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**A cycle model of organizational change mechanisms,
innovation and learning based on case studies**

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Abstract

It is a statistical fact that organizational change is an important part of modern business. Yet Sorge and Wittelloostwijn (2004) argue that “often organizational changes are ineffective” and point to bad consultancy and managers’ failure to integrate strategic change and organizational change. On the other hand they do also point to possible successful changes due to actors’ understanding of the complementarities between strategy, structure, context and environment. The paper addresses this challenge of change with which the management has to cope. So, the aim of the paper is to present empirical examples of management’s combination of strategic guidelines, structural and process change as well as the controlled use of consultancy with a focus upon the two-way process of organizational learning and change to the benefit of innovation. The task is solved by building a model strengthening how change effectiveness and organizational learning can be seen in a cycle perspective.

The analysis treats three cases selected among the DISKO 4¹ sample of around 1750 firms. The empirical data to be analyzed comprise changes towards outsourcing and new procedures of product development. The methodology builds upon the importance of social actors, process narratives, and cycles of change. The author’s model of change is developed from three examples of cycle models directed towards explaining successful organizational change. The suggested model comprises 1) Actors who initiate strategies of change, 2) Proactive structures and learning processes, 3) Measures to overcome hindrances 4) Supporting external relationships, 5) Time perspective , and 6) Innovation activities.

The paper shows that the cycle model makes it explicit how the management in cooperation with employees have succeeded in making changes related to *process and product innovation* by introducing new structures, by consciously working with learning and measures to overcome hindrances as well as incorporating external support. The experiences with each single element are summarised and the cycle character of the innovation processes is treated.

Descriptors: Organizational change, innovation, learning

¹ DISKO 4 is the acronym for “The Danish Innovation System: Comparative analysis of challenges, strengths and bottle necks” which was first run in 1996. The fourth survey was carried through in the autumn of 2006 among around 4000 private firms and answered by around 1750 firms (response rate 43%). DISKO4 is a joint project on behalf of four research groups (IKE, CARMA, CIP, and CCWS) from Aalborg University. The postal survey was done by Statistics Denmark.

1. Introduction

It is a statistical fact that organizational change is an important part of modern business. Yet Sorge and Wittelloostwijn (2004) argue that “often organizational changes are ineffective” and point to bad consultancy and managers’ failure to integrate strategic change and organizational change. On the other hand they do also point to possible successful changes due to actors’ understanding of the complementarities between strategy, structure, context and environment. The article adheres to this discussion by presenting empirical examples of management’s combination of strategic guidelines, structural and process change as well as the controlled use of consultancy with a focus upon the two-way process of organizational learning and change to the benefit of innovation. Another reminder regarding studies of organizational change concerns how naïve they can be regarding who takes the real decisions, how employee involvement is to be understood and the balance between economic results and human developments (O’Connor 1995). This article includes such issues but choose to focus upon firms’ experiences with change and learning analyzed within a model strengthening how change effectiveness and organizational learning can be seen in a cycle perspective. Organizational learning implies knowledge diffusion and increased knowledge where knowledge is generally acknowledged as a main driver and critical of organizational success (Lam 2000). The paper highlights the change mechanisms and how they may be structured for the benefit of learning, improved change, innovation and stronger competitiveness. This study of organizational change is based upon case studies presenting processes of change related to significant events as told by the management. The changes comprise innovative activities concerning outsourcing and new business process development in relation to product development. The methodology builds upon the importance of social actors, process narratives, and cycles of change (cf. Van de Ven and Poole’s (2005) approach II in their typology of four approaches for studying organizational change).

The paper is structured in the following way. First the scope of organizational change in Danish firms is highlighted. Secondly, the aim of the study and the data comprising three Danish firms are presented. The next section focuses upon cycles of change as presented in the organizational literature. This section concludes with the author’s proposal of a cycle model or framework of change, innovation and learning. Hereafter the Danish cases are analysed according to the model. The final section contains the conclusions of the study.

2. The scope of organizational changes in Danish firms

Organizational change with or without innovation is well-known in a majority of Danish firms. According to a national survey in 2006 (DISCO 4) of a sample of around 1750 Danish private firms, two thirds (64 %) of the firms have carried through important organizational changes during the period 2003 - 2005. In most cases (67 %) the changes had as their aim to strengthen the effectiveness of daily work. Half the firms (54 %) have introduced one or more new products/services which do not include minor improvements during the same period. A similar share has outsourced. Change and innovation are major factors securing competitiveness in today's global economy according to the organizational and economic literature (Archibugi and Lundvall 2001). Yet it is only in a minor part of Danish firms where the organizational changes have been directed towards strengthening the ability to develop new products/services (27%) and/or the ability to outsource (11%). It might mean that the firms have already taken action in these directions because product-/service development was given high or very high priority in two thirds of the firms (64%) during the 12 months before the investigation, whereas a lesser part of the firms (42%) (also) had given priority to business-process development (e.g. order process, supply chain process or the procedures of product-service development). Another explanation might be that the firms are hesitant towards such changes and “*satisfice* because they have not the wits to *maximize*” (Simon 1957 p.xxiv).

DISKO4's survey data and quantitative analyses are supplemented with case studies to get a better understanding of the activities of the firms e.g. concerning organizational change and its challenges. One such study is the topic of this paper.

