. That is, in a distribution system that relies heavily on intermediaries and gives them substantial room to develop their expertise, there may be many strong positions for intermediaries. However, the definition here and the ultimate relevance to a position is that a firm occupies one position, i.e., when talking about a specific position here, we are talking about the actual position of a firm rather than its opportunities.

Second, each position is likely to be unique, though this is not a requirement. It is very unlikely that another similar intermediary in the same distribution system would have exactly the same combination of roles or capacity for taking on roles. Having a unique position does not, however, mean that the intermediary cannot be replaced, and simply describing the position in terms of the elements discussed so far, is only a start. An interesting further development would be to say something about the strength of a role, i.e., how easy is it to replace the intermediary with a competitor? This goes back to the discussion on opportunities for intermediaries, which revealed that both aspects of the distribution system or coordination may be important for a firm's position, and that the strength of a position can vary. For example, there is nothing in this definition of position which says that an intermediary cannot take on a poor position.

Figure 10.1 below shows a representation of the most important elements of this definition. This should be treated simply as a summary of the most important elements for describing a position.

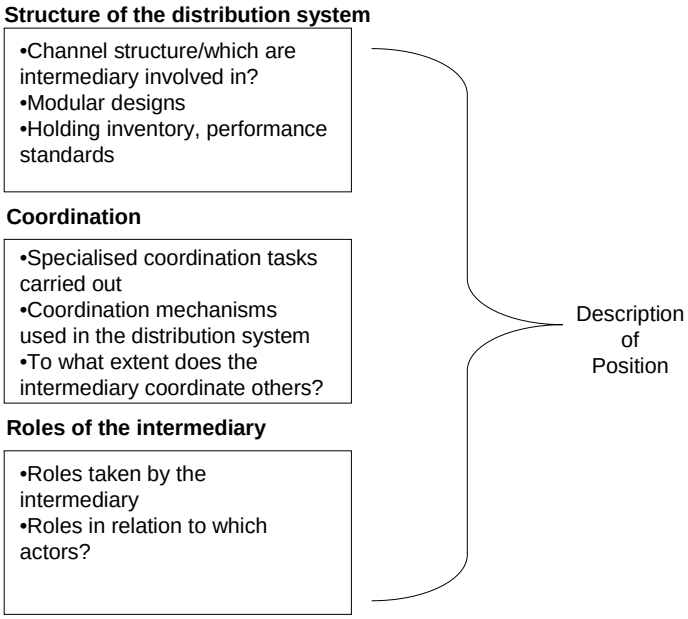


Figure 10.1: Components of the position concept

This figure represents the position of a particular intermediary and the description itself may say something about the strength of a position. The argument here is that the description of a position is largely dependent on the items in the figure. The following discussion elaborates on the relevance of the elements in the Figure 10.1.

The definition of the position as defined by the elements above, places the intermediary in the distribution system as a whole and shows which aspects are most important in defining this position. It is important to show the channel structure of the distribution system in terms of which channels are involved and whether the intermediary actually controls any of these channels, since this may give access to the consumer. The existence of modular designs may or may not be important to the intermediary, but we should know whether such designs are used in the distribution system. It is also important to know whether the intermediary holds inventory, and what types of performance standards it is subject to. These variables show that it is almost as important to know what parts of the distribution system the intermediary is not involved in, as to which ones, it is involved in.

In terms of coordination we must know the types of tasks carried out in order to be able to say something about the relevant interdependencies and coordination mechanisms. It is of great importance to know whether the

intermediary is responsible for coordinating other firms. Finally, in terms of roles we would want to know what roles the intermediary takes, and significantly for which customers. This framework for defining a position builds heavily on the discussion in this dissertation and should be considered a first step.

Based on the discussion of position as defined here it is possible to take the definition one step further to suggest a preliminary framework for the strength of a position. This must be seen as a first attempt at a model based on the previous discussion and inspired by the empirical study. Figure 10.2 below shows the proposed model.

