

ORIGINAL ARTICLE

Finance-oriented vs. operations-oriented management control in public hospitals

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Abstract

The purpose of this paper is to investigate the impact of finance-oriented vs. operations-oriented management control in public hospitals on physicians' role conflict and cost consciousness as well as on perceived organizational performance. First, we conduct a participatory research project, and identify two public university hospitals with clearly differing management control environments: one finance-oriented, the other operations-oriented. Then we collect quantitative data from 211 physicians employed in these hospitals, and analyze it using regression analyses and structural equation modeling. Our empirical results indicate that a finance-oriented control environment is preferable to an operations-oriented control environment with respect to cost consciousness, but with respect to role conflict the reverse is true. Regarding the perceived organizational performance, our findings indicate that an operations-oriented control environment is more advantageous than a finance-oriented control environment. The main implication of our study is that management control issues in public hospitals are important, risky, and therefore merit dedicated managerial support. To enable effective coordination without unnecessarily creating conflicts, top management has to find an appropriate balance not only between professional autonomy and monitoring requirements, or between trust and control, but also between financial and operational performance measures.

Key words

Management control, Public hospitals, Professionals, Role conflict, Cost consciousness

1 Introduction

The question of whether management control can be adequately applied to professionals in general and to physicians in particular has received considerable attention in the literature. However, the research to date is inconclusive. Several conceptual and qualitative empirical studies suggest that the imposition of management control mechanisms on medical professionals is not only futile, but that it may even give rise to conflict and dysfunctional behaviour^[1]. But other studies indicate that physicians may well be able and willing to accept management control mechanisms and work effectively and efficiently under such conditions^[2]. Quantitative research has similarly been unable to satisfactorily answer this research question. Several studies have investigated the adequacy of management control in large hospitals, taking into account important aspects such as managerial orientation, professional orientation, cost consciousness, role conflict, and subunit performance^[3-5]. However, this research stream is still rather sparse, and does not consider sufficiently the heterogeneity of existing management control tools.

Our paper builds on and extends this latter stream of quantitative research by investigating the impact of two different management control environments in public hospitals – finance-oriented vs. operations-oriented – on role conflict, cost consciousness and perceived organizational performance. For this purpose, we have conducted a participatory and quantitative empirical investigation in two university hospitals, which we consider to be archetypal examples of public hospitals with a finance-oriented and an operations-oriented management control environment.

2 Theory

2.1 Finance-oriented vs. operational-oriented management control

Management control represents a set of administrative tools implemented in organizations in order to monitor and regulate the activities of its members and thereby control organizational output and performance. Traditionally management control consists of observing employee behavior, as well as work output and employs formal control mechanisms, such as hierarchical structures and rules^[6]. As organizations grow, direct observation of employees' efforts becomes too costly. Therefore, in large organizations control has to happen through the design of appropriate, less intrusive, more complex management control tools, such as accounting information systems or performance management systems. Such sophisticated management control instruments have proved to be useful tools in helping managers leverage their attention and liberate them from decisions that can be delegated^[7].

Traditionally, most measures used in management control systems have been accounting-based and financial in nature^[8]. Many scholars have suggested, however, that this emphasis on financial measures distracts from essential non-financial factors such as customer satisfaction, product quality, *etc.*, and that non-financial measures are better predictors of long-run performance^[9]. Accordingly, an adequate management control system should include a comprehensive set of performance aspects consisting of both financial and non-financial metrics^[10]. Although empirical evidence for the benefits of non-financial information in management control is mixed^[11], the inclusion of non-financial measures has become an essential characteristic of current management control systems, to the point of becoming the main criterion in distinguishing different systems^[12]. Therefore, depending on the balance between financial and non-financial measures, a management control system may be characterized as finance-oriented or operations-oriented. Finance-oriented control systems are primarily based on financial accounting data, such as costs, earnings or profitability. In contrast, operations-oriented control systems are primarily based on non-financial data that focus on operational output and quality, for example service volume, employee turnover, or customer complaints.