3. The aim of the study and the data

The aim of this paper is to argue for a cycle model or framework of organizational change, innovation and learning at the level of the firm and/or work group. The change approach builds upon the importance of social actors, process narratives, and cycles of change. The model will include proactive elements as well as hindering factors. It will be validated by three case studies in firms showing a dynamic way of thinking about change. The examples comprise the introduction of outsourcing activities and new processes of product development. Regarding learning the term is understood in a broad sense comprising a process in which the subject's (individual or group) capacity for action is growing through experience and study. The question of change mechanisms has inspired much current research and in some cases interesting models have been suggested (Nelson 2003, Sanchez et al 2001,

Senge et al. 2000). It is a central part of the following analysis to build upon these models and to construct a new model which is sought validated by the present cases, cf figure 1. These firms were taken from a list of 98 firms found by Statistics Denmark among the DISKO 4 sample of around 1750. The selection criteria comprised the occurrence of important changes during the period 2003 - 2005, the introduction of more than one new product in the same period, and the firm's high or very high priority given to business process development (order process, supply chain process, or procedure of product-/service development) in the previous year. Finally the firm should be ready to receive a researcher for an interview. The size span of the selected firms was defined as 50 - 499 employees.

Figure 1 Data about three firms - ABOUT HERE -

The intention was to select between five and ten firms for a qualitative study. In fact seven firms were included two of which have been analysed in another paper (Lund 2007). Of the remaining five only three are included in this paper to secure sufficient space for depth of argument and citations from the interviews for the benefit of the proposed cycle model. Supplementary to the interview data the research group got the answers to the survey questionnaires from the firms themselves or from Denmark Statistics who administered the survey. Two rounds of interviewing took place. The first round was carried out in December 2006 - January 2007 and the second in January 2008. Each time the interviews comprised 1 or 2 managers and took 1-1½ hour. The interviews were audio-recorded and transcribed. The firms got a feedback report in the spring of 2007 but no such report was promised in 2008. The titles of the interviewees and the main changes to be analysed in this paper is shown in figure 1.

The following discussion of organizational change has its clear limitations. It does not include the effects of changes upon the firm's economic performance. Nor is it possible to extract from the model discussion whether firms should focus upon changes of internal resources or choose a new external position or eventually how to combine internal and external change to become more successful. Also the kind of data means that the results must be handled with care. The size span of 50 - 499 means that the firms present rather good conditions for extended informal communication across vertical levels and between units at the same level of the firm. The style of management in the firms seemed to support the good opportunities for communication. The value of the study should lie in its details about change mechanisms and the suggested cycle model.

4. Cycle models of change

In this section is presented three examples of cycle models directed towards explaining successful organizational change. The aim is to extract major elements which can inspire to create a model of change incorporating innovation and learning and mean an increased understanding of the dynamics of change. Whether this aim is reached will be discussed in relation to the case studies. Regarding the three models, I am aware of limitations concerning the presentations of the various models. So, the following treatment of the three models will not make full justice to the selected researchers' work.

Nelson (2003:26) presents a dynamic model of the organizational change process as an interdependent system of a few determinants of change: *context* or environment, *substance* or content, and *stewardship* of change within a *sphere* representing the change process. To illustrate the model he used his case of an organization within the electricity industry having a number of change problems. These problems could be explained by a failure of management to think according to a dynamic model instead of a static one. This meant that the management did not understand the interdependency between the introduction of a new structure (substance), the necessity of deciding about new required skills (stewardship) and the acknowledgement of the impact of a change in the government view (context). The dynamic character of Nelson's model is further underlined by its placement of the "sphere" in a temporal context of *past* (history), *present* and *future* that opens up for reassessment, adjustment and change of strategies to maintain momentum and control variables in a changing context. This model has some clear qualities based on its focus upon only a few central elements, its emphasis upon interdependencies between the elements, its time perspective and related reassessments. Its central lesson could be said to focus upon change of context along with the implementation of the original plan so to make the necessary adjustments of the plan through time and not forget history.

"The need to monitor progress and act on feedback information so that strategies can be altered accordingly should be a normal part on introducing change" (Nelson 2003:28).

Yet, the case study and the model do not tell (much) about the processes of monitoring, feedback and change initiatives. So the model should be enlarged by giving place for such processes of change. Here learning comes to the fore. The model also lacks an explicit connection to the organization's output.

A change model where learning capabilities are a central element in the framework is the model of “profound change” presented by Senge et al. (2000). Such learning capabilities must reflect growth processes as well as the limiting processes and include strategies for dealing with both sorts of processes to secure “profound change”. This is the message of the book “The Dance of Change” by Senge et al. (2000:10). Profound change is defined as “organizational change that combines inner shifts in people’s values, aspirations, and behaviors with “outer” shifts in processes, strategies, practices, and systems” (Senge et al. 2000:15). One ingredient of the framework of profound change is *leadership*, yet, instead of leadership from the top the authors point to “ownership” and commitment as the driving force of profound change. The term leadership is used for “the capacity of a human community to shape its future, and specifically to sustain the significant processes of change to do so” (Senge et al. 2000:16). The original initiating people have to involve larger numbers starting with a *pilot group*. This structure is further sustained by the central process of *learning* directed towards building capacity for ongoing change. The focus is on-the-job-training (Senge et al. 2000:20). *Time and history* also enter the framework. The framework builds upon a number of *cycles of growth* and bundles of *challenges* activating elements to combat *limiting forces*. So, initiation of change implies the follow-up of processes of sustaining, redesigning and rethinking change. Finally, limiting factors have to be understood from a system point of view implying *balancing processes* keeping the system in “homeostasis”. This viewpoint underlines the importance of understanding the content of conservative processes (Senge et al. 2000:558). The change model or framework might boldly be summarized as an understanding of change as 1) implying leadership in the broad sense of *leadership communities* 2) who initiate and sustain change through a *pilot group* and other structures sustained by members 3) who *learn* by job experiences and rethinking, an 4) who *overcome limiting factors* by redesigning and other strategies for dealing with challenges 5) through *time and history* 6) and understanding the *balancing forces of a system*. Even though the treatment of growth and limiting factors of changes bring many elements to our attention, I think the above mentioned six elements can represent the major configuration of the framework. Again the output is not explicitly given a place in the framework.

