HOW GERMAN HOSPITALS GOVERN IT – AN EMPIRICAL STUDY

Abstract

Health care services in German hospitals are causing immense expenses. Successful IT Governance might help to support specific challenges for every organization with an adequate use of IT. The market structure of hospitals in Germany is very heterogeneous, e.g. in size and sponsorship. This paper analyses the state of the art of IT governance based on a survey among 220 IT managers in German hospitals. The quantitative analyses reveal that hospitals govern their IT different according to size and sponsorship. In addition our analyses show that decision making authorities for the IT budget rise with hospital size and is positively correlated with the fraction of IT projects on the overall IT budget. We could also show that the investments in innovative IT projects increase with hospital size. In general, IT managers in private hospitals can decide about IT investments more often by their own and on a bigger scale than IT managers from public and non-profit hospitals. This study is the first to shed light into the empirical situation of IT Governance in German Hospitals.

Keywords: IT Governance, IT Management, German hospitals, eHealth.

1 INTRODUCTION

The expenses for healthcare services in the German healthcare sector were estimated to 239 billion euros in the year 2003 which constitutes to a 11.1% share of the gross domestic product of the Federal Republic of Germany (Destatis, 2006). On this background Germany is listed in the Top 10 of OECD countries according to per capita expenses on health care services (Anderson et al., 2006). Based on the Federal Healthcare report of the Federal Statistical Office (2008b) about 59 billion euros are omitted to the hospital sector.

In many industrial branches innovative information technology (IT) and its usage are key drivers for increasing effectivity and efficiency in production processes for goods and services and successful business processes. The effect of IT usage in healthcare is especially on medical service provisions (Jähn & Nagel, 2004) and administrative support processes (Lehmann, 2005; Haas, 2005). Hacker and Schommer (2004) report on increased effectivity and efficiency in examination, treatment and administrative processes in hospitals. IT usage can be a driver for diversification in competition and creation of innovative strategic competitive advantages in hospitals and the health care sector (Piccoli & Ives, 2005). Multiple studies prove IT-driven improvements in administrative and business processes, e.g. information systems for the input and integration of treatment data, reminder functions, medicament management and medication (Raymond & Dold, 2002; Crane & Raymond, 2003). Since the early 1990s studies show that cost reductions are not only generated by the automation of information accumulation and processing but additionally by the contemporary and optimized information allocation for decision makers (Borzekowski, 2002). This fact verifiably induces an improved treatment quality (Apkon & Sighaviranon, 2001; Hacker & Schommer, 2004) and fostering of patients (Nahm & Poston, 2000).

Despite the economic importance of the health care sector and weighted role of hospitals, Information Systems research lacks the effort to generate empirically collected data and based declarative and conceptual models on IT management and information allocation in hospitals. Multiple recent studies are either driven conceptual or miss hypotheses testing on an empirical basis (Sachs, 2005). Other studies focus on special tasks of IT management, e.g. investment and budget decision making (Bernnat, 2006), miss the application of statistical analyzing methods (Riedel, 2006) or lack statistical significant results on the background of low participation numbers (Irving & Nevo, 2005).

To close the gap in academic research and on the background of above-mentioned immense expenses for health care services in Germany, a unique and empirical broad state of the art descriptive study on IT Governance in German hospitals was conducted.

1.1 Motivation for the study

By conducting this study, we were inspired by the approach taken by Weill and Ross (2004) who describe two sources of motivation conducting a study on the IT Governance in corporations. Weill and Ross were motivated by the stock-market premiums given to firms with excellent corporate governance and therefore "suspected a similar premium existed for excellent IT governance" (Weill, 2004) and the "fact that relatively sophisticated financial governance in most enterprises could provide a good model for IT Governance" (Weill, 2004). Not only that we identified a previously described gap in academic research on IT management and specifically IT Governance in German hospitals, our motivation derives from assumptions that differences in IT Governance structures and operationalization exist across hospital size and sponsorship.
The foundation for our motivation derives from results of survey studies conducted in the scope of the Krankenhaus-Barometer (Blum et al., 2007) that indicates differences in types of sponsorship and hospital size.

