

STUDYING PATH DEPENDENCIES OF BUSINESSES, INSTITUTIONS, AND  
TECHNOLOGIES.

**February 28-29, 2008**

*Barnas Nothnagel*  
*Doctoral Program 'Research on Organizational Paths'*  
*Freie Universität Berlin – Business and Economics*  
*Garystr. 21, 14195 Berlin*  
*Phone: +49 30 83857185*  
*Fax: +49 30 83857186*  
[barnas.nothnagel@wiwiss.fu-berlin.de](mailto:barnas.nothnagel@wiwiss.fu-berlin.de)

# STUDYING PATH DEPENDENCIES OF BUSINESSES, INSTITUTIONS, AND TECHNOLOGIES.

**February 28-29, 2008**

## **Specialization as an Organizational Path**

### *Abstract*

Specialization can have several consequences inside a single organization. With a system theory approach and the concept of path dependence, a theoretical framework for organizational inertia caused by specialization is developed. Hence, the organization is described as a social system, which constitutes itself of decisions. The concept of path dependence is integrated and applied to organisational specialization. A case study with a German specialists hospital shows that positive feedback loops sustain the path of specialization and narrow the opportunities for action for the hospital. Specialization has the effect of triggering positive feedback loops and stabilizing the organizational path. The potential inefficiency of specialization in organisations is due to the reduced opportunities for action in critical situations. Therefore, the aim of this paper is to show how a potentially inefficient specialization path in an organisation can emerge, as specialization is considered often as something positive only.

### *Introduction*

Although specialization is regarded as something positive in business and economics (Smith 1976; Ricardo 1994), as it is mostly linked with an increase in productivity, the potential negative consequences and effects are often not taken into account. This may be the case especially in organisations where specialization leads to organisational inertia due to a lack of resources for change or a lack of visible viable alternatives. The concept of paths may be a good approach for addressing this problem. The properties of paths, for example positive feedback loops, seem to be very applicable to this phenomenon of reinforcing specialization. Therefore, the aim of this paper is to show how a potentially inefficient specialization path in an organisation can emerge and which mechanisms lead to an organizational path. In the first part, specialization is integrated a system theory and path dependence model to show how this specialization path develops. In the second part of this paper, a case study of a German hospital is conducted, showing specialization and the working mechanisms of specialization. In the last, part, the results are presented and discussed.

### *Theoretical Background*

A well known appearance of unintended phenomena in business is that of emergent phenomena when pursuing strategy (Mintzberg/Waters 1985; Giddens 1984). Of course not always bad, they can lead to undesired and unintended outcomes for an organization. The success of reaction to a changed environment may depend on the successful implementation of new strategies and tools. But several problems may arise, for example organizational inertia regarding specialization can be one of them (Kelly/Amburgey 1991). The reason for this can be the fact that every single organization has its own characteristics of dealing with change and arising problems. Focussing on this problem, the perspective on a single organisation and organizational inertia as one problem is needed (Hannan/Freeman 1984). At first, it is outlined that the organization defined by the German sociologist Niklas Luhmann provides a more general and descriptive view on organizations as an empirical or

institutional definition (Brunsson 2006). His conceptualisation of organizations as social systems constituted by communications opens up other linkages than before and provides a detailed framework for describing organizations; especially when dealing with organizations that have originally other than profit-maximizing goals. In a second step, the concept of paths is integrated into this framework. With this combined perspective, the organizational inertia due to specialization can be analysed from a process related view.

*Organizations as social systems* – In organization sciences, the quantity of definitions of what organisations are and what they are not is nearly endless. The sociological systems theory developed by Niklas Luhmann (1995) in the last decades of the 20th century provides a framework for dealing with organisations from a unusual point of view (Seidl/Becker 2005,2006). He describes systems as operating systems which operate self-referentially with a own characteristic; psychic systems operate with processes of perception and consciousness, social systems operate with communications. Luhmann describes communication as the unity of information, message and understanding. Communication is the elemental unit of social systems. Additionally, systems consists not only of one element but of many, and the various relations between these elements together with their interdependencies form the ‘product’ system. Reverting to Spencer-Brown’s calculus of indication, Luhmann distinguishes between system and environment. Only systems are able of observing, and in the systems theory terminology, observations are made by observers. Observing means the unity of difference of distinction and indication (Spencer-Brown 1994). With the figure of a system observing the environment and observing the system observing the environment, the system is able to introduce the distinction and indication of the first grade of observation back into the system and generate its basic category for system internal operations. With the concept of autopoiesis (‘self-creation’, originally used by Varela et al. 1974), Luhmann describes the process of self-organising of systems (Luhmann 1995). Autopoietic systems (re-)produce and control themselves from inside, they constitute the elements they consist of themselves and connect these elements with each other (self-referentiality). Although these meaningful communication are only temporarily, they are connectable towards the other elements of the system. With an increasing number of elements, the absolute number of possible connections rises exponentially, and therefore the complexity of the system. Although the complexity of the system is always lower than that of the environment, the system reduces its internal complexity by selecting the connections between the elements.