2.2 Management control in public hospitals

The literature has long questioned whether management control mechanisms may be effectively applied to physicians. Many authors have concluded that the implementation of management control systems in professional service organizations such as public hospitals is inadequate, costly, and dysfunctional^[5]. Important reasons behind this are the traditional role perception and work orientation of medical professionals, which are seen as antithetical to those that are prominent in traditional hierarchical bureaucracies^[13]. Consequently, inserting physicians into public hospitals and confronting them with management control mechanisms often results in opposition and conflict. Instead, public hospitals can resort to professional control – a fairly informal control mode based on collegial relationships among a community of peers, social and self-control processes that are compatible with the autonomy needs of professionals, and long periods of professional socialization – to instill the values, norms and standards of the profession^[13, 14]. In principle, this professional socialization should lead to congruence between professional, organizational and individual goals, thereby rendering external control of physicians' behaviour unnecessary.

In reality, professional control alone is scarcely observed in public hospitals. One reason for this is the potential for conflict between organizational goals and professional values. Professional control “has its roots outside the organi-

zation”^[15] as it relies on values, norms and standards imposed by the professional community. Indeed, the above-mentioned arguments in favour of professional control rely on the notion of convergence of professional values and organizational goals, which is questionable in this context. Organizational goals are more volatile than professional values, changing more frequently in response to the fast-paced economic and political environment. Furthermore, many of these arguments are based on research conducted in public sector settings in the first half of the 1990s and earlier. The applicability of these arguments to professionals in private sectors and in the increasingly “corporatized” public sectors of the 21st century^[16] is therefore rather doubtful.

Overall, the notion of potential conflict between professional and management control cannot be discarded. This conflict, however, should be regarded as one of degree rather than as an absolute^[13]. Social and self-controls may be adequate in many instances, but the additional implementation of management control tools is evidently useful in fostering organization-wide consistency and alignment with strategic initiatives, and in reminding the professional workforce that it works for an organization^[17].

2.3 Management control and role conflict

According to role theory, an individual experiences role conflict when he is forced to take on (at least) two different and incompatible roles at the same time, that is, when he is exposed to (at least) two sources of pressure such that compliance with one will make compliance with the other difficult or impossible. In a job-related context, role conflicts tend to increase an individual’s anxiety, tension and frustration and often lead to discouragement, dissatisfaction, reduced efficiency and poor overall performance^[18]. Such role conflict may arise when medical professionals are incorporated in public hospitals and confronted with management control^[5, 13]. As the acceptance of management control depends on the extent to which employees perceive that the information processed by the control tools is available, relevant and accurate for their decision making^[19], the gravity of this role conflict should differ between operations-oriented and finance-oriented management control.

The financial metrics used in finance-oriented management control systems emanate from economic and commercial principles, which medical professionals are typically not committed to, are unfamiliar with, and in some cases even disapprove of. Furthermore, physicians often lack the necessary financial background to comprehend the information input requested by a finance-oriented management control system and to interpret its information output^[20]. Physicians and business-trained managers possess very different specialized bodies of knowledge and use different professional languages, which may lead to communication problems when financial metrics are discussed. What is more, the relatively weak finance-related linguistic competence of physicians may influence the distribution of power within the organization in favour of business-trained managers at the medical professionals’ expense^[2]. Therefore, physicians should perceive attempts to impose a finance-oriented management control system as a significant threat to their professional autonomy and experience intense role conflict.

In contrast, operations-oriented management control tools based on non-financial, operational performance measures, such as service volume or service quality, capture the essence and immediate results of professional work. These metrics can be attributed to the professional sphere, and are usually linked to values and principles well-known and appreciated by professionals. Furthermore, physicians are relatively familiar with operational performance measures and their influencing factors, and subsequently regard such metrics as being more relevant for their decision-making. Operational performance metrics translate professional activities into quantifiable outcomes, and are thereby capable of bridging the communication gap between management and medical professionals^[21]. Therefore, we suggest:

Hypothesis 1: The role conflict experienced by medical professionals in a finance-oriented control environment is higher than in an operations-oriented control environment.

2.4 Management control and cost consciousness

A function of management control systems is to control costs by providing an insight into an organization's cost structure and identifying critical cost drivers. The prevalence of cost accounting data as input and cost-related performance metrics as output of most management control tools documents the importance of the cost dimension^[8]. Given the pivotal role of cost management in improving organizational performance, increasing the cost consciousness of employees is an important principle behind management control systems.