Objectives (values between 1 and 5)	**Hospital Sponsorship**					
	public		**non-profit**		**private**	
	mean	**rank**	**mean**	**rank**	**mean**	**rank**
patient satisfaction	4.6	1	4.6	1	4.6	1
high process quality	4.5	2	4.5	2	4.5	2
good image of the hospital	4.5	3	4.4	3	4.3	3
intensification of the relationship between hospital and medical practices	4.2	4	4.1	4	4.2	4
revenue increase	3.6	10	3.4	11	3.8	8
realization of profit	3.4	11	3.4	12	3.8	7
achieving the highest possible return on investment	2.7	12	2.8	13	3.7	10

Table 1. Importance of objectives across hospital sponsorship (extract from (Blum et al., 2007))

Table 1 displays the importance of hospital objectives based on arithmetic mean and rank results according to the type of hospital sponsorship. Although, the primary hospital objectives are identical across the three types of hospital sponsorship, we also find major differences. In all types of sponsorship patient satisfaction, high process quality, good image of the hospital and intensification of the relationship between hospital and medical practices are the most fundamental objectives. However, private hospitals focus more on economic objectives than public and non-profit hospitals. Revenue increase, realization of profit and achieving the highest possible return on investment are ranked higher by survey participants from privately sponsored hospitals. We assume that the realization of mentioned objectives is achievable through a value proposition of IT utilization based on findings by Fähling et al. (2009) that IT utilization traces back to decisions and that these decisions are primarily influenced by the IT Governance. To consolidate our assumption and influence of IT Governance, we explain (1) revenue increase by the utilization of administrative information systems that support process cost controlling and increase the rate of return on capital employed through the allocation of (information) resources, (2) realization of profit by the utilization of medical information systems that enable new business models and treatment methods and (3) highest possible return on investment by optimized and more efficient treatment methods on the background of medical information systems.

Table 2 displays composite results of the survey conducted by the Deutsches Krankenhausinstitut (Blum et al., 2007) which describes the differences on hospital size measured in number of beds on the basis of three survey items. We assume that the chosen items: cooperations between hospitals, mergers

between hospitals and new allocation of tasks between medical and non-medical staff, are indicators for different IT Governance cultures and models.

	Hospital size			
Survey item	**50 to 299 beds**	**300 to 599 beds**	**> 600 beds**	**total**
Cooperations between hospitals since 2004 (frequency of occurrence in %)	43.9	53.3	56.5	47.5
Mergers between hospitals since 2004 (frequency of occurrence in %)	7.5	11.1	16.1	9.2
New allocation of tasks between medical and non-medical staff (in %)	14.0	23.0	38.7	18.6

Table 2. Importance of objectives across hospital size (extract from (Blum et al., 2007))

Cooperations and mergers between hospitals require a flexible and interoperable IT landscape, which should have consequences for the IT Governance especially in big hospitals. To enable and support many reallocations of tasks between medical and non-medical staff, IT managers should have a high degree of decision making authorities and must understand the requirements of their medical and non-medical clients.

2 IT GOVERNANCE IN HOSPITALS

Weill and Ross (2004) state that "the difference between management and governance is like the difference between a soccer team running harder and practicing longer and the stepping back to analyze its composition and game strategy". So the result of an analysis may be that a team needs to introduce new coaches or different playing positions or provide diverse decision making responsibilities. Therefore a company and respectively hospital organization needs to involve different people in "IT decisions, designing new ways or making IT-related decisions, or developing new techniques for implementing IT decisions" (Weill & Ross, 2004) to achieve more value from IT artifacts. Along with other definitions on IT Governance (IT-Governance-Institute, 2000; Van Grembergen, 2003; Krcmar, 2005). Weill defines IT Governance as "specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT" (Weill, 2004). The definition implies a strict separation between management and governance whereas management talks about what specific decisions are made and governance "is about systematically determining who makes each type of decision (a decision right), who has input to a decision (an input right), and how these people (or groups) are held accountable for their role" (Weill, 2004). Consequently, the IT Governance framework proposes five major decision domains and six exclusive governance archetypes for making IT decisions which were adopted and linguistically adjusted and translated into German to fit common expressions used in praxis and the German health care sector. Table 3 displays information on the decision domains according to Weill (2004) and the corresponding terminology used in the underlying study.