Luhmann parts the social systems in three types with increasing grades of complexity: interaction, organization and society (Luhmann 1995). While interaction is communication between two individuals, and society is all communication, organizations constitute themselves through distinguishing decision-communication which belongs to the system and which belongs not to it and hence to the environment. Without decision-communication, organizations would become normal interactions and the borders of the system would vanish. These communications are operations that emerge and reproduce from the network of system-elements/decision-communications and simultaneously revert past communications as well as anticipate future communications in that network; a system structure has emerged.

*System structure, programs and processes* – The system structure and the endless differentiation to the environment maintain this continued generation of connectable communications produced in the social system. A binary code, for example in the scientific system true/not-true, facilitates the distinction of what belongs to the system. Hence, the code is the main point of reference for all internal elements of the system. For social systems and therefore for organizations, communication/not-communication is the general code. Within organization, the elements of decision or decision communication is the relevant code. Decisions are necessary for organization,

for example the organization decides, who becomes a member of the organization, which task has to be fulfilled, which parts of the environment are relevant and so on. In the case of new decisions, decisions premises accomplish the task of uncertainty absorption and enable the constitution of internal complexity of the system. Specific system elements are related to other elements, and *only* to this elements and not other elements. The decision premises are programs in that manner that they are sequences of generalized expectations. So they help classifying decisions, as the code itself cannot describe, what decisions are. Programs can be generated internally and externally, so systems can control themselves as well as internalise external programs. Programs are more flexible than the code and can be changed, but if the code is changed, the system collapses. Processes has to be distinguished from programs. Processes are the ongoing operations of the system, the temporarily connected elements of a system, and provide another pre-selection of further communication as they enable and disable future connectivity to themselves. Obvious, communications and decisions cannot be separated from persons or individuals, and hence from psychic systems.

*Psychic and functional systems and structural coupling* – As individuals can be members of the organization, they consist of a biological system and a psychic system. While the biological code is 'living', the code of the psychic system is 'thinking'. With the concept of structural coupling, psychic systems are coupled with social systems over language, as communication without psychic systems is impossible. Communication requires the unity of information, message and understanding, and only psychic systems can accomplish the task within the medium language. Structural coupling allows the establishment of relations between systems. Although events in the environment of a system take place, the system can observe these events with its own possibilities and can transform it into operations of the system. Interdependent irritation of systems finds response in coherent operations of the other system, a coevolution of psychic and social systems is possible and probable. In the form of 'person', either as individuals in interacting systems or as collective actors in organizations, it is possible for an observer, to attribute action to a person or role. This acting is assignable, as the message as part of the communication is directed from the messenger to the message-recipient. Therefore, the structural coupling with psychic systems is essentially for organizations.

Additionally, the structural coupling with functional systems can be equally if not more important to the organisation. As the society as overall social system evolved over time, it differentiates several functional systems. These functional systems have different tasks and operate with different generalized communication-media. For example, the politic system has the task of finding collective binding decisions and operates with the generalized medium power, the economic system has the task of allocating scarce resources and operates within the medium money. Luhmann describes other functional systems like law, science, religion, moral, love and so on. As all these systems are subsystems of the society, they operate with (special) communications. The functional systems facilitate themselves by bringing parts of their own complexity, their performance requirements, into the other system and therefore the organisation.

Luhmann generates a perspective on organizations that contains the possibility of describing the organization from a distant point of view (see Figure 1). With his concepts, the analysing of organizations in another way is possible. With the figures of self-reference, autopoiesis, observation the recursion on the organization itself and the inside of the organization leads to the assumption, that organizational inertia can be depicted by systems theory different than before. Nevertheless, systems theory is not a normative approach to social phenomena; for integrating this aspect, the concept of path dependency is used.

*Path dependence* – The concept of paths was developed in the last 20 years of the 20<sup>th</sup> century by Paul David and W. Brian Arthur (David 1985, Arthur 1994). While David describes the phenomena as a economic-historical process (the famous QWERTY example), Arthur focussed on increasing returns and applied it to a variety of problems and issues, from competition between technologies to the spatial agglomeration of industrial clusters etc. Other authors (Mahoney 2000, Cowan/Gunby 1996, Burgelman 2002, North 1990) applied it in different settings and also developed the concept of paths dependency towards path breaking and path creation (Garud/Karnoe 2001). Recent literature tried to develop a framework for the organization (Sydow et al. 2005), and elements from this framework are used here.

The notion path is an indication for the process-related character of this phenomena, and it is one of the main advantages of path theory. As David stated, that ‘history matters’, different interpretations can be made (David 1994). First, the events and settings before a process starts have an influence on the process. Second, the sequence of events at the beginning of a process can influence the outcome of the process (Arthur 1994). Both cases are plausible, but in the former case, the historical setting of the process can be analysed ex post only and is considered only in cases, where this is important; nevertheless, the history of a process has effects on its outcomes. According to Arthur (1994) and Sydow et al. (2005), the model of a path dependent process is divided in three phases.

