Differences in the Implementation of Diagnosis-Related Groups across Clinical Departments: A German Hospital Case Study

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Objective. This article aims to examine the implementation process of diagnosis-related groups (DRGs) in the clinical departments of a German hospital group and to explain why some gain competitive advantage while others do not.

Study Setting. To investigate this research question, we conducted a qualitative study based on primary data obtained in six clinical departments in a German hospital group between 2003 and 2005.

Study Design. We chose the case study method in order to gain deep insights into the process dynamics of the implementation of DRGs in the six clinical departments. The dynamic capability approach is used as a theoretical foundation. Employing theory-driven categories we focused on idiosyncratic and common patterns of “successful coders” and “unsuccessful coders.”

Data Collection. To observe the implementation process of DRGs, we conducted 43 semistructured interviews with key persons, carried out direct observations of the monthly meetings of the DRG project group, and sampled written materials.

Principal Findings. “Successful coders” invest into change resources, demonstrate a high level of acceptance of innovations, and organize effective processes of coordination and learning.

Conclusions. All clinical departments only put an emphasis on the coding aspects of the DRGs. There is a lack of vision regarding the optimization of patient treatment processes and specialization. Physicians are the most important key actors, rather than the main barriers.

Key Words. DRGs, implementation process in hospitals, dynamic capabilities, case study

In 2000, a National Health Care Reform was passed in Germany which included the implementation of a Prospective Payment System for 100 percent of the inpatient cases. The new finance system is based on diagnosis-related

groups (DRGs), a patient classification system which originated in the United States and Australia and was customized for Germany (Sell 2000; Hindle and Lenz 2001). DRGs categorize the variety of heterogeneous cases into clusters of medically and economically homogenous cases. For every DRG hospitals receive a fixed price, regardless of the actual costs of the patient treatment. The German health care system is comprised of the inpatient and outpatient sector, operating with their own budgets and actors. Owing to this system, the implementation of DRGs solely affects physicians in the hospitals treating inpatients and not private practice physicians in the outpatient sector. The German health care system is viewed as too expensive as cost expenditures for inpatient services are about €62 billion—representing 27.4 percent of the total health costs of €225.9 billion. There are approximately 1.2 million physicians, nurses, and workers employed in 2,200 hospitals (Berhanu, Henke, and Mackenthun 2004). On the one hand, ongoing challenges stem from increasing costs in employment, patient treatment, innovative medical technology, and a lack of efficiency and effectiveness in the hospital organization. Furthermore, demographic developments will lead to higher costs because of more older and multimorbid patients in the future. On the other hand, hospitals are receiving less financial support as the state and the health insurance firms have decreasing revenues (Gewiese, Leber, and Schwengler 2003). As several reforms addressing these challenges have failed in the past, the DRG reform is seen as necessary to reduce costs of patient treatment, optimize processes of care, and enable competition among hospitals (Busse and Schwartz 1997; Lungen and Lauterbach 2002b). Thus, German hospitals have to adapt to the competitive environment by executing a widespread reorganization of their processes, structures, and culture, implying a shift from bureaucratic organization into a more economical means of patient treatment with new forms of hospital management (Lungen and Lauterbach 2002a). In light of this all-embracing reorganization, we know little about change in hospitals, especially the influencing factors and process dynamics like inertia, barriers, conflicts, and acceptance of innovations. There is only limited empirical research regarding the capabilities and the constraints in hospitals which are adopting new routines and changing processes (Denis, Langley, and Cazale 1996;

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Edmondson, Bohmer, and Pisano 2001; McNulty and Ferlie 2002; Dent et al. 2004). Thus, in our study, we investigate the implementation process of DRGs in a German hospital group. Our aim is to present findings on how clinical departments implement DRGs and why some gain competitive advantage while others do not. We proceed in four steps. First, we present the literature on change in hospitals. Second, we provide our research design based on a dynamic capability approach. Third, we present empirical findings stemming from the implementation process of DRGs in six clinical departments and finally we discuss implementation modes by offering explanations and draw conclusions regarding gaining competitive advantage.

