Value Chain Innovation
An Actor Network Theory approach to innovation at the interface between the service and other economic sectors

1. Introduction
For some time, much work has been put into the topic of innovation in the service sector (e.g. van den Aa and Elfring 2000, Sundbo and Gallouj 2000, Drejer 2004, Tidd and Hull 2005, Gallouj and Djellal 2010), and we already know much about the drivers of and barriers to service innovation processes. Not least we know that service firms, particularly knowledge service ones, are as innovative as manufacturing firms. However, we also know that the innovation capability of most service firms is limited (e.g. Sundbo 2010) because the innovation processes in these firms are not systematic and not based on a division of labour utilising separate innovation departments. Service firms are still looking for better tools and methods with which to improve innovation, and which can maintain their close relation to customers, and the flexibility and practice-base of their innovation activities. Recently, the idea of user-based innovation (e.g. Kristensson, Gustafsson and Archer 2004, De Moor et al. 2010, Heiskanen et al. 2010; much of which is based on von Hippel 2005), has been emphasized as being particularly applicable to service innovation because traditionally service firms have a close relation to their customers in the delivery process. In this paper, we present and discuss a further development of the user-based approach, namely a model for value chain innovation. This model includes the roles of the users and the users’ users plus relevant experts and help functions (such as media-PR) involved in an innovation project. The basis for this model is neither the idea of ‘user-imitation’ that von Hippel (2005) has introduced, nor supply chain innovation in which narrow seller-buyer relations are seen as being the basis for innovation (cf. Roy, Sivakumar and Wilkinson 2004). Rather, it is a strategic innovation approach (Sundbo 2001, Tidd, Bessant and Pavitt 2001) in which market possibilities and sales strategy are taken to be an integrated part of the innovation process.

The blur between sectors, particularly between the service and manufacturing one, has also been emphasized in research, although it must be said that not much research has been done about the topic (recently called servitisation, e.g. Wilkinson, Dainty and Neely 2009). Value chain innovation unites not only aspects relating to services and goods, but also the development of raw materials (for example food) and experiences (cf. the discussion of the experience economy, Pine and Gilmore 1999).

This paper presents research results based on experiments. Value chain innovation is a particular method that has been developed through experiments and has been shown to be successful in these experiments. The model works for some service firms in some situations, but not for all service firms in all situations. The paper presents results relating to how the model works, which social and technical factors are decisive for driving a successful innovation process and which problems arise.
Such research has given us a greater insight into innovation processes and it offers practitioners a tool that can make the service innovation processes more systematic and more efficient. The experiments and the concept of value chain innovation can be understood, supported and extended by using an Actor Network Theory perspective (e.g. Law and Hassard 1999, Latour 2005).

2. Theory and modelling
Based on empirical (primarily case study) results, the theory of service innovation has emphasized the organisation of the innovation activities (Sundbo 1996, Gallouj 2002, van den Aa and Elfring 2002, Tidd and Hull 2005). The innovation activities are usually ad hoc and often founded on quick managerial decisions, and the development of the innovations is often organised around projects. Employees and customers are seen as key actors in the innovation processes. Recent theory suggests that the organisation and management of innovation processes in service firms often is rather flimsy precisely because it relies on individual actors – employees, managers and users – working on ad hoc projects (e.g. Bessant and Maher 2009, Sundbo 2010). This is in contrast to the organisation of R&D in manufacturing which ensures that there is a defined organisational unit dedicated to innovation. Actor-based innovation activities found in service firms are unstable because the actors have other tasks as well and have difficulties in multi-tasking. The innovation activities, which are frequently long-term, often suffer when the actors are under pressure to carry out other tasks. The theory that service innovation processes are unnecessarily inefficient is based on the empirical findings that employees have difficulties in formulating real innovative ideas and that the management system has difficulties in handling the ideas (Petit 2010). Users have also been emphasized to be the basis of service innovation. Further, in B-to-B situations, users (or buyers) may be dependent on their users (or customers), which influences their inclination to buy a new service. The service provider is also a user for whom innovations may be dependent on the possibility of procuring technology, competencies or other inputs from suppliers which are essential to service providers’ innovations. Empirical research has even shown that customer involvement, which has been stressed as a particular strength of service innovation in service marketing and management theory (Eiglier and Langeard 1988, Edvardsson, Gustafsson, Johnson and Sanden 2000, Kristensson, Gustafsson and Archer 2004), is not very high in services, and even lower than in manufacturing (Srilli and Evangelista 1998, SIC 1999, Drejer 2004). Users, or customers, seldom present ideas for innovation in the service encounter.

Our understanding of service innovation processes must be developed. It is a complex social process which includes barriers, inertia, inefficiency and uncertainties about what to do. One may assume, theoretically, that there is not one way of organising the process, but several, each of which can be successful for some service firms in some situations. Each service firm has to choose and try a specific model. This is a difficult task for the management because there is no sure fire answer. Empirical research does not even show that it is a question of the external market situation (as the contingency organisation theory claims, e.g. Lawrence and Lorch 1967), thus a simple dual model of the firm’s external situation (as Burns and Stalker (1968) found in manufacturing) can be used as a guideline. Internal resources and capabilities that are emphasized in the Resource Based View of the Firm (e.g. Teece and Pisano 1994) are also decisive. Other important factors include how the employees involve themselves in the innovation process, how the managers organise the innovation activities, how people interact in the innovation processes and how users are involved. Research can help to find out which way or model a firm should choose in a certain situation.