Decision domains according to Weill (2004)	**Decision domains adopted and linguistically adjusted**	**Description according to Weill (2004)**
IT Principles	IT Strategy	High-level statements about how IT is used in the business
IT Architecture	IT Standards	Standardization of technical capabilities that should be standardized enterprise-wide to support IT efficiencies and facilitate process standardization and integration Activities that must be standardized enterprisewide to support data integration

Decision domains according to Weill (2004)	Decision domains adopted and linguistically adjusted	Description according to Weill (2004)
	IT Applications	An integrated set of technical choices to guide the organization in satisfying business needs. The architecture is a set of policies and rules for the use of IT and plots a migration path to the way business will be done (includes data, technology, and applications)
IT Infrastructure Strategies	IT Infrastructure	Strategies for the base foundation of budgeted-for IT capability (both technical and human), shared throughout the firm as reliable services, and centrally coordinated (e.g., network, help desk, shared data)
Business Application Needs	IT Projects	Specifying the business need for purchased or internally developed IT applications
IT Investment and Prioritization	IT Investments	Decisions about how much and where to invest in IT including project approvals and justification techniques

Table 3. Decision domains according to Weill (2004)

Based on considerations on corporate governance, state governance and information politics Weill and Ross identified six IT governance archetypes, namely *business monarchy*, *IT monarchy*, *feudal*, *federal*, *IT duopoly* and *anarchy*, through a logical combination of above mentioned decision maker types. Table 4 displays the IT Governance archetypes which describe the combination of people who have either decision rights or input in IT decisions (Weill & Ross, 2004) and short descriptions outlining each archetype. Additional, Table 4 shows the results of the organizational and hierarchical entity mapping between corporation and hospital decision makers.

	Corporation decision makers	**CxO Level Executives**	**Corp. IT and/or Business Unit IT**	**Business Unit Leaders or Process Owners**
	Hospital decision makers	**Hospital and/ or polyclinical[1]/ clinical directors**	**Central hospital IT and/or clinic IT**	**Clinic directors or head of department/ assistant med. director**
Governance Archetype	**Description according to Weill and Ross (2004)**			
Business Monarchy	A group of, or individual, business executives (i.e., CxOs). Includes committees comprised of senior business executives (may include CIO). Excludes IT executives acting independently.	x		
IT Monarchy	Individuals or groups of IT executives.		x	
Feudal	Business unit leaders, key process owners or their delegates.			x
Federal	C level executives and at least one other business group (e.g., CxO and business unit leaders)—IT executives may be an additional participant. Equivalent to a country and its states working together.	x	x	x
		x		x
IT Duopoly	IT executives and one other group (e.g., CxO or business unit leaders).	x	x	x
			x	x
Anarchy	Each individual user			

Table 4: Six IT governance archetypes (Source: according to Weill (2004) and Weill and Ross (2004))

[1] Polyclinic is a clinic for ambulant therapy.

3 RESEARCH DESIGN

3.1 Research method

In order to explore the IT Governance in German hospitals, we conducted 12 expert interviews on IT Governance in German Hospitals to structure the research objective and questionnaire. The data was collected through a standardized online questionnaire. The questionnaire was adjusted linguistically to fit professional domain terminologies of IT executives in German hospitals. The duration of the survey was three months, from March to June 2008. The questionnaire forms were pre-tested among ten experts and where required readjusted in advance. Address data was collected through commercial-available domain-specific address data collections and internally compiled address data sets. After a consolidation of address data sources and validation of doubles, 2391 different hospitals and medical institutions could be identified as potential participants. The numbers show that multiple contact persons in the same professional domain per institution/hospital were contacted. All mailings included an individual code to avoid multiple participations. The average respond time for the questionnaire form constitute to about 30 minutes. The data collection included two follow-up calls for participation through email and postal mailings. Additional, two articles describing the study including a call for participation were published in professional journals: *Krankenhaus-IT Journal* and *Management & Krankenhaus*. Results presented in the underlying contribution are based descriptive analysis of relative frequencies, t-tests and correlations with the use of the correlation coefficient by Spearman.

3.2 Structure

After two researchers independently and iteratively conducted a data cleaning process 206 data sets (thereof 11 anonymous) of IT executives were collected through the online questionnaire form. More then two thirds of the IT executives (70%) hold an academic certification whereas 30% graduated with an apprenticeship certificate.

Caption: * absolute	**Sponsorship**														
	Public					**Private**					**Non-profit**				
	Number of beds					Number of beds					Number of beds				
	< 200	200-799	>= 800	abs.*	%	< 200	200-799	>= 800	abs.*	%	< 200	200-799	>= 800	abs.*	%
IT executive	12	49	20	81	40,5%	13	19	6	38	19%	15	59	7	81	40,5%
%	14.8%	60.5%	24.7%			34.2%	50%	15.8%			18.5%	72.8%	8.7%		

Table 5. Sample structure

For further analysis, the data set was segmented based on two segmentation attributes: *type of sponsorship* and *size of the hospital* as discussed previously. The size of the hospital was measured in number of beds. We adopted the classification of the hospital size from Leimeister et al. (2008). Hospitals were classified into three categories “under 200 beds”, “200 to 799 beds” and “800 and more beds”. This segmentation is based on an interview series among experts from the German medical and hospital environment. The type of sponsorship is partitioned to three categories: “public”, “private” and “non-profit” and corresponds with the German hospital market structure.

