The Effect of Knowledge Transfer on Innovation in the Context of Outsourcing

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Abstract

Managing outsourcing, innovation and knowledge transfer are one of the biggest challenges for business. This research investigates the effect of knowledge transfer on innovation in the context of outsourcing. The explanation of the related variables – outsourcing, innovation and knowledge is followed by the research propositions. The influence of knowledge transfer on the relationship between outsourcing and innovation is evaluated with the help of an extended knowledge transfer model. The addition of the Knowledge Portal in step 2 of the model plays an important role in the successfulness of an innovation. A case study of Dell is used to illustrate the usefulness of the extended knowledge transfer model.

Key words: Outsourcing, Innovation, Knowledge, Knowledge Transfer Model, Knowledge Portal, Dell
Index

Abstract .......................................................................................................................... 2

Chapter 1: Introduction ................................................................................................. 4

Organisation of the research ......................................................................................... 6

Chapter 2: Literature review ......................................................................................... 7

Outsourcing ..................................................................................................................... 7

Business process outsourcing ......................................................................................... 8

Knowledge process outsourcing ...................................................................................... 8

Types of activities suitable for outsourcing ...................................................................... 9

Innovation ........................................................................................................................ 11

Intensity of innovation ................................................................................................... 12

Knowledge ...................................................................................................................... 13

Knowledge and its transferability .................................................................................... 13

Chapter 3: Research propositions ................................................................................. 15

Theoretical framework .................................................................................................... 15

Influence of outsourcing on innovation ........................................................................... 16

Advantages of outsourcing innovation ........................................................................... 16

Dis-advantages of outsourcing innovation ...................................................................... 17

Relationship between knowledge transfer and innovation ............................................. 17

The knowledge transfer model ....................................................................................... 19

Chapter 4: Case study ................................................................................................... 23

Dell Computers .............................................................................................................. 23

Dell and the extended knowledge transfer model .......................................................... 23

Conclusion on the Dell case .......................................................................................... 25

Conclusion ....................................................................................................................... 26

Further research ............................................................................................................ 26

Bibliography ................................................................................................................... 27
Chapter 1: Introduction

More and more companies are outsourcing activities these days. Often new division and business relationships are built up in overseas countries where the company, its knowledge, ideas and technology are new and unfamiliar. Only a few employees of the company go overseas to implement the knowledge needed for the outsourced activities. These employees also need to be able to transport the new knowledge, generated by the outsourced firm, back to the own company. But can all necessary knowledge be transferred? Lots of knowledge is stuck in the capabilities and minds of the employees, unfortunately writing manuals does not cover everything. If outsourced processes need to be innovative, enough knowledge needs to be transferred to be able to reach this goal. Additionally, if the outsourced firm has done its job, also this new knowledge needs to be transferrable to the main company in order to implement further processing. Is outsourcing of innovative processes such a good idea after all, what are the influences of knowledge transfer on the relationship between outsourcing and innovation?

A lot is known about knowledge, what it is and how it can be transferred. The article of Argote, McEvily and Reagans (2003: 571) discusses the effects of mechanisms of knowledge management on different business units. Besides this research, these authors also stress the importance of further research on applying knowledge transfer across the boundaries (Argote, McEvily, & Reagans, 2003). Outsourcing could be such a boundary. Extensive research has also been done on innovation (Teece, 2000; Grand, 1996; Utterback 1994). Nonaka (1994) provides clear explanation about the different types of knowledge and especially organisational knowledge creation. Next to that, it is stated by Nonaka (1994) that knowledge streams are generated by innovations and can cause new changes for the company.

The challenge of this research is to see whether this statement applies to outsourcing as well. That is, the effect of knowledge transfer on the relationship between outsourcing and innovation is considered in this research.
Knowledge transfer might stimulate or discourage the outsourcing of innovation. Gilbert and Cordey-Hayes (1996: 301) investigated a model for knowledge transfer as a conceptual framework for exploring organizational processes.

Organisational innovative processes can be investigated with the help of a knowledge transfer model which has resulted from this research. This model will be used to develop an extended theory, applicable for outsourcing. In this way, the influence of knowledge transfer on the relationship between outsourcing and innovation will be investigated. Quinn (1999: 20) also indicates that managing outsourcing, innovation and knowledge transfer will be among one of the biggest challenges for business.