The research presented here drew on the concept of the value chain as developed within the strategic literature (particularly Porter 1980) to characterise how a product is produced and developed starting from the raw material to the product’s sale on the market. Each step is seen as one that can add more value to the foregoing ones. The concept of the value chain characterises the
model of innovation developed here. The model is based on the research results presented in this paper. While Porter’s value chain is functional, i.e. it emphasizes the functions of each step; the value chain innovation model is both functional and social. It emphasizes both the functions and the actors that carry out each step. Unlike Porter’s the innovation model is not a production model but one which describes an innovation process. Thus, we do not simply copy Porter’s value chain model, but use its principle ideas.

The idea of the supply chain, which is similar to that of Porter’s value chain, has also resulted in the production of a large number of scientific works (e.g. New and Westbrook 2004, Mentzer, Stank and Myers 2007). Although supply chain innovation has been investigated and discussed theoretically (e.g. Cachon and Fischer 2000), it remains an under-researched area. Supply chain innovation theory has mainly been based on the relation between seller and buyer as being the basis for innovation (Bidault, Despres and Butler 1998, Flint, Larsson and Gammelgaard 2008, Bakhshi and McVittie 2009). This idea is founded on the user-producer relation that was emphasized in innovation research a couple of decades ago (Lundvall 1985). Supply chain innovation models focus on the involvement of customers and customer satisfaction (Roy, Sivakumar and Wilkinson 2004), and they look at the supply chain as a series of successive steps in each of which customer-producer innovation can take place. These models emphasize integrated innovations, i.e. innovations that involve both services and goods (e.g. Johnson and Carlos 2008). Even experiences are seen as a link in a supply chain, these too can be the source of user-producer innovation (Bakhshi and McVittie 2009). In this respect, these models cover aspects of innovation that we, here, attempt to model within value chain innovation. The value chain innovation model that we develop in this paper, however, is not based on successive innovation processes in a supply chain, but on involving all actors from each of the supply chain links in one project group that carries out the innovation process on one concentrated, continuous and fast course. Additional actors that are not part of the supply chain, unless the concept of the supply chain is extended to a degree that may destroy its logic, are involved in value chain innovation. They may be actors such as researchers who – in the experiments referred to here – though not providers of direct knowledge nevertheless provide input to innovations as process facilitators. They may also be public change agents or consultants who act as advisors. If one can use an analogy with chemistry, one may say that within the supply chain logic, all the elements take direct part in the process (they are inputs that end up with a new output), while in value chain innovation there may be elements that function as catalysts (such as facilitators and advisors), they get the process going, but they are not part of the output.

The concept of a network has been used quite generally as a metaphor for a theoretical understanding of innovation processes that are loosely coupled to external actors (Johannisson 1987, Hakonsson and Snehota 1989, Kastelle and Steen 2010). Innovative networks can either be relatively closed networks such as formalised collaborative research and innovation networks (Pyka and Küppers 2001), or more loosely coupled networks such as those everybody has simply because we know other people. The theory of open innovation (Chesbrough 2006) also implies that innovation can be carried out in a network such as one in which new members can be involved along the process when they are needed for the innovation. Even though many actors are involved, value chain innovation is not carried out in a network. Value chain innovation is driven by one player – an entrepreneur or a change agency organisation – sometimes two. Other actors are involved to help the entrepreneur or a change agency organisation develop the innovation. The innovation process is carried out in an integrated project group in which the actors are active; there is no loose coupling as assumed in networks (e.g. Powell 1990, Hakonsson and Snehovd 2005).

Sometimes external actors may be involved in sub-processes to solve a specific problem or create an element that must be included in the innovation. The project group is thus centred round the driving actor who may, even from the beginning, introduce new members of whom some are only
loosely and briefly coupled to the network. Such inclusion is decided by the specific aim of the innovation and the group only exists as long as the innovation process is running. A network may be a precondition for the value chain innovation because the entrepreneur or a change agency organisation needs to know people and firms that can be useful in the innovation process, but the innovation group is not a network and it is not necessary for network relations to exist before the project starts.

Innovations that are carried out within the value chain innovation framework are often integrated as has been observed with service innovations (Sundbo and Gallouj 2000). Integration means that the innovation includes a new service product, new procedures and delivery system, new organisational forms and new market behaviour. Thus, from the start, the market possibilities are as important as a new behaviour or technology in the service production and delivery. Moreover, people that can support the market launch may be as important as people that can develop a new technology or a new service production system.