The three phases of a path are divided by events and have different characteristics, which are outlined in the following. In the first phase, the ‘history matters’ as it sets the initial conditions of the path. So called ‘small events’ take place that can have a deep impact on the further outcomes, but are not identified as ‘big events’ yet. The opportunities for action for the organization are not constrained yet. At a certain point, a critical juncture leads to the phase 2. The second phase contains the core of the path concept. Arthur calls this main element increasing returns, but this is a too rigorous assumption for empirical processes. At a weaker level, processes with positive feedback mechanisms have the same characteristics as increasing returns processes and contain the increasing returns case, too. The idea of positive feedback leads to some implications for theory. If there are positive feedback mechanisms, at least two stable equilibriums can be achieved. Although they must not be different in their overall outcomes (for example driving on the left/driving on the right), the potential for one equilibrium being more efficient than the other in the end is indentifiable. In this second phase, ‘small event’ drive the process with positive feedback mechanisms towards the possible outcomes. Hence, the outcomes of this development are partially determined through the positive feedback and partially emergent through the ‘small events’. Arthur generates this emergence in his simulation through a random sequence of specific events. In this phase, the opportunities for action of the organization becomes smaller, as the positive feedback mechanisms drive the organization to one more and more favourable alternative. When the outcome of the process is fixed, the path is ‘locked-in’. The third phase is the hyper-stable path, as the positive feedback mechanism would prevail any development to another equilibrium. After the ‘lock-in’, the organization has no more or only a few opportunities for action, than pursuing of the path.

The process related character of paths together with the irreversibility of sequence of events and effective positive feedback mechanisms show the importance of time, no matter if it is event time or clock time. As stated above, the first phase can be detected only ex post, so the ‘real’ path starts with the critical juncture. For overcoming the paths, three theoretical solutions can be found. First, the path can dissolve over time. In the

long run, any path will end, at least with the end of an technology or organization. This means that the outcome of the path is no longer relevant, as it is for example when new technologies replace old standards (DVDs replace VHS). Second, on an organizational level, the example of Intel depicts a path breaking. As the RAM production generates enough resources to switch to processor production, the memory path was broken (Burgelman 2002). Third, the positive feedback mechanisms can be destroyed or inverted, so that the path changes its character. After some time, the outcome of the path changes so that the path continues or opens but with another content.

*Path dependence and organizational inertia* – Change in organizations face various difficulties if the organization is inert or path dependent (Gilbert 2005). When we consider organizations as social systems, the question arises, where paths, caused by specialization, can be located. The individual is as well as physical assets part of the environment and can only irritate the system, but for the organisation relevant paths can not be located there. Hence, it is important, from which perspective and for what reasons paths are observed. Nevertheless, path dependence is the disability of the organization, to react to changes in the environment (Hannan/Freeman 1984). So the track between the changed environment and the not changed parts of the organizational structure should be followed in order to find the obstacles of changing path dependent organizations. The organization as a social system together with the concept of path dependence offer some ways of approaching this problem.

As the organizations is structurally coupled with the psychic systems, these systems are responsible for introducing irritations into the system. So the problem can be: First, the organization is not irritated by environmental changes. This can have two reasons: The system is not irritated by the psychic systems although they perceive the change; or, the system is not irritated by psychic systems because the psychic systems does not perceive the change. The second possibility should be factored out here, because the organizational inertia triggered by specialiaztion should be analysed. So if the organization does not know that there was an environmental change, it cannot react to it. Even if it expected the change and was fully alert, there is no need in doing anything, as, from the systems view, nothing happened. This type of inertia is more a cognitive and individual inertia and should not be fully considered here. In the former case, it is the deselection of this irritation as considering it irrelevant for the organization.

Second, the structure of the system, the decision programs, allows only specific decisions and the processes select only specific decisions which can connect well to former decisions. Organizational paths emerge, because the decision premises and decision programs reduce the variety of possible following decisions, deciding for an alternative becomes harder or even impossible. Moreover, the decision processes, as they are sequences of decisions, reduce the connectivity of future decisions. This funnels the potential extent of future decisions and reduces the opportunities for alternative decisions to a narrow path. With this problem deals the path dependence, as positive feedback mechanisms seem to be at work.

Four positive feedback mechanisms described in the literature (Sydow et al. 2005) must partially be transformed for the case of organizations. (1) Scale economies and experience are relevant for organizations which mostly are interpenetrated by the economic system. But this comes about, as many organizational functions are interconnected with the economic system, as producing and selling goods etc. The underlying mechanism is that the more a firm produces, the less time and costs for the products is needed (Henderson 1984). The positive feedback loop in the organization is the decision for the same alternative, as the profit maximizing concept prevents the organization to decide that another alternative is chosen. The more frequently the

organization chooses the same alternative, this decision becomes a decision premise and can result in a decision program. From this point, the organization takes the decision for granted. (2) Direct and indirect network effects lead to the increasing utility of a member of a network, as in the telephone example (Arthur 1989, Katz/Shapiro 1994). The organization as a social systems can be exposed to two kinds of network effects. First, the internal processes of decisions and assigned actions can form a decision network towards one alternative, as later decisions can legitimate anticipated decisions, the organization focuses on a set of decisions, which confirm themselves but loses connectivity to alternative decisions. Second, the organization can decide to become a member of a network through adapting a technology or standard or being a member of a network of organizations. In the case of technology adaptation, the sunk costs for this technology let the organization decide to use it in the future. Being a member in one network can prevent the membership in another network, as the decision rules of these network may be exclusive. (3) In the case of learning (Abernathy/Wayne 1974), the organization decides to adapt to specific irritations from the environment and it may be more costly to unlearn and give up the hitherto existing decision programs as to use them along, as they proved to be successful for dealing with communicated problems. The individuals connected over their psychic systems with the organization may have learned specific tasks and the resulting coevolution increases learning and hardens decision programs. (4) Coordination and complementarity effects can be seen as positive feedback mechanisms (David 1994, North 1990), if the coordination results in less expensive coordination practices, for example trust. Complementarity refers to the appearance of solutions that are conform to existing rules and avoid costs for choosing decisions that do not fit. In the case of organizations, the coordination of decisions between the organization and functional systems are coordinated through the interpenetration. In the case of deviation, the organization would not be able to decide according to the functional systems operation and hence not be recognized by it.

