Future Transport Concepts
- in a Supply Chain Learning Perspective

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Abstract

This paper presents an action research project carried out in co-operation with two Danish transport companies. The project is part of a larger project 'Future Transport Concepts' which is running simultaneously in four different transport companies with the purpose of initiating a concept driven process towards the development of future transport concepts.

The paper discusses how the concept of action research may be a desirable method for installing organisational learning processes along the supply chains with the focal focus on the transport companies and their networks. It discusses the results, the method and the researchers' roles as active facilitators in initiating learning processes. It is shown how the actors within the organisations formed arenas for learning across old boundaries, space and time in order to develop processes of supply chain learning.

Keywords: Transport, action research, competencies, supply chain learning, organisational development, qualitative methodology

Background and Setting

For small and medium sized transport companies the daily life is one of survival. The actors within this part of the industry suffer from the strains of a massive time pressure and last minute planning. This in co-operation with lack of strategic resources and competencies mean that they rarely have the reserves of time nor competencies to develop the organisation in accordance with the external demands for more sophisticated transport services that often require organisational flexibility and organisational ability to learn.

The lack of strategic and abstract thinking in the transport industry and the need to understand transport activities as an integrated part of the supply chains has been the focus of many recent projects in Denmark (Drewes Nielsen, 1999; Drewes Nielsen, Hansen, Kornum, Nederland & Aastrup, 1999).

The project 'Future Transport Concepts' is financed by the Danish Ministry of Commerce and is part of a general business strategy in Denmark linking activities in companies with research and knowledge produced at the universities[1]. The project is organised around several network activities around a core of four transport companies two of which are the case studies discussed in this paper. The project is part of a governmental strategy to support the Danish Transport Industry (Erhvervsministeriet, 1998;).

The purpose of "Future Transport Concepts" is:
- to develop competitiveness through development of future transport concepts in co-operation with the participating companies.
- to create new knowledge about transport and logistics concepts and their use in a Danish context

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[1] Participants: Participants: Aalborg University, Århus Business School, Roskilde University, Institute for Transport Studies, Danish Technological Institute

- to increase knowledge about - and develop methods and action plans in relation to innovative, competitive and integrated transport concepts.
- to develop tools to support the implementation of future innovative and competitive transport concepts in Danish industries.

For each participating company a project group has been formed. Each group consists of participants from the companies (managers, employees), consultants (Danish Technological Institute) and researchers (universities). All four projects are run according to the same overall template with the following phases: Analysis of current situation, development of concept, implementation of concept and evaluation of concept. It is two of these projects that are discussed in this paper. The purpose of these two projects is to develop methods for implementing learning processes in transport companies and their networks through action research inspired methods thus providing a tool for developing future transport concepts.

In addition to the case studies five research projects are carried out at the participating universities. Researchers from Roskilde University are responsible for a research project on organisational development. The purpose of the project is to focus on how organisations react to and adopt changes.

Action Research in a Democratic Orientation

New concepts are often developed and introduced to organisations through top-down processes where managers - often supported by external consultants - run the implementation of a new business concept in the organisation. This is often referred to as the expert driven process or in the language of learning the design driven process (Elkjær, 1998; Sarv, Aronsson, Carlsson & Lindskog, 2002). Characteristic of the expert driven process is that is a linear one with fairly clear distinctions between the phases.

The expert or design driven process has be referred to as artificial intervention by Nonaka (1994) who argues that this method relies on the implicit assumption that "someone inside or outside an organisation knows 'objectively' the right time and method for putting learning into practice" because "the questioning and reconstruction of existing perspectives, interpretation frameworks or decision premises can be very difficult for organizations to implement by themselves (Nonaka, 1994). This assumption, however, relies on a mechanistic view of the organisation, which Nonaka dissociates himself from by arguing that organisations continuously create new knowledge by reconstructing existing perspectives, frameworks, or premises on a daily basis (Nonaka, 1994).