A third contribution is Sanchez’s (2001:3 -37) five learning cycles of the “competent organization”. His model is directed towards the creation of a learning organization. The specific trait of his model is the acknowledgement of the generation of new ideas at both the individual level, the group level, and the organizational level “and the progression of those ideas upwards and downwards through the five learning cycles” i.e. at the three levels and between individual and group, and group and organization (Sanchez 2001:11). The overarching dynamics consists of the interrelationship between managers who select and embed new knowledge and frameworks in the organization, and groups and individuals who

apply and exploit knowledge through their activities. New knowledge may be acquired by individuals and groups and alternatives are available for new selection and cycle dynamics. In this dynamics “top managers have some important “top-down” levers of influence” but other groups and key individuals play a role in the integration of knowledge in the organization and the development of a *strategic logic* for the organization (Sanchez 2001:11). Sanchez uses a strict vocabulary concerning knowledge, learning, competence and related terms which is not to be elaborated here. Yet, it must be mentioned that he considers learning to include both learning-by-doing (know how), learning by analysis (know why), and know-what learning generating ideas for new kind of things to do. Furthermore a few major points regarding each of the three levels have to be incorporated in this presentation. At the individual level incentives can promote knowledge sharing (Sanchez 2001:15), but it has to be taken into account that there is also found a personal set of beliefs which stands for a certain inertia. This inertia may be repeated at the group level even to the neglect of management’s change of structure and work processes. “Rather, work groups may need to be exposed to new environmental conditions that make it impossible for the existing group cognitive equilibrium to continue” (Sanchez 2001:13). At the organizational level management occupy a “significant - but not exclusive - influence on the ideas that become accepted as knowledge in an organization” (Sanchez 2001:18).

Figure 2. Cycle models of change - ABOUT HERE -

In figure 2 the main elements of the change models constructed by Nelson, Senge et al. and Sanchez are summarized and systematized along the elements suggested in the author’s model which is now going to be exposed.

The first element of my change model is *actors initiating strategies of change*. I choose to see initiation of change activities as a task for proactive actors who might be the management but who may also be people in non-managerial positions. This element is inspired by the three models’ credit paid to stewardship, leadership and management. The broad interpretation of proactive actors is in line with the positions of Senge et al. and Sanchez. The next element comprises *proactive structures and learning processes*. This element takes inspiration from such structures of change as pilot groups by Senge et al. and the central role of group activities in all three models. On the other hand it is also pointed out in the quoted literature that structures are not sufficient in themselves, they have to be build and activated by relevant processes of interaction and communication. The essential element is learning. It is seen fundamental for continuous change that new ways of behaviour and related structures are recognized and reflected in accumulated knowledge and capabilities. The third element of the model is *measures to overcome hindrances*. From Senge et al. one learns that it is fundamental

for understanding change that limiting factors are acknowledged. Similarly Nelson and Sanchez point out that change processes will meet hindrances for good reasons. So my model explicitly point to the fact that a successful change process implies that the proactive actors must include measures to overcome such hindrances. The fourth element of my model is the inclusion of *supporting external relationships*. In various ways Nelson, Senge et al. and Sanchez point to the promotion of change by awareness of external forces. The fifth element of my model acknowledges the importance of time and history by including the *time perspective* which is underlined for various reasons by the quoted researchers. A sixth element is concentrated upon organizational change in relation to *process- and product innovation* as known to be important for the firms' competitiveness. This choice means that the model is not intended to explain minor changes that are only repeating prior changes of the same kind. Process- and product innovation is not in the same way a focus point for Nelson, Senge et al. or Sanchez who treat organizational change as a phenomenon of itself where I want to attach change specifically to a major competitive challenge for business firms besides the challenge of change as such.

For further clarification of the model, actors, structures and processes of learning and innovation are seen as internal organizational elements which stand in a dynamic relationship with the environment and both internal and external elements are seen in a time perspective. The model is shown in figure 3. Change starts with an initiative taken by an actor. The change implies innovation activities resulting in new structures and processes. The actors' evaluations result in learning dependent upon effective measures to overcome hindrances which also are of importance for the actors' possibility to initiate new changes. Mutual relations between internal processes and the environment seen in a time perspective are further influencing the cycle of change - learning - new change.

Figure 3. Model of Change, innovation and learning - ABOUT HERE -

5. Cases of change, innovation and learning

The empirical data to be analyzed comprise changes towards outsourcing and new procedures of product development.

5.1 Outsourcing

Organizational changes in Danish firms directed towards outsourcing are to a high extent motivated by reduction in costs (53%), and to a lesser extent explained by flexibility in production (33%) and quality and customer service (18%), cf. DISKO4.

The following analysis of outsourcing is based upon two examples. One concerns the BANK and its outsourcing of IT tasks to a joint data centre comprising about a dozen banks. This example includes the work of such a centre. The Disko 4 sample did not include the BANK's outsourcing partner. Instead the selected EDP SERVICE firm is one of the other Danish data centres that services banks and one that was included in the sample. The other example comprises the CHEMICAL firm's outsourcing to India and China.