The value chain model presented here is not fixed, the individual steps and order may be different according to the situation. Further, as mentioned, we are open to the possibility of including actors that are outside the chain, but who can contribute to a smooth and efficient innovation process. This could, for example, be people from knowledge institutions such as a university, though not in the same way as in the classic R&D model where basic research is seen as the first step in an innovation, but as process facilitators and knowledge input providers who are active at each step. A possible (but not standard) model of a value chain innovation process could be the following:

**Figure 1**  
*Example of a value chain innovation process – The functional side (what was done)*

**New food and experience concept of a café**

<table>
<thead>
<tr>
<th>Raw material</th>
<th>Processing to raw product</th>
<th>Refines processing</th>
<th>Distribution</th>
<th>Service</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming</td>
<td>Diary</td>
<td>Food industry</td>
<td>Wholesaler</td>
<td>Café</td>
<td>Music,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>atmosphere</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Packing</td>
<td>Packing industry</td>
<td></td>
<td></td>
<td>Marketing</td>
</tr>
<tr>
<td>Public knowledge institution</td>
<td>Café web sites</td>
<td></td>
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</tbody>
</table>

The example shows the development of a new café concept. This includes a new product (organic coffee) served in a new atmosphere: a refined “Viennese café”. The core elements were twofold. Firstly, a technical innovation was required for the development of a new type of organic low-fat milk that could be whipped and thus used to make cappuccino coffee. Secondly, changing the café environment required both a social innovation (the waiters needed to behave differently) and an architectural innovation (a new arrangement of the room and lightening (energy saving bulbs)). This is the functional side of the Value chain innovation process. The social side characterises the individual representatives engaged in the different steps. These individuals, or organisational units, can in this specific case be characterised as follows:

**Figure 2**  
*Example of a value chain innovation process – The social side (who did it)*
Each of the steps or elements – even those outside the development line – add value to the final product. The functional steps are necessary to develop the new coffee and concept. The social actors make the innovation process happen. The idea of the model is that each step is not taken successively, but simultaneously in a short-term innovation and development process. The innovation process is strategic (Tidd, Bessant and Pavitt 2001, Sundbo 2001): It takes into consideration the market possibilities, all the necessary material, social elements and the social process that must be present to realise the aim. It is not based on a single idea of a new service or product, but more on the idea of a broader concept (in this case the new type of coffee and experience).

Both social and technical factors are important in this innovation process. The innovation process is carried out in a project in which all the actors are present. To some extent this situation resembles the laboratory that Latour (1987) described in his seminal work “Science in Action” which suggests that Actor Network Theory (ANT) could provide a theoretical framework through which one can understand value chain innovation. ANT is not a deterministic theory postulating exact cause-effect relations, rather it is a more hermeneutical framework for understanding processes. The theory has been developed from studies of manufacturing research and innovation, but can be applied to service innovation. ANT emphasizes social agents as actors who are not necessarily bound by determining social structures, but who – at least to some degree – are free agents that can form temporary groups with special purposes (such as making an innovation). The social agents are not bound together in a fixed structure, but can establish momentary associations (Latour 2005 p. 65). Such associations are the innovation groups that are formed to develop value chain innovation.

It is not only social agents that are actors, material elements such as a technical inventions or technological trajectories (Dosi 1982) can be considered actors too. Material elements may be necessary to reach the goal (the innovation) and their nature and the way in which one can develop them can influence the innovation and the behaviour of the social group engaged in the innovation. Social factors are important for the innovation, but technical factors such as finding the right type of milk and how it can be processed are also important.

Thus, when applying ANT to service innovation, we include the manufacturing, raw material and even experience elements in the model and thus get an understanding of the combination of service and manufacturing. The value chain innovation model describes processes in which social and technical aspects of service innovation are involved. In ANT (Law and Hassard 1999, Czarniawska and Hernes 2005), there has been a discussion of whether the social or the technical factor is most important. This discussion is a reflection on STS theory (Bijker, Hughes and Pinch 1987), which claims that all technology is socially constructed. ANT claims that technical factors are also determinants of innovations. This may be challenges the generally held understanding of service innovation since services traditionally have been seen as being man-made. This point of view can no longer be maintained, it has already been demonstrated that IT has a great influence on
the development of service innovations. We see value chain innovation as mainly based on social
behaviour, but material elements may be necessary.

3. Method
The first finding of the value chain innovation model: Practise base
The value chain innovation model and the scientific understanding of service innovation processes
that it implies have been developed and investigated by means of experiments which employed a
particular analytical approach – a field experiment – which includes an array of methods and data
collection techniques (cf. Sørensen, Mattsson and Sundbo 2010). The experiments were started in
Denmark in 2008 by the author of this paper and another researcher who wanted to test how service
innovation processes could be improved (i.e. have a greater success rate and be developed in a short
time) by using results from the research literature about how to organise innovation processes. We
therefore collected a series of tools and instruments from the academic innovation and service
literature. We then started an innovation field laboratory in one service firm, a food wholesale
company, to see how the firm could select tools and which tools were most efficient. The
innovation laboratory consisted of a group of managers and employees from the wholesale
company.