Owing to earlier research projects we recognise the organisation's ability to create knowledge and that organisational knowledge is created through dialogue between tacit and explicit knowledge (Drewes Nielsen, 1999; Nonaka, 1994). Previous studies of the transport industry have indicated that the knowledge of logistics and transports is kept at all levels of the organisation (Drewes Nielsen, 1999). These studies of work within the transport and logistics industry also concluded that the diffusion of knowledge could form the basis for innovation and logistical changes also as processes of bottom-up. According to Nonaka (1994) innovation can be understood as a process in which the organisation creates and defines problems and then actively develops new knowledge to solve them. If spaces for innovation and learning were created within these organisations it might be possible to change the organisation from another perspective than the top-down outside-in perspective (expert driven process).

The idea was to create such spaces for innovation and organisational learning hence developing a bottom-up inside-in model for organisational changes. This would overcome individuals' fear of changes thus resulting in a more stable organisation with a high degree of satisfaction from the employees who participated actively in the change process. To achieve this we looked to the action research approach for inspiration. As defined by Gustavsen (1996) "Action research represents an effort

to link research directly to processes of change and development: research is responsible, or co-responsible, for the achievement of certain results, definable as new practical arrangements."

Applying the action research perspective means that the experiences and views of those concerned must be brought out to form the foundation for the change process (Eriksson & Hauger, 1996). In carrying out action research it is important that researchers are careful not to commission themselves as 'experts' but rather. "… the contributions of research have to be inserted into the process through a dialogue in which research is a partner on a par with the other actors, and not a higher authority. In relation to the local partners, action research must earn credibility and legitimacy through 'solutions which work' rather than through a reference to theory" (Eriksson & Hauger, 1996).

To avoid the expert role much focus is placed on researchers organising and facilitating discussions. The structuring and management of discussions is a major tool in action research (Eriksson & Hauger, 1996). Depending on the situation, the organisation and the type of change desired there are different techniques to organising discussions. In that sense all action research projects are unique as each process of change has its own characteristics. It is an important competence of action research to be able to deal with variations through a flexible adaptation of its own role (Eriksson & Hauger, 1996).

The two case studies represented in this paper are very different in nature and it will appear that the methods applied for initiating discussions are equally different. The case studies provide an illustration of the flexible adaptation of the action research approach. Despite the differences between the two case studies it is still the same underlying principles of dialogue and recognition of knowledge creation within the organisation that guide the design of the case studies. Also, in both cases the researchers serve as facilitators for processes driven by the participants. This action research inspired process can be characterised as one of circular movements, where the different stages of progress overlap in a constant development as opposed to the expert driven process that evolves in a linear fashion.

Supply chain learning (SCL) can be defined as the supply chain actor's capability to adapt and react to changes (Lamming, Bessant, & Ross, 1999). The concept is based on the concept of organisational learning only it is expanded to the supply chain. SCL is still under development as a concept, but our contribution to this will be that the concept can be build on three fundamental principles used in our research:

- Establish arenas for learning
  - carry out analysis of current situation in order to find problem areas. These areas were then to function as learning arenas where the participants ('those concerned') would enter into dialogues and discussions.
  - to build the change process on experience and knowledge already available within the organisation

- Establish action research process
  - have participants (those concerned) actively involved in the process
  - facilitate dialogue and discussion in arenas thus establishing learning space; insist on involving all parties actively as opposed to passively attending courses and presentations
  - to develop methods of organisational self-help to be used in the future

- Insist on democratic objective in concept development
  - install methods of dialogue across the organisation – a democratic perspective on the development of organisations
  - applying a democratic objective does not mean that everybody is involved in management's decision making but that a broad set of participants is involved in processes leading to decisions
  - management must be used as sparring partner but insist on broad spread of developmental work within organisation - this may cause trouble as regards implementation but concerning learning it is very valuable

The purpose with these case studies was to initiate processes supporting the gradual development of a new business concept as opposed to the traditional consultancy approach of developing and implementing a ready-made business concept. These ideas are in keeping with Danish traditions within the democratically oriented action research and concept driven research (Nielsen, Nielsen & Olsén, 1999, Riis og Johansen, 2000).

