

Value Creation in Industrial Networks

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ABSTRACT.

This paper deals with value creation in industrial networks. The argument put forward is that value is realised in the exchange between two business actors. However, the antecedents of the value must be search for both beyond the focal exchange of resources, as well as below the same. Therefore we argue that the industrial networks contains two layers. The first is exchange layer and the second is the resource layer. Furthermore, the authors claim that the exchange layer is embedded in the resource layer. In order to find potential value and realise the value of an exchanged resource, a firm must recognise and manage the embeddedness. The arguments are supported by a case from the pulp and paper industry, where a specific paper grade is exchanged between two major European firms within this field.

Key words: Exchange, Networks, Value Creation, Resource, Embeddedness.

Introduction-The Creation of Value

The creation of value is fundamental in all business activities. In the strategy field Porter (1985) introduced the value chain concept, where value is added step by step in the firm's core activities. Porter's definition of value is that value is what customer is willing to pay (ibid p 3). Normann & Ramirez (1994) argue for a redefinition of the value concept and shows how value chains has been transformed into "value constellations". Anderson & Narus (1998) approach the value concept from a marketing management perspective and define value also as something that customers are willing to pay for (value) and prefer in comparison to what other firms offer. Ford & McDowell (1999) approach the value concept from a business relationship perspective and show how business relationships can be managed by analysing the value created by different actions. Despite the difference in definitions of what value actually is, value is seen as created in the exchange of resources between two firms. Granovetter (1985) did in his well-known article argue that economic action is embedded in a network of social relations. We will in a similar way claim that the economic action, in our terminology the exchange layer, is embedded in a technology and production system, which we label the resource layer. These arguments are supported by Astley & Zajac (1990) and Johanson & Mattsson (1992). Consequently, a resource that is exchanged contains the combinations of several resources that have been used and processed in a flow of activities and that are linked to each other in complex cycle. Therefore, the exchange of a resource between implies a realisation of value, not a creation of the same. Value creation is definitely not a one-man show and not even a tango. We see value creation as a process where a large number of actors are active, thus more of a square dance, where

the rules are changed from time to time. So far, less attention has been paid to how value actually is created in industrial networks. In this paper value of a resource from a single firm's perspective seen as created *and* realised by re-cognising and managing embeddedness of the exchange layer in the resources layer. For the firms engaged in an exchange relationship it is a matter of creating and realising the potential value of the heterogeneous resource element (Penrose 1959, Alchian & Demsetz 1972; Håkansson & Snehota 1995) by knowing how to use it, that is how to combine it with other resources in the best possible way and thereby taking advantage of the unique features that become visible in the combination with other resources. The aim of this paper is to add to knowledge about how value actually is created in industrial networks.

In the following sections we will firstly discuss the two layers, the resource layer and the exchange layer. Then we will examine how firms create and realise value out of resources by recognising and managing the embeddedness of the two layers. Then we will move to the empirical case. The case is taken from the pulp and paper industry, and has as the point of departure a focal business relationship, between two major players in the European newsprint industry, one buyer and one seller.

The Resource Layer in Industrial Networks

Hayek argued over 50 years ago that the use of resources is the economic problem that society has to face. Moran & Ghoshal (1999) stretch the argument that resource use is the most important issue for the single firm and claim further that the “creation of economic value, be it individuals or organisations, is a process that involves the use of resources”. This statement makes the definition of the resources crucial. The traditional definition view resources as homogenous and tangible. During the 1980s and 1990s, both proponents of the network theory (e.g. Snehota 1990; Håkansson & Snehota 1995; Ford et al 1998) and the resource-based theory scholars (e.g. Amit & Schoemaker 1993; Dierickx & Cool 1989; Peteraf 1993) have argued for that the resources are heterogeneous and that economic value stems from the resource heterogeneity. This implies that there, in principal, exist an endless amount of possible resource combinations, and consequently, there is always space for new combinations. The heterogeneity of the resources is partly caused by the fact that the knowledge about the utilisation of resources is imperfectly distributed among the actors (Penrose 1959; Snehota 1990) and partly caused by nature; that is, constraints and limitations in how to combine equipment, raw material etc. (Hägg & Johanson 1982). Resources are by themselves never “inputs” in a production process but only as the generated services. A service generated by a resource is a function of the way of using it. The very same resource used for one purpose and/or in a certain way in certain combinations would generate another service if used differently in other combinations (Penrose 1959).

Resources are used in combinations the features of a specific resource therefore become blended together with a large number of different resource features when exchanged between firms. Each combination consists of at least two resources and in the same way as the exchanges are connected in the network the resources are connected. In industrial network resources are deployed and combined over the firms’ boundaries and beyond the exchange between firms. We call all these resource combinations that are connected but not exchanged in the network the resource layer. In this layer resources are combined and activated by a set of actors, who partly, but not completely, share knowledge, they have a common past. The knowledge is tied to the resources in each specific network. Since a technology does not slavish follow the exchanges resources are invested in the network and not only in the

exchange relationships. This results in a multilateral dependence between resource collections controlled by several firms, which tends to make the combination of connected resources in the resource layer durable over time. The durability of the resource layer in the industrial network is determined by the degree of complementarity (Dierickx & Cool 1989) and by the degree of transferability of the resource combinations.

The first aspect is the complementarity of the resource combinations. Complementarity is defined as the state when two things that are different together form a better whole, that is, than they do separately. Richardson (1972) argues that the relationship is dominated by the usage of different kinds of resources. The counterparts provide different knowledge, equipment etc. to the interface, but they are through the activities, performed by the parties adapted and devoted to the relationship. Due to the complexity firms in the resource layer have to do adaptations (Hallén, Johnson & Seyed-Mohamed, 1991). The aim of the adaptation is to bring fit about the resources combined in the layer. This means that the adaptations are not only directed towards the counterparts, but do also affect the counterpart's customers and suppliers' technology. High complementarity means less friction, which makes extensive usage of the two resource collections possible, which through routinisation gives efficiency. Over time the resource combinations can be adapted and adjusted to each other, that is fit can be brought about the resource combination and thereby increase the complementarity or the other way, one or both can become obsolete. Highly complementary resources tend to have a high dependence.