It turned out that the managers in the wholesale company could not use any of the tools as they
were thought too complicated and academic. Instead they presented an idea of involving two
customers who were café owners. The café owners started talking about their desire to use low-fat
milk in cappuccino, but this type of milk could not be whipped. A manager from the wholesale
company introduced the manager of a small organic dairy who developed a plan for inventing a new
type of organic low-fat milk that can be whipped. His largest problem was to find an organic farmer
with the excess capacity to produce the milk. At a later stage, one of the café owners said that he
wanted a new concept for his café, which emphasized customers’ experience of an exclusive
organic style. He would like to continue the innovation process to include the new milk in the
coffee within his new concept of the café. This required some architectural changes in the café and
the waiters behaving differently. The researchers were supposed to contribute to getting the café
personnel to behave differently; they were considered, not as objective spectators, but as practical
consultants. This innovation process was carried out successfully. The milk was developed – and
became a great sales success for the dairy and the wholesaler – and the café got a new economically
beneficial experience-rich concept. All of this happened very quickly (within less than a half year).

Thus the experiment was turned completely upside-down. Instead of a deductive testing of
academically formulated tools, practice took over. The practitioners formulated their own way of
undertaking successful innovation. They would not have done so if the researchers had not arrived
and started the experiment, however, the process was not one of a well-planned experiment. The
researchers were “reduced” from being the directors of the experiment to catalysts in the
practitioners’ own process development. In the subsequent evaluation of the experiment, the
researchers formulated the value chain innovation model based on the new understanding of service
innovation which saw material elements such as a new type of milk as being part of a service
innovation..

Further testing and development
It was decided to test the new model further and obtain results about drivers and barriers of the
model by making some more experiments. Three more experiments were carried out. The four
experiments are described below and in table 1. In all experiments an innovation group was
established. The group met regularly and worked with the development of the idea. Special
elements such as the technical development of a kind of new milk were made outside the group (in
the milk example it was in the dairy). A team of two researchers carried out each experiment; they functioned as process facilitators in the innovation groups.

The essence of the four innovations and the processes that developed them can briefly be described as follows:

1. **Organic Cappuccino milk and café concept**
   As has been described in the previous section, central to the innovation was the development of the special organic milk and the way this event led to the start of an innovation process in café 1. This process involved customers and employees in creating ideas which could support the development of a new concept emphasizing exclusive gastronomic organic coffee and the social and physical environments that underline this concept.

   The innovations in this case have been a new organic low-fat milk and a new café concept. The milk has been a sales success and thus created growth and profit for farmers, the dairy, the wholesaler and the cafés. The new café concept has been a success for the café.

2. **Gastronomic pasta**
   A farmer on a Danish island discovered that this island is the only place in Denmark where durum wheat, which is necessary for making pasta, can grow. The farmer grew durum wheat and had engaged a pasta expert and bought production machinery for pasta. Their idea was to sell the pasta to tourists as a souvenir. When the researchers entered the development project, they also involved a food wholesaler. This led to the belief that a larger market existed if the pasta could be sold as gastronomic pasta at a high price in the capital city. The innovation process then became about finding a way to market the pasta as a gastronomic experience-rich product. A market innovation was developed: Chefs from some gastronomic restaurants in the capital city should use the pasta in advanced menus which would highlight the pasta. This required a special pasta. Experiments were made with herb flavouring in the spirit of the Nordic Food concept. This was done successfully and some restaurants used the pasta which provided the basis for newspaper and magazine articles. The wholesaler marketed the pasta to special shops and small, sophisticated, supermarkets. Thus this innovation was a combination of a gastronomic-material invention (wild herbs in pasta) and a new marketing strategy (via chefs and magazines to high class opinion leaders).

   This innovation was successful for the farmer. The pasta could not compete on the mass market, but in this niche the farmer could make a profit. Even the wholesaler benefited, both because of increased sales and because of a marketing effect following the publicity.

3. **Christmas Lunch**
   A hotel on a tourist island wanted to extend the season to include the winter period. When the researchers entered the process, a group was established consisting of several actors: Two tour operators (one providing physical action tours and one providing sailing tours), an owner of a car hire service, a manager from a travel agency and an editor of local weekly newspapers on the island and Copenhagen. An idea of organising Christmas lunches (which are an important Danish tradition) for firms from Copenhagen was developed. The product was to be a combination of accommodation and food in the hotel with activities on the island and possibilities for driving around in hired cars. The editor provided PR in his newspapers in the capital city. The innovation was the combination of existing tourist products on the island with the special experience event of Christmas lunches and a particular promotion campaign.

   The innovation was successfully developed and launched. However, the benefit was never realised because the hotel went bankrupt just before the Christmas season. This was caused by other factors (the burden of a high interest due to previous investments in new buildings and the financial
crisis). This experiment shows that value chain innovation can generate profits and business progress, however the innovation might progress too slowly to save a firm in an acute economic crisis.

4. Involving excluded labour force
A firm provides temporary manual service of many types (from repairing machines in industry to garden work). Their main competence is their ability to rapidly find employees to solve customers’ problems. They have had a contract with a municipality about employing an excluded labour force (typically long-term unemployed, alcoholics, immigrants etc.) receiving economic support from the municipality; the labour force carries out garden work for the municipality’s pensioners. When the researchers started the experiment the service firm wanted to extend this business.

The innovation was pedagogical in nature. It was the ability of the managers and personnel of the service firm to get the excluded labour force to act as normal labourers. This implies arriving on time, carrying out one’s part of the job in a team etc.