Expectations of expectations are the imagination of the organization of what others expect. Expectation emerges from the constraining of possibilities, the unconstrained part are the expectations. Expectations can be disappointed, in such a case the organization can adapt and 'learn' and produce changed expectations (cognitive expectations), or it can be ignored, and the old expectation is sustained (normative expectation). These expectations form the structure of the social system organization and can foster or hinder the positive feedback mechanisms (Luhmann 1995). Although expectations play an important role in the structure of a social system, they are not explicitly considered here.

Third, contradictory functional systems prevent the organization of changing. Obvious, the functional system are not contrary to each other, but can generate contradictory decision premises in the organization. In the case of public management reform, the functional system changed and the organization is wanted to change, too. But because of the operative closeness of the system and interpenetration with both functional systems, it can prevent any change internally; it happens, if the system deselects the irritations from the environment caused by the changes. This can be the case, if the function of the organization integrates at least the performance requirements of two different functional systems, for example the economic system and the medical system. For operating in both functional systems, the tension between profit maximizing decisions and medical necessary treatments can be focussed on one side respectively on one functional system. Changes in the functional system are factored out, are not internally selected, and hence form no basis for future decision.

*Path dependent organizational specialization* – As specialization may be one reaction to environmental change, figure 1 shows the integrated model of path dependent organizational specialization. Specialization in

this context can be understood in two ways. First, the organization tries to specialize in certain activities, capabilities and so on. They focus on a certain area of activity and neglect other. The second kind of specialization is to specialize in a certain kind of specialization. Nevertheless, as specialization is chosen as strategy, its connectivity to further, even undeliberate specialization can be increased through the positive feedback mechanisms described. Moreover, the decision premises can be focused on the, in the short run successful, strategy. Alternatives are at first deselected, but as time elapses, they can not be chosen anymore, as the knowledge of them and the opportunities for action may have decreased. So the reselection of specialization as a organisational strategy becomes a path.

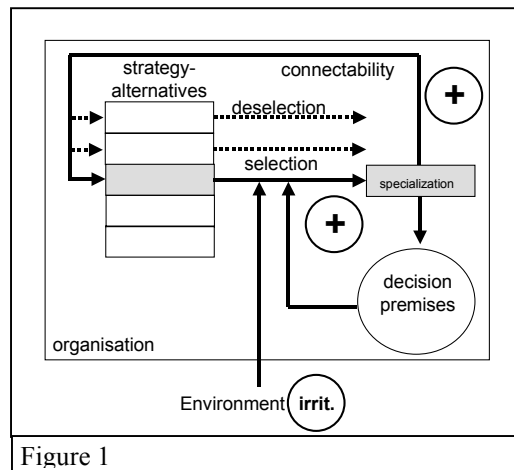


Figure 1

#### Method and Data

The research for this case is a single case study from a specialized German hospital. Due to its specialization, it seems to be a critical case for determining, if the propositions of the systemic path dependence are correct (Yin 2001, Eisenhardt 1989). Also, the hospital is a typical case for an organization with the interpenetration of functional systems, which operate contrarily to each other. Data of the case were collected from multiple sources. Semi-structured interviews with the CEO as well as negotiators and controllers were conducted as well as informal conversations not only with the management but also with the supporting staff. The review of official documents, for example the annual reports and protocols, were another source for the data.

*Historical background* – The hospitals and the hospital sector in Germany experienced some major environmental changes. Considering the environment and structural coupling of an organization must be one main aspect of analysing the change reactions in performing such a reform implementation (Pollitt 2003). Though health care is not an original issue of new public management, the tools and concepts are very well applicable to it (Preker/Harding 2000). The devolution of management practices into the hospital and the reaction of organisational members over structural coupling and the organization as a whole must be analysed. A key issue may be professionals and their reaction to the reform due to a commitment to ‘their’ thinking of what the organizational objectives are, as they are coupled with different functional system (Doolin 2001, Sehested 2002). Since the hospital reform for inpatient care in 1972 in Germany, the introduction of diagnosis related groups (DRGs) was the largest reform in health care concerning the most important part of the health care sector, the hospital financing system. From total reimbursement of all costs until 1993, the raise of hospital budgets was limited to the raise of the rate of the income of the members of the statutory health insurance then. Furthermore, the hospital was reimbursed with daily-rates, case fees and extra-remuneration. In 2004, the financing system for all hospitals was mandatory switched to the DRG system. This meant that all equal cases in all hospitals were reimbursed with the same price. This price was calculated with the hospital base rate multiplied by the case value. This value was calculated by the ‘Institute for the Remuneration System in the Hospital’ (Institut für das Entgeltsystem im Krankenhaus, InEK). It describes the average economic effort of every hospital for this case. An average case with the value 1.0 and a base rate of 2,000 EUR for the hospital would yield 2,000 EUR; multiplied all case values with the corresponding hospital base rates would result in the overall budget for all hospitals. As the federal states have different structures (more rural, more urban areas), the