LITERATURE REVIEW

Reviewing the literature on *change processes regarding the implementation of DRGs*, we identified the tendency to interpret DRGs as an administrative innovation. Research focuses on the system and functions of DRGs (Fetter 1999) and there are numerous studies regarding the outcomes of DRGs, especially reduction in length of stay, decrease in costs, improvement of the patient treatment process (Chulis 1991; Trinh and Begun 1998), increase of the home care industry (Balinsky and Starkman 1987), and the impact of DRGs on hospital management (Crawford and Fottler 1985). Notably, research has emerged focusing on strategic planning regarding pricing policy, optimal patient mix, and the extension of the ambulatory services (Kimberly and Zajac 1985). Although the introduction of DRGs is one of the essential kinds of reorganizations in hospitals, studies on the implementation process itself are few. With regard to case study material based on the Australian case-mix reform, Degeling (1994) argues that the existing struggle between clinical managers and physicians is based on a shift in the “underlying rules of the game” (Degeling 1994, p. 15). Reformers who focus more on technical aspects of the reform (e.g., transparency, budgets, and cost effectiveness) neglect the social and historical foundations of balancing management tasks with medical autonomy. Intended goals of the case-mix reform concerning quality and cost issues remain largely unaddressed or unresolved. The former argument is supported by a representative study of hospitals in Australia about the implementation of DRGs (Degeling et al. 1996). Although the founder of the concept of DRGs assumed an amalgamation of medical and economic concerns, the study shows that there is a gap between occupational groups in the perception of DRGs. Managers demonstrated an adequate level of knowledge about DRGs,

while physicians and nurses scored lower. They appreciate DRGs as a means of increasing hospital efficiency and providing the possibility to make the clinical staff more accountable for the clinical outcomes of their treatments. In contrast, physicians interpret DRGs as an increase in administrative costs and control and reject the management's supervision over the clinical staff.

Stemming from these findings, one can expect that the implementation of DRGs is not a clear-cut administrative innovation. We need more empirical research about the introduction and acceptance of this system, process dynamics, and influencing variables. An adequate theoretical perspective has to consider that clinical departments themselves have to organize processes of DRG coding, optimize processes of care and specialization to develop competitive advantages in order to survive in more competitive hospital markets (Lüngen and Lauterbach 2002a).

RESEARCH DESIGN

The dynamic capability approach as developed by Teece, Pisano, and Shuen (1997) is a basis to identify capabilities for altering and refining the structures and processes of an organization in order to gain competitive advantages. Dynamic capabilities are strongly linked to the resource-based view (Barney 1991, 2002). The logic is that the organization can be seen as a collation of resources (Penrose 1959). These resources can be the strength of an organization (Wernerfelt 1984). Heterogeneity and immobility of resources form the basis of competitive advantage and organizations have to invest in resources that are valuable and rare (Barney 1991). Isolating these specific resources can lead to nonimitable positions in markets and enable sustained competitive advantages. Dierickx and Cool (1989) highlight the important aspect that not all resources can be bought, such as reputation, quality, trust, and dealer loyalty. Firm-specific resources are to be accumulated internally and have to be "converted" into firm-specific skills (Amit and Schoemaker 1993, p. 36). In this understanding, the concept of dynamic capabilities fills a gap in describing how organizations combine and utilize resources in common and/or in unique ways to gain competitive advantage. Eisenhardt and Martin (2000) connect the concept of capabilities with different types of market dynamics. Dynamic capabilities are defined as "antecedent organizational and strategic routines by which managers alter their resource base—acquire and shed resources, integrate them together, and recombine them—to generate new value creating strategies" (Eisenhardt and Martin 2000, p. 1107). Dynamic capabilities are