5.1.1 The BANK and the EDP SERVICE firm

The BANK had as a start outsourced technical activities related to its electronic data processing of bank activities to a joint data centre comprising a dozen banks. This change could be understood as a simple transferral of a distinct set of activities, but the BANK's and the EDP SERVICE firm's experiences show that such an initiative had its own dynamics. From the start the BANK's initiative was motivated by the continuing changes going on concerning edp solutions of interest to financial activities. Similarly, the EDP SERVICE firm could tell that even though it had started its work by purely technical support to its clients, its work had changed into supplying combined technical and organizational solutions. Quoting the EDP SERVICE firm's management:

In the old days it was more IT. Today it is more business. Create a logical basis. In a banking system the profit depends upon a change of the routines in the bank. ... It is one of the areas where we have seen most product innovation on the whole (2.3.15-18; figures refer to interview number, page of transcript, and line number).

From these activities both the EDP SERVICE firm and the BANK continued to learn more and more about fitting technical and organizational work. The management of the EDP SERVICE firm said:

Constantly we have banking people working together with us. A considerable number who are testing the developed product. We have the responsibility for the analysis and the project basis. When

implementation takes place in the bank we are coming to help. We train and come up with proposals for suitable business processes (2.2.1-7).

Similarly the BANK could tell that it supplied personnel when the BANK's edp centre wanted banking expertise (12.5.40) The BANK's management looked upon the activity as learning running both ways (12.6.4).

Learning processes were supported in various ways. In the BANK the IT chief would regularly inform the chiefs of the BANK and at the same time an evaluation took place when necessary. Moreover a number of cross running meetings took place so relevant information were spread across functions. The BANK management felt that this communication had increased to a high extent and had itself taken a number of initiatives including the introduction of an information and communication department. In the EDP SERVICE firm the mutual learning was intensified in more and more cases by establishing projects run by a group comprising two bank representatives and two from the service firm. When new projects were started project leaders would look into evaluation reports from previous projects and take contact with colleagues i.a. guided by a so-called blue book containing experiences as acquired by the staff. Furthermore project leaders' fora and designers' fora would meet from time to time and discuss various themes.

The interviews show that these learning processes have further consequences in the form of organizational change. So, the EDP SERVICE firm extended its strategic space to fulfil its obligations towards the outsourcing firms. In this connection the EDP SERVICE firm's management tried to think along the lines of its clients and follow-up with internal competence building. To keep its services as relevant as possible and smooth internal communication the role of the technical experts was extended. So, the management let its technical experts take part in the deliberations from an early date even though the discussions with the client would start with the client's organizational problems. In this way new experiences could be anchored in the methodological work. Other employees developed bridging skills.

Our edp people get also more clever to understand business. They get clever in translating if the technical expert get too technical and the banking people too business oriented (3.3.39-40).

An important precondition for the development of new solutions was an extended degree of freedom among the employees in the EDP SERVICE firm in relation to action and this freedom was founded on trust between management and employees (3.8.41-42). Similarly the BANK management's attitude

towards change implied informal meetings and dialogue across the firm where people could expose their viewpoints without risk (12.4.16-17).

In the BANK the outsourcing decision had the additional effect that the BANK worked more on finding out about its own priorities regarding outsourcing. Again one can observe an organizational change. In this case it implied the creation of a role as concern IT chief.

In 2005 we hired a concern IT chief. Naturally, he is member of top management. It is simply because it is important for us that IT functions, is developed correctly, and the resources are used correctly. He has the overall responsibility... It is his task to find a common denominator (5.3.7-11).

In both cases the organizational changes imply new learning consciously thought as the basis for further development.

In the BANK the IT tasks were supported by consultants. The BANK valued the consultants' experiences acquired by their running experiences. The problem was that the consultants were too busy working at more than one project at a time, but the BANK's IT manager thought he could control the situation and get the consultants to focus upon the firm's specific problems even though they might start out with some general instruments.

The changes regarding the organization of edp services did not take place without the BANK and the EDP SERVICE firm run into some difficulties. So the BANK had to acknowledge that the joint edp projects could not go on without selecting some partners and dropping others. The Director said in 2008:

In spite of having a joint edp data centre we must acknowledge that this is not enough. ... We join with 4 - 6 banks because we cannot get an agreement within the joint edp data centre. There are differences in needs dependent upon size (12.17-19; 24-25).

The change might develop more or less fast dependent upon the choices made. This was underlined by the IT chief in the BANK in 2008:

It is a classical problem when talking development. If you are sufficiently large and have realized a need in good time before smaller ones you are met by a dilemma. Are you going to carry all the costs, or should you weight until you can convince the others that they should contribute (12.2.7- 11).

In the EDP SERVICE firm the work on changing bank procedures had resulted in more complex and dynamic tasks such as supporting bank advisers with their activities vis-à-vis their customers. This meant that one of the challenges was to adapt the changes so they did not answer yesterday's problems but got adapted to the current understanding of the original task. So, the change effort was constantly evaluated and revised in an iterative process where written communication was substituted by oral communication to a high extent. The change was met with some resistance because the old way of much documentation gave a feeling of security whereas the new working model provided uncertainty. The Project leader explained:

It is not so easy this iterative sort of work when you have been accustomed to write, and write, and write (14.4.41-42)

In case the obstacles could not be mastered by the group, it would send the problem higher up in the hierarchies of bank and service centre.