Literature review is used to study the influence of knowledge transfer on the relationship between outsourcing and innovation. The main concepts which will be explained are outsourcing, innovation and knowledge transfer. Next to that attention will be given to the transferability of knowledge, how innovation can be implemented, what the implications of outsourcing are and what the relations between these variables are. Unexplained and unconsidered variables are the country where the outsourcing takes place, the industry to which a company belongs and the type of firm considered.

The study will be based upon the literature review method with publications coming from high quality journals, so academic relevance can be ensured. Examples of used journals are the Organization Science, Long Range Planning and Strategic Management Journal. To find the appropriate articles, the UvT library database, the ProQuest databank and scholar.google.nl are used. Using these academic literature databases cover a great part of the available research and will provide enough evidence for the statements made in the paper. The advantage of relying on secondary data is that it is time saving and that it is quantitative. However, full dependability on secondary data also implies that information may be obsolete and not meeting the specific needs of the particular situation or setting (Sekaran, 2003). These disadvantages will be minimized by the usage of up-to-date information and when necessary additional assumptions will be made.
Organisation of the research

This research is concentrated on the following research question:

What is the influence of knowledge transfer on the relationship between outsourcing and innovation.

Chapter 2 is used to explain the variables outsourcing, innovation and knowledge. In depth knowledge of these variables is needed to understand the scope of this research. The types of outsourcing, the intensity of innovation, the different types of knowledge and its transferability along with its terminology are discussed.

Chapter 3 investigates to what extend knowledge of the outsourcing company need to be transferred to the firm outsourced to. The theoretical framework is presented. Second the influence of outsourcing on innovation is examined. The expectation is that outsourcing stimulates innovation. A process or an idea is outsourced to a more specialized firm and so quicker and more advanced innovation is expected to be possible. Also, the need for transferability of the new knowledge generated by innovation is considered. In the chapter it is explained whether it is sufficient if the R&D department is fully informed about the innovation or whether the new knowledge also needs to be transferable to other divisions. When the latter is the case, the success of an innovation depends on the transferability of knowledge. The successfullness of outsourcing an innovation when knowledge transfer is (im)possible is considered at the end of the chapter. Expectation are that knowledge transfer needs to be possible to some extend for an outsourced innovation to be successful. A tool to realize this is presented and stimulates the outsourcing of innovation.

Chapter 4 presents a case study. The outsourcing of an R&D activity of Dell is studied. The outsourcing of Dell is evaluated with the help of the extended transfer model worked out in chapter 3. The importance of knowledge transfer in a real life case will be presented.
Chapter 2: Literature review

Outsourcing

Allocating activities from inside the company to external parties is what is called outsourcing (Kroes & Ghosh, 2010). The meaning of outsourcing has significantly changed over time, nevertheless. In the past outsourcing was limited to contracting out non-core activities, but nowadays outsourcing can apply to almost every firm activity. Examples of those activities are core and non-core components, business processes, information technology processes, manufacturing and distribution activities, and customer support activities (Chamberland, 2003; Gottfredson et al., 2005; Venkatraman, 2004). Specialized firms have been set up increasingly and can provide their expertise, provide higher customer interaction and become more innovative than the overall firm is capable of internally (Quinn, 1999).

A careful decision should be made according to which activities should be kept inside the company and which activities to outsource. A competitive advantage can be achieved by outsourcing the right firm activities. Besides the increased offer of specialized companies, also the growing ability of outsourcing programs to reach a competitive advantage increases the importance of outsourcing (Kroes & Ghosh, 2010). The globalizing world contributes to this, as the search for excellent production factors is not limited anymore to national boundaries (Kumar, Fenema, & Glinow, 2009). Examples of competitive advantages that can be achieved by outsourcing are quality improvements, higher flexibility, cost reductions and superior product designs (Ettlie and Sethuraman, 2002). Other reasons for outsourcing can be improving the company’s capacities to stay up to date and to innovate, reach more integrated services than internal sources can offer, reduce fixed investments, achieving cross-divisional coordination and shareholder value gains that the company could otherwise not achieve. Additionally a clear shift from short term outsourcing to long term outsourcing is visible (Quinn, 1999). An example is provided by Quinn (1999: 10): “Royal Dutch Shell seeks outside experts” different views and more specialized knowledge for the scenario building that is central to its renowned strategic planning activities.
Outsourcing decisions involve a careful analysis of the risks, reasons, resources, culture, infrastructure and indisputably the capabilities of the external firm to which the activities are outsourced. The main concerns of whether or not to outsource an activity are the loss of control and the loss of internal knowledge (Lai, Riezman, & Wang, 2007). Additionally an ‘us’ verses ‘them’ mentality might be created which makes implementation more difficult. The outsourcing decision is performed at strategic level and shifts more and more towards the CEO’s (Kumar, Fenema, & Glinow, 2009; Quinn, 1999). The type of outsourcing is also determined at this level. Broadly speaking, there are two main types of outsourcing, namely business process outsourcing (BPO) and knowledge process outsourcing (KPO) (Sen & Shiel, 2006).