Sponsorship	**Public**	**Private**	**Non-profit**
Federal Statistical Office	36.01%	38.37%	25.62%
Sample	40.50%	19.00%	40.50%
Size	**Small (1-199 beds)**	**Medium (200-799 beds)**	**Big (800+ beds)**
Federal Statistical Office	55.54%	40.54%	3.92%
Sample	20.00%	63.50%	16.50%

Table 6. Comparison between German hospital market structure and our sample (according to (Destatis, 2008a)

In comparison to the data from the Federal Statistical Office, our sample is not consistent with the statistical data about German hospital market structure (see Table 6). While our sample consists of 40.5% non-profit hospitals, only 25.62% of the hospitals in Germany are under control of a non-profit sponsor. By contrast, our sample contains only 19% of private hospitals whereas 38.37% of hospitals in Germany are held privately. We also see differences in hospital size between our sample and the German hospital market structure. Within our sample only 20% of all hospitals are small compared with 55.54% in the German hospital market. By contrast big hospitals are overrepresented in our sample with a share of 16.5% compared to 3.92% in the German hospital market.

4 EMPIRICAL DATA

4.1 IT-budget

In a first step, we analyzed the distribution of the IT budget. The respondents could assign 100% of the IT budget to three different categories. The first category *Operations* contains all costs for the operations of current IT systems in the hospital. The second category *Projects* includes all expenses for projects beyond operating tasks. This part of the IT budget is invested to develop new and innovative IT solutions within the hospital. The last category *Organization* involves all personnel expenses. The higher these costs, the bigger the relative size of the IT organization.

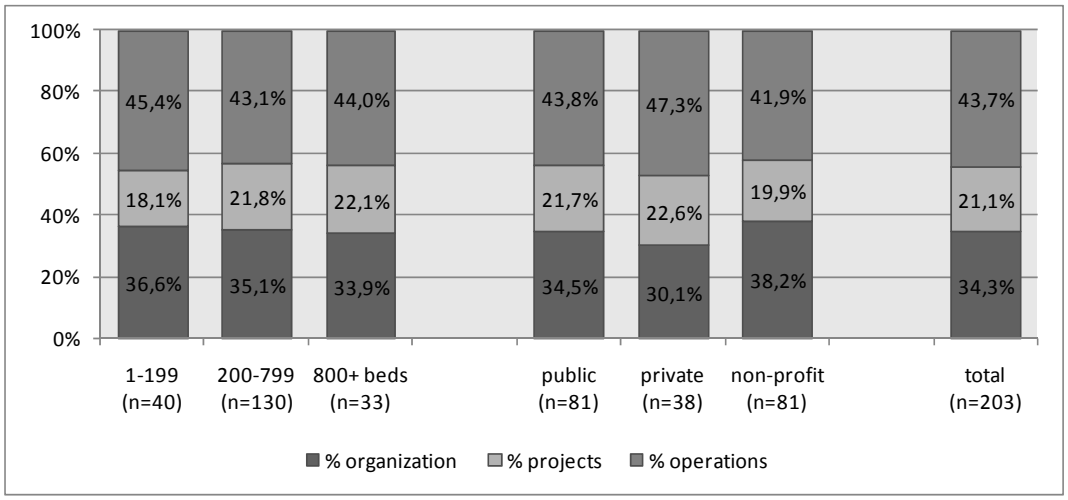


Figure 1. Relative distribution of the IT budget across hospital size and sponsorship (Source: sample data)

The three left bars in Figure 1 show the comparison between the hospitals by size. The rightmost bar represents the average values across all hospitals. The IT budget for the IT organization in big hospitals with 800 beds and more is slightly lower (33.9%) compared to 35.1% in medium and 36.6% in small hospitals. On the other hand, big hospitals invest more in IT projects (22.1%) compared to 21.8% in medium and 18.1% in small hospitals. Bars number four to six from the left give an overview over the IT budget distribution across different sponsorships. Here we could identify interesting findings in all budget parts. First, the part for IT operations represents almost half of the whole IT budget in private hospitals (47.3%) compared to 43.8% in public and 41.9% in non-profit hospitals. Second, the organizational part on the IT budget is much lower in private hospitals (30.1%) compared to 34.5% in public and 38.2% in non-profit hospitals. Finally, private hospitals invest a bigger share in IT projects (22.6%) compared to 21.7% from public and 19.9% from non-profit hospitals. T-tests could not reveal any significant differences between hospital size or sponsorship.