Abernethy and Vagnoni^[4] demonstrated that the use of management control systems in public hospitals has a positive impact on the cost consciousness of physicians. We suggest that this positive relationship depends on the characteristics of the management control system, and in particular on its balance between financial and non-financial measures. Finance-oriented control systems rely primarily on cost and accounting data and produce more cost-related performance metrics, such as staff and treatment costs, return on investment or profitability. In contrast, operations-oriented control systems use basically non-financial data that focus on operational output and quality, for example service volume, employee turnover, or customer complaints^[12]. Consequently, finance-oriented control systems confront medical professionals more intensely with the cost consequences of their decisions and should be better suited to initiate learning processes that enable physicians to manage costs effectively than operations-oriented systems. Therefore we propose:

Hypothesis 2: The cost consciousness of medical professionals in a finance-oriented control environment is higher than in an operations-oriented control environment.

2.5 Management control and organizational performance

The above hypotheses suggest that the management control environment in hospitals has an impact on physicians' cost consciousness and role conflict, that is, on two intermediate organizational goals related to performance. However, the more important question is how management control influences organizational performance itself.

Organizational performance of public hospitals is influenced by a plethora of external (environmental) and internal (structural and process) factors as well as by internal and external stakeholders^[22, 23], one important factor being the individual job performance of the medical professionals^[24, 25]. And the individual job performance of physicians depends, in turn, on many factors, such as the above-mentioned cost consciousness and role conflict, but also on a multitude of motivational factors, too numerous to be discussed individually – much less measured separately – in the present study. These factors include, for instance, income, working hours, workload, work climate, *etc.* As already explained above, the financial metrics used in finance-oriented management control systems reflect commercial principles, which medical professionals are typically not committed to and in some cases even disapprove of, and which may be perceived as a threat to physicians' professional autonomy. Operations-oriented management control tools, in contrast, use non-financial metrics, which capture the essence of professional work and which are usually linked to values accepted and appreciated by medical professionals. Therefore, in a public hospital many of the above-mentioned motivational factors are likely to be more adversely affected by a finance-oriented control environment than by an operations-oriented control environment. In the present empirical study, these indirect effects are not measured separately but captured collectively as a quasi-direct effect of the management control environment on organizational performance. We therefore propose:

Hypothesis 3: A finance-oriented control environment has a stronger negative impact on organizational performance than an operations-oriented control environment.

3 Methodology

The study herein is the result of a two-stage empirical research project conducted in 2007 and 2008 in two large public university hospitals. The first stage followed a participatory research approach, while the second stage built on its results and collected quantitative data in order to test the hypotheses presented in the previous section.

3.1 Stage 1: participatory research

The first stage of research consisted of a third-party funded comparative study of two public university hospitals located in Germany and England. Our research strategy followed a participatory approach closely related to participatory action and learning research, but less focused on changing social reality, and instead on the collaborative production of knowledge^[26-28]. The initial aims of our study were, amongst others, to unearth the differences and similarities in the provision of university hospital services in two major European health systems, to develop a systematic and reliable approach to assessing organizational performance of university hospitals and to identify best practices. For this reason two public university hospitals of similar size were selected. Hospital G was located in Germany, employed approximately 700 physicians and offered approximately 1,300 beds, whereas Hospital E was located in England, employed approximately 800 physicians and offered approximately 1,100 beds.

The participatory, comparative study took place in 2007 and the first half of 2008. It included the collection of standard reports data, which were compared and analyzed, and then presented to key senior management personnel at each hospital for in-depth analysis. The range of methods to be used in participatory research is very broad and includes qualitative interviews, focus groups, questionnaires, blogs, diaries, *etc.* In the present study, we employed semi-structured interviews, focus groups, and numerous informal discussions with university researchers, members of the boards of directors of both hospitals, medical and nursing professionals, managers and administrators, and other important stakeholders. According to the principles of participatory research, we did not plan the research process in detail, and, above all, we did not formulate hypotheses in advance, but instead allowed the research questions to emerge gradually during the discussions^[28].