often characterized as unique and idiosyncratic processes that emerge from the path-dependent histories of individual firms (Helfat and Peteraf 2003), but empirical observations show that effective processes are copied, refined, and enhanced and therefore become accepted routines which signal a standard of quality for the organization. These *commonalities* are accepted as *best practices* and are well known as successful routines (Eisenhardt and Martin 2000). In our study, we mainly concentrate on the approach of Teece et al. (1997) who define the term *dynamic* as the capacity to renew competencies in order to be in congruence with the business environment. The term *capabilities* refers to the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competencies to match the requirements of a changing environment. According to our research focus, we define these skills, resources, and functional competencies as *change resources*, that is, the resources that are necessary for adapting to change, such as human resources, IT, and financial resources. Moreover, Teece et al. (1997) highlight the importance of *path* dependencies as history matters in change processes. Existing routines have been developed over time and these routines constrain future behavior. It can be expected that hospitals proceed from different starting points and differ in their willingness to change and their clinical specialties. Organizational *processes* addressing change have the three roles of coordination, learning, and reconfiguration. It has been shown that firm-specific *coordination processes* serve to differentiate firms from other firms. Research has shown that hospitals have to focus on coordination, balance an administrative and medical division of power, and struggle with hierarchies as well as with barriers among occupational groups. *Learning processes* enable hospitals to perform better and more rapidly as a result of the combination of individual skills and organizational knowledge. Adaptation to changing environments requires knowledge accumulation, diffusion, and storage (Zollo and Winter 2002). *Reconfiguration processes* require the long-term modification of organizational structures and processes. Competitive advantage lies in the ability to develop new competencies to adapt to the changing environment and in accordance with Lungen and Lauterbach (2002a), hospitals facing the implementation of DRGs have to develop new competencies in DRG coding, patient treatment processes, and specialization as their *implementation outcomes*. The relationship among the categories is shown in Figure 1.

Our research questions can be described as follows. (1) Change resources: How do hospitals accumulate and develop change resources in order to implement DRGs? (2) Path: How does the existing path of a hospital influence

Figure 1: Framework

the implementation of DRGs? (3) Processes: How do hospitals develop new routines through processes of coordination, learning, and reconfiguration in order to implement DRGs? (4) Implementation outcomes leading to competitive advantage: How do clinical departments develop competencies in DRG coding, patient treatment processes, and specialization? Overall, we expect that idiosyncratic patterns among clinical departments exist in each category, which will lead to specific implementation processes (Eisenhardt and Martin 2000).

METHODS

Hospitals are systems of great complexity that are in a state of high flux, continually and rapidly changing. In order to investigate processes of change the case study method is appropriate to gain deep insights into process dynamics of change and to assess them (Yin 1999a). Therefore, we used a multiple case study design to investigate the clinical departments of a German hospital group implementing DRGs (Eisenhardt 1989; Miles and Huberman 1994; Yin 1999b). The empirical study was conducted in a public hospital group which represents a typical German hospital in terms of size and organization. The hospital group consists of 1,850 beds allocated in 33 clinical departments offering a wide range of medical treatments like pediatrics and cardiology. Three-thousand and six-hundred physicians, nurses, and administrative workers are employed in total. The hospital group is directed by a board of executives with a chief director, followed by a medical director, a nursing director, and an administrative director. The hospital group has been involved in the implementation of DRGs in 26 clinical departments since

2000. The empirical study began during the summer of 2003 by observing the overall implementation of DRGs in the hospital group which is steered by a central interdisciplinary DRG project group. This DRG project group consists of members of the board of executives, senior physicians acting as so-called DRG agents, nurses, and administrative staff such as controllers. Their main task is to provide information, budgets, and tools, as well as to stipulate decisions regarding the content and procedure of the implementation of DRGs. The main focus of the study considers the detailed implementation processes in six selected clinical departments and examines why some clinical departments more effectively responded to DRG coding mandates than others. In this respect, we followed Eisenhardt (1989) and selected two polar groups of clinical departments with respect to their DRG coding performance, in order to search for idiosyncratic and common patterns. We used the DRG coding parameters as measures of the DRG coding performance to classify the clinical departments into these two groups. The DRG coding parameters are developed by the DRG project group in order to evaluate and review the DRG coding performance of the clinical departments and are published monthly in a reporting system. They reveal the finalization of the DRG coding by the so-called case completion, reflecting how many cases a clinical department has finalized by case completion and how many open cases a clinical department still has in relation to their discharges. The DRG project group has defined a critical limit for open cases for each clinical department and evaluates whether they are within or above their critical limit. Being consequently within the critical limit is assessed as a good coding performance, while being consequently above critical limit is evaluated as a poor coding performance. Therefore, the coding parameters gave us the opportunity to make a clear and valid distinction between successful and unsuccessful coding clinical departments. We chose the three clinical departments with the best coding parameters between January 2003 and June 2004, being consequently most within their critical limit and termed this group "successful coders" (S1, S2, and S3). Likewise, we selected the three clinical departments with the worst coding parameters, being consequently most above their critical limit, and termed this group "unsuccessful coders" (U1, U2, and U3). In order to establish the construct validity and reliability of our case study, we followed Yin's principle of data collection with the triangulation of data sources. Multiple sources of evidence are highly complementary and the purpose is to collaborate the information of each data source (Lincoln and Guba 1985; Yin 1999b; Stake 2005). We used three data sources: interviews, direct observations, and written materials in order to triangulate and to validate the empirical findings with

different sources of data. The three data sources are coded by the following nomenclature: the first letter(s) of the nomenclature represents the data source interviews (I), direct observations (DO), and written materials (WM), followed by a figure representing the chronological number of the interviews, direct observations and written materials. In the case of direct citations the second figure represents the text passage.