The transferability is defined as to which extent resources can be used in other combinations and transferred to other networks. (Dierickx & Cool 1989; Peteraf 1993), but also by the cost for finding and using replacement. This could, for instance, be the case if the complementarity is low. Desirable, one or both resources should be substituted. A resource being highly substitutable carries with it a low dependence. However, with a high level of dependence incentives for finding new resource combinations may follow. We propose that in industrial network the resource layer is characterised by a high complementarity and low transferability, which in turn, result in a high multilateral dependence by a web of actors' resources.

The Exchange Layer in Industrial Networks

Resources are used, processed, developed and exchanged within and between firms in order to create value¹⁴⁰. Exchange is a value realising process as the firms that are involved in the exchange are better off after the exchange than before. The resource moves from one firm that value it less to a firm that value the resource more. Firms exchange resources (goods and services) both on arms-length basis as well as on a more long-term basis. Several empirical studies have given evidences that long-term exchange relationships is the predominant governance mode in industrial markets (Hallén 1986). This is assumed to happen when the price does not contain sufficient information for the buyer and the seller. Instead, price is just one of several dimensions, which characterise the exchange. Relations is nowadays viewed as

¹⁴⁰ The exchange of a product or service is, as mentioned above, often said to be a value realising activity. In economics, for example Kirzner (1973) argues that this is due to a asymmetric distributed knowledge about what the resource exchanged can be used for. However, just as we do not think that there are only two firms engaged in the value creation process, the knowledge argument is hard to fully accept. The technology that the firms are using prevent them to use the resource in another way than they do today, there are technological constraints and in some cases a rather high degree of inertia is present.

a governance mode besides the firm/hierarchy-market dichotomy, were mechanisms like trust (Anderson & Narus 1990; Ganesan 1994; Morgan & Hunt 1994), commitment (Powell 1990; Anderson & Weitz, 1992) and co-operation are central features. Relationships are in a wider perspective connected to each other in a structure, a network (Axelsson & Easton 1991; Ford et al 1998; Håkansson & Snehota 1995). This is the main difference between those who view dyadic business relationships as something independent, not related to each other, and those who view business relationships as connected to each other and thereby constituting a network structure. This, in turn, means that the dyadic relationships is affected by a larger exchange network, but is also affecting the same network (Cook & Emerson 1978; Håkansson & Snehota 1995).

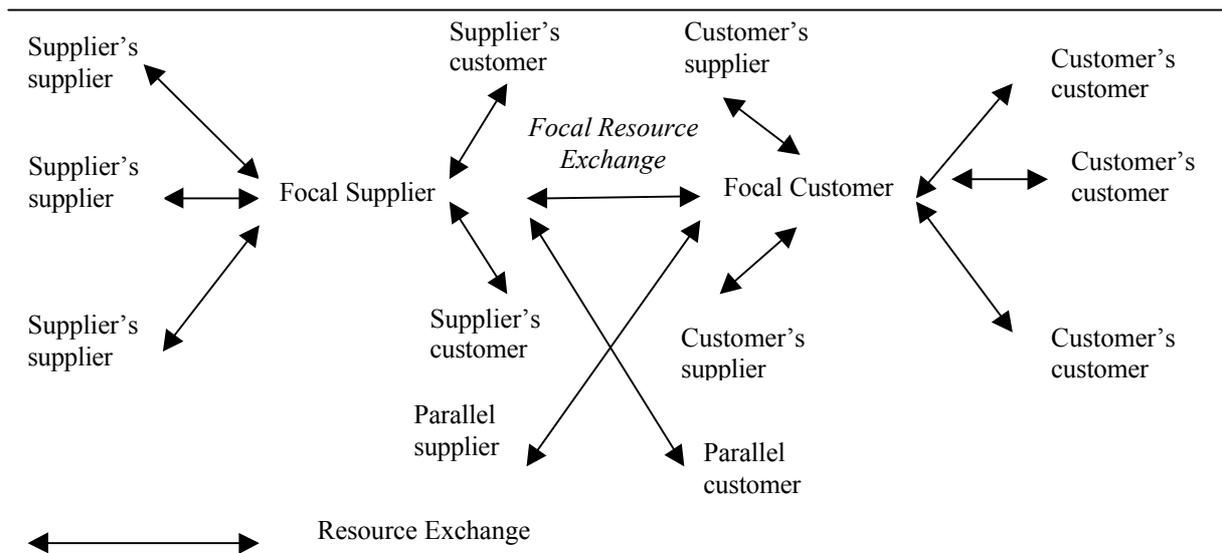


Figure 1. The exchange layer in an industrial networks

From the social exchange theory it is gathered that no firm can survive by exclusively combining its internal resources, but it is always dependent on other firm's provision of resources, which causes a situation where the firm is exchanging resources with other firms. Therefore, in accordance with Emerson (1981) each actor or firm has both possessions and behavioural capabilities and need related to realisation of them. Firms will act so that the needs are satisfied. Partly this act can be performed within the firm, but partly the firm is dependent on the environment. The possessions and behavioural capabilities, mentioned above, are resources, if other specific firms value them. The firm performs an act if it finds the results rewarding. The act is: "rewarding or of value if it is reinforcing, that is, if its occurrence strengthens the actions that produce it" (Emerson 1981). From that follows that the firm will continue to exchange resources as long as it he finds it rewarding and as long as it expects that it can be provide more value than the alternatives. Basically, what all these lines of thought agree on, is that value is realised in the exchange of a resource. Both parties participating in an exchange episode benefit from the exchange. The money received is of higher value for the producer, while the buyer value the product or the service more than the amount of money spent on it. The firm will approach other firms in order to obtain the resources needed. An exchange is relatively easy to codify in sales volumes, invoices, costs, bank accounts etc. These resources are more or less critical for the firm and the more important the resource the more dependence there will be on the provider of the specific resource. The discussion about the exchange layer is illustrated in figure 1 and can be

summarised in one sentence: the resource exchanged between firm A and B has an influence on the exchange between firm B and C, that is, exchanges are in industrial networks connected.