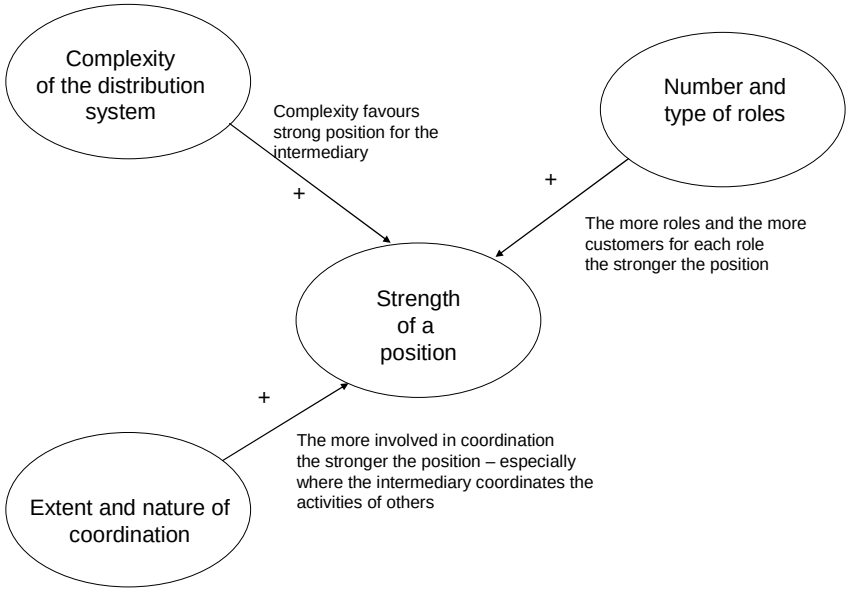


Figure 10.2: Strength of a position for an intermediary

The model focuses on the main effects from the previous discussion. For the purposes of this first effort only the most important effects and those that have a positive bearing on the strength of a position are included. Negative effects as well as reverse effects where the strength of a position influences the roles taken on are possible, but in the interest of reducing the scope of this first model these are not included.

The effects in figure 10.2 can usefully be summarised here. The complexity of the distribution system affects the strength of a position. In general, we would expect that the more complexity there is in the system, the stronger

the position of an intermediary is. A distribution system with high complexity will tend to have more specialisation, and through this creates more opportunities for the intermediary. Since a highly specialised system may become even more dependent on its specialists, this favours a strong position.

In terms of roles the argument is relatively simple. The more different roles the intermediary can fulfil, and the more customers it fulfils these roles for, the stronger the position. This may seem an obvious conclusion, but there are important additional points to be made. The ability to fulfil many different roles is an advantage in this model, and as such runs counter to core competence arguments that favour concentrating on a smaller number of activities. These arguments can however be reconciled if many roles can be fulfilled using the same basic resources or capabilities. It also means that it is not just a matter of accumulating business since the argument would also be that having a complex set of roles spread across several customers gives a stronger position in the distribution system than a simple set of roles for one customer giving the same amount of business.

The extent and nature of coordination can mean two quite different things here. First, the extent to which the intermediary is involved in coordination, perhaps due to specialist skills in this area will tend to strengthen its position in a distribution system. This argument is the same as for any other specialist skill, with the added perspective that increasingly complex distribution systems are increasingly dependent on good coordination to function. Second, if the intermediaries are responsible for the activities of other actors and so in essence take on responsibility for organising a subset of the distribution system, this will strengthen their position further. It may still be quite possible to replace the intermediary, but the additional complexity in coordinating other actors means that this can be quite a difficult task.

This alternative approach to defining position represents an expansion based on the theoretical framework used here to discuss roles. This gives both an added dimension to the discussion of roles, and a wider perspective on how intermediaries fit with complex distribution systems. The concept of position as used here is seen to overlap somewhat with existing concepts in the literature but only certain aspects of these were seen as relevant in terms of the present discussion. The final discussion on the strength of a position should be seen as a first step to identifying the most important aspects of the position concept for the success of an intermediary.