Interviews (I)

Forty-three semistructured interviews were conducted with key persons responsible for the implementation of DRGs in autumn 2004. Our study examines internal dynamics like, for example, coordination, learning, and reconfiguration processes of the implementation process of DRGs in the two groups of the selected clinical departments. Therefore, we concentrate solely on the perceptions and assessments of involved employees of the hospital group such as physicians. We purposely excluded external views of community representatives, patients, and other external stakeholders. Our interview sample was selected through a purposive strategy. To receive information about the overall implementation process of the hospital group we interviewed the four members of the board of executives and the 15 members of the DRG project group. In order to gain insights into the six clinical departments we mainly interviewed physicians as they are mostly affected by the implementation of DRGs and can provide the most detailed information and assessment of the implementation process. Concretely, we interviewed four key persons per clinical department, namely the chief physician, the senior physician acting as the DRG agent, the physician who is in charge of the DRG coding, and the chief nurse. Interviews ranged from 45 to 120 minutes in length, while most of them took about an hour. All interviews were transcribed and coded by *MAXQDA* software for qualitative data analysis according to the theory-driven categories of change resources, path, and processes.

Direct Observations (DO)

We carried out direct observations of the monthly meetings of the DRG project group starting in November 2003. We took on the role of passive observers watching the discussion and decision-making processes closely and taking field notes during the events (Miles and Huberman 1994). The observations were conducted by two researchers in order to validate the field notes.

Written Materials (WM)

A variety of internal and external documents were sampled. The written materials include documents like correspondence and manuals of the board of executives, the DRG project group, and the clinical departments, protocols, and official annual quality reports. These written materials were especially helpful to examine the overall implementation process and to gain information about the researched clinical departments.

EMPIRICAL FINDINGS

On the basis of the interviews, direct observations and written materials we first observed the overall implementation process of the DRGs, which indicates that all clinical departments started with the same implementation conditions. Interviews with the board of executives and the members of the DRG project group as well as direct observations show that the board of executives founded the central DRG project group in order to steer the overall implementation process in the hospital group, as the CEO of the hospital group demonstrates:

We made first initiatives concerning DRGs in 1999, then founded a superior, central, interdisciplinary DRG project group in 2000 which is managed by the chief of the controlling department, is involved in organizing regular monthly meetings and is responsible for the training and information about the DRGs (DO, 17:23).

The DRG project group develops instruments and tools to support the clinical departments in their implementation processes. As directly observed and confirmed in written materials, this DRG project group is connected to the clinical departments via DRG agents, who are senior physicians chosen from every clinical department. In addition, interviews, direct observations and written material substantiate that the DRG agents transmit decisions and tools from the DRG project group to the clinical departments and relay difficulties and idiosyncrasies of the clinical departments back to the DRG project group. As a result of identical implementation conditions within the overall implementation process, each clinical department has to organize its own individual implementation process leading to idiosyncratic implementation processes. In the following section we present empirical findings with respect to the aforementioned categories and focus on: (1) idiosyncratic patterns of “successful coders” (S1, S2, and S3); (2) idiosyncratic patterns of “unsuccessful coders”

(U1, U2, and U3); and (3) in addition, we observed common patterns among the implementation processes of all of the six clinical departments.

Idiosyncratic Patterns of Successful Coders

Following our theoretical framework, we first present findings according to the idiosyncratic patterns of successful coders along the categories of change resources, path, and processes.