The Embeddedness of the Layers

It is often implicitly assumed that the two layers always follow each other. Investments and commitment are made towards the exchange partners trust emerges when resources are exchanged etc. A difference between the exchange layer and the resource layer is that the latter is more complex and extensive. Consequently, in industrial networks the resources connected do not only follow the exchange of resources. The resource layer is more tacit and more difficult to completely codify. The firm's ability to realise a product's value in the exchange is the result of how well it creates value in the utilisation of its resource collection, which is bounded to the context the firm is a part of. The value of a specific resource arises from knowledge about what someone can do with it in combination with another resource (Håkansson & Snehota 1995), thus the value is never definite in time and space (Håkansson & Johanson 1992). Therefore, managing resources cannot be understood or evaluated without taking the space, the context, where the firm is operating, into consideration (Barney & Zajac 1994), since it is first when other actors are confronted with the firm's resource collection that its value could be appreciated. In order to appreciate a resource, knowledge about how to use and exploit its features is a vital condition.

Combination of resources are connected to each other in the network, which, in turn, can be derived from the firms' past. Over time, in a dynamic and interactive process, multilateral dependence in the network increases. This argument is in line with Astely & Zajac's (1993) findings. They show that in relationships the dependence caused by the division of labour, called 'workflow interdependence' – that is, what everyone is actually doing – is more difficult to terminate than interdependence, which is a result of the exchange of resources. Thereby the machines in use, the people operating them etc, are not only influencing the exchange, they makes up the frame for which exchanges are possible. The multilateral dependence in the network make the resource layer more complex and extensive than the resource layer. Compared to the exchange layer, the resource layer has a higher degree of interdependence. This, in turn, means that the exchange layer is embedded in and governed by the resource layer.

These lines of arguing is supported by Penrose (1959) who claims that the "services that the resources will yield depend on the capacities of the men using them". However she also realised that the interaction between the human and the physical resource affected the ones handling the resource: "but the development of the capacities of men is partly shaped by the resources men deal with". Therefore, the knowledge about a resource and how well developed the knowledge is in relation to the resource exchanged is crucial in order to realise the full potential value at a given moment. Obviously, humans active in the network create value. Due to the fact that value comes from combining heterogeneous resources there is always potential value. But in order to realise the potential value firms must first participate in the value creation. In a network setting value creation has two sources. First, firms must recognise that the resource exchanged is embedded in a network of connected resource combinations, and, second, managing this embeddedness. Re-cognising means that the firm *perform activities* and possible also *set up an organisation*, which can enhance the managing of the embeddedness. Collecting information and interacting with firms, with which one does not exchange resources, are important dimensions. The information collected and experience

gained from interaction are necessary in order to find potential value. Sometimes, these activities are easier to perform if the firm set up specific organisational units. Evidently, recognising the embeddedness contains both an activity component and a structural component. However, finding potential value is only the first step and must be followed by a second step, where the firm on the base of the knowledge about the embeddedness of the exchange layer in the resource layer is able to realise the value or increase an already existing value. The management of the embeddedness means that the individual firm *re-combine the internal resources it controls* but in industrial networks it does also mean that *firms have to re-combine resources over firm boundaries*.

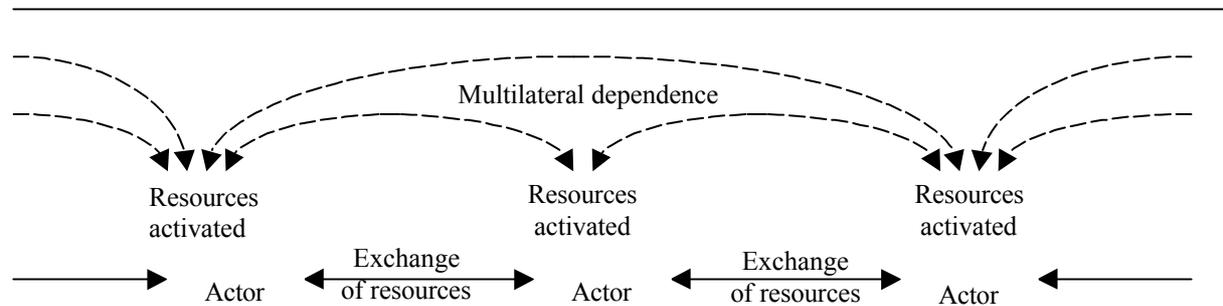


Figure 2. Two layers in the network. Adapted from Johanson and Mattsson (1988)

The Case of Holmen/Hallsta-Springer

The Two Companies

The aim of this paper is to analyse how value is created in industrial networks. In order to understand this, we will examine the structural conditions in which the exchange of a specific resource is embedded. We selected Hallsta's relationship with Axel Springer Verlag (Springer) and the surrounding network as our unit of analysis. Holmen's production unit Hallsta Paper Mill is one of Europe's largest producers of paper. Every year the mill produces 650 000 tons of printing paper. Springer is one of Hallsta's biggest and therefore also most important customers. Holmen/Hallsta and Springer has been doing business since the 1940s. Springer is further buying a large share of Hallsta's production of its paper machine number 11 (PM11) which is used for the production of the Bild am Sonntag's edition of 2,5 millions copies. Hallsta was founded in 1915 and is one of three paper mills within Holmen Paper, which in turn is a business unit within the Modö Group. Hallsta has a capacity of 650 000 tons of so called wood containing paper and employs about 1000 people. This makes Hallsta one of Europe's biggest producers of paper. Axel Springer Verlag (Springer) is one of Germany's biggest publishing firms, founded in 1946. Springer publishes a large number of daily papers as well as weekly and monthly magazines. Die Welt, Welt am Sonntag, Hamburger Abendblatt, Bild and Bild am Sonntag are among the most important ones. Springer has production units in Berlin, Ahrensburg, Essen-Kettwig and in Darmstadt. The Springer Group has about 12 000 employees and had a turnover of DM 4,8 billions in 1998. Springer purchases 450 000 tons of paper every year.