The EDP SERVICE firm's choice of running some change projects in banks according to an iterative model was supported by employees acting as 'ambassadors' for the model.

The Project leader explained:

The corps of ambassadors was started in grand style and communicated as central for the planned changes (14.5.22-23).

The implementation of the iterative model involved also considerable training activities and support of an external consultancy.

Figure 4. Cycles of change based on outsourcing - ABOUT HERE -

5.1.2 Outsourcing in the CHEMICAL firm

The second example of outsourcing highlights some of the difficulties in getting the change - learning cycle running. The CHEMICAL firm's top management outsourced part of the production processes to get extra capacity, but the firm kept full control of technology and quality.

We outsource on the basis of our own technology. We control our partners concerning quality and production. We also see to it that the product is consistent with the demands directed towards our firm by the authorities (8.10.36 - 39).

Some product development activities had also been outsourced. Again the CHEMICAL firm kept close connections to the work done by the foreign laboratory.

The co-operation goes on in this way that our foreign colleagues are commissioned to a specific project. Engineers and chemists from our Danish firm go abroad to start the work by pointing to critical aspects of the task which the foreigners must solve. From there they work by themselves but in close contact with the Danish headquarter (8.6.1-5).

Both regarding production processes and products it is seen that the CHEMICAL firm's management found it necessary to be very careful concerning the protection of knowledge which on the other hand set narrow limits to learning in these fields. Instead it can be observed that to get the outsourcing activities more efficient, learning regarding communication and governing of the external relationships got into focus.

The contact implied mutual visits, video conferences and mailing. The electronic communication had got more common during recent years and reduced the necessity of travels quite a deal.

The firm's co-operation with chemists in India and China had demanded much mutual learning and had taken a number of years. The outsourcing to these countries had put culture in focus.

And I will say concerning culture, it has been a very, very long learning process for both parties to get the co-operation to function both in India and China (8.6.22-23)

It was the impression by the Danish management that it was necessary to work actively with the relationships to get things done. The reason was that otherwise things would stop. The Manager gave as explanation:

People from India are very top guided and the single employee does not have the same natural way to take decisions to get things smoothly arranged or see to it that others help to make the decision (8.6.32 - 34).

Even though the co-operation about the outsourcing had been met by hindrances it was the management's evaluation at the first visit in January 2007 that it had been possible for the CHEMICAL firm to overcome these difficulties and get positive results. But the situation changed during 2007. More and more activities were dependent upon outsourcing because the firm's business at foreign markets grew stronger. The result was i.a. that product development procedure was revised as treated in the next section.

5.2 Business process development

Since the 1990's the CHEMICAL firm has changed its focus from developing products for other chemical firms which had the contact with the private market towards itself servicing this market. This change has meant that the firm now gives priority to develop more effective production processes of well-known chemical products to make them competitive at the private market. The new strategy had organizational consequences. The growth in outsourcing of product development activities added to the organizational challenges as mentioned in section 5.1.2. In the following the basic changes in product development procedures are treated. Afterwards the issue of outsourcing and product development procedures is addressed.

Figure 5. Cycles of change based on process and product development

- ABOUT HERE -

Since 1999 the firm has made radical organizational changes which imply a clear distinction between production/operations and development.

It is a very flat organization. One of the main principles is that we distinguish between development and operations. When a thing is developed it is transferred to operations. Other people take over (8.4.42-44).

The development organization is based upon project management. Change of the way project management was governed was at the centre of a new procedure for product development introduced a few years before the time of interviewing. This adaptation of project management work meant a change in how the various specialties and functions worked together. The change was still under development when the first interview took place. The new procedure was rather similar to the stage-gate model known from many other manufacturing firms (Cooper 1993).

The change was a challenge which demanded much supporting activity. Both project leaders and top management had participated in courses on project management.

It is more difficult than you think (to introduce project management). But we have worked with this since 1999. And we are in fact getting rather wide concerning the organizational work, systems that support our work, IT which contains all our activities within development and not least education of project people. Both project leaders and top management have taken part in project education (8.5.5-9).

The participation of top management was motivated by its getting an understanding of project work and so could better support the change.

The top management took part to get the right behaviour and understanding in relation to project work (8.5.18-19).

Also employees without managing responsibility had gone through rather comprehensive courses and got further information in relation to their actual work.

We have gone through methods and goals at a large number of project meetings so everybody will understand the meaning of working in this manner. In fact it functions (8.9.18-20).

The courses were arranged by a consultancy.

You have some firms who are very good in this field. Especially, we had a very large project leader training course running in 2004 most of the year. The firm X was responsible for it. They are very clever people (8.5.13-16).

The procedure implied a stricter planning of the total process and a better accumulation of experiences coming up during the development. According to the new procedure the management of a permanent business development committee would make a preliminary decision concerning the idea of a new product. Afterwards a project group would get the task to write a project basis that included an estimate of necessary chemical investigations, a market analysis, and specification of costs involved to get the chemical product accepted by the authorities at the relevant markets. The various estimates

were related to an economic evaluation directed towards net present value of the project. When these data were at hand the management committee took a decision about starting the project or dropping it.

If the project was accepted the development work was divided between a number of work groups representing different chemical specialities, marketing, specialists on the relationships with public authorities and legislation, and people from engineering. A major feature of the new procedure was the definition of borderlines between stages of work and a clear time schedule for the transferral of work from one group to the next. Furthermore it was mandatory that the transferral of work from one group to the next was based upon written documentation that clearly showed that the work fulfilled the prescriptions and was a satisfactory foundation for the work of the next group.