Change Resources. Based on the interview data there is evidence that successful coders mobilize additional *personnel resources* in order to implement the DRGs. Mostly physicians and one chief nurse in the clinical departments S1 and S3 report a reorganization of their division of labor with respect to the implementation of DRGs. Interviewees in S1 revealed that their chief physician released two physicians partially from the medical work in order to be responsible for the implementation of DRGs. This perception is put forward by the chief nurse in S1:

To begin with, our chief physician has released two physicians. He said: 'You are now only responsible for the DRGs. You will only do one or two operations in the morning in order to stay in practice.' It was two senior physicians [...]. They have been released every day for half a day. They did the DRG coding and attended the other physicians. [...] The other physicians had to operate and started at 6:30 although their regular working time begins at 7:30. They worked overtime to compensate for that. This lasted for about 1/2 year or 3/4 year and because of that DRGs worked in our clinical department properly (I 4:281).

Furthermore, all physicians in the clinical departments S2 and S3 refer to an active improvement of the IT expertise of the physicians. For example, the physicians in S2 document that their chief physician considers IT expertise very important for his clinical department and therefore hired a physician with additional IT knowledge who later became the DRG agent. This goes along with the empirical finding from the interviews that nearly all physicians in the successful coders put an emphasis on *IT resources* for the implementation of DRGs. For example, the DRG agent in S1 accounts that they introduced an isolated application concerning their IT configuration, which enabled them to analyze patient data and operating procedures and to electronically write medical records. With respect to *key resources*, interviewees in the clinical departments S2 and S3 report the closest relationship to the DRG project group as their DRG agents have been active members of the DRG project group

since it had been established. Direct observations of the monthly meetings of the DRG project group support this close relationship.

Path. Concerning *willingness to change*, nearly all of the respondents of successful coders described themselves in the interviews as being open minded about change, as the quote of the DRG agent in S3 illustrates:

This is the credo of our department. That we always like to know which way to choose in the future, so that we know where the train will go. That we realize early which initiatives are necessary, which actions have to be pushed and where we have to set our priorities (I 10:30).

This finding can be substantiated by the direct observations of the DRG project group meetings in which the DRG agents in S2 and S3 stood out as delivering innovative proposals and committing to change concerning the DRGs as the following statement of the DRG agent in S3 during a DRG project group meeting shows:

And if clinical departments do not have clinical coders, the physicians have to do it on their own. But unfortunately you find differences according to motivation and quality. Each member of the DRG project group is committed to the DRG coding in order to ensure revenues—that is the credo of the DRG project group. If we do not generate any revenues, the hospital group has no future (DO 3:4).

Almost all interviewees in the successful coders show a positive perception of the DRGs. They expect a decrease in the average length of stay and costs, as well as an increase in the efficiency and quality of patient treatment processes in their clinical departments. Some physicians state in the interviews that they accepted the additional administrative work of the DRGs in an early stage of implementation, as they assessed opposition as a waste of time. Thereafter, physicians and nurses of every clinical department reported that they initiated administrative projects regarding the implementation of DRGs. For instance, all actors in S1 revealed their project of implementing integrated medicine for two of their most frequent disease patterns. They highlight the importance of being the first clinical department of the hospital group which engages in cooperation with preliminary physicians in private practice and downstream institutions of rehabilitation. They state that they intend to optimize their processes of care as well as interactions with their cooperation partners. Second, with regard to *clinical specialties*, interviews with successful coders reveal that they have no disadvantages in the DRG coding process because of their clinical specialties. In their opinion all clinical departments are subject to the same coding preconditions. Strikingly, physicians in S3 even report about

tendencies toward coding advantages due to their surgical specialties in which their predominantly surgical procedures facilitate the DRG coding.

Processes. Statements of nearly all respondents in the successful coders concerning *coordination* lead to the assessment that they view the coordination via the DRG project group as an adequate forum for the implementation process. They see the group as highly supported by the board of executives, acting autonomously and conducting reasonable proposals. Additionally, interview data of mostly all of the interviewed physicians and nurses substantiated that successful coders criticize the board of executives for not imposing any sanctions toward clinical departments with a low standard of coding quality. The discussion about sanctions against unsuccessful coders led to the decision made by the DRG project group that these clinical departments would be asked to engage in a dialog with the DRG project group where they would be offered coaching and support and would not suffer any major consequences. Interviewees in the successful coders interpret this behavior as a weakness in leadership and demand more pressure, harder sanctions, or labor law consequences. The majority of interviewees in the successful coders highlight internal modes of coordination in a flat hierarchy and effective cooperation between the occupational groups which allows them to act in a self-determined way during the implementation process. Concerning *learning*, physicians and nurses of all clinical departments report that they use internal training to accumulate DRG knowledge in their clinical departments instead of utilizing the DRG support of the central medical controlling department. This finding is corroborated by a protocol of a DRG project group meeting in which a physician characterizes the trainings as a waste of time because of a lack of input. In addition, in interviews it is stated that successful coders organize their learning processes more formally by discussing the monthly reports in regular meetings to assure adequate knowledge diffusion. To summarize, the most prominent results are that successful coders invest into additional change resources, characterize themselves as open minded about change by accepting administrative innovations, and organize effective processes of coordination and learning with regard to the DRGs.