The numerous conversations and discussions highlighted significant differences between the two university hospitals, for instance with regard to board and governance structures, but also interesting similarities, for instance with regard to organizational structure and many performance indicators. It also showed that although the health systems of Germany^[29] and England^[30] in general, and the corresponding public hospital sectors in particular, differ in many aspects, both hospitals investigated were found to face surprisingly similar strategic and environmental conditions. One aspect, however, appeared to be particularly interesting from the point of view of management research: many conversations, discussions and interviews uncovered striking differences regarding the management control environments in the clinical departments of both university hospitals.

In the clinical departments of Hospital E, management control was operationally focused, with emphasis on non-financial measures that capture the results of medical work. The key performance measures used for management control purposes were patient satisfaction, waiting times, length-of-stay, and similar metrics. In contrast, management control in Hospital G was significantly more focused on accounting and financial data. Although it also included several clinical performance indicators, the key metrics used for management control purposes in Hospital G were financial indicators such as departmental profits and costs. Thus, it became clear that the two university hospitals investigated respectively represented archetypal examples of professional service organizations with a finance-oriented and an operations-oriented management control system.

In Hospital E, the strong focus of management control on operational and quality measures was attributed to a change of leadership in 2006, as the following statements indicate:

“I think the new CEO came with this drive to have quality. He talks quality of patient care as his mantra. He says it all the time.” (Operations Manager, Hospital E)

“Now our new Chief Executive, who had actually taken up half way through this process actually, but one of his main priorities were the quality of the patient experience, efficient patient care, getting people through... through the system and out in a timely fashion. (...) the hard finance is not quite at the front of the agenda in a way that it was.” (Service Manager, Hospital E)

These descriptions of the managerial priorities of Hospital E's new CEO by his members of staff illustrate some important characteristics of an operations-oriented management control environment. Instead of focusing on profitability, operations-oriented management control aims primarily at improving non-financial performance measures such as patient satisfaction, quality of care and efficiency. The interviews, conversations and discussions we conducted in Hospital E showed that the preferential use of such non-financial metrics for management control purposes was broadly supported and appreciated not only by medical and nursing professionals but also by managers and administrators. Overall, we found numerous convincing indications that Hospital E's management control environment should be characterized as operations-oriented.

In Hospital G, however, the management control environment was considerably less affected by operational metrics and much more focused on financial measures. Managers as well as physicians and nurses used almost exclusively financial measures such as profitability and turnover for management control purposes. Physicians, in particular, were well aware of the financial consequences of their treatment decisions and intensely preoccupied with costs and revenues, as the following statements show:

"(...) the average inpatient time would probably be four nights. Which is very close to the minimum inpatient time before you get financial deductions." (Physician, Hospital G,)

"I earn less if I discharge the patient earlier." (Physician, Hospital G)

Our interviews and discussions suggested that this striking focus on financial aspects had a remarkable impact on physicians' behaviour and decision-making, which generally depended on both clinical and financial considerations. The relative weighting of clinical and financial arguments in physicians' decision-making remained unclear. However, the following statements of clinicians working in Hospital G revealed enormous pressures to achieve financial goals, and illustrated how economic issues may have a disproportionate impact on medical decision-making in a finance-oriented management control environment:

"If a patient stays in hospital for less than three days, payment for the inpatient episode can be denied. And this is what we deliberately try to avoid [...] In effect, you usually try to accommodate for the patients' wishes, however we try not to keep patients in for less than 4 days to avoid the litigation claims from the insurances." (Physician, Hospital G)

"The management is purely economical. We have a display, which all the registrars on the wards can see. The days when patients should not be discharged are shown in red." (Physician, Hospital G)

By contrast, in the operational-oriented management control environment of Hospital E the impact of financial arguments on clinical decision-making seemed to be clearly lower. Although the interviews and discussions revealed that medical and nursing professionals were definitely conscious of the importance of achieving economic goals, they were less aware of the financial consequences of their diagnosis and treatment decisions than their counterparts in the finance-oriented management control environment of Hospital G. Overall, physicians and nurses in Hospital E were less geared towards financial performance measures, more focused on operational, clinical goals, and felt much more detached from financial performance responsibility, as the following statements suggest:

"And so your benefits come out of reducing length of stay, getting more people in beds, but also about quality and better clinical outcomes. (...)" (Service Manager, Hospital E)

"Well I think that... (...) although the financial argument remains crucial... that just the feeling that one has from the senior management who may have had doubts, has been more sympathetic to the clinical aspects." (Consultant, Hospital E)

The detection of an operational-oriented management control environment in Hospital E and a finance-oriented management control environment in Hospital G was the most striking result of our participatory research project.