**Business process outsourcing**

The first and traditional type of outsourcing is the business process outsourcing (BPO). According to Ghosh (2009), BPO focuses on transferring the execution of routine activities in a firm’s non-core or secondary value chain processes. Outsourcing routine activities is relatively easy compared to outsourcing non-routine activities as the former can be specified in manuals. The routine activities can easily be performed by new workers. Examples of these are storing, making and buying of goods and services, customer selection, finance and IT (Sen & Shiel, 2006). But as companies continued to outsource more and relationships with the third party improved, the type of business processes became more complex. Knowledge transfer became increasingly important as better skilled employees were needed and has resulted in knowledge process outsourcing (KPO) (Sen & Shiel, 2006).

**Knowledge process outsourcing**

Knowledge process outsourcing considers the non-routine outsourced activities. Work processes which are more complex and ambitious with a higher degree of tacit knowledge, uncertainty and ambiguity are now increasingly outsourced. KPO became popular because of higher operational efficiencies, cost savings, access to highly talented workforce and improved quality (Sen & Shiel, 2006).
Examples of KPO are the offshore outsourcing of General Electronics’ engineering R&D division to their Indian subsidiary and Ferrari outsourcing the design of their CAD/CAM system to Tata Consultancy Services in Bangalore and Pune (Kumar, Fenema, & Glinow, 2009). In KPO highly developed skills and capabilities, along with strong commitment to the job are needed for successful outsourcing. These requirements are assisted by IT systems and decision support systems which make communication along a large distance possible (Ghosh, 2009). As technologies advance and become even more specialized, the occurrence of KPO is likely to increase.

**Types of activities suitable for outsourcing**

When opportunities for outsourcing arise, a careful decision about which activities to outsource should be made. Some activities are more appropriate for outsourcing then others. A task should be mainly considered on its interdependence on other tasks and information stickiness. Interdependence is defined as “the extend to which the performance and outcome of one task are affected by, or need interaction with, the performance and outcome of the other task” (Kumar, Fenema, & Glinow, 2009). Task interdependencies were introduced by Van de Ven in 1976. In figure 1 an overview of the four differ types of activities is presented.

*Figure 1: Task interdependencies (Ven, Delbecq, & Koenig, Determinants of Coordination Modes within Organizations, 1976)*
The first table presents the independent work flow case in which work enters a unit and leaves the unit without cooperation of different units or workers. No interaction takes place between the different units, the units work independently. In the sequential work flow case, the work starts in one unit and its output becomes the input for the second unit and so on. The units work independently but do depend on the output of each other. Information about the output should be transferred in order for the next unit to be able to work with its input. These first two types of activities can be considered as BPO and are relatively easy to outsource.

In the third case, the reciprocal work flow case, there are workflows back and forth between the different units. The output of work unit one is the input for unit two, but the output of unit two also gets back to unit one for additional work. In the team work flow case “work is undertaken jointly by unit personnel who diagnose, problem-solve and collaborate in order to complete the work” (Ven, Delbecq, & Koenig, Determinants of Coordination Modes within Organizations, 1976: 325). Case three and four are considered KPO.

It becomes clear from the different interdependence work cases that one type of work flow needs more cooperation with other work units than another. This has important implications for outsourcing. It is assumed that activities which have intense interdependence do automatically concern sticky\(^1\) information (Kumar, Fenema, & Glinow, 2009). More effort is needed to transfer all necessary information about the work which is passed on from one unit to the next. Sticky information is best transferred by the interaction of workers, watching colleagues working, hear them talking and by communicating with each other anytime. By outsourcing working units which make use of intense interdependence the transfer of sticky information becomes difficult. This makes certain activities more suitable for outsourcing than others.