The point of departure for this is my experience and the experiences of my colleagues that 80% of the things that go wrong do it because it is not clear enough what has been delivered and the receiver has not formulated his demand clear enough (8.7.28-31).

The project leader was responsible for driving the project work. The management arranged meetings every six month with the circle of project leaders and established ad hoc groups to gather information of importance for project work. The project leader was backed by a coach who would spar with him and at the same time act as a gatekeeper and liaison in relation to the business development committee at the management level. By this link experiences of importance for further project work would be promoted. Yet the problem was that too few coaches had too much work to do so the arrangement did not work satisfactorily. It was therefore changed in connection with the revision of the system from 2008, cf below, so more coaches were at hand.

The organizational changes did not stop with the new procedures. The management felt the necessity of getting more dynamic and flexible which i.a meant more focus on the role of departments outside Denmark in connection with growth in global development and operations. At the second interview in January 2008 the Process Development Manager said:

It is about three quarters of a year since we really felt that the projects we had and those in the pipeline did not fit into the scheme X showed to you last year. Much became outsourced to China and India. The challenge was that our project system was founded on projects to be developed at our place, but it is only a few that follow this way (13.2.13-19).

The result was that some people made a new project development plan for the firm's sourcing system. The attitude was that from the outset it was not possible to decide whether a given project should belong to the sourcing system or the Danish plant. So during the autumn of 2007 the firm succeeded in merging the new plan for the sourcing system and the original plan by building a joint project system template that kept a number of choices open regarding borders between departments.

So it is the task for a project when it is ready to choose whether it is of the one or other sort and select border lines and define deliveries of the given project and define which borders we shall not think of (13.2.36-39).

The revised procedures were supported by some organizational changes related to project coordination and sourcing and the support and control by a new broader composed business development committee. As to product coordination it was the intention to evaluate borderlines of future projects to promote a more effective product organization. At the end of the interview in 2008 both managers declared that *"in two years time it (the organization) does not look like the one today (13.11.1)*. So changes of the product development organization seemed a continuous one.

6. Conclusions

The cases have shown how the three firms have carried through changes concerning business process- and product innovations such as outsourcing and procedures for product innovation. The ambition has been to show mechanisms of importance for a joint cycle of change, innovation and learning. To this end the analysis has been structured according to the cycle model developed above. Due to the cycle model it has been made explicit how the management in cooperation with employees have succeeded in making changes related to *process and product innovation* by introducing new structures, by consciously working with learning and measures to overcome hindrances as well as incorporating external support. In the following the experiences with each single element are summarised. Next the cycle character of the innovation processes is treated.

The first element of the model is *actors initiating strategies of change*. My choice was to see initiation of change activities as a task for proactive actors who besides the management might include people in non-managerial positions. The evidence confirms this choice. In the EDP SERVICE firm the change towards an iterative model of service to bank advisers included the establishment of a corps of ambassadors eager to convince their colleagues about the advantages of the new way of providing

service to banks (cf Senge et al. 2000:48 concerning committed people). In the CHEMICAL firm the top management was specifically attentive to the importance of positive attitudes and commitment to the change process of product development procedures both at the management level and lower levels of the firm. At the same time it is seen that the CHEMICAL firm's outsourcing activities were closely related to the content of the product development procedures. In contrast to the experiences of the EDP SERVICE firm and the CHEMICAL firm, the BANK's change towards outsourcing of edp activities was driven by top management and did not disclose specific committed groups of employees. Finally, concerning the element of actors initiating change the outsourcing examples call attention to the importance of external partners in some change situations and the parallel importance of negotiation of change. O'Connor's (1995) reminder of not being naïve concerning who drives the change is substantiated so far as the changes studied here were born at the strategic level, but should have the corollary: do look for committed people and do not forget the necessity of negotiations with vital partners.

The second element of the model is *proactive structures and learning processes*. This element has been an important part of the change processes according to the experiences of the firms' management. The CHEMICAL firm had introduced project management and related roles as well as specific procedures to support the change processes. The BANK had established a new IT role to adapt its outsourcing activities. In the BANK and the EDP SERVICE firm changes were founded on work groups' trial-and-error activities and reflections taking place at evaluation meetings. At such meetings the members delivered reports of their work to be discussed.

The experiences related to structures and processes show that the processes are of most importance. For example, in the CHEMICAL firm the introduction of the role of coach did not tell about the extent of coaching which was hampered by lack of personnel. And the iterative processes in the EDP SERVICE firm told more about the changes which were under way than new formal structures. Processes may go about with or without explicit change in structure. On the other hand it has to be recognized that recurrent processes themselves express structures.

The third element of the model is *measures to overcome hindrances*. The occurrence of constraints concerning the change processes was rather widespread in the visited firms showing themselves as internal difficulties in handling more complex tasks and resistance towards changing old ways of working. In relation to external cooperation the difficulties comprised disagreement among partners about the precise content of the (next) change, and culture differences.

The countermeasures comprised training, motivation, learning from experience, and negotiation. In the EDP SERVICE firm employees were trained to cover broader working tasks comprising both technical and organizational aspects to help bridging different functional areas. Such changes in roles were promoted by motivation implying some autonomy left to the employees. In the BANK the management's attitude supported a dialogue approach. In the CHEMICAL firm learning took place about how to govern external relationships influenced by different cultures. Concerning disagreements between the BANK and its partners, negotiation were to be used.