Idiosyncratic Patterns of Unsuccessful Coders

Whereas empirical findings demonstrate that successful coders support the implementation of DRGs, there are contrasting findings among the unsuccessful coders according to the categories change resources, path, and processes.

Change Resources. With respect to change resources, physicians and nurses in U1, U2, and U3 comparably depict that they are not able and willing to mobilize additional personnel resources for the implementation of DRGs. They highlight that their clinical departments always suffer from restricted personnel resources and they work overtime regularly. Extra work is seen as a usual part of the physicians' profession to maintain the standards of patient treatment, but additional work on DRGs is interpreted as barely realizable and not belonging to their responsibility, as the DRG agent in U1 describes:

For DRGs our personnel resources are too restricted and we have to fulfill too many different functions. People often call this an organizational failure of our clinical department—this may be an evaluation which is correct for an outsider. But for someone who knows how we work in here—this is difficult to manage because our work is not fixed on a drawing table. There are always many things that turn up. There are emergency patients [...] DRG coding only happens when there is a time gap. Then we huddle on DRGs and do the DRG coding (I 14:31).

Interviewees in the unsuccessful coders reveal that they are not willing to conduct the DRG coding and therefore require external clinical coders. This claim for additional personnel resources was discussed in a meeting of the DRG project group in which U2 demanded additional resources but their demands were rejected. Concerning *financial resources*, one physician per clinical department reports that additional investments in IT equipment for the implementation of DRGs have led to financial restrictions in other areas. It is even criticized that the IT investments are a waste of resources which reduce investments for medical innovations.

Path. Concerning *willingness to change*, the majority of interviewees reveal that unsuccessful coders are negative toward the DRG-based payment system and fear a decline in medical quality and a disposal of staff. Moreover, all of the interviewees reject the additional administrative effort stemming from DRGs. For example, all interviewees in U2 describe themselves as consequently understaffed and emphasize the priority of patient care over administrative work. Therefore, they exhibit a low level of acceptance and a weak willingness to undertake the DRG coding. With regard to *clinical specialties*, interviews with unsuccessful coders show that they feel handicapped in DRG coding due to their clinical specialties. Their argument can be ascribed to their internal medicine specialties, in which the designation of diagnoses is far more complex than in surgical specialties.

Processes. All physicians and nurses in U1 and U2 criticize the *coordination* of the implementation of DRGs by the board of executives in the interviews. They report that they felt left alone in the implementation process and did not recognize any coordinating activities or support by the board of executives. Furthermore, the coordination via sanctions is criticized as the majority of the representatives in U1, U2, and U3 blame the dialog which occurred with the DRG project group. The DRG agent in U1 and his deputy state in the interviews that it was not a constructive dialog and that they felt “treated like school boys [. . .] who did not do their homework” (I 14:33). The DRG agent in U3 characterizes this dialog as “psychological terror” (I 20:179). The DRG agent in U2 also viewed the dialog as a reprimand. In his opinion, the DRG project group is not really interested in the reasons for clinic-specific problems and does not give any support and reasonable improvements at all. These subjective perceptions are not supported by the direct observations and protocols, which show that physicians were first asked to report their difficulties and to provide reasons for their coding deficiencies. In the next step, they were offered support and suggestions by the members of the DRG project group. Moreover, one physician in each clinical department and the chief nurse in S3 claim that unsuccessful coders have internal modes of coordination in a strong hierarchy. In addition, there is no cooperation between the occupational groups due to the DRGs. Concerning *learning* processes, physicians and nurses of unsuccessful coders report that they could not attend the DRG trainings because of a lack of resources. Instead, they utilized the central medical controlling department as a source of DRG knowledge accumulation. In addition, some physicians state that they tend to learn by chance as they only react randomly to coding mistakes. To summarize, the most prominent results are that unsuccessful coders put their main emphasis on medical care. Therefore, they are not willing to invest into additional change resources, and they demonstrate a low level of acceptance of administrative innovations like DRGs, and do not organize effective processes of coordination and learning concerning the implementation of DRGs.