10.4 Variety revisited

A mainstay of this dissertation has been showing the variety of distribution systems, and how this affects a particular class of firms labelled intermediaries. It has been central to the dissertation to view variety as a positive factor. One of the main transitions from more traditional distribution systems has been that customers in modern business contexts demand more variety. Moreover, firms have found ways to increasingly satisfy this demand. This in itself is, of course, positive since it means more of customers' needs are fulfilled. Whether this increasing variety in demand is inevitable or not, is beyond the scope of this dissertation. The focus here has been on how distribution systems have adapted to modern contexts with considerable variety in demand. We have discussed multiple channels, hybrid systems and adjusting the balance between postponement and speculation as core ways of dealing with customer needs. In addition, the roles of intermediaries, enabling these systems to work, has been discussed in some detail. Since this dissertation focuses on distribution, the point was made earlier that the channels through which a product is provided is also important to the consumer.

The literature on this subject, often presents modularisation as a panacea for reducing costs, while at the same time serving varied customer demands. This may be combined with postponement to avoid obsolescence costs and to meet actual demands. The complexity in such a system is partially handled through the use of intermediaries to carry out a range of tasks. This leads to a coordination problem which is partially overcome through the use of intermediaries themselves in order to coordinate parts of the distribution system. In sum, the focus has been on explaining how distribution systems have adapted to customer demands.

There are, however, limitations to all these adaptations made to meet varied customer demands, and going into these more deeply may offer further theoretical insight. This is a matter of exploring the constraints in the systems described more fully, as well as considering the costs tied to them. This may be called the costs and limitations of variety. The purpose here is not to invalidate the usefulness of the type of distribution system used to handle variety, but rather to more fully show the tradeoffs needed and to be more specific about the limitations inherent in these.

10.4.1 The costs of variety

The costs of variety are the extra costs incurred in providing greater diversity to the customer, or meeting the customers' preferences for product options and variety in distribution channels. These costs are initially incurred by

either the manufacturer or other members of the distribution channel, for example intermediaries, but they are ultimately borne by the distribution system and the customer. The question of whether all such costs can be passed on to the customer is dependent upon the customer's willingness and ability to pay for the cost of variety. However, it is determined by factors beyond the scope of this dissertation, and, therefore, the exact division of costs will not be focused on. The dissertation will instead focus on the additional costs needed for successful adaptation to variety.

There are three main elements to cost when dealing with increased variety: manufacturing costs, the costs of maintaining multiple channels and channel conflict costs. The first is the increase in manufacturing costs to support large variety. Manufacturing costs are not directly tied to the distribution system but are closely connected, and when talking about variety in general, represents an important cost. Some systems are able to overcome this to a certain extent. For example, in the literature on lean production, much of the focus was on the ability of certain manufacturers to provide more variety at lower cost through organising manufacturing and distribution differently (Womack et al., 2007). However, what this literature is saying is that a particular (lean) type of manufacturing and distribution system can deliver more variety to the end customer less expensively than traditional mass manufacturing. Three more limitations are relevant in this literature. First, the distribution system does not make use of many different channels so there is little variety in channels. Second, the variety in product choice which is the main feature of lean system manufacturing is made within the context of a limited menu of features. Other authors have suggested that allowing excessive variety has created problems in the car industry, which is exactly the same as the initial lean literature described (Schonberger, 2007). Finally, lean system manufacturing is dependent on relatively constant volume and planning processes. This is not, however, criticism of lean systems in general or the literature on lean systems. The issue is rather that increased product variety itself has attached costs, not all of which can be overcome if the variety is sufficiently large. Systems that do provide substantial product variety cheaply may be efficient, but for any such system the argument could be made that reducing variety would probably lead to some reduction in production costs. We are, of course, aware that production costs are not the only issue in such a system, but in terms of the cost argument, this is an important point.

A second argument with more relevance to distribution itself is that where multiple channels are used to reach the customer, this creates additional costs for maintaining the extra channels. Operating both direct and indirect channels, such as an agent network, franchises, online purchasing or a presence at online auctions, represents costs which may not be negligible.