Therefore, we decided to complement the participatory research with a consecutive quantitative study, which investigated the impact of these two different management control environments on physicians' cost consciousness, role conflict, and perceived organizational performance.

3.2 Stage 2: quantitative research

In the second stage of research we analyzed quantitative data collected in 2008 using an online questionnaire that was made available to all clinicians employed in the two above-mentioned public university hospitals. The specific item indicators, questions, and scales for all our variables are contained in Table 1.

Table 1. Measurement scales

Variable and items	Question	Scale
Organizational commitment:		
-Maintaining or increasing the efficiency of my unit is important to me.		strongly
-It is more important for me to promote and develop the loyalty of members of my unit to the hospital, rather than only to their own jobs.	To what extent do you agree to the following statements?	disagree (1) -
-It is important to increase or maintain the prestige or image of the hospital.		strongly agree (7)
Professional orientation:		
-It is important to me that I am able to publish the results of my work in professional journals.		strongly
-Being able to do the kind of research that will contribute to the standing of my profession is very important to me.	To what extent do you agree to the following statements?	disagree (1) -
-It is important to me that I am able to pursue and carry out my own research ideas.		strongly agree (7)
Role conflict:		
-I have to do things that should be done differently.		very little (1)
-I do things that are apt to be accepted by one person but not accepted by others.	To what extent do the following conditions exist in your daily work?	- a great deal
-I have to break a rule or policy in order to carry out an assignment.		(7)
-I work on unnecessary things.		
Cost consciousness:		
-I put a lot of effort into reducing costs.		strongly
-When I decide to use medical supplies, drugs or medical equipment I focus heavily on how much it costs.	To what extent do you agree to the following statements?	disagree (1) -
-I am very confident of my ability to manage costs.		strongly agree (7)
Organizational performance:		
-costs	How would you rate your department's performance on the following dimensions compared to other departments?	below
-medical professional teaching		average (1) -
-research		above
-quality of care		average (7)

The key variable of the present study – the management control environment – stemmed from the first stage of research described above. In the statistical analyses, it was represented by a dummy variable (0 = operations-oriented control environment in Hospital E; 1 = finance-oriented control environment in Hospital G).

Role conflict was measured similar to Abernethy and Stoelwinder^[13] asking, for instance, whether the participants worked on unnecessary things or had to break rules in order to carry out assignments in their daily work. To measure cost consciousness, we adapted the instrument used by Abernethy and Vagnoni^[4] and focused on efforts to reduce costs, the ability to manage costs, and influence of costs on decision-making. The variables were calculated as the mean scores of the corresponding items. Cronbach's Alpha values for role conflict of .79 and for cost consciousness of .84 provide support for the use of our measurement instruments.

Our organizational performance measure is not based on objective data, but on subjective assessments of performance by the participating physicians. Thus, it does not capture actual performance, but perceived performance. To improve the validity of our measure, we asked for departmental performance, as we assume that the participants can assess the performance of their own organizational unit more reliably than the performance of the whole hospital. We measured perceived organizational performance similar to Abernethy and Lillis^[21] by asking the participating physicians to rate their departments' performance compared to other departments on four dimensions: costs, teaching, research, and quality of care. In contrast to Abernethy and Lillis^[21], exploratory factor analysis revealed that our items do not load on clearly defined factors: extracting one (two) factors would result in an explained variance of only 44.8% (69.9%), and Cronbach's Alpha is only .51. Consequently, we refrained from defining multi-item performance measures, and instead evaluate each performance dimension separately.