hospital base rates are also very different, but converge to a federal state base rate in 2009 (convergence phase). Hospitals which would lose over one percent of their budget in 2004 were limited to this, as the costs can not be reduced as fast as the budgets. The aim of the Federal Ministry of Health and Social Security was the motivation for economic behaviour, the further reduction of the average length of stay and the strong transparency for patients and health insurances as well as restructuring and reorganisation of the hospitals (Bundestag 2001). All these aims fit very well in the concepts of 'new public management', especially the introduction of yardstick competition and the possibility for hospitals to gain profits and incur losses.

The market of hospitals is regulated by the German federal states due to a hospital plan. This plan defines the extent of care provided by each hospital listed in this plan and the size of the hospital (for example the number of beds). So you can distinguish between hospitals with basic medical care, the hospitals with special medical care and the hospitals with a maximum of medical care (for example the university hospitals). Long term investments are financed by the German federal states. The running costs are reimbursed through the statutory health insurance funds, and they provide the part of turnover where hospitals can gain profits. The managers of the health insurance funds negotiate every year with each hospital about the quantity and type of treatments (DRGs); arbitrary changes in business segments or case numbers would not or only with adjustment be financed.

*Public management reform in a specialist hospital* – The hospital as a social system and organization has some characteristics, which are important for further examination. Clearly, the hospital operates in the functional systems of the economic and the medicine. Of course, both functional systems are tied with another system in a relevant way, the law system. But we limit the analysis to the other functional systems and incorporate legal issues only, if they are really relevant in terms of the organization respectively the other functional systems. The members of the organization are the managers and the medical staff, including doctors and nurses. These two groups of individuals are rooted in their corresponding functional system and look at the objectives of the organization from a different point of view. But they form the structure of the organization together, so that both objectives (efficiency and health care) are tried to achieve. So there are several points where organizational inertia can start. In the next part, the case study hospital is described and the theoretical model is applied to it.

The case study hospital is quite an old organization, as it is founded over 50 years ago. It is a medium sized hospital with nearly 300 beds and four medical departments, integrated in a management holding with three other hospitals and further health and social care organizations. It is a non-profit hospital in a large German city and because of its specialization, there is little local competition. After several years of negative performance, the management sourced the catering, the laundry and the park gardeners in 2003 out. This reduced the staff to 280, the operating medical core of nurses and doctors and the administration including management and controlling. In 2004 the hospital switched to the DRG system. Having a very high base rate, the hospital incurs and will incur budgetary cuts to the end of the convergence phase in 2009, although it yields a larger amount for the same cases than other hospitals until then. But the high hospital base rate is also the argument for the health insurance funds, for not increasing the inpatient volume in the negotiations, as the patients would be treated in another hospital for a lower price. Nevertheless, the hospital earned a net profit for the year 2005 and 2006, but the economic pressure through the budgetary cuts will remain. The hospital faces tough times, if it is not able to cut costs and/or increase profits.

Due to the introduction of the DRG system, the hospital introduced a medical coding assistant. This assistant answers the questions of doctors regarding the coding of the inpatient cases and indicates missing diagnosis and procedures. Each case is coded by the ICD10 code and a surgeries- and procedures catalogue code.

These codes are typed in an official grouper software, it calculates the DRG, according to the gender, the age, main- and side-diagnosis, surgeries and so on. To prevent any intended or unintended upcoding (generating a DRG with a higher value through assigning wrong diagnosis or unnecessary therapies) through the hospital, a 'neutral' medical service of the health insurance funds looks for critical or implausible cases and controls the correct coding. These persons work in the hospital despite the fact that they are paid by the health insurance funds. Of course, a new IT-system was installed for coping with the new financing system. Additionally, the doctors are trained each year in coding their specific medical area correctly so that the hospital can generate the most valuable DRGs possible in each case (without intervention from the medical service of the health insurance funds).

These organizational changes allow drawing the conclusion that the hospital reacted to the introduction of the reform. But these reactions do not show any organizational inertia, as necessary actions have been taken. According to the model, several points of organizational inertia can be identified and checked, if the hospital is on the way to or already on a path of organizational inertia.

(1) The perception of individuals regarding the public management reform can irritate the organization. But why should any person irritate the organization in a way that the organization let itself be irritated? The selection of relevant events and processes bases on the distinction of what belongs to the system, so the irritation bases on the selection of belonging to the system because of the information it contains. Obviously, the public management reform was an event that was regarded as relevant information and changed decision premises and programs. Last but not least, the pressure for selection was introduced through the legal system; the introduction of DRGs was based on the 1st Case Fee Amendment Act, and mandatory for all hospitals. But doctors seem to be less irritating the organization than managers, as the economic pressure is a burden for managers and not doctors. So it is not astonishing that the change of the financing system caused irritations of the organization through managers a few years before the real introduction. The expectations of how the relevant environment will change were there:

*And then you catch up on the topic [DRGs], and read a date: In two, two and a half years, and then you put it in the drawer, because you think there is plenty of time. But you hear at conferences and meetings everybody is talking about DRGs, and then, after a year, you fetch it out again and engage with it, because you notice it is time for it. (Hospital manager#1)*