The case is based upon in-depth interviews with people working at all the involved firms and has been complemented with technical literature and annual reports. In total, about 70 interviews were conducted. The interviews were made over a period of time of two years and has since then been complemented by additional telephone interviews. The presentation of the empirical case is structured as follows. First the resource exchanged, the product

produced by Holmen/Hallsta, is examined. After that Springer's network of customers and suppliers will be examined. In the following section Holmen/Hallsta's network of suppliers and customers will be presented.

What is Exchanged?

The resource exchanged between Holmen/Hallsta and Springer is a paper quality called Holmen Super Bright, a so-called "improved newsprint" quality, with higher brightness and grammage than standard newsprint. Springer purchases about 30 000 tons of this quality every year from Holmen/Hallsta. The grammage of the paper is 49 grams per square meter and it is bleached with hydro peroxide. The paper is bleached to ISO 72 (ISO is a way to measure a paper's brightness) which is very bright compared to the standard newsprint quality (for newspaper production) which at Holmen/Hallsta has ISO 58 and has a grammage of 45 grams per square meter. Holmen Super Bright has further some other physical properties that are central for Springer. Important ones are the optical features of the paper as well as different strength properties, such as tear strength and tensile strength. Why these are important will be explained later. The Holmen Super Bright paper quality is a so-called machine finished product, which means that all the processing takes place in the paper machine. Both sides of the paper is further of equal quality. This seems perhaps evident but far from all printing paper qualities have the same features at both sides of the paper sheet.

The product is standard today, but during a period Holmen/Hallsta produced a quality that was specifically adapted for Bild am Sonntag and that was developed together with Springer. The adaptation consisted in that the paper was given a certain yellow colour. This quality was produced once a month. Out of reasons that were concerned with the production economy, Holmen/Hallsta wanted to change this routine. Holmen/Hallsta therefore approached Springer and asked if they could consider a paper quality with a somewhat more "blue" dimension and that Holmen/Hallsta could produce in a much more efficient way. Springer accepted this. For Holmen/Hallsta this has meant a significantly more efficient production than before. Every year 30 000 tons of paper is shipped by boats owned by Hallsta and Holmen from the little village Hallstavik, 100 kilometres north of Stockholm to the Hamburg area, where Springer has its head quarters and one of its printing houses.

Springer's Perspective

Bild am Sonntag was launched in 1956 and has since then been printed on paper from Holmen and Hallsta. First there were paper machines number 2 and 6 that supplied Springer with paper for Bild am Sonntag and, since the mid 1980s, PM11 has been the sole supplier within Holmen and Hallsta to supply the weekly magazine with paper. The paper that Springer purchases from Holmen/Hallsta is used and combined with several other central resources at the printing house in Ahrensburg outside Hamburg.

The most obvious resource that is activated by the exchange of the Super Holmen News is the printing presses, where Bild am Sonntag is printed. However, before going into press, the paper has to be created, pictures have to be taken, texts written etc. An important part of a newspaper's operation is therefore the pre-press activities. To print with four colours means that yellow, magenta (red), cyan (blue) and black are put together in different combinations. Repro¹⁴¹ is the operation where an original image is divided into its basic colours, that is to colourseparate an image. Today this is often done digitally. An important part of the pre-press operations is to decide what is possible and not possible to print. Images that are going to be

¹⁴¹ Those operations that images and other illustrations have to go through in order to be printed (www.stc.se)

used in an article or advertisement must be adapted to what is technologically possible to do in the printing press. This is done in a dialog with the different firms involved, such as advertisement agencies, buyers of advertisement space, the editorial office, the advertisement office etc.

Before going into the printing press, the paper is tested and analysed. Springer has compared to other buyers of paper large resources to analyse its suppliers' paper qualities. This is done in their own laboratory, where the different quality properties and features are measured and evaluated. All paper that Holmen/Hallsta (and the other suppliers deliver) must be in the range of certain specifications.

An important part of the selling of advertisements is therefore to make advertisement customers and their advertisement agency adapt their advertisements to the technical facilities that are present. The adaptations can for example concern how many screen lines and dots per inch an image can be printed in. A standard newsprint paper can be printed in 85 screen lines, while a magazine paper such as LWC (Light Weight Coated) or SC (Super Calendered) can be printed in 150 screen lines. The more screen lines the better the quality of the image. The most common printing technology used at Holmen/Hallsta's customers is the web offset technology and this is also used at Springer's printing house in Ahrensburg. Offset took over the method that had been the dominating technology during the whole 20th century, i.e. letter press printing. Compared to letterpress, the offset technology could offer a better printing result, healthier environment for workers and, for short production runs, a better economy.

In a web offset printing machine a printing plate transfer the printing ink to the paper web via a rubber blanket. The paper must therefore tolerate interaction with components in the printing process such as ink, printing plates and rubber blankets. In the offset printing process, printing plates transfer the ink to rubber blankets, which in turn directly interact with the paper to print the newspaper. Thus, there is a direct physical interface between these components in the printing press and, in order to achieve an efficient process, there are high demands on the paper's runability in the printing press. Runability has to do with how long it is possible to run the press without stops caused by the paper. For example, because of breaks in the paper web, or by the need to clean the printing plates and rubber blankets because wood fibres have been torn off from the paper surface and have got stuck on the rubber blankets.

It is not unusual that at least big printing houses combine the different input resources in specific combinations. For example paper from paper supplier A is combined with ink from ink supplier A in one printing press and paper from supplier B is combined with ink from ink supplier B in the second printing press. The ink recipe may be adapted for example in terms of viscosity and the different printing presses must be adapted to the different combinations for example in terms of the printing press' web tension, which also depends on how much ink and damp that is put into the process. The goal is to produce a product that is identical from the two printing presses. The finished newspaper is in practice a combination of printing inks from different suppliers, newsprint from different suppliers, damp mixture, printing plates, rubber blankets put together in the printing press. No one of the input goods work as totally independent variables in the process and there is more or less a constant adaptation between the different resources.