The experiences of the five firms have clearly shown the importance of including the element of *measures to overcome hindrances* in the cycle understanding of change. The measures have been used by the management in a manner based on communication and openness about the change initiatives. So the examples leave a more positive impression of employee involvement in the visited firms than could be expected from O'Connor's (1995) reminder about the understanding of employee involvement.

The fourth element of my model is the inclusion of *supporting external relationships*. Consultancies and other actors with specific knowledge supported the changes in the three firms. The BANK valued the consultants' experience acquired from work in other firms. So contrary to the fear expressed by Sorge and Wittelloostwijn (2004) concerning bad consultancy about change projects the case studies showed the management's ability to extract relevant support. Again, the management's building of change upon strategic considerations supports Sorge and Wittelloostwijn (2004)'s exceptions and it can be added that the management was not unaware of consultants' bias towards specific management's tools.

The fifth element of the model acknowledges the importance of time and history by including the *time perspective*. The changes related to outsourcing in the BANK and EDP SERVICE firm as well as in the CHEMICAL firm were all having further implications in the direction of new changes. The process innovations related to product innovation in the CHEMICAL firm also gave basis for further changes by accumulation of knowledge, diffusion and new initiatives.

The *cycle character* of change - learning - new change is based upon the interdependencies between the elements. The actors' initiatives about change are furthered by new structures and learning processes supported by necessary counter measures to overcome obstacles. On this basis the actors can go on with new changes stimulated by external challenges. In the CHEMICAL firm the management's introduction of more formal product development procedures prior to 2007 was supported by

widespread training by the help of consultants, communication and a new project leader role. Learning through 2007 resulted in negative experiences caused by the challenge of increasing outsourcing activities. So, work was initiated to get a new understanding of product development and to reconsider the procedures. The resulting new procedures were carried out in connection with some structural changes giving more weight to project coordination and sourcing.

The interdependencies between the elements were governed by the actors' initiatives, but under circumstances also supported by an inner logic of technical and organizational dimensions. This is evident in the cases of outsourcing as experienced by the BANK and the EDP SERVICE firm. Here the original change initiatives directed towards outsourcing of technical edp activities developed into organizational projects as a 'natural' solution which means that to get an effect of new edp activities the management had to decide to change its strategy and get the edp activities incorporated in new organizational structures and processes. It is natural to remember about rather similar experiences regarding the interrelationship between technology and organizational conditions which was experienced by many OECD countries in the 1970s and 1980s when productivity increases did not follow automatically from investments (OECD 1987).

In few words this study points to a general result concerning innovative change in business firms i.e. cooperation between top management and key actors about the accumulation of relevant learning and the creation of structures and processes securing diffusion of new projects by mastering measures to overcome hindrances.

Having made this conclusion it is time to remind about the limitations of the empirical data. The limitations comprise the size span of the firms and the open leadership style of the management. The positive effect of relatively small size and a flat structure for the exchange of ideas and so learning has been mentioned by the visited firms themselves. A further limitation is that the effects of changes upon the firm's economic performance have not been taken into consideration, but the improvement of innovative efforts should not be overlooked. Finally the case approach forbids hypothesis testing but instead it should be recognized that the change mechanisms made explicit have a general value. In this paper focus was directed towards the understanding of the mutual relationship between change and learning to the benefit of innovative activities.

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Figure 1 Data about three firms

Firms characterized by activity area	Interviewed managers	Main changes
EDP SERVICE firm	Managing Director ¹ Director ¹ Department Manager ² Project leader ²	Outsourcing
BANK	General Manager ¹⁻² IT Chief ²	Outsourcing
CHEMICAL firm	Vice President of Development ¹ , Process Development Manager ² Market Development Manager ²	Process development in relation to product development Outsourcing

1. Interviews December 2006 – January 2007.

2. Interviews January 2008.

Figure 2. Cycle models of change

AUTHOR's MODEL	NELSON's MODEL	SENGE ET AL.'s MODEL	SANCHEZ's MODEL
Actors initiating strategies of change	Stewardship of change (control, coordination and leadership)	Leadership communities (p.16) initiating and sustaining cycles of change	Management, work groups and key individuals integrate knowledge into a strategic logic for the organization
Proactive structures and learning processes	Substance or content (Structure)	Pilot group Learning by job experiences and rethinking	Groups and organization creating shared and new knowledge by interaction and learning
Measures to overcome hindrances	Stewardship of change (control coordination and leadership)	Limiting processes overcome by redesigning and other strategies for dealing with these challenges	The "cognitive orthodoxy" stands up against alternative interpretations of the organization's strategy. Incentives for knowledge sharing
Supporting external relationships	Outer Context (external environments)	Balancing processes of the system	New environmental conditions can support change
Time perspective	Past (history), present, future	Time and history	Time for processes
Innovation activities			