Case A

The organisation
Case A (hereafter CASE A) is a 100% Danish owned transport company operating in Denmark. CASE A is a network organisation comprising 28 self-employed hauliers wholly or partially tied up in CASE A. The hauliers vary in size from the smallest 'one man with a van' to the largest companies owning as much as 50 lorries. In terms of capacity the company has 3 freight centres, 19 regional terminals and 360 lorries divided among 28 hauliers at its disposal. There is a total of 500 employees. The goods distributed are a wide array of shipments ranging from parcels, pallet consignments and full loads. In the warehouse hotel the company offers services such as palletising of goods, picking, packaging and labelling.

The hauliers are both suppliers and customers to the CASE A network in the sense that they supply goods from their home region to the freight centres where other hauliers pick it up for distribution in their regions and vice versa. Hence, within CASE A competition among hauliers exists alongside the need for co-operation, which can create tensions between members pursuing individual and mutual interests at the same time.

Background
Through participating in the project CASE A wished to improve the company's competitiveness through the development and implementation of a better concept to suit the customer requirements. Increasingly the company experienced that customers required improved management of the transport chain where transport to a higher degree is co-ordinated and integrated with the manufacturing processes and logistics within the companies that ship and receive the goods respectively. Living up to this requires more sophisticated IT solutions that CASE A was capable of offering. Hence IT had a special emphasis in the development project.

CASE A's goal for participating in the project was to develop a transport concept that would ensure an efficient co-operation between the hauliers in the future and secure the group of hauliers' competitiveness on the market for distribution of mixed freight.

The development of the project
Initially a report showing CASE A's current situation was made. To comply with the aims of the ' Future Transport Concepts' project it was decided to carry out three analyses: The current IT system (CASE A and members), business procedures (freight and communication flow) and the organisational culture (commitment, cooperativeness, co-operative problems). Moreover it was decided to also cover the area of internal marketing as management felt it problematic.

On the practical level we conducted qualitative interviews with all 28 members of CASE A that in combination with questionnaires formed the basis for an analysis of the current situation of the company. From this analysis it was obvious that there were four areas particularly problematic for the company namely: Training, IT, route structure and price structure. Around these subjects were formed four learning arenas or interest groups that were to develop the areas.

In accordance with the general idea of the project and the democratic objective not least – all members throughout the organisation should have the possibility to exert influence on the development project and were offered to participate. 30 employees from all levels and corners of the organisation decided to participate. All participants decided themselves which learning arena to participate in.

A kick-off seminar was organised where the learning arenas were started through a process of mind mapping. The participants drew up mind maps showing what their particular problem area ideally would look like in one year's time resulting in a visual plan over subjects to be discussed and dealt with in future arena meetings. The researchers acted as facilitators for the process but did not take ownership. It was stressed that it was the participants' process and their responsibility for it to be a constructive one. Mind mapping is a fairly simple yet very useful method for initiating discussion in a group. The organisation of subjects in groups and subgroups provides a clear overview of the arena's future tasks.

So far it has been a successful process. The participants are working together across old organisational, functional and geographical boundaries and that alone has created an energy and enthusiasm not seen before in the organisation.

Case B

The organisation
CASE B is a Danish transport company running some 275 lorries in Denmark mainly occupied with distribution haulage. CASE B also owns and run four warehouses located different places in Denmark. There are 300 employees.

Background
Inspired by several Danish reports on the concept of city logistics (COWI, 1997; Vejdirektoratet 2000; Miljøstyrelsen & Århus Kommune, 2001) the managing director of CASE B contacted the consortium behind the project 'Future Transport concepts' with the idea of developing a business concept for city logistics. His point of departure being the belief that it is only a matter of time before laws regulating access of heavy vehicles in inner cities will be passed, and hence through this project the company would be ready to take up the challenge when it arises.