We controlled for a number of factors that we assumed to be particularly relevant in the context of the present study. An important control variable should be the extent to which professionals maintain a high professional orientation once employed by an organization. An individual with a pronounced professional orientation is one who primarily identifies with his profession, is committed to maintaining and increasing the power and prestige of the profession, develops his specialist expertise, and looks to professional colleagues for support and censure^[3]. Our measurement instrument for professional orientation is based on Abernethy and Stoelwinder^[13] and asks for the importance of publishing in professional journals, pursuing own research ideas, and contributing to the standing of the profession. Cronbach's Alpha of .89 provides support for the use of this measurement instrument.

Another important control variable should be the extent to which professionals internalize managerial values and norms, that is, professionals' organizational commitment, which has also been termed "system goal orientation"^[5] or "managerial orientation"^[25]. Professionals with a pronounced organizational commitment are characterized by a positive attitude towards business and management issues, and interest in improving both the economic performance of their organization and their finance, management and leadership skills. Our measurement instrument for organizational commitment borrows from Abernethy and Stoelwinder^[13] and focuses on the importance of organizational efficiency, loyalty to the hospital, and prestige of the hospital. Cronbach's Alpha of .73 provides support for the use of this measurement instrument.

A third important control variable is the type of patient care the physicians typically perform. We assume that our dependent variables are influenced by the intensity and directness of the interaction between the physician and the patient^[31]. Thus, we asked the participating physicians for the organizational department they were assigned to and used this answer to code a dummy variable that differentiates between departments characterized by an intensive doctor-patient interaction, such as internal medicine or surgery, and departments characterized by little patient contact, such as radiology or pathology (0 = indirect patient care; 1 = direct patient care).

Finally, the participating physicians were asked in the questionnaire for their gender (male; female) and their hierarchical status in the hospital (clinical director or chief physician; consultant or senior physician; assistant physician). The responses were used to code appropriate dummy variables to include in our analyses.

4 Results

4.1 Response rate and descriptive statistics

Two hundred and eleven questionnaires were completed and returned, 111 from Hospital G and 100 from Hospital E. The response rate was 15.8% in Hospital G, 12.7% in Hospital E, giving an average of 14.1% overall. From our point of view, these very low response rates can be primarily attributed to three factors. First, physician surveys generally achieve response rates that are comparatively low^[32]. Second, online surveys generally achieve response rates that are com-

paratively low, often up to 50% lower than paper-based ones^[33]. And third, we were not allowed by the management of the two public university hospitals to send more than one reminder email to non-respondents in order to minimize the risk of irritation or nuisance among the surveyed physicians. Altogether, these factors resulted in the above-mentioned, disappointing response rates, which certainly represent an important limitation of our study.

Table 2. Descriptive statistics

	N	%	Scale	Mean	SD
Hierarch. status: assistant physician	70	33.2			
Hierarch. status: senior physician/consultant	112	53.1			
Hierarch. status: chief physician/medical director	27	12.9			
Hierarch. status: n.s.	2	.9			
Gender: male	132	62.6			
Gender: female	75	35.5			
Gender: n.s.	4	1.9			
Type of patient care: direct	137	66.5			
Type of patient care: indirect	69	32.7			
Type of patient care: n.s.	5	2.4			
Organizational commitment	209	99.1	1-7	5.52	1.06
Professional orientation	211	100.0	1-7	5.31	1.54
Role conflict	209	99.1	1-7	4.22	1.51
Cost consciousness	211	100.0	1-7	4.28	1.37
Performance: costs	208	98.6	1-7	4.39	1.42
Performance: teaching	210	99.5	1-7	5.17	1.49
Performance: research	211	100.0	1-7	4.54	1.87
Performance: quality of care	209	99.1	1-7	5.78	.98

To reduce response-order effects, the online survey instrument randomized the order of the items corresponding to the variables. We checked for non-response bias in our sample by assessing whether there were any significant differences in the mean responses with respect to our variables between the late and the early respondents, which was found not to be the case. Table 2 provides some descriptive statistics, and shows that all three hierarchical levels, both genders, and both patient care categories are adequately represented.