Figure 3. Model of Change, innovation and learning

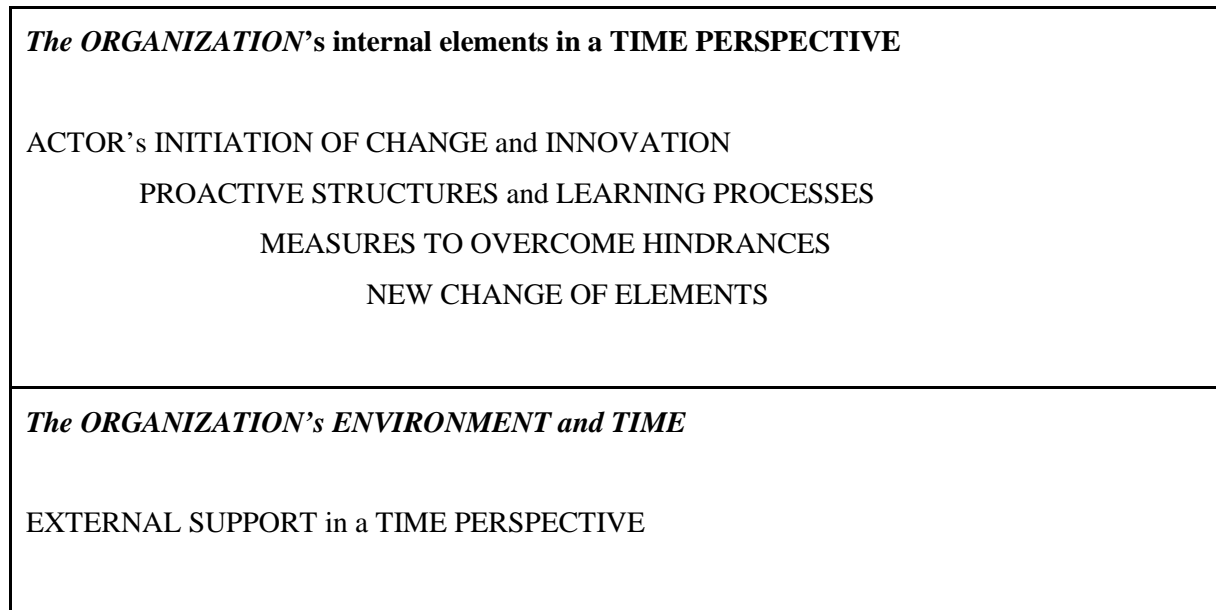


Figure 4. Cycles of change based on outsourcing

CYCLE ELEMENTS	EDP SERVICE firm	BANK	CHEMICAL firm
Actors initiating strategies of change	<p>CHANGE INITIATIVES</p> <ul style="list-style-type: none"> - Top management's strategy changes from purely technological considerations towards the inclusion of organizational projects - Extension of strategic space by thinking along clients' lines 	<p>CHANGE INITIATIVES</p> <ul style="list-style-type: none"> - Outsourcing of edp decided by top management - Derived outsourcing of organizational tasks 	<p>CHANGE INITIATIVES</p> <ul style="list-style-type: none"> - Top management's strategy of extra capacity for production and development by outsourcing
Proactive structures and learning processes	<p>STRUCTURE</p> <ul style="list-style-type: none"> - Task groups - Extended role for edp people <p>LEARNING</p> <ul style="list-style-type: none"> - Joint testing of solutions 	<p>STRUCTURE</p> <ul style="list-style-type: none"> - New role of IT chief <p>LEARNING</p> <ul style="list-style-type: none"> - joint testing of solutions - training 	<p>STRUCTURE</p> <ul style="list-style-type: none"> - Danish task force <p>LEARNING</p> <ul style="list-style-type: none"> - how to control - learning through joint development by mutual visits and video conferences
Measures to overcome hindrances	<p>COUNTER MEASURES</p> <ul style="list-style-type: none"> - Extended degree of freedom to act based on trust between management and employees - Intensified communication with client by iterative process 	<p>COUNTER MEASURES</p> <ul style="list-style-type: none"> - concentration on fewer partners of IT change project 	<p>COUNTER MEASURES</p> <ul style="list-style-type: none"> - learning foreign culture - training foreign partners - new product development procedures (cf figure 5)
Supporting external relationships	<p>EXTERNAL SUPPORT</p> <ul style="list-style-type: none"> - Joint work with outsourcing client - Consultants 	<p>EXTERNAL SUPPORT</p> <ul style="list-style-type: none"> - Outsourcing - Consultants 	<p>EXTERNAL SUPPORT</p> <ul style="list-style-type: none"> - Extra capacity
Time perspective	<p>PERIOD OF CHANGE</p> <ul style="list-style-type: none"> - Continuous 	<p>PERIOD OF CHANGE</p> <ul style="list-style-type: none"> - Continuous 	<p>PERIOD OF CHANGE</p> <ul style="list-style-type: none"> - Continuous
Innovation activities	<p>INNOVATION</p> <ul style="list-style-type: none"> - New services 	<p>INNOVATION</p> <ul style="list-style-type: none"> - New services 	<p>INNOVATION</p> <ul style="list-style-type: none"> -Product development

Figure 5. Cycles of change based on process and product development

CYCLE MODEL	CHEMICAL firm
Actors initiating strategies of change	<p>CHANGE INITIATIVES</p> <ul style="list-style-type: none"> - Top management introduces clear distinction between production and development - The management's development of project management
Proactive structures and learning processes	<p>STRUCTURE</p> <ul style="list-style-type: none"> - Project management - Procedures for development <p>LEARNING</p> <ul style="list-style-type: none"> - Courses on project management - Meetings about procedures and project work in general - Coaching project leaders
Measures to overcome hindrances	<p>COUNTERMEASURES</p> <ul style="list-style-type: none"> - Top management's learning and active support of the change - Meetings about the changes - Revision of procedures
Supporting external relationships	<p>EXTERNAL SUPPORT</p> <ul style="list-style-type: none"> - Consultancy
Innovation activities	<p>INNOVATION</p> <ul style="list-style-type: none"> - New procedure for development of new production processes - Change of these procedures
Time perspective	<p>PERIOD OF CHANGE</p> <ul style="list-style-type: none"> - Since 1999