The aim of the project was to create a complete concept of city logistics that would take into consideration all imaginable competencies and features needed for systems, equipment, material and immaterial activities that would meet with future requirements from all stakeholders involved in or influenced by distribution of goods in urban areas.

The underlying assumptions for the project were that the number of distribution operators in urban areas in Denmark will decrease in numbers to only a few operators and that the demand for terminals located close to cities will increase. Moreover, the project worked with the following theses: The storage capacity will decrease in urban areas; the road capacity will not increase; the requirements for reducing the environmental impact will increase; the equipment is expected to adjust to the surrounding environment in relation to size, flexibility, working environment, multifunctional capacities etc. The following basic elements had to be included in the project: IT, terminals, equipment, customers and the great public.

The development of the project
Within CASE B a project group was formed comprising of employees representing various functions from strategic, tactical and operational levels. In addition a project group was formed where employees from CASE B in co-operation with consultants and researchers were to develop the course of action for the project. After only a few meetings the project group decided on the following aim and course of action for the project: through processes of learning and exchange of competencies and ideas 25 posters describing the concept of city logistics from different perspectives should be produced. The intention of the posters would be to visualise the city logistics concept in order to present it and initiate discussions with the purpose of further specifying the concept for future implementation. Moreover it was decided that the posters would be professionally made using appropriate layout and graphics in order for them to be presented at exhibitions, seminars and conferences.

A kick-off seminar in the shape of a future workshop was organised in order to activate all the participants and divide them in working groups organised around themes. The idea was then to let the individual groups work on their themes towards another plenary seminar, where the work would be coordinated and merged into to a common platform for the posters. The future workshop was the method chosen to initiate dialogue across demarcations and inter-organisational borders.

The future workshop is a method developed in 1960 by Jungh and Müller. The purpose of a future workshop is to:
- focus on the experiences and wishes of the participants
- develop accurate pictures of the future and visualise them
- develop common understanding in an atmosphere of exploration
- develop action plans on how to realise the future pictures

The workshop is lead by two workshop leaders and the form changes between group work and plenary sessions. The tool is written language on posters, discussions and visualisation in the form of role-plays and drawings. The role of the workshop leaders (the researchers) is to facilitate the process where the participants actively using their experiences and conceptions to form concrete images of the future.

The idea of the future workshop is to create pictures of the future and consider how to get there in an atmosphere of equal communicative practices. The strict rules for discussion in the workshop has the aim of equalising power in relation to status, experiences, personality etc. In this way all qualifications can contribute to the joint project. The workshop also includes practices of democracy as the choice of themes for further development in the workshop is based on a voting procedure. The themes with the most votes are selected for further development in the working groups that are formed as a result of the workshop.

The workshop is divided in three phases:
Phase 1: Phase of criticism, where participants put forward all negative and bad associated with the concept of city logistics. These are not discussed just stated.
Phase 2: Phase of Utopia, where participants with no constraints put forward ideas on the ideal city logistics concept in a world where everything is possible. These are not discussed just stated.
Phase 3: Phase of reality, where participants work in groups to put forward an action plan on how to realise an utopian concept of city logistics.

We contacted stakeholder groups and invited them to join the project. Despite our inability to pay any compensation for their participation we did not have any problems recruiting participants. The people invited thought the task very interesting and found the opportunity of meeting other actors around this concept so inspiring, that they eagerly joined the project. Only a few had reservations as to how much effort they could put in the following process with the working groups. We managed to compile a group of participants with an excellent profile representing different interests at the future workshop. 20-25 people representing different roles and stakeholder groups in relation to city logistics participated in the opening seminar. They were distribution professionals, engineers, planners, researchers, experts in working environment, business consultants, etc. A city logistics network was created at the workshop.