4.2 Regression results

To test our hypotheses, we conducted multiple linear regression analyses with role conflict (model 1), cost consciousness (model 2) and the four performance indicators (models 3 to 6) as dependent variables, and management control environment as independent variable. In all models, we included professional orientation, organizational commitment, hierarchical status, gender, and type of patient care as control variables. In regression models 3 to 6, we also included role conflict and cost consciousness as control variables. The results are shown in Table 3 and 4.

According to Hypothesis 1, the role conflict experienced by professionals in a finance-oriented control environment is higher than in an operations-oriented control environment. As the (standardized) regression coefficient for management control in regression model 1 takes a value of .29 and is significant, Hypothesis 1 is supported.

In Hypothesis 2 we claim that the cost consciousness of professionals in a finance-oriented control environment is higher than in an operations-oriented control environment. As regression model 2 leads to a significant coefficient of .56 for management control, Hypothesis 2 is also supported.

Table 3. Regression analyses - role conflict and cost consciousness

	Model 1: Role conflict	Model 2: Cost consciousness
Control variables:		
- Hierarchical status: consultant	-.10	.26**
- Hierarchical status: medical director	.03	.16 [‡]
- Gender: female	-.08	-.03
- Type of patient care: direct	.19**	.01
- Organizational commitment	-.02	.17*
- Professional orientation	.07	.05
- Cost consciousness		
- Role Conflict		
Main effect:		
- Management control environment	.29**	.56***
df	198	199
F	5.16***	8.48***
R ²	.16	.24
R ² (adjusted)	.13	.21

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; [‡] $p < .1$; Standardized coefficients reported

Table 4. Regression analyses – performance

	Model 3: Costs	Model 4: Teaching	Model 5: Research	Model 6: Quality of care
Control variables:				
- Hierarch. status: consultant	-.12	-.02	.10	.22*
- Hierarch. status: medical director	-.03	.07	-.03	.14
- Gender: female	-.04	.05	.03	-.04
- Type of patient care: direct	-.07	-.03	.07	.05
- Organizational commitment	.06	.29***	.08	.19**
- Professional orientation	.13 [‡]	.13 [‡]	.30***	.04
- Cost consciousness	.21**	.02	-.09	.04
- Role Conflict	.06	-.08	-.03	-.21**
Main effect:				
- Mgt. control environment	-.29**	-.13	-.18 [‡]	.02
df	196	197	198	197
F	2.21*	4.44***	5.79***	4.10***
R ²	.10	.18	.22	.16
R ² (adjusted)	.05	.14	.18	.12

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; [‡] $p < .1$; Standardized coefficients reported

Hypothesis 3 suggests that a finance-oriented control environment has a stronger negative impact on perceived organizational performance than an operations-oriented control environment. The coefficients for management control in regression models 3 to 6 needed to be negative and statistically significant for this hypothesis to hold. Regression models 3 and 5 comply with these requirements, whereas regression models 4 and 6 lead to insignificant coefficients. Therefore, our regression analyses support hypothesis 3 with respect to perceived cost and research performance, but not with respect to perceived performance in terms of teaching and quality of care.

4.3 Structural equation modeling results

To confirm the results of the regression analyses, we used structural equations techniques. Structural equation modeling gives a comprehensive simultaneous picture of a set of hypothesized relationships and is particularly appropriate to

analyze indirect relationships between variables. However, the methodology is quite sensitive and therefore model parsimoniousness is important. We therefore focused on those variables explicitly investigated in the stream of quantitative research, which forms the theoretical core of our study^[3-5, 13], that is, managerial orientation, professional orientation, cost consciousness, role conflict, and subunit performance. The control variables type of patient care, gender and hierarchical status, which only play a minor role in this literature stream were not incorporated in the structural equation models. We employed the software package AMOS to estimate the standardized path coefficients, the associated standard errors, the significance, and the model fit. Since we used four different performance measures, we constructed four different models. Table 5 shows the results for the models 7 to 10. The measures usually employed to test the fit of structural equation models – the Normed Fit Index (NFI), the Non-normed Fit Index (NNFI), the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) - indicate that the modified model fits the data very well.