In this case, the experiment was started before the researchers arrived. An innovation group with representatives from a municipality and some managers from the service firm already existed. They developed the concept. Two people in particular drove the process: The entrepreneur-owner of the service firm and the director of the municipal social services. The researchers started as process facilitators. However, the director of social services got a new job and left the group and his replacement was less engaged in this project causing the innovation process to become slower and more insecure.

Initially, the innovation was successful for the service firm; it increased the turnover, the firm got a new channel for procuring workers, it developed relations with the municipality and new competencies. However, this experiment also shows how sensitive value chain innovation can be to core individuals disappearing from the process.

Table 1 summarises the experiment processes in the four cases.

<table>
<thead>
<tr>
<th>Table 1 Experiments with value chain innovation</th>
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</thead>
<tbody>
<tr>
<td><strong>Experiment</strong></td>
</tr>
<tr>
<td>1. Organic coffee milk and café concept</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Actors involved*</th>
<th>Course</th>
<th>Activities</th>
<th>Result</th>
<th>Benefits (who benefited from the innovation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Organic coffee milk and café concept</td>
<td>Wholesaler Café 1 Dairy Café 2 Farmer Wholesaler’s employees Café 1’s employees Café 1’s customers</td>
<td>Started summer 2007 with two researchers contacting the wholesaler. The first innovation group was established in August 2007 and the work ended in December 2007. The second innovation group was started in March 2008 and terminated in September 2008.</td>
<td>Meetings in the group 1. Invention of a new type of milk by the dairy. Extension of an organic farmers production capacity. Idea coming from wholesaler’s employees. Development of a new café concept in group 2. Café 1’s employees providing ideas</td>
<td>1. New coffee milk 2. New organic café concept</td>
<td>Café 1 (both innovations) Wholesaler (milk) Dairy (milk) Farmer (milk)</td>
</tr>
</tbody>
</table>
### 2. Gastronomic pasta

<table>
<thead>
<tr>
<th>Partners</th>
<th>Process Description</th>
<th>Outcomes</th>
<th>Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer and pasta manufacturer (including a pasta expert) Wholesaler Chef</td>
<td>The innovation process took 6 months from March 2009. The farmer and the wholesaler carried out the marketing afterwards.</td>
<td>Meetings in the group. Technical experiments with wild herbs in pasta. Marketing activities including restaurants’ use of the pasta and sales promotion.</td>
<td>Creation of a niche market for exclusive pasta and a gastronomic movement. The farmer (pasta producer) Wholesaler</td>
</tr>
</tbody>
</table>

### 3. Christmas Lunch

<table>
<thead>
<tr>
<th>Partners</th>
<th>Process Description</th>
<th>Outcomes</th>
<th>Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel Physical action tour organiser Shipping company Care hiring service Travel agency Newspaper editor</td>
<td>The innovation process was carried out in the space of 5 months from February 2009.</td>
<td>Meetings in the group. Development of action tours by the tour operator. Promotion planning by the editor.</td>
<td>A new concept for Christmas lunch. (Hotel)(Tour operators)</td>
</tr>
</tbody>
</table>

### 4. Involving excluded labour force work

<table>
<thead>
<tr>
<th>Partners</th>
<th>Process Description</th>
<th>Outcomes</th>
<th>Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm providing temporary manual services Municipality</td>
<td>A development process had been going on 2007-2008. The researchers entered the process from 2008 to 2010.</td>
<td>Meetings between managers from the service firm and managers from the municipality. Development of managerial methods for the service firm’s employee. Meetings with the researchers.</td>
<td>A new pedagogical management approach to involve excluded labour force. The manual service firm. The municipality (solved social problems)</td>
</tr>
</tbody>
</table>

*The researchers functioned as process facilitators in all the experiments.*

* Those partners who are underlined are the main partners in the innovation process

As stated earlier, the hotel went bankrupt for other reasons in the implementation phase

After the experiments, the researchers analysed the material that documented the experiment process in each case (interviews, diaries that have been made during the experiment, documentary material) to find out which factors were decisive for the success of the experiment and which barriers existed. The researchers in each experiment team discussed these issues and the manager who was in charge of the experiment in the core actor-firm was subsequently interviewed to get his or her evaluation and discuss the researchers’ evaluation. These evaluations are the basis for the results that will be presented in next section.

### 4. Results

In this section we present results concerning how the model works – which social and technical factors are decisive for making the innovation process successful and which problems turn up. These results are the conclusion of the researchers’ and practitioners’ evaluation of the four
The results are based on factors that were deemed important in two or more of the four experiments. If a factor was only important in one experiment, we eliminated it on the basis that it could be too specific to that particular field, form or experiment group. The results cannot be generalised because of the nature of the qualitative experimental method. More controlled experiments or quantitative studies should be made to prove the results’ generalisability. However, these results can tell us something about service innovation processes.

**What makes value chain innovation successful?**

*A fast and efficient innovation process*

Compared to normal service innovation that the firms involved had developed earlier and compared with research results in general (Sundbo 2010), it is a fast process. Value chain innovation thus makes the innovation process more efficient and more profitable for the firm(s) involved. The greater the efficiency is (including in terms of the market penetration of the new service, hereunder a possible material product), the faster and more secure it is. The reasons for its speed and efficiency are described below.