Indeed, this is part of the reasons why intermediaries have a role to play in the distribution system. Specialists which carry out certain limited tasks efficiently, help firms overcome some of the overhead tied to operating many channels. Even if this is done well and intermediaries reduce costs, it is still likely that operating many channels lead to additional costs that are not insignificant. Whether this enables the firm to serve customers better or to reach new customers, which are main motives for using multiple channels in the first place does not supplant this underlying cost argument. In terms of reducing costs the relevant argument would be that reaching more customers through multiple channels, means that channel costs can be divided among more customers, thus compensating for the overall higher costs of operating them.

A third and related argument is that maintaining several channels can lead to channel conflict (Webb and Lambe, 2007). This can have several effects stemming from fundamental issues such as, which channel "owns" the customer and how should the benefits be appropriated to the different channels. The latter is often a contentious issue because it affects the remuneration of channel employees. Such channel conflict can lead to costs related to working at cross purposes, "cannibalising" customers so that several channels are expending energies in trying to reach and serve the same customers. If this is not coordinated, energies are expended in resolving the channel conflicts. Further, unsuccessfully trying to operate several channels can mean loss of customers, whereas maintaining a single channel might have retained customers, even though the customers were not completely satisfied. The demands on coordination in order to successfully operate a multi-channel system become inherently higher and are likely to result in significant costs.

10.4.2 Limits to variety

Together, the three main types of costs described above show many problems inherent in a system with considerable variety, since there is a tendency for costs to grow as the system becomes increasingly complicated. This is not the only challenge, however as there are two further limitations to variety itself.

One limitation and an essential question for a distribution system, is whether the considerable variety in a complex system actually satisfies the variety in demand. This has been the assumption in this dissertation, and it is also a frequent premise in the literature. Such a bias is natural, especially since studies describing these new systems tend to focus on those firms that have been successful, such as Dell (Curry and Kenney, 1999, Feitzinger and Lee, 1997). However, increased variety in the distribution system and product

choice is not useful unless it is the right kind of variety. This means that the availability of new channels, for example online, may contribute to variety, but is not necessarily beneficial if it does not match customer demand in some way. Clearly, customer demand can be dynamic in this sense, but it is not the purpose here to discuss demand formation, since it is well beyond the scope of the study. What is important, however, is that with the proliferation of intermediaries and different channels, there may be a strong bias in favour of creating a system with more variety in terms of different channels and product choice, whether or not this is actually needed. We should be careful, therefore, to consider a more complex system as inherently better just because it has more options for the customer. For distribution, the consideration is twofold; does using a combination of channels bring costs down, and/or is the customer served better? For example, online banking brings down the costs for the bank, so there is an advantage whether or not it creates a benefit for the customer. Savings can be passed on to the customer if the reduction in costs is substantial, so that the customer can benefit indirectly as well.

The second main limitation beyond the costs of operating a more complex system is the core challenge of making the system work. This dissertation has mainly dealt with what aspects of such systems are useful, and how they work. In terms of a more complex system with many firms taking part, there is the underlying challenge that the more complex the system and the higher the demands on it, the more difficult it is to make the system work. The fact that some firms are making hybrid and complex distribution systems work does not necessarily mean that this is appropriate for all firms. What is missing is an evaluation of how well the manufacturer or focal firm and the distribution system function. A distribution system which fits the customer very well and works for one manufacturer, may not be appropriate for another, simply because there is not the capacity to make it work properly, either because of internal limitations, or because the kind of specialists necessary to make the system work are not available.

10.4.3 Tensions and tradeoffs in variety

The arguments here in no way invalidate the previous descriptions of successful use of hybrid distribution, modularisation and the use of intermediaries to deal with variety in customer demand. Rather, they illuminate possible conflict in terms of distribution systems with substantial variety as well as some of the pitfalls in providing variety in product and distribution options to the consumer. This represents stress between the benefits in using multi channels, hybrid solutions and modularisation approaches and the costs of these approaches. Some of this strain was seen in the discussion on postponement and speculation-based approaches to

distribution in Chapter 2, but the same discussion has not been carried out for the other elements or for the concept of variety as a whole.