\(^1\)For stickiness the definition of Von Hippel (1994) is used: ‘the incremental expenditure required to transfer that unit of information to a specified locus in a form usable by a given information seeker. When this cost is low, information stickiness is low; when it is high, stickiness is high."
Among the four types of workflow cases discussed above, the independent work flow case is the easiest to outsource. All units work separately and do not need interaction which each other. This implies that it does not matter where the different units are located and by whom they are performed, as long as the worker are capable of doing the work. Second, the sequential work flow case. Although workers work separately on their tasks, the output is transferred along the process. Outsourcing these activities becomes more difficult as information about the output is needed so a detailed description should be written. It would be possible to outsource parts of this work flow, but an advisable alternative would be to outsource large parts or even the complete work flow (Kumar, Fenema, & Glinow, 2009). The last two work flow cases, the reciprocal and the team work flow case contain high interdependence and therefore highly sticky information. Outsourcing here would contain higher transfer costs, confusion might arise and a high coordination of activities is needed (Kumar, Fenema, & Glinow, 2009). Additionally, the process becomes more complicated as parts of the process are located elsewhere. Good communication tools should be present to enable knowledge transfer.

**Innovation**

Consumer preferences are continuously changing and so new opportunities arise. Product lines need constant renewal or total replacement by new product lines. Doing new things, or doing things which were done before, in new ways is what is called innovation (Ven, Central Problems in the Management of Innovation, 1986). Companies innovate to sustain or improve their competitiveness. Examples of innovation are green electricity, ecommerce and enterprise resource planning systems (SAP). A company needs to be able to generate new ideas, assemble information and translate all of that into new knowledge to make the ideas possible for product or process innovation. Innovation starts with a company’s innovative capabilities, resources, activities and structures, which enable or constrain the transformation of resources into new designs or functionalities.
There are four main types of innovation, namely incremental and radical innovation and product and process innovation. Product innovation considers the innovation in goods and services, while process innovation discusses technological and organisational innovation. Incremental innovation tries to improve the efficiency of operations. It considers small changes in existing operations, focuses on the short term and makes use of a market pull. Radical innovation is revolutionary and destructive, there is no way back. In the short term it costs money, but radical innovation is essential to continue in the long term. Companies come up with new possibilities from their Research and Development (R&D) departments and try to find a market for their products (technological push) (Abernathy & Utterback, 1978).

Intensity of innovation
Afuah and Bahram (1993) construct the hypercube of innovation. The model describes the different effects of innovation at various stages of the innovation value-added chain. Innovation at one business unit will also have an effect on the other business units. Figure 2 presents the hypercube of innovation. It shows that an innovation might be incremental at the stage of the supplier, but can be radical at the customer stage.

![Figure 2: The hypercube of innovation. The X and Y axes are the innovation-classifying factors. The Z-axis is the innovation value-adding chain.](image)
If the core concepts of innovation are replaced while the linkages between the concepts are unchanged, the innovation is called modular. The term architectural innovation is used if the core concepts were being reinforced while the linkages between these core concepts and components of the product were changed (Afuah & Bahram, 1993). To give an example of the effects along the value-added chain, we may consider the DSK keyboard (Afuah & Bahram, 1995). To the innovating entity, this innovation was architectural. For suppliers of components and complementary products the innovation was incremental, but it was radical for users. As the impact of an innovation may differ greatly between the different stages of the value-added chain, the impact should carefully be considered and evaluated.

**Knowledge**

One of the key capacities of a company is knowledge, a substantial competitive advantage can be obtained by using this resource in the right way. Knowledge can be split up into two parts, namely information and know-how (Kogut & Zander, 1992). Information is considered standardized and results in data and manuals. It is explicit and describes what something means. Information can easily and at low cost be transferred from one person to another. Know-how on the other hand describes how something needs to be done. It considers experience and skills which are captured inside people and organisations and therefore is called tacit. To give an example, think about a company launching a new product in the market. Pricing the product (information) is one thing, but how to place it in the market effectively (know-how) is another.

**Knowledge and its transferability**

Knowledge is captured in individuals, societies and in organisations. In this research the focus will be on knowledge which is explicit or tacit and captured in individuals or organisations. Figure 3 illustrates that there are tremendous differences between individual knowledge and organisational knowledge (Kogut & Zander, 1992). If all knowledge of an organisation would only be captured inside individuals, this would mean that by simply replacing individuals knowledge would be lost. This is not the case. Knowledge is also kept by organisations themselves. Explicit knowledge of the organisation is captured in manuals, data on sales and technology and is mostly transferred by manuals.
Tacit knowledge however is stored in the combination of the know-how and information. It requires combining capabilities and exploring learning and organizing opportunities. This knowledge is easily replicated within an organisation, as people can learn from each other by practicing, but difficult to imitate by others.