4.2 IT decision-making authority

The second question is related to the decision-making authority. Three types of decision-making authority were formulated in the questionnaire: the IT manager can only prepare but not make decisions, the IT manager is allowed to make decisions within a specific amount of budget and the IT manager may decide over the full amount of the IT budget.

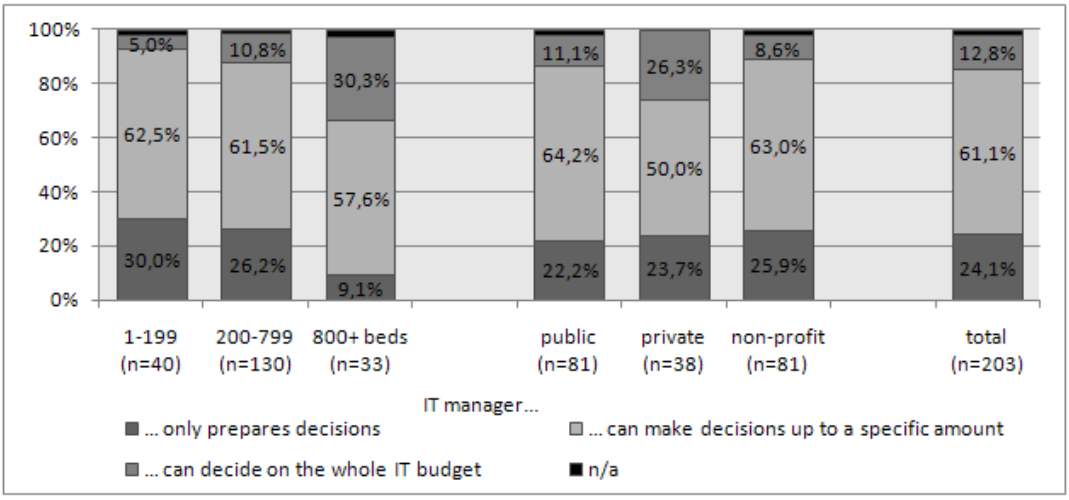


Figure 2. Decision-making authority (Source: sample data)

Our study revealed high differences across sponsorship and size (see Figure 2). While only 8.6% of the IT managers from non-profit and 11.1% from public hospitals are allowed to make decisions within their full IT budgets, more than a quarter (26.3%) of IT managers from private hospitals may decide over the full amount of the IT budget by their own. The part of IT managers which only prepare decisions is almost the same across all hospitals (from 22.2% in public over 23.7% in private to 25.9% in non-public hospitals). Across hospital size, IT managers from big hospitals have more often the possibility to make decisions by their own (30.3% in big, 10.8% in medium and 5.0% in small hospitals) than in medium and small hospitals. This fact is also underpinned by a correlation between the freedom of IT budget decisions and the number of beds (r=0.202; p=0.004; n=199). The decision-making authority index is based on a three point Likert-scale: “preparing of IT decisions” maps on a value of 1, “make decisions within a specific amount of budget” maps on a value of 2 and “make decisions within whole IT-budget” maps on a value of 3.
Another analysis of decision making authority index and the different parts of the IT budget revealed a positive correlation between the decision making authority and IT projects (r=0.170; p=0.017; n=199). The more decision making authority the higher the part of IT projects on the whole IT budget. One explanation is that IT managers with low budget responsibility have difficulties to convince other stakeholders of their ideas for IT projects. Another explanation is that IT managers which execute more IT projects receive more trust from the other stakeholders and therewith more authority for decision making.