We can summarise the arguments made here and relate these to the motivation for the study in the following manner. The increasing variety in customer demand requires adaptation through the use of multiple channels, modularisation of products and greater emphasis on the principle of postponement. In order to make the resulting complicated distribution system work, it is necessary to specialise. This leads to firms such as intermediaries taking on important roles in the distribution system. This increases the need for coordination and places greater demand on all the participants in the distribution system, since there are reduced buffers in the system. Sub-optimal use of the system represented by channel conflicts may lead to very poor performance, but if the system is operated successfully, it is possible to keep costs down while simultaneously serving existing and new customer groups better. The underlying point in this section has been that although costs can in some cases be brought down through for example serving certain customer types through cheap channels (e.g., online ordering for customers who do not require service) variety in product choice and channels typically leads to additional costs. At the same time, we have made the point that variety in products and distribution channels does not have an inherent value in itself, but rather that this must be matched with customer requirements and the capabilities of focal firms and the distribution system.

Table 10.1 below summarises some of the main features seen in distribution systems to handle variety, their main benefits and also some of the challenges and costs that arise as a result.

Feature to handle variety	**Benefits**	**Challenges/Costs**
Multiple channels and products	Reaches new customers and serves present customers better	Increased complexity and increased costs, including manufacturing
Balancing channel mix	Serve customers more cheaply	Channel conflict can easily create extra costs
Use of specialists to handle increased complexity	Benefits of specialisation in scale, scope and core skills	Increased need for coordination, higher demands on system
Modularisation and customisation approaches	Serving customer better and more cheaply	Challenge of complexity in the system, higher performance standards
Increased postponement	Less obsolescence, better fit with actual demand	Higher performance standards needed, potential out of stock

Table 10.1: Main tensions in coping with variety

The table above shows some of the main areas of conflict in this system. These are important to keep in mind when making the decision to provide a new type of product variety, using a new channel, or using the distribution system in a different way (e.g., using specialists for certain tasks). This table should be considered a summary of some of the main features explored both in the theoretical framework and in this section on variety.

It is possible to use the case in this dissertation to exemplify some of the general points made in table 10.1. The case showed one primary channel for distribution although the focus was not mainly on the channel mix but rather the distribution system as a whole. A more comprehensive study of car distribution with the channel mix in mind would have shown more channels. The distribution system was clearly affected by different customer demands, with some customers willing to wait for cars and others not. Furthermore some customers were willing to pay extra in order to specify the exact features of a car, while for others this was of limited importance. The case demonstrated different approaches to handling this tension with make-to-order and pick-from-stock approaches as well as compromises between the two.

This demonstrates most succinctly the tensions in the use of postponement, since postponement was required to tap certain customer demand, but none of the manufacturers were able to serve all of their customer demand in this way. This tension led to some of the compromises seen in the case such as multiple order points. The case also exemplified the use of specialists and some of the issues tied to coordination in the system where the specialist was able to contribute through flexibility, and through organising part of the distribution system. At the same time there were potential improvements in the system in terms of obtaining important information at an early stage. As an example, the case illustrates the tensions in postponement and the use of specialists in particular. This also shows that a particular distribution system may not experience all of the tensions in table 10.1. Alternatively we can say that studying different aspects of a distribution system will show different parts of the tensions in the table.

The focus in this final part of the section is on some solutions for overcoming some of the potential strains in the system. Ways of handling potential conflicts inherent in providing a great deal of variety in a distribution system have already been mentioned, but it is useful here to summarise this and to place it in context. There are two main ways of creating a “shift” in the tradeoffs between elements of cost and providing variety to meet end customer requirements. Assuming that there are tradeoffs in cases where a firm has to make sacrifices such as paying more to

maintain a complex system, it is of great interest to see how these can be reduced.

The first approach is logically to reduce the variety in the system. The most obvious way to do this is to avoid accomodating all the variety demanded by the customer population, but effectively choosing which segments to serve. The topic of segmentation is treated extensively in the marketing literature and is not pursued further here. In terms of distribution, the equivalent choice is to not use all the available channels, i.e., to only use certain types of outlets. This may also be a constructive choice, but this may not be up to the firm. In many cases, customers will expect to be served through several different channels and, therefore, the firm cannot choose to ignore these. As an example, most large industrial firms cannot today choose not to have an internet presence, whether for sales or marketing purposes. As a consequence, the increased complication in the distribution system may then be real and unavoidable.