*All the relevant actors are involved in the innovation group*

All actors that are necessary to carry out an innovation are included in the innovation group. They are dedicated to the process and can react quickly in their own area (e.g. a dairy that must develop a new milk type) and in the group. Some actors are user-producer parties in a supply chain. They can very quickly and efficiently negotiate and develop common elements (such as a diary and a farmer) necessary for the innovation. This is possible because they had a B-to-B relationship. A direct user-producer collaboration in such an innovation group would not be possible in a B-to-C relationship. It would be difficult to select which consumers to involve and the consumers do – according to the involved firms’ experiences – mostly not act in a very goal-oriented manner (they focus on their own problems, which may not be general, they most make complaints or they present unrealistic ideas). Generally speaking they do not have the same direct interest in the innovation as the business partners (they may buy another service or the service is not very important to them). Other actors are experts, typically market experts (as a manager for a travel agency functions as a market expert for a hotel that wants to attract new customers). They represent the consumers. The users are thus represented via experts on user behaviour.

*All elements are united: Material, service and experience*

Value chain innovation unites technical, service and experience elements in the service product, the production and delivery process and the marketing. Even aspects relating to raw materials (e.g. farm products) are included in the innovation group’s competencies. Servitisation (Wilkinson, Dainty and Neely 2009) is built into the innovation from the beginning. Further, representatives of each of these elements, who may come from different cultures, get to know each other and gain a common understanding.

*Entrepreneurship*

A certain entrepreneurial spirit among all participants is a major driver of value chain innovation. If the people involved persons have a drive and a will to realise the innovation, it increases the probability of success tremendously. It is particularly progressive if the core firm is represented by an entrepreneur who can drive the process.

*The market accept is included from the beginning*
Whether and how a new service will be accepted by the market is decisive for the innovation’s success. That is why the market has been emphasized in service innovation and development and in strategic and user-based innovation theory (Grönroos 2000, Sundbo 2001). In value chain innovation, the market possibilities are represented from the beginning and are the point of departure for the innovation process. The innovation process is continuously oriented towards market possibilities and possible market reactions.

Technical challenges can be solved efficiently
Technical elements that are needed for service innovation can be developed quickly and are goal-oriented because the technology suppliers are represented in the innovation group. It is important that the suppliers are represented by a person who can make decisions in the group as it leads to less time or other resources being wasted in relation to long-term considerations, unclear developments and dysfunctional communication.

Composition of the innovation group
It is important to have the right composition in an innovation group in terms of both functions and personnel. The functions are the link-actors in the supply chain and “side-actors”, for example relevant knowledge providers, architects or artists (or other experience designers). “Market experts” are also important (e.g. chefs knowledge of the gastronomy-market, newspaper editors of marketing); these experts can – in addition to giving advice – be active in the marketing process. In terms of personnel, it is important that the people work together well otherwise individuals will be squeezed out, a process that is usually led by the entrepreneur of the core firm.

Facilitator
The innovation process is more likely to be a success if there is a facilitator (cf. Cooper and Edget 1999) whose task it is to ensure the process progresses, however the facilitator is not necessarily involved in the development of the concrete innovation (he/she is a kind a “catalyst”). The facilitator structures the process and keeps it running. The facilitator should be an outsider with authority. The researchers functioned in these experiments as facilitators, however other people such as consultants may also act as facilitators.

Organisational learning
In the firms studied here, the value chain innovation process led to the firms being able to organise their innovation activities better. They subsequently introduced new procedures which ensured the continuation of innovation processes and that these processes do not stop. They also became more focused on the market possibilities from the beginning of the innovation process.

Incremental innovations
The innovations that were developed in these experiments were not radical. It is not sure that value chain innovation leads to radical innovation, such changes may demand other methods. However, the innovations that were developed in these experiments were realizable and were developed quickly.

The barriers to value chain innovation
The experiments also revealed problems with value chain innovation. Besides the mentioned tendency to incremental innovation (a barrier to radical innovation), there were other barriers to success. These barriers will be presented in the following.
Organisational Inertia
Some problems occur after the innovation group phase. When the innovation had to be implemented in the organisation, the process can slow down and possibly stop. There can be a certain organisational inertia (cf. Sundbo 2010) caused by employees and managers lacking innovation culture (even though the core entrepreneur of the innovation group is very innovation-minded) and internal power structures. Middle managers may be a barrier to the implementation of the innovation because they think they will loose power if the innovation is realised.

The optimal constitution of the innovation group can not be achieved
The innovation groups in the four experiments fulfilled the composition criteria stated above, however in two of them there were some difficulties in finding people with the necessary competencies which could be accepted by the other members of the group. Theoretically, it is obvious that it can be difficult to find the optimal group. It may, for example, be difficult to find a facilitator who can fulfil the demands of being an outsider, but nevertheless have authority in the group. University professors may fulfil the criteria if they can communicate at a practitioner level. However, it might be difficult to find other types.