![Figure 3: Classification of knowledge at different levels](image)

According to Kogut and Zander (1992) codifiability and complexity influence the transferability of knowledge. Codifiability concerns the structuring of knowledge to particular rules and relationships which are uncomplicated to communicate. The complexity of knowledge is described as the number of actions needed to complete the job. “For a particular code, the costs of transferring a technology will vary with its complexity” (Kogut and Zander, 1992: 388).

Additionally, before knowledge transfer to occur, a certain cognitive distance should be present (Nooteboom, 2000). If two people work extensively together their cognitive distance is too short and they will not have an incentive to share knowledge. However, if the cognitive distance between two people is too large, which means that their interests are widely spread, there is not an incentive to share knowledge either. For knowledge transfer to occur it is important that there is a cognitive distance, but it should be within a certain range.
Chapter 3: Research propositions

The outsourcing of activities is happening for decades already. The outsourcing of R&D and innovation however is a far less experienced area. The question is whether knowledge transfer plays a critical role. What effect does knowledge transfer have on the relationship between outsourcing and innovation?

Theoretical framework

![Theoretical framework diagram]

*Figure 4: Theoretical framework*

What is the role of knowledge transfer with regard to the relationship between outsourcing and innovation?
Influence of outsourcing on innovation

Innovation that takes place inside the company is under full supervision of the company and all knowledge is provided internally. The question is whether this strategy is optimal. In terms of innovations, can firms benefit from outsourcing?

Proposition 1: Innovation is influenced by outsourcing. Outsourcing can accelerate the innovation process as a more specialized company can do the innovation. On the other hand the principal agent problem and the necessary knowledge transfer make outsourcing of innovation less attractive.

Like many other company activities, innovation might also be suitable for outsourcing. Currently the outsourced fraction of R&D is still a small part of total R&D (Lai, Riezman, & Wang, 2007). However, as other activities, also the outsourcing of innovation is expanding. As companies become more experienced with outsourcing innovative processes they get more trust in their external party and long term relationships along with a common stock of knowledge is build up.

Advantages of outsourcing innovation

External parties have the advantageous of economies of scale and labor specialization which enables them to innovate faster and cheaper (Lai, Riezman, & Wang, 2007). For this reason, the company itself should focus on it’s core competencies. In order to make the outsourcing of innovation successful, the company should be flexible and make use of a reward system which makes the external party act on behalf of the company (Quinn, 1999).

The availability of new monitoring techniques and improved electronic communications enables companies to keep better control over their external parties. Moral hazard is reduced enormously and a more trustful relationship is established. Own employees should be linked to knowledge sources and databases as directly as possible to create understanding for and acceptance of the innovation (Quinn, 1999). Due to these improvements, innovation cycles in terms of times and costs can be reduced by 60 to 90 percents by outsourcing (Quinn, 1999).
The leakage of trade secrets is being reduced by the higher protection of intellectual property, resulting in more R&D outsourcing, increased economic efficiency and reduced monitoring costs (Lai, Riezman, & Wang, 2007).

**Disadvantages of outsourcing innovation**

The major concern about outsourcing innovation is the principle agent problem (Lai, Riezman, & Wang, 2007). The external party, the agent, needs extensive information about sensitive knowledge of the company (principal). The agent might cheat the principal by selling information to competitive companies, causing the market share of the principal to erode. This thoroughly sharing of knowledge distinguishes the outsourcing of innovation from the outsourcing of other company activities.

The information leakage problem could be overcome by perfect contracting (Lai, Riezman, & Wang, 2007). However, prefect contracting is unrealistic according to economic theory. Consider a revenue sharing contract. Here an incentive for the principal and the agent is provided to stick to the contract and to achieve the best possible outcome. Leakage of information or other principal-agent problems will mainly be overcome. It should be taken into account that a revenue sharing contract is only optimal when the loss of the principal and the gain of the agent would be small in case of information leakage. If the losses and gains would be large, only then in-house innovation is considered optimal (Lai, Riezman, & Wang, 2007).