Common Patterns of Successful and Unsuccessful Coders

Although clinical departments started from different points of departure, achieved different stages of coding quality, and demonstrate the aforementioned idiosyncratic patterns, some common patterns could be observed among all of the six clinical departments.

Change Resources. With respect to *personnel resources*, all interviews prove that every clinical department received a so-called DRG bonus as personnel compensation for additional DRG work. A central finding of the interviews concerning this DRG bonus is that the majority of physicians and nurses of all clinical departments criticized the bonus for being offered too late, its small amplitude, and its neutralization by job slashes. The following quote of the DRG agent in U1 underlines this argument:

The resources for the DRG implementation have been taken away from everywhere. Usually this should be financed by the board of executives. But it has been taken away where possible. We did not get any extra financial means for the DRGs. And in my opinion the DRG bonus is no extra resource (I 15:131–135).

Regarding *IT resources*, most of the interviewees report a minor upgrade of the hardware in the clinical departments and evaluate the hardware equipment at the time of inquiry as adequate. In contrast, some physicians criticize the applied industrial software as inapplicable to the hospital organization. According to our direct observation of the dialog in U1 and U2 with the DRG project group, this criticism of the inapplicability of the software has been cited as a reason for their poor coding performance. With respect to *financial resources*, the majority of physicians and nurses state that they did not receive any funds from the board of executives for the implementation of DRGs. Furthermore, physicians in two of the successful and two of the unsuccessful coders criticize that individual initiatives like projects, medical innovations, and structural alterations of their clinical departments are not financially supported which will lead to competitive disadvantage in their opinion. Nearly all the physicians and nurses of the six clinical departments estimate the DRG agents as being *key resources* for the implementation of DRGs, serving as linking pins between the DRG project group and clinical departments, and budging the implementation process through several difficult situations. Therefore, DRG agents take on the responsibility for the implementation of DRGs, being officially defined as “DRG key experts” (WM 4:3).

Processes. With respect to the *coordination* of the implementation process, half of the physicians and nurses criticize the board of executives for being too distant from the clinical departments, focusing on individual career interests and management failures, and for their lack of support of individual projects. Aside from these criticisms, nearly all interviewees evaluate the support of the central medical controlling department as helpful, expressed by a senior physician in S1:

There is a special department which is responsible for the DRG coding. If you have any questions you can call them anytime. There is permanently someone to call everyday and to ask about specific problems. That is really very good. [. . .] When we have problems we call them directly and they contact us proactively when they get to know of specific problems or news (I 3:64, 74).

In addition, physicians and nurses highlight the monthly reporting system initiated by the DRG project group in the interviews as a useful instrument to control the coding performance of the clinical departments. This finding is corroborated in the written materials where physicians report their positive experiences. Written materials show, furthermore, that clinical departments have received the monthly status of their coding performance attached to the protocols of the DRG project group meetings since February 2003. Concerning *learning* processes, all interviews with the physicians and nurses substantiate that none of the clinical departments made use of external consultants in order to accumulate DRG knowledge. Instead, interviewees report that they accumulated DRG knowledge on the basis of information offered by the hospital group, such as protocols of the DRG project group meetings. All interviewees except for one chief nurse refer to an informal channel of knowledge diffusion as the DRGs are perceived as a subject of everyday work. Regarding the storage of knowledge, interviewees of five of the six clinical departments highlight that they have developed so-called hit lists which contain the most frequently occurring diagnoses and their codes. With respect to *reconfiguration*, nearly all interviewees except one chief nurse state that they developed a new coding process in order to match the requirements of the DRGs. In contrast, we could not yet observe tendencies toward the optimization of patient treatment processes and specialization as the hospital did not make its first steps toward clinical pathways until the end of 2004 when it organized an official information meeting about clinical pathways. To summarize, the most prominent results concern the overall lack of change resources, deficiencies in coordination by the board of executives, and DRG agents serving as linking pins between the DRG project group and the clinical departments.