In terms of action research this step is crucial for the success of the project. As the future workshop method builds on the participants' experiences and competencies in relation to the subject of the future workshop - here their experiences with and conceptions of city logistics - it is very important that the researchers select and put together an appropriate mix of participants.

At the workshop we had all the problems associated with city logistics at its current state represented through the participants' experiences. As a result of the phase of reality they formed four working groups. The groups were organised around the following themes:

1. Flow/handling
2. Structure, IT, logistics
3. Organisation, business models
4. Urban planning/physical planning

Results

It is always a problem to pick the right point of time for evaluating an action research project. Organisations are continuously changing which makes it difficult to establish an evaluation process and not least tracking down knowledge on the ongoing process within the organisation.

People changing jobs more frequently these days and companies merging or closing down appears to be an increasing problem for action research projects as organisations and people simply disappear from the process arena. This is also the case in our research. After successfully having started work in the interest groups CASE A changed the managing director and the new manager could not find time in the organisation to continue the work in the groups at present. CASE B also changed managing director as well as the whole organisation was changed due to a merger and the project was closed down in the middle of the process.

The following evaluation is oriented around our first-hand impressions and the evaluation of the participants during the process. We have divided the evaluation into following four dimensions:

The role of action researchers
In the logistical supply chain transport companies play an important role. They are in different ways part of networks related to the supply chain and also related to a variety of actors representing society. The two case studies represent different transport networks playing different roles in society. Equally, the two methods applied reflect how we as researchers understand these roles and act accordingly by introducing different methods or processes of learning in the two networks suiting different purposes and results.

CASE A's setting can be characterised as a *homogeneous network* because the process of concept development was established in a network already existing in the organisation. The participants were all employed within the network and had the same overall interests and motives for participating. Also there was a mutual interest in improving the business for the network as a whole. The process was one of dialogue teaching the participants to handle an evolutionary process of organisational development. This was done in an extraordinary way but was not meant to induce big changes in the organisation. In terms of action research the method applied can be described as a generic method based on dialogue and project development.

CASE B's setting on the contrary can be characterised as a *heterogeneous network* because the process of concept development was established in a network formed for the purpose of this project. The participants represented different stakeholder groups and did not necessarily have the same overall interests and motives for working on the project. Here we formed relations and processes across the boundaries of various city logistics stakeholders and created an utopian free space supporting the process of innovation of a city logistics concept. The participants met for the first time and worked together to produce pictures of a future reality for city logistics. This work may reflect a development out of tradition for the solving of a problem in relations between the transport firms and the society. Producing a platform for city logistics can both fulfil the demand for competitiveness on company level and the demand for safety and environmental friendliness on society or macro level.

In both projects the researchers introduced methods from the fields of action research in order to stimulate learning processes through discussion and dialogue. Other researchers' tasks were designing arenas of learning, preparation of programme, selection of participants, follow up on the process before and after and responsibility for documentation and evaluation. It is however important to stress

that researchers did not take ownership of the processes; they always acted as organisers and facilitators.

The development of arenas of learning
One of the main purposes of the project was to create arenas of learning across the networks and hence organisational barriers.

Picking the right actors across the network is crucial for the process of creating arena for learning. Traditional logistics development methods focuses on a focal actor of a given supply chain and start from there. Our belief is that the focal company is not necessarily representative for the supply chain. With this method we go beyond the focal perspective by focusing on relations and processes within the network and letting the participants enter into processes and relations across existing ones. By bringing the actors together a new platform or arena for inter-organisational dialogue and learning can be established.

The formation of arenas of learning across the network and introduction of the action method allow competencies and experiences to unfold and be discussed in creative and innovative processes which might prevent some of the failings of expert driven outside-in methods.

The exchange of knowledge through interaction across organisational as well as intra-organisational barriers with the purpose of developing a concept for organisational change can also be understood as knowledge creation built on dialogue between tacit and explicit knowledge (Nonaka, 1994). In both cases the actors only had little or no knowledge about the other participants explicit and tacit knowledge when they set out. The arenas of learning in our projects were pilot experiences in both cases.