**Relationship between knowledge transfer and innovation**

Organisational knowledge and learning is essential for innovation to be successful. The innovative capabilities of the firm enable or constraint the learning process and so the success of innovation. If a marketing department wants a product line to be replaced by a new one and the knowledge for new technologies is available inside the firm, the transferability of knowledge it the key for success. The marketing department clearly has to explain their wishes to the R&D department and the other way around the R&D department clearly describes the possibilities of the technology.
Proposition 2: The degree of success of an innovation depends on the transferability of knowledge. A common stock of knowledge is needed for acceptance and implementation of the innovation.

To obtain the knowledge transfer needed for innovation, employees and departments require frequent interaction. By doing this, an own language or code is developed by the groups and enables mutual understanding. The knowledge transfer takes place by a common stock of knowledge (Kogut & Zander, 1992). Knowledge is shared as much as possible to help understand the mutual significance and interests. In this way the best outcome for outsourced innovation is to be realized.

Considering the task interdependencies, innovation is best comparable with the team workflow case. Innovation is a complex process in which cooperation among unit personnel, but also across divisions is an important aspect of the process. The sticky information which goes along with high interdependencies makes R&D far less suitable for outsourcing than less interdependent departments. However, if the cost of transferring information to the outsourced company is lower than keeping the job in-house and appropriate coordination can be achieved, outsourcing is an option.

If R&D is not a core competency of the firm, innovation might be suitable for outsourcing (Quinn, 1999). A company can choose between outsourcing the total innovation process or just a part of it. In both types however, knowledge transfer plays a role. As learning and innovation require the understanding of a common stock of knowledge, problems arise when the new knowledge needs to shift from R&D to other departments. These departments, for example the manufacturing and marketing departments do not share the same stock of knowledge as the R&D department does, especially not when this R&D department comes from outside the firm (Kogut & Zander, 1992). The knowledge transfer model (Gilbert & Cordey-Hayes, 1996), displayed in figure 4, is used as a guide to explore what role knowledge transfer plays on the relationship between outsourcing and innovation.
The knowledge transfer model

According to Gilber and Cordey-Hayes (1996) knowledge transfer is needed for new information to become familiar to the company and passes through the five steps. Considering these different steps which are conditional for achieving successful innovation, explanation on the model will be given and adjustments will be made in order to apply it to the outsourcing of innovation.

**Proposition 3:** Knowledge transfer becomes increasingly important when the innovation process is outsourced. Before innovation can be successful, knowledge should be acquired, communicated, applied, accepted and assimilated. After these processes the innovation can become a core routine of the organisation and the successfulness of the innovation can be determined. Outsourcing innovation makes communication of knowledge more difficult and requires the help of a knowledge portal.

**Step 1**

At stage one, knowledge is acquired. In the original model this is done in-house, but for the adjusted model this step will be outsourced. There are no constraints to this adjustment. The advantage to outsourcing step 1 is that the acquisition of knowledge is likely to be accelerated, better quality can be achieved and cost efficiencies can arise.
Step 2
At stage two, the acquired knowledge should be communicated through the company. The implications for the adjusted model are more intense at this stage. In the original model the knowledge was in-house already and could be communicated easily through verbal or written communication. Inside, organizing principles which proceed as mechanisms, translate the knowledge into wider principles, understandable for a broader range of employees (Kogut & Zander, 1992). The question rises how this mutual understanding of knowledge is created between the company and the outsourced firm. The knowledge in the adjusted model needs to be transported from the outsourced firm to the mother company in order to process it further or adjust the working processes to the new knowledge and innovation. By developing long-term relationships with the outsourced company, common language and organizing principles can arise and enable the outsourcing of innovation.

To realize this mutual understanding of the new knowledge, a knowledge portal might be the answer (Baalen, Bloemhof-Ruwaard, & Heck, 2005). As new knowledge is scattered, a knowledge portal helps to accelerate the transfer of it. Baalen, Bloemhof-Ruwaard and Heck (2005) argue that the transfer of knowledge is an activity of trial and error and mutual adjustment and happens in social networks. Social networks are defined as “a patterned organisation of a collection of actors and their relationships” (Baalen, Bloemhof-Ruwaard, & Heck, 2005), which implies that also virtually connections are relationships. The company and the outsourced firm can form such a social network through the knowledge portal. The knowledge portal consists of an online network by which knowledge can be shared in several ways: ongoing interaction, identity persistence and knowledge of the previous interactions. Additionally the knowledge portal should contain various spaces for knowledge sharing, synchronous and asynchronous communications media, document storage and retrieval (Baalen, Bloemhof-Ruwaard, & Heck, 2005). In this way the scattered knowledge can be collected in one virtual place. Continuous interaction and consulting of the knowledge is possible, for both the company and the outsourced firm. In this way both companies keep each other informed about the latest developments and expectations.
Primarily, the company which wants to outsource its R&D activity starts the knowledge portal. It includes all necessary information which the outsourced firm needs. These include the wishes of the company, the purpose of the innovation, technological possibilities and limitations etc. If the knowledge portal is filled, the outsourced firm starts its work. Along with the progress the firm makes, the knowledge portal is filled with information about the progress. This process enables the communication of the innovation and common knowledge in early stages of the innovation process. As from the start of the project a common stock of knowledge is built up, the transfer of knowledge once the innovation has finished will be far smoother. The knowledge portal does not make a distinction between tacit and explicit knowledge. However, as the knowledge portal is present from the start and lots of different communication forms are provided, no difficulties for tacit knowledge to be transferred are present. The difficulties, regarding knowledge transfer, of innovation in the context of outsourcing are mainly overcome.