	IT-operations	**IT-projects**	**IT-organization**	**Number of beds**
Decision making authority index	-0,022 / 0,762 n=199	0,170* / 0,017 n=199	-0,053 / 0,460 n=199	0,202** / 0,004 n=199

Table 7. Correlations between decision making authority index (Source: sample data)

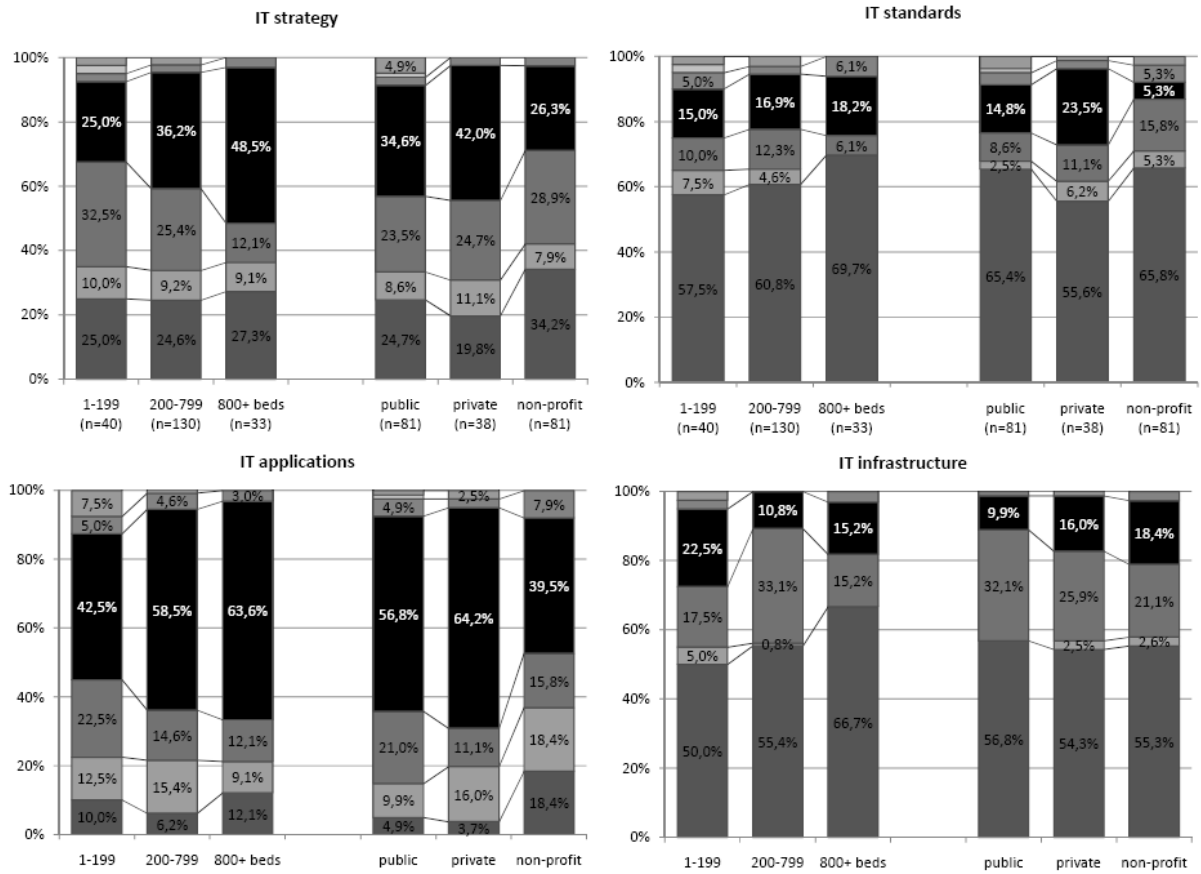
Results of the t-test between hospital sponsorship across hospital size (see Table 8) disclosed that the highest differences in decision making authority exist between big private hospitals and public (level of significance: 0.026) as well as non-profit (level of significance: 0.048) hospitals.

Hospital size	Hospital sponsorship		
	public vs. private	private vs. non-profit	public vs. non-profit
1-199 beds	0.230	0.549	0.547
200-799 beds	0.243	0.621	0.007**
800+ beds	0.026*	0.048*	0.687

Table 8. T-tests between hospital sponsorship across hospital size about decision making authority (Source: sample data)

4.3 IT-decision domains

As previously described, we analyzed all IT decision domains across hospitals by classifying our sample in hospital sponsorship and size. The first IT decision domain, we focused on is *IT Strategy*. Figure 3 shows that the fraction of the federal archetype increases and the fraction of IT duopoly decreases with hospital size. This can be explained by an increasing number of departments at larger hospitals. In private hospitals decision processes for the IT strategy follow more often the archetype of an IT monarchy (34.2%) than in non-profit (24.7%) and public (19.8%) hospitals. In public hospitals the most often archetype is federal, possibly because the share of big hospitals in public hospitals is higher than in private and non-profit ones (Figure 3). Results for the decision domain *IT Standards* show that the most common archetype for IT standards is IT Monarchy (from 57.5% at small to 69.7% at big hospitals). This is not surprising because decisions around IT standards are highly technical-driven and do not much affect business process issues. Anyhow, almost one-fifth of the hospitals use a federal archetype in decisions on IT standards. The biggest share of the federal archetype can be found in public hospitals (23.5%), the smallest in private hospitals (5.3%). Noticeable is the high share of IT duopoly at private hospitals. This share (15.8%) is almost twice as high as in non-profit (8.6%) hospitals.