New competencies across the chain/network
The main result in relation to the cases was the establishment of learning processes across the supply chain or network - so-called cross-functional learning. This is different from other learning processes tied to individual learning or organisational learning within an organisation.

In CASE A the cross-functional learning was by nature embedded in the relations that were the result of the co-operation between transport companies. The actors involved had never experienced this cross-functional process. Although they in their daily routines have several relations with other actors, they had never had the opportunity to join a common innovation project. Moreover, some of the participants only knew each other by name or through emails or phone calls, but never through personal meetings and on-going working groups.

In CASE B the cross-functional learning was completely different. The network itself was cross-functional. The actors in the network were not brought together through common commercial interests but through a common interest in the concept of city logistics. The cross-functional learning process was a process of dialogue and respect between different views and interests. This was a clear goal formulated by the initiating company. The future workshop was a fruitful method in order to provide an open space for different interests. It was important to create dialogue and discussion although not forcing consensus if not possible. Equalising power in the relations was essential. The feeling that any routine or experience would contribute to a visual image of the future city logistics concept was a precondition for the process. Our experience from the workshop was that visualising a city logistics concept was much easier for the participants that were involved in daily logistics routines (drivers, shippers and traffic planners) than the participants with a more academic approach to the field.

Supply chain learning (SCL) as a new concept?
The concept driven process was never meant to be a top down process. Whether the process actually turned out to be the opposite: a process of bottom up is not obvious. The process has been initiated in collaboration with the company's top management in both cases. This means that the justification of the process is related to the top manager.

The top managers' buy-in to the idea of strengthening the processes in their organisations was clear through all the phases. The problems started when the managers, who to a degree were synonymous with the project, left the organisation for other jobs. Having a development project tied up with one member of management makes the projects extremely week in relation to management changes in the organisation. At the time the manger left CASE A the project was not yet fully consolidated in the organisation, and the lack of consolidation was behind an easy decision to close the project as a consequence of managerial changes.

Another barrier for running these processes came from an unexpected side: the team of researchers. Researchers within the field of logistics expressed some scepticism with regards to the action research inspired methods. This scepticism is stems from two sources: On the one hand a lot of capabilities within the field of logistics are rooted in the quantitative tradition of natural sciences. For researchers of this tradition it is difficult to understand the soft sciences of action research and how to evaluate these methodologies along the criteria of what is considered 'proper' science, validity, reliability etc.

One the other hand the field of logistics is dominated bye researchers who act normatively in an attempt to implement new logistics tools in top-down processes. The approach used in this project where supply chain learning processes are developed through action research inspired methods may be disregarded and blamed for being time wasting and based on insufficient knowledge. The methods may also represent a threat to the expert driven concept development.

Supply chain learning (SCL) can be understood as a new concept within the logistics field. This project has added new dimensions to the concept namely the action research inspired methods and ideas. The experiences among the actors in the two case studies are clear - the learning processes have been an eye opener to many of the participants in the project and they feel like being partners in a network or chain. They have become actors in new arenas for supply chain learning. Creating these arenas are the central to this approach.

Conclusion

Supply chain learning is a rather new concept that focuses on processes of learning along the supply chain: a process of cross-functional learning. Two Danish transport companies took part in the research project resulting in two case stories of an action research driven process of supply chain learning. The results of the methods were threefold:.

1. The action driven concept development in our setting is evidence of how change processes within the field of logistics in the future must involve methods of establishing cross-functional arenas and improving dialogue more than is the case today.
2. In relation to the tools of action driven concept development the experience from the inside-out, bottom-up processes is that it does give the participants a fruitful insight into the tacit and explicit routines and competencies already included in the company's daily routines in the shape of other participants and how they can be used in future processes in the circular processes of supply chain learning.
3. The project provides fruitful experiences in relation to applying action research in order to developing a concept through processes of dialogue establishment of arenas of learning across networks or supply chains.

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