**Step 3**

The acquired and communicated knowledge should be adopted and applied in the company processes. For application to occur, first of all the senior managers should adopt the innovation and indicate that the employees will use the innovation in their work (Klein & Speer Sorra, 1997). During the application period employees should acquire the required skills and knowledge to be able to use the innovation. Once all necessary knowledge is obtained, the process continues to step four.

**Step 4**

Before the innovation can be used by the company, acceptance of the employees is needed. Communication of the knowledge is enabled by the knowledge portal, but integration of the knowledge needs to ensure the understanding among the working force.

For horizontal integration individuals have to play a crucial role between the departments in order to make the stock of knowledge common among them. The use of the knowledge portal should be extensively explained and practiced. Vertical integration also depends on mutual adaptation and employees should be willing to learn the new codifications.
Attitudes of the employees should be turned positive towards the innovation before it can be implemented. The process of acceptance and change will occur by learning-by-doing and feedback. User support services should be set up and employees should get the time to experiment with the innovation (Klein & Speer Sorra, 1997). Only after these processes, acceptance for the innovation will occur (Gilbert & Cordey-Hayes, 1996).

Step 5
Gilber and Cordey-Hayes state how important it is for knowledge to be transferred: “The key to the process of knowledge transfer is the assimilation of the results and effects of applying the knowledge gained” (1996: 304). Depending on the successfulness of the assimilation, it can be stated how successful the innovation has been. It is important to state that the success of the innovation often does not depend on the innovation itself, but on its implementation and thereby the knowledge transfer process (Klein & Speer Sorra, 1997). If one of steps 1-4 fails, the assimilation of the innovation will not be successfully implemented into the core routines of the organization.

Figure 6 summarizes the extensions suggested for the model to make it suitable for outsourcing innovation.
Chapter 4: Case study

A case study of Dell Computers is used to illustrate the usefulness of the extended knowledge transfer model. The case study is based on several articles (Kraemer, Dedrick, & Yamashiro, 2000; Nardo, 2003) and information acquired directly from the Dell website (www.dell.com). In this case study it is shown how important knowledge transfer is while outsourcing innovation.

Dell Computers

Dell is the world leader in direct customers sales of computers. The company was founded in 1984 by Michael Dell and has experienced an enormous growth since than. The strength of Dell is it’s direct selling to the final customer and its ability to adjust to individual customer preferences. Additionally, the 24-hour customer service for complaints and technical support also contributes to the popularity of Dell (www.dell.com). During the beginning of the nineties Dell expands so rapidly that the organisational model has to change in order to manage what had become a billion dollar company (Kraemer, Dedrick, & Yamashiro, 2000). As Dell makes use of just-in-time production, close relationships are needed with its suppliers. The extended knowledge transfer model is used to evaluate the R&D outsourcing process of Dell, considering the ‘Product Albatross’.

Dell and the extended knowledge transfer model

Step 1: Outsourcing the acquisition of knowledge

During the turndown in demand for technology during the nineties, Dell was forced to evaluate and optimize performance (www.dell.com). One of the opportunities for Dell was outsourcing the Product Albatross, a value-priced desktop with a high profit margin. The product had a complicated cost structure and the time to market had to be small, outsourcing was initiated immediately (Nardo, 2003). An original equipment manufacturer (OEM) is the firm to which the product was outsourced to. This OEM had the knowledge and capabilities to build, test, support, distribute, and service the product (Nardo, 2003). Cost efficiencies and an accelerated innovation cycle would be realized.