One way of reducing variety while maintaining the required number of channels, is through standardisation, which has been discussed in this dissertation and the literature. The benefit of standardisation is that it allows for consistency of operations and good use of resources, which are advantageous both for the distribution system and the customer. This point is unchanged in a system with many specialists, serving varied customer demands. In this section, the way standards are constructed and enforced, is more relevant for reducing the scope for variation in an acceptable way. This influence of standards may affect both the customer and the technology or method of technological production. If the customer is a firm buying one or more services, it means that the services are standardised to reducing the variation implicitly. For the end consumer, this means a wide but not unlimited range of choices. It is not inconceivable that a customer is better served by being offered a moderate range of choices, which are consistent, rather than having a full range of options.

For the distribution system, standardisation of services and operating procedures for large parts of the distribution system, i.e., incorporation of container transport means that it becomes more difficult to reconfigure parts of the distribution system. There is considerable remaining flexibility, but restricted to using the building blocks as defined by the system. At a large scale this can be transport infrastructure, such as Europallets, but standards for industries can serve a similar function. A final effect of standardisation in the distribution system is that it prevents firms from competing on excessive variety in providing goods, which can be beneficial for the distribution system as a whole. Rather than overwhelming the customer

with options, the firms must find the most important variables for competition.

The final way to handle variety is shown indirectly in the remainder of the dissertation. Intermediaries are in some sense part of the problem of variety, by enabling a great deal of variety in the distribution system which thus requires more coordination, making the distribution system more complicated. At the same time they have the potential of becoming part of the solution. This is referred to in the literature as 4PL solutions. In this dissertation intermediaries in an organising role, reducing variety in several ways, depending on the perspective, have been described. From the point of view of a large manufacturer requiring multiple channels and specialists to handle this, the intermediary can be yet another layer of specialist which organises other specialists. This does not in itself reduce variety, but it moves the responsibility for handling this variety away from the manufacturer, and in effect it becomes the intermediary's problem. This type of effect may be more fully captured by using the concept of a position discussed in section 10.3. Using position it should be easier to see more aspects of both the variety in the system and to what extent an intermediary is involved in managing this.

In terms of the distribution system, organising other specialists enables one firm to collect more of the overall picture of the system and carry out some of the reduction of variety such as standardisation, discussed above. Handling variety thus goes from being a general description of the distribution system to describing what certain intermediaries in the system do. This brings us full circle from an initial definition of intermediaries as firms simply placed between the manufacturer and consumer, to intermediaries as those firms which enable the matching of the technology of production and the technology of use. This makes it quite natural that intermediaries are heavily involved in handling variety whether it originates in the technology of use or technology of production.

10.5 Further research

The study makes contributions to the three main theoretical blocks; the structure of the distribution system, interdependencies and coordination, and the role of intermediaries, as well as the interactions between these. Furthermore, there are theoretical contributions to concepts of position and variety. This last section of the dissertation explores four possible directions for future research; the issue of bridging different systems and how this contributes to the functioning of the system, studying position as a concept,

expanding the concept of an intermediary, and, finally, expanding the concept of roles.

Bridging different systems was raised as one important assignment for the intermediary in the discussion. The ability to observe this was specifically tied to the choice of empirical domain with one firm present in several different distribution contexts. The study has shown something about these opportunities for bridging, through for example the influence of the manufacturer. Furthermore, bridging was tied to increasing specialisation and the influence of standards in distribution systems. More research is necessary to tie some of these issues to the specific opportunities that open up. For example, are the opportunities for intermediaries largely given in the system, or are there examples of intermediaries able to create opportunities for themselves? Can intermediaries circumvent the power of manufacturers through bridging, or will this inevitably lead to conflict with some of the primary customers of the intermediary? Since such conflict is likely, how can the conflict be handled? These issues are closely tied to challenges found in hybrid distribution systems in general.