Entrepreneurial fit disappears
In some innovation groups, the process runs efficiently because there are just a few entrepreneurs who drive the process, have a particularly good personal relationship and can work in a kind of division of labour. This was, for example, the case in one of the experiments (Involving excluded labour force ) where the owner of the service firm and a director of social services from a municipality had such an entrepreneurial fit. If one of the entrepreneurs disappears from the group (as the director of social services did), the innovation process becomes less efficient. Other members of the groups can leave or be less active in the process. This was observed with some of the participants that did not directly benefit from the innovation, particularly those that participated just to do the core entrepreneurs a favour.

Budget and economic crisis
The innovation process may stop if the innovating firm does not have a particular budget for innovation or if the firm gets into an economic crisis. The firms in the experiments realised that they need to have a particular budget for innovation. If they do not, the innovation process will easily slow down. In two of the experiments (“Involving excluded labour force ” and “Christmas Lunch”), the firms were hit by the financial crisis and the turnover fell. The hotel in one of the cases (“Christmas Lunch on an island”) went bankrupt because of high interest rates. These results demonstrate that value chain innovation perhaps works best in good economic times while economic crises often lead to a decrease in innovation activities. Value chain innovation is particularly vulnerable to economic crises because the manager or entrepreneur from the core firm gets less time for participating in development projects.

Mostly suitable for B-to-B services
All these experiments except the café experiment were made in B-to-B service firms. It is easy to see how business partners can be involved in value chain innovation. The attempt to involve customers in innovation groups and the service firms’ experiences with this suggest that this is rarely possible. Customers are not sufficiently engaged in the innovation process and have difficulties in thinking about innovation. This was also the conclusion in the café. Customers can probably only be involved indirectly via market experts. One may conclude that value chain innovation is mostly suitable for B-to-B services.
5. A theoretical understanding: Extending ANT

Value chain innovation in services is a phenomenon that can be understood by employing Actor-Network-Theory (ANT) and the study of value chain innovation supports the development of ANT. The study of value chain innovation in an ANT framework also gives a better understanding of services and innovation within services.

Value chain innovation is an example of social actors who establish a momentary association (Latour 2005 p. 65) to develop an innovation. The study of value chain innovations provides a deeper insight into the issue of which actors are involved and how these actors behave.

The task of a value chain innovation group is seemingly very goal-oriented and rational: to develop an innovation that a particular service firm wants. The roles of the actors are clear. However, the circumstances for building such an association such as a value chain innovation group are more complex. Several roles are involved:

The innovating service firm. This actor is divided into several sub-actors. The firm organisation with its hierarchy is one sub-actor. The leading entrepreneur from the service firm is another (whose interests and behaviour do not necessarily completely fit those of the organisation). Is the leading entrepreneur the leader of the innovation process and the other actors just walk-ons? Sometimes he is – as in one experiment (“Involving excluded labour force”) where the owner-manager of the service firm was a strong entrepreneur who dominated the process. Sometimes he is not – as in another experiment (“Christmas Lunch”) where the owner-manager of the hotel was weakened by a threatening bankruptcy. It may even be unclear who the leading entrepreneur is or it may change over time – as in another experiment (“Organic coffee milk and café concept”) where the wholesaler (or the marketing manager who participated in the innovation group) was the leading entrepreneur when the value chain innovation started, but the owner-manager of a café took over and continued the innovation process as a café innovation.

The researcher or facilitator. The researchers were part of these experiments and not neutral observers. They were catalysts for the process. The researchers did not develop the innovation, but they were crucial for the innovation process. If the researchers had not addressed the service firm to make an experiment which was necessary for their research interest, the innovation process would not have been established. The researchers also functioned as facilitators and thus made the process run efficiently. However, the researchers were still outsiders and the innovation process could not have been carried out without an active effort from all the involved actors. Other characters could function as facilitators.

The other parties. Why do the other participants in the innovation groups participate? They have different motives. Some of them benefit directly from the innovation (for example the dairy in “Organic coffee milk and café concept”, the tour operators in “Christmas Lunch” and the wholesaler in “Gastronomic pasta”). Others hope to benefit from the innovation in the future or see the innovation group as a chance to establish network relations (as for example the newspaper editor in “Christmas Lunch” and the chef in “Gastronomic pasta”). Some of them even participated because of general interest in the topic or the social association (as for example the travel agency manager in “Christmas Lunch”); the reason for their participation was primarily because they knew some of the main actors (a kind of social exchange dependency). The other parties thus are driven by a combination of business and social motives; those driven by business motives were the most stable members of the innovation groups.

Further, the circumstances determine the outcome. Although value chain innovation is described in rational terms in scientific articles such as this one, such innovation is neither the result of a scientific knowledge trajectory nor of accumulated practical firm experiences. As described in the
methodology section, the value chain innovation model appeared in a concrete situation where other scientific knowledge trajectories did not work. The idea of value chain innovation appeared in that situation as the result of interaction between researchers, the service firm and other actors that either the service firm or the researchers knew. Elements of coincidence and creativity in that situation played a role. Out of this situation came the value chain innovation model, however, in other circumstances nothing but chaos and a rapid abandoning of the innovation process might have been the result. The description of the development of the value chain innovation model is a narrative of a process that is not planned or completely determined by any structure, neither social nor material, but is developed under specific circumstances by a momentary association of people.