So the organization was definitely aware of the change and integrated this expectations into its structure. Organizational inertia is not very probable in this point, although the history does matter:

*The long tradition of the hospital makes it far more difficult to change. In young firms, change happens more easily. [...] And the hospital, due to its specialist alignment, was forced to change more than any other hospital [in the holding]. (Hospital CEO)*

(2) As the organization was aware of the external economic pressure through the economic system, the hospital reacted. The economic pressure was large but the solution seem to be easy:

*Problems will rise, if you are not prepared for taking the effects of the DRG system into account; you have to specialize, you have to concentrate on the task you perform really well, which are proven that you fulfill them optimally in a medical but also in an economic sense. Other tasks can be performed in cooperation or abandoned. (Hospital CEO)*

The existing structure of decision programs lead to further specialization. Therefore, two even more specialized medical centers were build up for generating more turnover in two departments .

*The chances are there, [...] if you can acquire the available inpatient potential. [...] Increasing the case number is planned, we had a constant increasing case number in the last years and aspire it for the future. (Hospital manager#1)*

The past experience as well as the professional skills of the doctors facilitate the organizational decision. The fact that the hospital is a specialists hospital results in a higher proportion of patients who need these special treatments, surgeries and therapies. The first feedback loop is established: specialization leads to more experience and economies of scale and this leads to further specialization.

Before that, the organization already started to specialize. Bit by bit, it sourced the non-core services out and gained network effects. For example, the laboratories in each hospital were merged to one laboratory and it works together not only with the hospitals in the holding, but also for external customers.

*Today, the administration is the part of our staff, which is the most distant to the patients. any other staff is medical staff. (Hospital CEO)*

Realising this network effects is another aspect of positive feedback. Reducing the organizational task to the competencies lead to further decisions and first of all to faster decisions for outsourcing: Specialization leads to outsourcing leads to further specialization.

As in any other hospital, the doctors are responsible for coding the patient. This coding is the basis for the DRG calculation. If any side-diagnosis or other factor, which is economically relevant, is forgotten, the hospital incurs a loss with this patient. In extreme cases, and because of the high base rate of the hospital, the absolute loss in the hospital per case was about 3,500 EUR. So it is economic relevant, what the doctors code. Clearly, the self-conception of doctors is not that they do desk work and struggle with unknown software and codes. They want to heal and make patients healthful. This results in a low interest for the DRG system, as it is considered as not relevant for the medical side of the hospital, and the management is responsible for economic tasks. Moreover, it takes the time of the doctors, which can be up to 15min per case for coding, checking and correcting. Obvious, they want to spend this time for the patients. In the training sessions for this last year, only 5 doctors attended the DRG coding training for their specific diagnosis. But according to the medical coding assistant, the doctors improve slowly, and the medical services of the health insurance funds has less objections than the years before.

Additionally, the hospital attended the calculation of the InEK and achieved the installation of a complexity case fee for one of their areas of expertise, because a majority of cases was difficult and hence expensive and also not correctly represented in the DRG system:

*These cases result in a DRG with a mediate length of stay under 10 days, and we have a rather large part which is about 12,13 days und according to that it is not adequately covered. (Hospital manager#1)*

But the achieved goal of a special DRG did not produce the desired goals:

*We will have a emergency session next week. [...] The medics can not deliver the case numbers [of a specific DRG], which we agreed upon with the health insurance funds. It was discussed with them before. This hail damages the result of our budgetary agreement for this year. (Hospital CEO)*

Nevertheless, learning as a reinforcing mechanism works; the doctors learn to code in their specific areas and the 'learning' DRG system is developed to a for the hospital favourable financing system. The feedback of learning and the following success leads to further learning and to more expertise in the relevant field.

Last, the hospital cooperates with other hospitals through patient interchange, increasing the volume of the special cases:

*It is not necessary transporting the patients through the city for a single examination only because we have not the equipment for it. [...] (Hospital manager#2)*

*That means that we try harder to get specific patients, which lay in another hospital, into our hospital. And you do not have to do much for it, because [...] they become unattractive, because they trigger in a DRG, which do not earn the prior profits. Even if they result in the complex DRG, they often do not*

*meet the requirements for the treatment of this patients, and this results in a less valuable DRG.  
(Hospital manager#1)*

So the complementarity of local hospitals lead to a increased specialization which leads to further cooperation, and eventually increases the geographic catchment area.