DISCUSSION

The goal of the implementation of the DRG-based payment system in Germany is to enable competition among hospitals in order to reduce the costs of patient treatment and to optimize processes of care. Therefore, hospitals have to successfully implement DRGs in order to adapt to this competitive envi-

ronment. As the literature review shows, there is a lack in description and analysis of the implementation process of DRGs in hospitals. Our study addresses this gap and is based on theoretical approaches that explain competitive advantage in relation to resources and dynamic capabilities. Our *contribution to the literature* concerns, first, the finding of a lack of resources which is well-known phenomenon in hospitals (Lauterbach and Lungen 2000). In our study, we observed a lack of change resources as the board of executives estimates the implementation process of DRGs as cost free, underestimates efforts necessary for the implementation process and does not invest in additional change resources for the implementation of DRGs. Second, we observed the dominance of physicians in the implementation process of DRGs which is not very surprising and confirms results from previous studies (Carman et al. 1996; Dent et al. 2004). But strikingly in our study, physicians, who are mostly seen as the main barriers to the acceptance of administrative innovations, are the most important key actors, as they partially accept change and are supporters of the implementation process. Third, we proved that there is a distinction between administrative and medical innovations (Kimberly and Evanisko 1981). Differing paths and attitudes among clinical departments lead to heterogeneity in acceptance and cooperation with regard to administrative innovations like DRGs (Degeling et al. 1996). We observed that the acceptance of DRGs as an administrative innovation is especially low along unsuccessful coders. Fourth, in accordance with this observation, successful coders accept DRGs and interpret them as a chance to enhance medical quality and therefore are going the extra mile in terms of change resources, path, and processes. Finally, our findings indicate an emphasis on the coding aspects of the DRGs and a lack of vision regarding the optimization of patient treatment processes and specialization. In terms of the *contribution to theory*, our empirical findings illuminate the theoretical categories of the dynamic capability approach through real world data. We identified specific underlying structures regarding the evolution and deployment of routines. We realized the extraordinary relevance of change resources in change processes. Regarding paths, we clarified different points of departure and identified different implementation processes according to the history of a hospital and their perception of the environment. Regarding processes, we deepened insights into coordination, learning, and reconfiguration. We also consider our study as being relevant for *management practice*. As we have demonstrated, DRGs are interpreted as an administrative innovation. Implementing the DRGs solely with an administrative focus supports the likelihood that physicians will reject this reform. Emphasizing the medical aspects and advantages of the DRG

reform would enhance the rate of acceptance. Therefore, information and training have to concentrate not only on DRG coding but also on the improvement of medical quality. In addition, the steering and coordination of the implementation process by a central interdisciplinary DRG project group and decentralized DRG agents is very effective and has a higher chance of being accepted than external consultants. Moreover, the question remains whether physicians or clinical coders should conduct the DRG coding. Our data reveal that there is no clear-cut solution. From the perspective of the board of executives, physicians are the cheaper solution. Physicians are dividable into those who prefer coding themselves because they feel responsible for the economic future of their clinical departments and into those who reject coding as an administrative burden and thus demand clinical coders. It is a moot question whether the former, identified along the successful coders, accept the DRG coding due to their surgical specialty. As the surgical specialty implies coding advantages it is possibly not surprising that two clinical departments of the successful coders belong to this specialty. In contrast, it is also debatable to what extent physicians reject the DRG coding because of their internal medicine specialties. Because of coding disadvantages of internal medicine specialties it is as well unsurprising that two clinical departments of the unsuccessful coders are of this specialty. Finally, although the clinical departments were expected to optimize their DRG coding and patient treatment processes, as well as to focus on specialization in order to gain competitive advantage to survive in the hospital market, at the current state of our empirical study we only observe an emphasis on the coding aspects of the DRGs and a lack of vision regarding the optimization of patient treatment processes and specialization. The price could be that in Germany the intended goals of the DRG reform concerning quality, optimization, and specialization will remain unattained. This leads us to the final conclusion that at the time being successful coders have already made the first step toward competitive advantage but there is still a long way to go in order to survive in the new hospital market. The following *limitations* of our study have to be considered. The number of cases indicates the restricted generalizability and more qualitative and quantitative studies are needed to enhance knowledge about dynamic capabilities in hospitals. In addition, the categories of the dynamic capability approach need more refinement and further research is needed to examine the more detailed relationships which were only surveyed in this study. The internal research focus on physicians and nurses should be expanded in future research by adding the perspectives of patients and other external stakeholders of the hospital.

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