However, structures have also been determinants of the development of value chain innovation. One obvious structure is the interest of science in procuring new knowledge (in this case about innovation in services). Another obvious structure is that service firms are forced by market laws to get ahead in market competition. This has led to the desire for an innovative strategy.

Other structures or factors also influence the building of value chain innovation associations. ANT stresses technological development as an actor in social processes such as innovation processes (Latour 1992). Technological development has been a factor in several of the value chain innovation experiments besides the social process of establishing an association and driving it. This underlines ANT’s early theoretical claim that material factors are important in innovation processes (Callon 1975, Latour and Woolgar 1979). Technology has not been a determinant of the value chain innovation, but has been a necessary means to reach the goal. This was the case with the pasta technology in the case “Gastronomic pasta” and milk technology in the case “Organic coffee milk and café concept”. If the milk idea had not occurred or the technical problems of developing the new milk type could not have been solved, the innovation process could have taken another direction and resulted in a completely different and non-technological innovation. In these experiments we have also seen non material elements, for example experience elements (cf. Pine and Gilmore 1999, Sundbo and Darmer 2008). This suggests that the ANT understanding could be extended from focusing on social and material elements to also include experience, i.e. sensoric and emotional, elements. While the first two are scientifically understood in sociology and natural sciences (Latour 2005), the experience element should be understood from a psychological point of view or even as an artistic element that can not be explained by rational science. The implication of social, material and experience elements is exactly what makes the service field broader than just the traditional social dyadic interaction that service marketing has emphasized (e.g. Grönroos 2001). It explains what has been called servitisation (Johnson and Men 2008, Wilkinson, Dainty and Neely 2009), however, it is more than manufacturing firm just introducing services as add-ons. All three types of elements should be included because the product that people can use is multi-faceted and must include all these elements. The field (the sector or industry) must be defined as new, different from the service, manufacturing and culture (or creative) industries.

ANT also emphasizes power although power is not seen as a pre-existing structure that determines social processes such as innovation processes, but as a result of such processes (Czarniawska and Hernes 2005). This needs emphasising if we are to understand value chain innovation processes. The value chain innovation groups are not established as a result of anybody’s power, not even the principal innovating service firm’s or the researchers’ power. They are established as a result of the free will of independent actors, however, they are established because these actors, or some of them, are in a situation where they need the value chain innovation groups. The principal innovating service firms need to introduce a new way of acting in the market and innovations that can make them more competitive. The researchers need the groups to collect data for their research. The other parties hope to get some benefit from the process. An ANT view that power comes after the social processes (e.g. innovation processes) is problematic when one
looks at value chain innovation. The innovation groups did not gain much power after the innovations as can be seen in the case “Involving excluded labour force ” where the continued innovation process and the principal service firm’s wish to carry out an innovation process was weakened by the withdrawal of the municipal entrepreneur, the director of social services. The innovation group did not have the power to press the new director of social services to be fully engaged in the innovation process. The value chain innovation groups do not function to create power, which may be defined as the ability to make other people do what they perhaps do not really want to do. They exist to solve concrete problems and carry out entrepreneurship as a form of social behaviour that some people think is meaningful and interesting in its own right.

These experiments that have led to the formulation of the value chain innovation model have particularly contributed to extending ANT’s understanding of social processes. They have underlined that social processes can be understood as the establishment of momentary associations (Latour 2005 p. 65) and, further, that the social processes do not need to have particular aims concerning power, but can be undertaken out of interest driven by entrepreneurship.

6. Conclusion
The paper has presented four experiments with service innovation. The aim of the research was to improve the systematisation of service innovation by using the results of research in the form of methods or tools. The first experiment took another direction because the practitioners were unable to use the academic tools. Instead they collected a group of actors to help them in the innovation process. This led to the development of new model of service innovation, value chain innovation, which was tested in three successive experiments. The results of the experiments were benefits for the firms and a better understanding of value chain innovation and thus service innovation in general. This understanding emphasizes that services can be connected with raw material, goods and experiences in integrated concepts. The experiments provided new knowledge about the boarder between manufacturing and services and even primary sector activities such as farming and experiences. The merger between services and manufacturing, often termed servitisation (Johnson and Men 2008, Wilkinson, Dainty and Neely 2009) is extended to also include raw materials and experiences.

The empirical experiments can be understood and explained by using an Actor Network Theory (ANT) which explains the formation and function of the innovation groups. The value chain innovation model contributes to a deeper understanding and extension of ANT, particularly the understanding of momentary social associations which can be driven by interest and entrepreneurship as an isolated motive. The model adds psychological-artistic elements as experiences to the range of determinants, or actors, of social processes besides social behaviour and material trajectories.

The results of the experiments may also be of interest to service firms because the value chain innovation model is also a practical tool. Value chain innovation can be used by some service firms in some situations where technology and/or experiences are necessary parts of the service innovation. The model is probably most suitable for B-to-B firms or customers must be indirectly involved via market experts, surveys or the like.
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