Resources Activated in Springer's Network

The paper that Holmen/Hallsta supplies Springer with is, as mentioned above, used in combination with resources such as printing presses and printing ink. In total Springer buys different types of paper qualities from about 15 different suppliers and negotiates with another 5-7 manufacturers of paper. Of the total volume 75 percent is imported and the rest is purchased from German paper producers. For Bild am Sonntag, Springer has two main suppliers, Holmen/Hallsta and a production unit within Stora Enso, situated in Finland. Holmen/Hallsta and the Stora Enso unit have both informal and more formal meetings that to some extent are initiated by Springer. After visits at the printing house in Ahrensburg it happens that the people from Holmen/Hallsta bring back test batches from the Swedish-Finish producer; at the same time Holmen/Hallsta is aware that Stora Enso does the same thing. There are also direct contacts between the paper mills. For example people from Holmen/Hallsta have visited the mill in Finland to exchange experiences around the paper machine side and the paper production. A very typical example that shows Springer's role in relation to its suppliers and how Springer co-ordinates the resource use at their suppliers is the episode when Holmen/Hallsta wanted to change the paper quality that the mill supplied Springer and Bild am Sonntag with. They briefly mentioned this episode above, however in a somewhat "simplified" way as it gave the impression that this was something that Holmen/Hallsta and Springer could decide upon. However, in order to change the quality Holmen/Hallsta also had to convince the Stora Enso unit to produce the same paper quality. The reason is that Springer's purchasing philosophy is to always keep at least two suppliers for each paper quality if possible. Therefore Springer contacted Stora Enso and asked if the Finish unit could accept to produce the same quality that Holmen/Hallsta wanted to supply Springer with. The Stora Enso unit agreed to do this and Holmen/Hallsta then provided the Stora Enso unit with the paper grade's "recipe". In order for changes to take place an involvement from at least another firm is necessary. In this case it was facilitated by the fact that only one more supplier had to be involved. Still Springer had of course to consider how their customers would react on the new paper quality and if other suppliers, such as ink suppliers could manage the change.

Printing presses are important resources for Springer. MAN Roland has supplied the printing presses to Springer's printing unit in Ahrensburg outside of Hamburg. In total there are ten MAN Roland Colorman offset printing presses in the printing house. Springer describes the contacts with MAN Roland as a close working relationship. For example the design and construction of the printing presses was made together. Depending on the design of the printing press' printing units, the printing ink supplier manufactures a product that is adapted to these. There are three different types of printing units; underlying knife print unit, overlying knife print unit and pump print unit. The underlying print unit is most common for smaller and middle-sized printing presses. The overlying print units and the pump print units are most common for the bigger printing presses. Springer's printing presses in Ahrensburg are of the overlying types.

Springer has in total six suppliers of printing ink and the majority are German. Among the suppliers are for example Gebrüder Smith and Hoestmann Steinberg. Springer works with these on a regular basis to improve the printing process and the printing quality. The manufacturing of printing inks has been pushed towards a larger share of colour inks. This depends mostly on that the possibilities to print with four colour has increased because of,

among other thing, the use of the offset method¹⁴². 10-15 years ago, 10-20 percent was colour ink and the rest was black ink. Today it is 50 percent colour inks.

Springer purchases paper from Hallsta and Holmen for one reason, to print a newspaper. Bild am Sonntag is a weekly paper that has two major types of revenues, from sold papers and from firms advertising in the paper and it is to serve these groups that the resources earlier described exist. Springer's five biggest customers stand for eight percent of the total advertisement revenues in the Bild am Sonntag case. The advertisers are mainly interested in the newspaper's readership (income, age, etc). The advertising firm buys space in the paper and wants to know what type of persons and how many of them read the newspaper in order to adapt its message to them. The technical quality or the environmental issues are also factors that the customers consider. The most important customer group is perhaps not surprisingly the German automotive industry. In the Springer case a majority of the advertising agencies can be found within the firms. These firms produce the advertisement in a more or less sophisticated manner. Pictures are taken in relation to what paper is going to be used in the printing press (Holmen Super Bright) and what type of printing press that is used (Web off-set MAN Roland Colorman). Therefore also the pre-press operations are more or less adapted to these facts and the information about what the printing press can handle in technical terms has been distributed to the different firms. Here Holmen/Hallsta is able to support Springer with advice, through the Technical Marketing function. By engaging in this types of activities Holmen/Hallsta also learns a lot about the problem that Springer faces. Through the relationship with Springer, Holmen/Hallsta gains knowledge about the requirement that Springer and Springer's network have. In this case, it means that Holmen/Hallsta has over the years acquired knowledge about Springer's combination of resource collections with other firms. For instance, suppliers like MAN Roland and Gebrüder Smith, and customers like the advertising firms and the readers, which has meant adaptation and recombination of Holmen/Hallsta's resource collection as well as Springer way of using and combining resources.

The customers want to make the readers aware of their advertisements. The most effective way to achieve this is to use lots of colours in the advertisement. In other words, the more colours that are used in the advertisement, the bigger is the possibility that the reader will see the ad, and be affected it. Therefore a general trend is to use more and more colours in the advertisements and therefore also in the whole newspaper and Bild am Sonntag is no exception. If more colour is used, a paper with higher printability is demanded, which is for example a paper that can absorb ink in an efficient way that does not disturb the printing process and make the images look nice on the paper. Moreover, in order to achieve a good "contrast" between the advertisement and the paper, a whiter paper is needed. Therefore the paper grades that Springer has demanded has over the years changed in the direction of a whiter paper and a paper with higher printability.