2 This name is not the original name for the outsourced product studied in this case. The product’s name was changed due to private information of Dell. This research sticks to the name used by Nardo (2003).
**Step 2: Communication**

Dell and the OEM did not invest in a close relationship at all. The main concerns to Dell were the cost reductions and the ability of the OEM to meet various output levels. The OEM was not integrated into Dell’s supply chain and no trainings were provided for testing and quality programs to meet Dell’s standards (Nardo, 2003). The OEM was considered a capable firm who could arrange the whole R&D process themselves. The OEM started working for Dell while both companies barely knew each other and only little common stock of knowledge was present.

No actual communication between Dell and the OEM originates during the outsourcing period. Even though a complete R&D process is outsourced here, it will be shown later on that problems arise because of the lack of communication.

**Step 3: Application**

Dell outsourced the complete R&D process, but with the absence of communication Dell became concerned about the Customer Experience of the product (Nardo, 2003). To overcome this problem, Dell changed the target customer to the one-time customer. This customer would buy a Dell product only once and in this way the Customer Experience concerns were diminished. Taking this distrust into account, senior management did not fully accept the innovation. It did not fully trust the outsourced firm and therefore no real implementation was possible.

The cost structure of the OEM caused another problem. The volatility in demand at Dell was high and the OEM had difficulties with the low volumes of demand. Profit margins were wiped away because the service centre costs could not be spread out enough, real economies of scale could not be achieved (Nardo, 2003).

**Step 4: Acceptance**

The preferences of sales personnel and the customer were not completely met. While one of the strengths of Dell is the individual preferences for a desktop, the Product Albatross was a fixed configuration model in which up selling was not possible.
Customers started turning away from the Product Albatross and demand decreased drastically. About the acceptance of the innovation by employees at Dell no specific information is available. Unfortunately for Dell and the OEM, step 5 of the extended knowledge transfer model was never met, Dell stopped the production of the Product Albatross.

Conclusion on the Dell case
The Dell case study shows the importance of knowledge transfer. The process begins at step 1 and no step can be skipped or neglected. During the outsourcing process in step 1, things were going well and the project seemed promising. The development of the Product Albatross only took the OEM nine months. However, as almost no communication took place, both parties were not informed well enough about the expectations on both sides. This resulted in more severe problems during step 3 and 4. A knowledge portal would have been a way to have overcome these communication problems.

The marketing department at Dell did not have enough mutual understanding of the product and was not able to put the Product Albatross well enough in the market to realize high demand. Additionally the principal agent problem caused distrust at Dell. Previous concerns about the Customer Experience were not completely grounded. At the beginning Dell appointed this concern to the OEM, but if Dell had given better customized specifications to the OEM and a knowledge portal had been created, the concerns would not have been necessary as both companies would have been communicating. Additionally, the chose of Dell to change the target customer might have played a role in decreased demand as well.

It is difficult to ascertain whether the project would have been successful if the marketing department had been able to reach more customers. At least the project would have had a better chance and the option of implementing a knowledge portal during the process would have been an option to overcome the problems.
Conclusion

When organizations decide to outsource part of their R&D processes, beneficial returns are expected. Indeed, the outsourced firm might have more specialized knowledge, higher capacity or more advanced technology to enable and speed up the innovation process. If both parties are unfamiliar to each other, but a certain cognitive distance exists, a common stock of knowledge should enable knowledge transfer. The knowledge transfer model of Gilbert and Cordey-Hayes (1996) explains all necessary steps for knowledge transfer to occur. The model has been extended to be applicable for outsourcing. The most important adjustment to the model is step two. While with in-house R&D organising mechanisms ensure the communication, for outsourced innovation the Knowledge Portal is developed. The Knowledge Portal enables both parties to communicate and transfer knowledge during the complete innovation process. By using the extended knowledge transfer model, innovation in the context of outsourcing is stimulated.

Further research

Further research on the Knowledge Portal is needed as no distinction is made between implicit and explicit knowledge. In this research it is assumed that both types of knowledge will be transferrable by the knowledge portal. However, more evidence on this topic is needed. Additionally, this research has not investigated what the optimal cognitive distance is between the company and the outsourced firm. This might be of interest as these outcomes might have implications for the outcome of this research.

To conclude, the effects of the country outsourced to, the industry to which a company belongs and the type and culture of a company are unexplained variable which might be of interest. These require further research.
Bibliography


The effect of knowledge transfer on innovation in the context of outsourcing