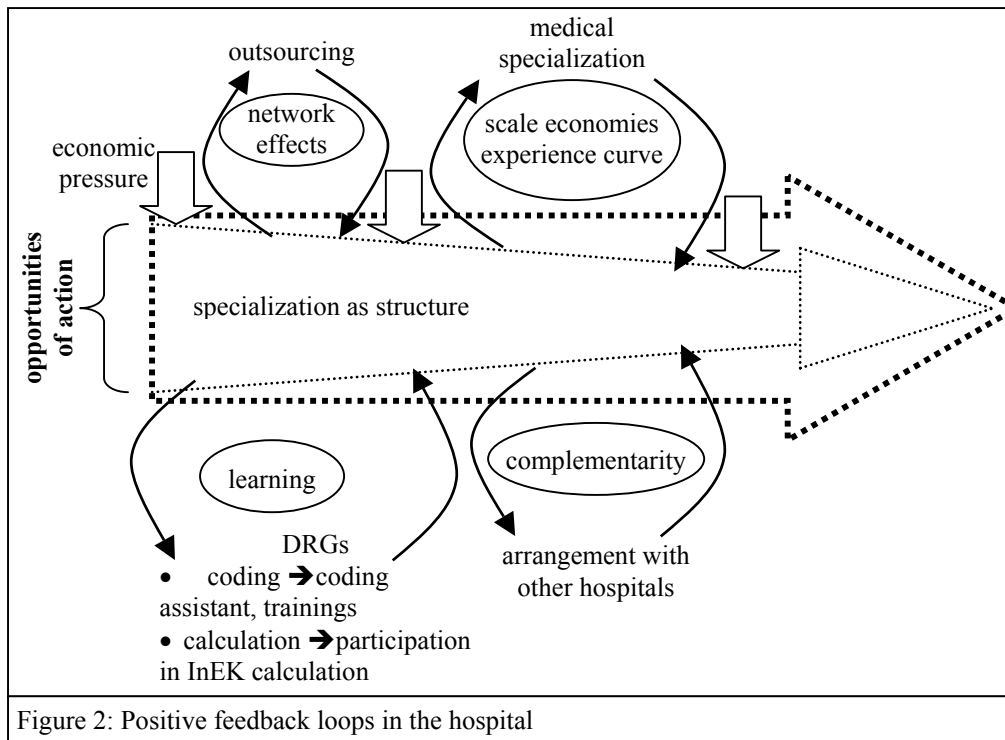


Figure 2 shows the reduction of opportunities of action respectively decisions through positive feedback mechanism which sustain the specialization paths of the hospital.

(3) The interaction in the organization between the economic objectives derived from the economic system and the medical objectives derived from the medical system evoked some stabilising and reinforcing decisions for the organization, as mentioned above. The interpenetration of the systems with the organization makes it difficult to attribute it clearly. But one characteristic of paths can be located here. The potential inefficiency lies in the fact of specialization:

*The worst thing that could happen to the hospitals would be the withdrawal of the head physicians of the hospital. (Hospital controller)*

In such a case, the hospital would not be able to compensate the personal skills very fast and run into a economic crisis very soon. The survival of the hospitals depends from the economic success, and this economic success depends from the economic work of the doctors, but they are more devoted to the medical and ethical objectives of the hospital than to the economic ones.

### Results and Discussion

Also the hospital financing reform was a critical juncture for the organization, a new path process was not set in motion. Small events that lead in different directions of different strategies were not observable. Although positive feedback mechanisms are working, they did not lead to the start of a path. However, the path seemed to be inherent of the specialist hospital. The hospital plan and the negotiated budgets and cases formed the structure and processes of the hospital, and as they are the precondition for the following negotiations, there is little space for decisions of change. Alternatives to the specialization would have been the exploration of new business fields, but as the entry costs are very high and the health insurance funds would not agree, it is nearly

impossible to achieve this. Therefore, the organization decides to connect to past decisions inside the opportunities of action of the system, which means specialization. By deciding to allocate more resources, the decision becomes more and more successful and legitimated. The organization need not to reformulate its expectations or programs. A favorable organizational design leading to competitive advantages is expected to be an outcome of this process. Additionally, the capabilities of the organization to serve the market improve. Relying on the capabilities or competencies of the organization as a competitive advantage would build them up and contribute to the economic performance of the organization and reduce the economic pressure (Burgelman 2002). Such a process, however, is very likely to trigger further decisions in this direction. As the opportunities of action are reduced through the commitment to the strategy decisions, the organization is locked-in to this strategy, i.e., the organization is no longer able to deviate from the chosen path (Ghemawat 1991, Staw 1981), especially, as the economic pressure will remain:

*The savings are not sufficient. The hospital has to perform more services with the same staff [...] or perform the same services with less costs. And this in a scale of 9% of the present budget. (Hospital CEO)*

The potential inefficiency of this specialization is the organizational inertia, which increases with further specialization. If a head physician leaves, the department and to a certain degree the hospital would have a serious problem, as special treatments and therapies could not be performed anymore. The decreased case volume as well as the threatened reputation of the hospital and the disability to prevent can result in a crisis for the whole organization. Additionally, the two competing objectives of the organization lead to a further specialization. Because the professionals and their organizational decisions have a greater influence on the organization than the technostructure (Mintzberg 1992), the economic pressure is not reduced as much as it could. As less economic pressure would generate more connectivity for deciding for alternatives, the doctors foster the positive feedback loop.

Specialization can trigger organizational paths, as economic pressure can lead to positive feedback mechanisms, which foster future decisions based on past decisions, despite the fact that alternatives were possible. But as this special case shows, the conditions for paths to emerge or to get activated may not be found everywhere. Nevertheless, organizational change can be successful and have consequences at the same level, which can not be anticipated by the organization, as they emerge from the internal structure. So it is obvious that there should be some kind of path detection and monitoring system developed in the future.