In some cases the customers demand an environmental friendly paper, that often is defined as a paper based upon a certain share of waste paper. Springer has therefore decided that the Groups total newspaper production must contain a certain share of paper made from recycled paper. Springer believes that the environmental issues will become more important in the future. What the advertising customers will define as "environmental friendly" will also

¹⁴² The development of the off-set method has made the ink manufacturer to change the ink's properties. For example the ink has to be more stripped, with smaller sizes of the ink pigment. An ink that is more stripped takes longer time to produce and is more expensive than ink for the old method, the letter press technology. The pigment content in off-set ink is furthermore is higher which is the most expensive part of the printing ink.

guide Springer's behaviour in relation to suppliers of different kinds. Springer has however an important role as an "educator" in relation to its customers, the advertisers, and can influence their perceptions and how they will act in relation to environmental issues. One customer group that is more aware and work actively with environmental issues than others, is the child food industry. Springer has for this sake a special environmental manager whose job is to take care of the environmental issues.

Another central resource that is activated through the exchange between Holmen/Hallsta and Springer is the resources used in the whole distribution cycle. Trucks are taking Bild am Sonntag out to several distribution nodes, where smaller trucks are taking over. This cycle is repeated until the paper reaches the kiosks or the super markets where Bild am Sonntag is sold. What happens when the Bild am Sonntag is "consumed"? Well, then a new cycle of activities starts and a complete set of other resources are activated. Germany is the country in Europe where most waste paper is collected and recycled. As Sweden is not a very densely populated country, the paper industry has to import a rather large share of waste paper and lots of it comes from Germany as it is a big newspaper market.

Holmen/Hallsta's Perspective

Through the exchange with Springer, a large number of resources are activated at Holmen/Hallsta. Paper Machine number 11 (PM11) at Holmen/Hallsta has a production capacity of about 200 000 ton per year. Hallsta has four paper machines. The largest, PM12, produces standard newsprint, while the other three, PM11, PM3 and PM2 produce so called improved newsprint. These are qualities with higher brightness and often also higher grammage. The products on PM12 are based upon partly TMP (thermo mechanical pulping) and DIP (Deinked paper, or waste paper). The other three are based on virgin fiber processed in the TMP process in the cases of PM11 and PM2, while PM3 is supplied with Stone Ground Wood pulp. The major reason why Hallsta produces improved newsprint on PM11, 3 and 2 has to do with the sizes of their paper machines. Paper production is very scale sensitive and bulk production is therefore much more suitable on big and fast paper machines. This production takes place at Hallsta's sister mill within Holmen, Braviken Paper Mill, which has bigger and more efficient paper machines than Hallsta. The improved qualities are produced in smaller production batches which is suitable for smaller paper machines. About 50 percent of its production is devoted to one single product group, Holmen Super News (Within this product group the paper grades differ in terms of brightness). Springer is without doubt PM11's biggest customer and purchase about 15 percent of the paper machine's capacity. The quality that Holmen/Hallsta produces for Bild am Sonntag is called Holmen Super Bright. In general the overall heading for PM11's products is "improved newsprint". In the paper machine, special clothing for PM11's customers is needed in order to produce the improved newsprint. Compared to standard newsprint the clothing is of higher quality with smaller grids. PM11 was built in 1967, but was re-built in 1982 when it got a new head box, a new wire section and a new press section. These investments were necessary in order to increase both productivity but also the quality of the products. Without the new wire section the paper would not for example have two identical sides. The business concept of PM11 is to produce relatively many different products in relation to more modern paper machines. The reason is that PM11 is much slower than newer machines. A modern paper machines runs in 1500-1600 meters per minute, while PM11 has a speed of 1100 meters/minute. A more modern paper machine produce therefore about 25 percent more than PM11 does. At PM11 about 70 man are working in six shifts. The majority are so called blue-collar workers.

PM11 is supplied with thermo mechanical pulp (TMP) from one of the three TMP mills at Holmen/Hallsta, TMP3. TMP3 has a capacity of about 600 tons of pulp per day and together with PM11, TMP3 form a production line. Before the pulp goes into the paper machine, the pulp is bleached with hydro peroxide. A TMP mill consists of a number of so called disc refiners. These are in turn equipped with refiner segments, which are round metal plates. In the refiners wood chips are being processed between the plates. In order to reach the different physical properties of the paper, especially the strength properties mentioned above but also the more optical properties, the wood chips have to be intensively processed in the refiner and between the refiner segments. Therefore the operation is very electricity intensive, about 3000 kWh in total is consumed in the TMP process. In total Holmen/Hallsta consumes about 1,6 TWh during a year, which is more than one percent of the total production of electricity in Sweden. Before the wood chips have reached the TMP mill, they have been chopped in chippers and thereafter screened in order to take away waste that can disturb the process. The wood used at Holmen/Hallsta is only spruce, since it gives the pulp and later the paper the demanded properties such as strength but also optical properties.

Resources Activated in Holmen/Hallsta's Network

In order to produce Holmen Super Bright and to make business with Springer, Holmen/Hallsta is in need of two major inputs, wood and electricity. These two (natural) resources account for a major part of the purchasing costs during a year. Electricity and wood are furthermore two resources that are very concentrated to a national setting. Pulpwood is purchased from the sister company Modö Forests and Holmen/Hallsta needs about 1,2 million cubic meters of wood during a year. This means that over 21 000 trucks of wood deliver the spruce that later will be processed into pulp and paper to the mill. However, even if this is an internal commercial operation when Holmen/Hallsta pays Modö Forest, the biggest part of the pulpwood is in practice supplied by a competing forest company, Stora Enso Forests. The reason to this is that Modö, Stora Enso and another forest company, Korsnäs, have formed a joint purchasing company in order to make wood distribution to their different mills as efficient as possible. Besides of Stora Enso and Korsnäs, Modö Forests purchases wood from other independent forest owners. The average distance a tree travels to get to Holmen/Hallsta is 100 kilometres. A certain amount of the wood comes from the Baltic countries.