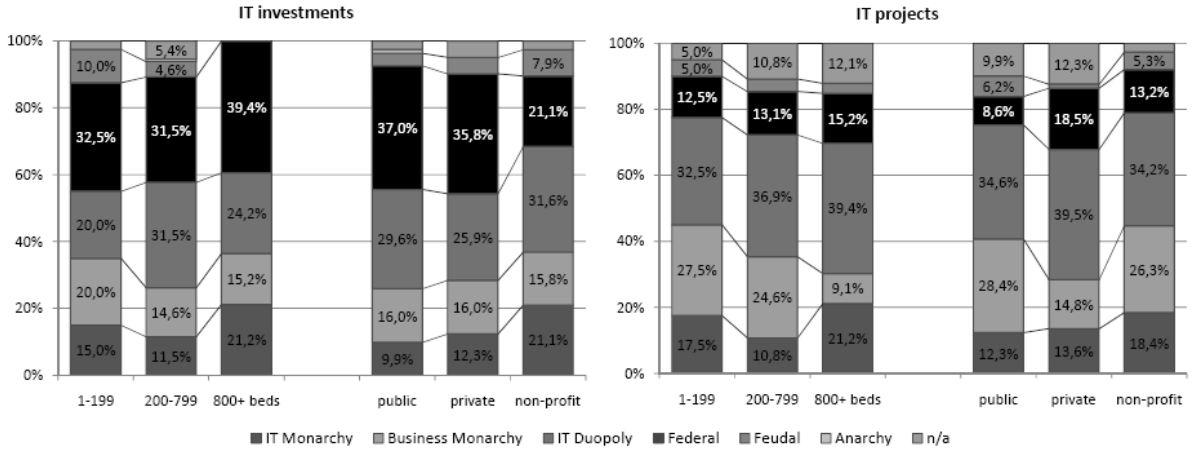


Figure 3. Decision areas (Source: sample data)

Next we analyzed the decision domain *IT Applications*. In this decision domain, the archetypes are distributed very differently. IT Monarchy plays an unimportant role. The most mentioned archetype is federal. The fraction is growing with the hospital size (42.5% in small, 58.5% in medium and 63.6% in big hospitals). This result shows that the clinical departments which use IT applications are mostly involved in decisions about these applications. In private hospitals we identified a fraction of 18.4% and in public hospitals a fraction of 16% in which decisions on IT applications are made according to a Business Monarchy archetype that means without the involvement of It decision makers and departments. The low fraction of the federal archetype at private hospitals is derived from the high share of 34.2% small private hospitals (see Table 6). In addition, the share of IT Monarchy at private hospital is much higher than in the other hospitals. One explanation might be that IT managers in private hospitals site themselves near to medical and operating departments so they get more trust in selecting the best application for the requirement of their internal customers. The decision domain *IT Infrastructure* is dominated by the IT Monarchy archetype. The second important archetype is IT Duopoly. The federal archetype plays only a role in small hospitals (22.5%). The distribution of archetypes is highly similar across all sponsorship types. More than 50% of the decisions are made within IT Monarchy. These results demonstrate that IT infrastructure issues as well as IT standards are highly specified decisions of IT specialists. Our descriptive analysis on the *IT Investments* decision domain reveals a small fraction of IT Monarchy (17.5% at small, 10.8% at medium and 21.2% at big hospitals). The fraction of IT Monarchy is even lower than Business Monarchy in small and medium hospitals. Only in big hospitals the fraction of Business Monarchy is half as small (9.1%) as for IT Monarchy.