#### *References:*

- Abernathy, William J./Wayne, Kenneth 1974 'Limits to the learning curve' Harvard Business Review 52: 109-120.
- Arthur, W. Brian 1989 'Competing Technologies, Increasing Returns, and Lock-In by Historical Events' Economic Journal 99: 116-131.
- Arthur, W. Brian 1994 Increasing Returns and Path Dependence in the Economy. University of Michigan Press: Ann Arbor.
- Brunsson, Nils 2006 Mechanisms of Hope: Maintaining the Dream of the Rational Organization, Copenhagen Business School Press.
- Burgelman, Robert A. 2002 'Strategy as Vector and the Inertia of Coevolutionary Lock-in' Administrative Science Quarterly 47/2: 325-357.
- Bundestag 2001 Drucksache 14/6893 11.09.2001

- Cowan, Robin/Gunby, Philip 1996 'Sprayed to death: Path dependence, lock in and pest control strategies' *The Economic Journal* 106: 521-542.
- David, Paul A. 1985 'Clio and the Economics of Qwerty' *American Economic Review* 75: 332-337.
- David, Paul A. 1994 'Why are institutions the 'carriers of history'?': Path dependence and the evolution of conventions, organizations and institutions' *Structural Change and Economic Dynamics* 5/2: 205-220.
- Doolin, Bill 2001 'Doctors as managers: New public management in a New Zealand hospital' *Public Management Review* 3/1: 231-254.
- Eastaugh, Steven R. 2006 'Specialization and Hospital Costs: Benefits of Trimming Product Lines' *Journal of Health Care Finance* 32/4: 29-38.
- Eisenhardt, Kathleen M. 1989 Building Theories From Case Study Research. *Academy of Management Review* 14/4: 532-550.
- Garud, Raghu/Karnoe, Peter 2001 *Path Dependence and Creation*, Lawrence Erlbaum Associates Inc.
- Ghemawat, Pankaj 1991 *Commitment: The Dynamic of Strategy* Free Press: New York.
- Gilbert, Clark 2005 'Unbundling the structure of inertia: Resource versus routine rigidity' *Academy of Management Journal*: 48/5: 741-763.
- Hannan, Michael T./Freeman, John 1984 'Structural Inertia and Organizational Change' *American Sociological Review* 49/2: 149-164.
- Henderson, Bruce D. 1984 'The Application and Misapplication of the Experience Curve' *Journal of Business Strategy* 4: 3-9.
- Hood, Christopher 1991 'A Public Management for all Seasons' in: *Public Administration*, Vol. 69/1, pp. 3-20.
- Katz, Michael L./Shapiro, Carl 1994 'System Competition and Network Effects' *Journal of Economic Perspectives* 8/2: 93-115.
- Kelly, Dawn/Amburgey, Terry L. 1991 'Organizational inertia and momentum: A dynamic model of strategic change' *Academy of Management Journal* 34: 591-612.
- Luhmann, Niklas 1995 *Social systems*, Stanford University Press: Palo Alto.
- Luhmann, Niklas 2006 'System as difference' *Organization* 13/1: 37-57.
- Mahoney, James. 2000. *Path Dependence in Historical Sociology*. *Theory and Society* 29/4: 507-548.
- Mintzberg, Henry/Waters, James A. 1985 'Of strategies, deliberate and emergent strategies' *Strategic Management Journal* 6/3: 257-272.
- Mintzberg, Henry 1992 *Structure in Fives: Designing Effective Organizations*, Prentice Hall.
- North, Douglass C. 1990 *Institutions, Institutional change and economic performance*, Cambridge University Press.
- Pollitt, Christopher 2003 *Public Management Reform : Reliabe Knowledge and International Experience*, in *OECD Journal on Budgeting*, Vol. 3/3, pp 121-136.
- Pollitt, Christopher/Bouckaert, Geert 2000 *Public Management Reform : A Comparative Analysis*, Oxford.
- Preker, Alexander S./Harding, April 2000 *The Economics of Public and Private Roles in Health Care: Insights from Institutional Economics and Organizational Theory*. The World Bank, Working paper no.21875.

- Sehested, Karina 2002 'How new public management reforms challenge the roles of professionals' *International Journal of Public Administration* 25/12: 1513-1537.
- Seidl, David/Becker, Kai H. 2005 *Niklas Luhmann and Organization Studies*, Liber & Copenhagen Business School Press,
- Seidl, David/Becker Kai H. 2006 'Organizations as Distinctions Generating Processing Systems: Niklas Luhmann's Contribution to Organization Studies' *Organization* 12/1: 9-35.
- Spencer-Brown, George 1994 *Laws of form*, Cognitzer: Portland, Or.
- Staw, Barry M. 1981 The Escalation of Commitment to a Course of Action. *The Academy of Management Review* 6/4: 577-587.
- Staat, Matthias 2006 'Efficiency of hospitals in Germany: a DEA-bootstrap approach' *Applied Economics* 38/19: 2255-2263.
- Sydow, Jörg/Schreyögg, Georg/Koch, Jochen 2005 *Organizational paths: Path dependency and Beyond*, paper presented at the 21st EGOS Colloquium, Berlin 2005.
- Varela, Francisco J./Maturana, Humberto R./ Uribe R. 'Autopoiesis: The organization of living systems, its characterization and a model' *Biosystems* 5: 187-196.
- Yin, Robert K. 2002 *Case Study Research – Design and Methods*, Thousand Oaks.