The concept of a position was derived as a complement to the discussion on roles for intermediaries, as well as the theoretical blocks used in the study. However, data was not collected in order to pursue the concept of a position specifically, since this would require a somewhat different approach, thus making this an obvious route for further study. The framework for defining a role as suggested can be further investigated through empirical study, where the salient dimensions of a position including its strength, are more fully explored. Since position was formulated as a concept to achieve a deeper understanding of the concept of a role, through capturing how the intermediary is placed in a system, this leads to a somewhat different stream of research.

The concept of an intermediary itself, beyond the roles it can occupy, is an important area for research. The concept used here is essentially those firms which carry out tasks connecting the user and manufacturer. This is founded in the functionalist literature, and is quite general. Furthermore, we see that there is considerable overlap with the 3PL literature – i.e., most if not all of the firms described in the 3PL literature are service providers and not title takers. Most of these firms would fit the description of an intermediary. It is, therefore, likely that many of the questions dealt with here could be conceptualised in a way which more fully integrates both these directions in the literature. Or stated another way, when studying firms involved with distribution, the focus is on the tasks performed by intermediaries which have some features of third-party provision. However, as firms with more traditional intermediary roles should be included, there is considerable scope

for investigation of issues such as the type of task carried out, whether a firm is a title-taker or not and to what degree it is responsible for the performance of others. This development clearly intersects with the development of roles.

The concept of roles for intermediaries as used here can be expanded in several ways. One is to apply the framework to different settings where it is possible that intermediaries play different roles or combine the existing roles in different ways. However, it should be noted that since there are continual changes in business and alternative approaches to using intermediaries, there will never be an exhaustive typology of roles. What we can achieve are good typologies for limited domains and periods of time, which is what was attempted here. Another main avenue for research is to refine the framework itself. For example, do the roles appear together in systematic ways, and are there more basic economic functions served that are related to roles? The roles as presented in this dissertation do not have explicit dimensions as such, and thus may be developed further given a larger selection of roles.

In general, there are two main directions for future theoretical development in terms of the role framework presented here. One is to apply it to settings where different roles are likely to be present, in order to refine and improve the framework, for example through taking the interactions in figure 9.3 and making these more complete. The other is to "turn the framework upside down", and rather than considering the roles found in a particular setting, analyse the basic economic contributions of the different roles and begin to uncover strategic implications. Questions such as whether an intermediary can "make" a role for itself or whether there must be clear opportunities given by the structure of the distribution system, are of particular interest. Even more so is uncovering what aspects of the intermediary determine whether it is capable of occupying a role successfully in competition with other potential intermediaries.

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Appendix A: Interview Guide

Section 1: Activities

Q1: What activities are performed from a car leaves the factory door until it is handed over to the customer?

a. Transport activities
b. Communication activities
c. Modifications/preparation/packaging and loading

Q2: Who carries out sorting of cars?

a. Who has the final decision
b. Carries out the coordination of this
c. What are the sorting criteria
d. Who carries out the physical operations related to this

Q2: At what points is sorting of the cars carried out?

a. To different destinations
b. In terms of different customers
c. Different types
d. Physical location of the sorting

Section 2: Actors

Q3: What actors carry out the different activities?

a. Name of actor
b. What "type" of actor is it (firm, business unit etc)
c. Alternative actors who could carry out the same activities
d. Why is this particular actor chosen
e. How long have they been carrying out the activities

Q4: What actors are Autolink's (importer's) most important counterparts?

a. In terms of incoming business
b. In terms of being necessary for Autolink to provide services to its customers
c. External parties (authorities, standards etc.)