Remarkable is the relatively high fraction of the answer item “not applicable”, especially in medium (10.8%) and big (12.1%) as well as non-profit (9.9%) and public (12.3%) hospitals. This indicates that this IT decision domain does not exist in the mentioned hospitals. The results disclose that in most hospitals the retrospective analysis of IT investments and decisions on how much and where to invest in IT is made at CxO level. While the fraction of the federal archetype in the decision domain *IT Project*s is very high in all hospitals, the lowest fraction is in private hospitals (21.1%). The fraction of IT Monarchy is relatively high in big (21.2%) as well as private (21.1%) hospitals. This is surprising because private hospitals mostly comprise small hospitals in our data sample. Again, the results show that IT managers in private hospitals position themselves closely to medical and operating departments because they hold a higher autonomy of decision on IT projects than IT managers from public and non-profit hospitals. In addition, the analysis discloses that in private hospitals decisions on IT projects are made more often on CxO level (IT Monarchy, Business Monarchy or IT Duopoly) than in hospitals with different types of sponsorship.

5 DISCUSSION

Based on different objectives and circumstances between small and big as well as between private and non-private (public and non-profit) hospitals, we analyzed the IT governance approaches between hospital sizes and sponsorships. Overall, we concentrated our analyses on three topics: IT budget, IT decision-making authority and IT decision domains.

Although, the partitioning of the IT budget differs between hospital size and sponsorship, these differences are not statistical significant. But we identified a significant correlation between decision making authority and the fraction of IT projects on the overall IT budget. We assume that IT managers invest mainly in IT projects. In other words, the more decision making authority on IT budget, the more IT improvement through innovative IT project deliverables can be expected. With the help of t-tests we proved statistical significant differences between big and medium as well as small hospitals. But these significant differences only exist among private and non-private (public and non-profit) sponsorships.

The following discussion considers the IT governance approaches across hospital size and sponsorship with respect to the identified differences in objectives. Private hospitals focus on revenue increasing and optimizing return on investment more often than other hospitals. Our study revealed that IT managers from private hospitals try to support these objectives with a higher fraction of IT projects on the overall IT budget. Overall, they have more decision making authority than IT managers from public and non-profit hospitals. The analyses of the decision domains disclosed that IT Governance structures in private hospitals are affected by higher self-determination and better control methods. In private hospitals the fraction of IT Monarchy in IT strategy development is much higher than other sponsorship types. In addition, the relative high fraction of IT Monarchy on IT application and IT project decisions suggests that IT managers in private hospitals have a better understanding of their internal client requirements. The higher degree of self-determination also hypothesizes higher trust of medical and business directors in IT managers. In addition, 7.9% of private hospitals follow a feudal decision approach for IT projects which suggests that those hospitals have totally decentralized IT structures. Finally, almost every private hospital has implemented a process for IT investment assessment in contrast to only 87.7% of public and 90.1% of non-profit hospitals. These processes ensure to prioritize optimal investments and to learn from prior investment decisions.

The second stream of analyses focused on considerations in previously introduced areas across hospital size. The results lead to the assumption that big hospitals are more often confronted with new allocation of tasks between medical and non-medical staff than smaller hospitals, which results in requirements IT flexibility requirements of IT as well as profound understanding of medical and treatment processes by IT managers. In addition, cooperation and merger activities play a greater role in big compared to smaller hospitals. The fraction of IT projects in the total IT budget in big hospitals is slightly higher than in the other hospitals. While in small hospitals only 5% of the IT managers have decision authority on the whole IT budget, more than 30% of the IT managers in big hospitals are allowed to decide totally independent. The decision domain IT strategy is dominated by the federal archetype in big hospitals with almost 50% compared to 25% in small hospitals which signals an increasing degree of decentralization with growing hospital size. In contrast, IT standards and IT infrastructure are governed more centrally in big hospitals compared to small ones. Considering the partition of the IT budget we assume that big hospitals achieve organizational economies of scale through centralized IT standard and IT infrastructure decisions. Big hospitals follow a federal approach for IT projects and IT applications which is hypothesized to be helpful for a fast IT alignment with new allocation of tasks.

6 LIMITATIONS AND FURTHER RESEARCH

This study is not without its limitations. First, the study is limited by its data collection process and data set structure. The collected data represents a snap shot of reality and therefore conclusions on dynamics and timely progression are not derivable. In the future, multiple and frequent data collection

processes could lead to interesting findings over time. The data set structure is not representative along sponsorship and size segmentation. Second, the study only considers the perspective of chief information officers and IT managers in German hospitals which might generate a bias on question items. Third, additional qualitative data collection might create a coherent and in depth understanding of presented primary findings. In combination with planned further profound statistical analysis, the researchers try to generate and test structural equation models to expose cause and affect chains in IT Governance of German hospitals and to identify the role of contingency factors in choosing the optimal IT Governance archetype.

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