Wood fibres can be shorter or longer. The long fibres give the pulp and the paper its strength properties but are on the other side darker because they come from older trees. The long fibres also need more refining in the TMP mill than the shorter fibres, which often come from young spruce. For the products produced on PM11 the short fibres would be absolutely the most optimal as they give the paper good optical features, such as brightness and printability. Therefore Holmen/Hallsta has asked for a certain sorting of the wood. If this would be possible Holmen/Hallsta would save a large part of its bleaching costs. As a consequence it would also be possible to save electricity in the refining of wood chips as only short fibres would be processed and not the long ones that instead could be used for other qualities where strength is more imperative. However, due to the transport optimisation plan that Modö Forests, Stora Enso Forests and Korsnäs have worked out all the spruce is handled as more or less a homogenous resource, even if it is far from it. This also means that Stora Enso is Holmen/Hallsta's largest supplier of pulpwood. Therefore Holmen/Hallsta has not been able to get any special sorting, at least not to any large extent. Instead Holmen/Hallsta sorts the wood at the mill's wood yard in three different qualities, bright, dark and a third unspecified quality. The wood quality is determined on the basis of the "year rings" of the trees.

The production and perhaps even more importantly, the distribution of electricity has for long been the domain of governmental ownership, control and regulations. However in the last 5 years Sweden has deregulated the electricity market. One reason is of course that electricity has many of the features of a product that makes it suitable to be traded in a classic market place. Therefore an electricity-exchange has been created, Nordpool. However, in spite of this Holmen/Hallsta has chosen to stay with its old supplier, Vattenfall, which has supplied the mill with power for 85 years. One reason is that Holmen/Hallsta needs such large volumes that can not be purchased over the counter. Another reason is that Holmen/Hallsta needs the knowledge that Vattenfall possesses in order to solve problems that have to do with the transformation and distribution of the electricity to the mill.

The electricity and the wood is used and processed in production facilities that are supplied by a rather limited number of firms. The TMP mill that supplies PM11 is supplied by Sunds Defibrator¹⁴³ and the German firm, Voith, manufactures PM11. The relationship with Sunds Defibrator is quite undeveloped due to old ownership ties to Holmen's competitor, SCA, while Voith is considered a close partner. Voith also supplied PM11 when it was rebuilt in 1982. Still, these firms are of course very important in order to use electricity and wood as effectively as possible. Every paper machine at Holmen/Hallsta has a series of well-identified customers. Depending on the paper machine's size, there are few or several customers that the paper machine serves. Other customers than Springer on PM11 are both big and small; the majority are however small. To most of these customers Holmen/Hallsta is one of two or three and in some cases one among several suppliers. In the Western part of Europe which Holmen and Hallsta consider at their home market, it is paper mills from the Nordic countries that Holmen/Hallsta share customers with, at least when it comes to larger customers. For smaller customers, the paper mill is more often the sole supplier.

In order to inform both customers but also parallel suppliers and customers' customers about products and opportunities and support the customers in various ways, Hallsta and most other paper companies has formed an organisational unit that takes care of these issues. "Technical Marketing", which is the formal name of the function is the customers helping hand when problems arise. Technical Marketing can also work together with other suppliers such as ink producers, printing press producers and control equipment producers in order to increase the productivity at the customer's printing site. The information and knowledge developed by the Technical Marketing function is reported back in a monthly meeting at Hallsta, where also sales and order planning as well as production people participate. In these meetings Technical Marketing informs the Hallsta people what types of problems that have been observed at important customers and how Hallsta's products can be of any help in order to solve the problem. Sometimes the problem is Hallsta's products and then Technical Marketing brings back information so that the production people can change the product in some dimensions. The people working as Technical Marketers are responsible for products that come from one or two paper machines. So even if Holmen produces newsprint in both Hallsta and Braviken, there are different people that is working as Technical Marketers for Hallsta's newsprint and so on. The reason is that paper machines and their products are different in some aspects in relation to other resources, even if they are supposed to be typical commodities and therefore "behave" in a homogeneous way.

¹⁴³ In practice the TMP mill was purchased from Jyhlävaara, a division within the Finish paper company United Paper Mills (UPM). Jyhlävaara was later taken over by Sunds Defibrator, which in turn was taken over by the Finish paper machine producer, Valmet in 1999.

Other big customers for PM11 are Interprint, one of Scandinavia's biggest magazine producer and STC (Svenska Tryckcentralen), which produces tabloids, journals and books. What is different with Interprint is that it uses a somewhat other printing technology than for example Springer, which uses the offset technology. Interprint prints with the photogravure printing method, where the ink is distributed from "valleys" on the printing plates to the paper. This method requires a very even paper surface and the wood fibres must therefore be well defibrated. The strategy of PM11 and Holmen/Hallsta was some years ago to go for the customers with the photogravure printing technology, since they thought that it would become a dominating method within the printing industry. However, it never became the big hit as Holmen/Hallsta thought, but as some products go to customers with photogravure printing presses, all the other customers on PM11 also get pulp that is processed for this printing technology and so does also Springer. For very big customers it happens that the paper is adapted in terms of functionality and appearance. One example is how Holmen/Hallsta adapted the products from PM11 to Springer with a mixture of colours to make it more yellow. These types of adaptations are fairly experience based. The adaptation started in the paper machine and was specific for Springer. Since big customers such as Springer account for such a large share of the production it happens that certain adaptations to big customers in the end become a standard for other customers. However, as mentioned above Holmen/Hallsta wanted to produce a somewhat more standardised product to Springer.

Conclusion

In this paper our attempt has been to illustrate and analyse how the exchange, the use and the value of a specific resource is embedded in several larger structures. In the case study we have made three main observations that have implications for firms. First, as assumed in the beginning of the paper the value of the focal resource, Holmen Super Bright, is realised in the focal resource exchange. Holmen/Hallsta has been able to provide a resource that the two parties have been able to realise into economic value for almost 60 years. However, this does, of course, not mean that Holmen/Hallsta is still selling the same paper as in 1940s to Springer. Furthermore, Hallsta and Springer are not the only ones creating this value, there are as indicated a large number of firms that are involved in the value creating process. For the supplier firm, Hallsta in this case, value creation is obviously, as we proposed in the theoretical part of the paper, a process where the firms over time manage the embeddedness. Instead we consider that the value in a specific exchange is created in the larger structural conditions which the network constitute.