Section 3: Resources

Q4: What resources and infrastructure are required to carry out the activities?

a. Fixed resources and infrastructure
b. Mobile/transport resources
c. Personnel/human resources
d. Other (IT systems and standards)
e. Who owns the resources/pays for their use

Section 4: Contracts and inter-organisational coordination

Q5: What contracts exist between the different parties and how are these structured?

a. Length of contracts
b. Type in terms of residual claim, incentive structure
c. Specification (relational, arms-length)

Q6: What mechanisms exist for coordination between the firms?

a. Plans/market organised/negotiations
b. Specified or ad hoc

Q7: What specific functions do Autolink perform with regard to the other actors in the distribution system?

a. Reducing the number of business ties
b. Achieving scale advantages in particular in logistics activities
c. Task and skill specialisation
d. Sharing/distribution of risk

Appendix B: Interviews and Empirical Sources

Interviews

Autolink

Type of	Subject	Position	Date	Duration
Meeting/presentation	Lars Olsen	Managing Director	23 November 2003	2 hours
Interview	Bjørn Width	Head of Marketing	3 April 2006	90 minutes
Interview	Morten Bryn	Head of Domestic Transport	3 April 2006	1 hour
Interview	Eva Sundberg	Head of Services	3 May 2006	1 hour
Interview	Morten Bryn	Sales	3 May 2006	70 minutes
Interview	Kjell Owrehagen	Head of production foreign transport/Head of logistics	23 May 2006	90 minutes
Feedback meeting	Bjørn Width	Head of Marketing	13 July 2007	90 minutes

Autolink – Møller (Volkswagen)

Type of	Subject	Position	Date	Duration
Presentation and feedback Møller & Autolink			12 October 2004	2 hours approx
Monthly meeting Møller-Autolink	Karsten Nielsen Bente Flygansvær Bjørn Width Lars Olsen		2 June 2005	1 hour
Monthly meeting Møller-Autolink	Karsten Nielsen Bente Flygansvær Bjørn Width Lars Olsen		24 June 2005	1 hour
Monthly meeting Møller-Autolink	Bente Flygansvær Bjørn Width Lars Olsen		14 March 2006	1 hour

Honda (Honda Nordic)

Type of	Subject	Position	Date	Duration
Interview	Joakim Balter	Sales	14 November 2006	90 minutes
Telephone interview	Ulf Berg	Head of Sales	8 December 2006	30 minutes

Bertel O. Steen

Type of	Subject	Position	Date	Duration
Interview	Roy-Erik Johnsen	Logistics manager	20 January 2007	100 minutes

Møller (Volkswagen)

Type of	Subject	Position	Date	Duration
DNet Meeting	Alf Inge Andersen	Møller Logistics	4 February 2004	45 min approx
DNet Meeting	Erik Staavi	Møller Cars	4 February 2004	45 min approx
DNet Meeting	Karsten Nielsen	Head of Car Logistics, Møller Logistics	4 February 2004	45 min approx
Interview	Jan Erik Reinsborg	Erik Arnesen (VW dealer)	31 March 2004	90 minutes
Planning meeting	Bente Flygansvær	Head of Car Logistics, Møller Logistics	4 August 2006	2 hours
On-site observation and talks at Møller Logistics during ”boat-day”	Numerous		7 August 2006	5 hours
Passive observer, Møller Logistics Group meeting	Numerous		7-9 September 2006	1 ½ days
Tour of Autolink Facility Sweden (with Møller Group)	Bjørn Width (leading)	Head of Marketing	8 September 2006	2 hours
Interview	Arild Solheim	Head of Administration Møller Logistics	19 September 2006	2 hours

Toyota

Type of	Subject	Position	Date	Duration
Interview	Tor I. Berge	Head of Bauda Group (Toyota importer)	11 June 2004	90 minutes

Others

Type of	Subject	Position	Date	Duration
Interview	Bart Steijaert	General Managers, Cars - CMP	14 November 2006	1 hour
Short talk	Fredrik Fribert	Deputy General Manager, Cars - CMP	14 November 2006	20 min
Tour of CMP facilities	Bjørn Width (leading)	Head of Marketing	8 September 2006	1 hour

Other data sources

Annual reports for the main manufacturers involved: Peugeot, Mercedes, Volkswagen, Toyota, Honda.

Annual reports for Bertel O. Steen, Møller Gruppen

Internal presentations and publicity materials from the importers and car manufacturers, as well as Copenhagen Malmö Port.