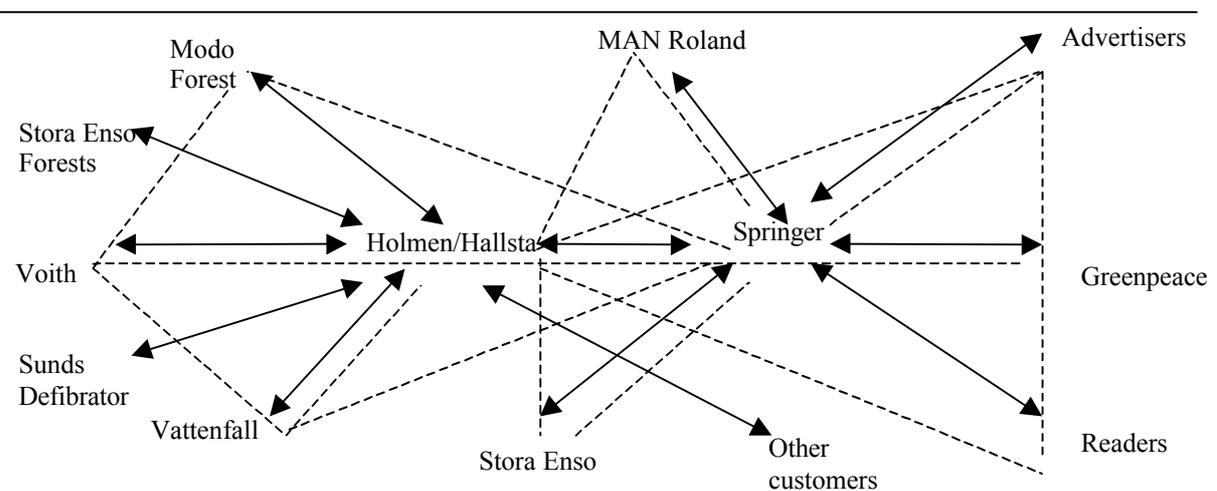




Figure 3. The Embeddedness of the exchange layer in the resource layer.

Second, creating value is in consequence with the observation mentioned not only a question of handling the exchange with the customers and suppliers but also about managing the embeddedness that the resource layer implies. For instance, as we saw in figure 3 Holmen/Hallsta is active not only in relation to the its important exchange partners Modo Forests, Springer and Vattenfall. But, Holmen/Hallsta both strive to acquire knowledge about and influence on other actors like the advertisers, the end-customers, the Swedish-Finish paper supplier and MAN Roland. In the same way, Springer’s resource collection is connected to both Holmen/Hallsta’s suppliers of equipment, Modo Forests and Vattenfall. In the case there are clear evidence that Holmen/Hallsta is following our propositions concerning re-cognition of the embeddedness. In order to being able to realise the value of Holmen Super Bright it has set up an organisational unit, Technical Marketing, whose task is to collect information and interact beyond the exchange partner Springer. In the same way is Springer acting. Springer’s production unit in Ahrensburg consume 65 000 MWh of electricity every year. The paper consumption lies on 250 000 tons of paper. Springer has an explicit goal to become more energy efficient in its own production processes. However, Springer also use 90 000 000 kWh that are embedded in the products that Holmen/Hallsta supplies Bild am Sonntag with. Springer also use over 13 000 cubic meters of wood that can be derived from Holmen/Hallsta’s products. Therefore on a resource level there is a clear connection between Springer and Vattenfall and Springer and Modo Forest or Stora Enso Forest. For this reason, there is a need for Springer to manage the embeddedness. Springer has for example a highly qualified testing office, which implies that the different input resources can be tested together in order to understand how the features of the resources work together. Another example of how Springer manages the embeddedness in the network is the fact that it has set up an environmental office in order to handle the changed attitudes towards environmentalism.

| | RE-COGNITION OF THE EMBEDDEDNESS | | MANAGEMENT OF THE EMBEDDEDNESS | |
|----------------|---|----------------------------------|--|---|
| FIRMS | <i>Organisational unit</i> | <i>Performance of activity</i> | <i>Re-combination of the internal resources</i> | <i>Re-combination of the resources in the network</i> |
| HOLMEN/HALLSTA | Technical Marketing | Service and knowledge generation | Re-allocation of paper machines’ size in order to match customer’s demands | Better sorting of wood New combinations of paper and ink |
| SPRINGER | Testing office. Environmental office | Testing and knowledge generation | Combinations of ink-paper and printing press | New printing technologies and new ink technology |

| | |
|--|--|
| | |
|--|--|

Table 1: Summary of the value creation in the case Hallsta/Holmen-Springer.

Third, creating and realising value comes from the complementarity and durability of the network of connected resource collections. Certainly, the firms can through the exchange affect the resource use, that is, decrease the costs, but to increase the value of an exchanged resource, firms must follow the direction of the resource connections and not only the logic of the exchanged resources. In the case, both Holmen/Hallsta and Springer continuously improve the complementarity and durability of their resource collections in relation to the surrounding network. For example, we have seen that when Holmen/Hallsta sells its products to Springer, electricity is embedded in Springer's resource collection and combined with a large number of different resources, such as ink, printing plates, rubber blankets etc. In the next step Springer sells advertisement space to firms. Then features of the paper are activated and become embedded in the relationship between Springer and the firms that advertise in Bild am Sonntag. In the end, the reader consume the Bild am Sonntag and respond to the text and the images in the paper. The advertisers hope that the reader will respond to the messages in the ads and so will the resources and the features that they have shaped become embedded in the "relationships" between the advertising firms and its consumers. The result but also the pre-requisite for this are the business relationships that the firms and actors have formed and that in some examples are very long term. We believe that the reason to this is to take care of the features of the different resources in the network and by doing so create value. To sum, we believe there are two steps to create value in an industrial network. The first step is to recognise the fact that the firm and the resource exchanged are embedded in wider structures. The second step is to manage the embeddedness. This is summarised in table 1.

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