Table 5. Structural equation models

	Model 7: Costs	Model 8: Teaching	Model 9: Research	Model 10: Quality of care
Main effects:				
- Mgt. control - Performance	-.24**	-.129	-.22*	-.07
- Mgt. control - Cost consciousness	.46***	.46***	.46***	.46***
- Mgt. control - Role Conflict	.38***	.38***	.38***	.38***
Ancillary effects:				
- Cost consciousness - Performance	.20*	.04	-.09	-.03
- Role conflict - Performance	.03	-.10	-.03	-.23**
- Org. commitment - Performance	.09	.25**	.01	.30**
- Profess. orientation - Performance	.09	.15 [‡]	.35***	.04
- Org. commitment - Cost consciousness	.35***	.35***	.35***	.35***
- Profess. orientation - Role Conflict	.19*	.19*	.20*	.19*
NFI	.91	.90	.91	.89
NNFI	.98	.97	.98	.95
CFI	.98	.98	.99	.96
RMSEA	.03	.04	.03	.05

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; [‡] $p < .1$; Standardized coefficients reported; N = 188

Overall, the results of the structural equations models are in line with the results of our multiple regression analyses in the previous sections. Hypothesis 1, which suggests that the cost consciousness of medical professionals in a finance-oriented control environment is higher than in an operations-oriented control environment, and hypothesis 2, which assumes that the cost consciousness of medical professionals in a finance-oriented control environment is higher than in an operations-oriented control environment, are supported. Furthermore, we find support for hypothesis 3, which implies that a finance-oriented control environment has a more pronounced negative effect on perceived performance than operations-oriented control. This hypothesis is supported with respect to perceived cost and research performance, but not with respect to perceived performance in terms of teaching and quality of care.

5 Discussion

The objective of this paper was to investigate the impact of finance-oriented vs. operations-oriented management control in public hospitals on physicians' role conflict and cost consciousness as well as on perceived organizational performance. Our empirical results indicate that a finance-oriented control environment is preferable to an operations-oriented control environment with respect to cost consciousness, but with respect to role conflict the reverse is true. Regarding the perceived organizational performance, our findings indicate that an operations-oriented control environment is more advantageous than a finance-oriented control environment. The implications of these findings will be discussed in the following.

First, our paper draws attention to instruments and concepts from the financial sphere, which have been intensely investigated in other sectors – most prominently in manufacturing firms – but whose effect in public hospitals is less understood. In spite of the fundamental importance of coordination issues in public hospitals and the associated requirement for control, these topics have not received adequate attention to date. The present paper is an attempt to fill this gap. Since professional service organizations such as public hospitals are “substantially different from (...) traditional manufacturing firms”^[34], the temptation to simply transfer evidence from other sectors to public hospitals should be resisted. Indeed, it is quite conceivable that the distinction between finance-oriented and operations-oriented control, which is fundamental to the present study, is much less important in a manufacturing environment.

Second, our paper is one of few quantitative empirical studies explicitly testing the effects of management control on performance in a public hospital context, and the first that considers performance factors at the level of the individual professional – in terms of role conflict and cost consciousness – and at the level of the organization units – in terms of perceived organizational performance. While our empirical results differ across performance indicators, our findings support several of our predictions, and indicate that the management control environment in public hospitals has indeed a significant impact on performance. Therefore, our study suggests that management control in general and the decision to implement a more finance-oriented or a more operations-oriented control environment matter in public hospitals. As such, management control systems merit dedicated managerial support. Developing an effective management control system that uses and produces adequate performance metrics for a professional workforce presents an important challenge for any public hospital. Public hospitals are likely to benefit from a management control environment that stimulates effective and efficient professional behavior.

Third, our empirical results illustrate the inherent complexity of the link between the choice of management control mechanism and the performance of public hospitals. On the one hand, our results indicate that medical professionals demonstrate notably higher cost consciousness in a finance-oriented control environment than in an operations-oriented control environment, thereby supporting the assumption of a positive impact on organizational performance. On the other hand, our findings also indicate a contrary performance effect, along the path of an increased role conflict and consequential performance deterioration. Moreover, our results reveal a stronger negative (quasi-direct) effect of a finance-oriented control environment on perceived organizational performance as compared to an operations-oriented control environment – but only with respect to two out of four performance dimensions. These findings suggest that particular performance dimensions are likely to be more susceptible to the positive or negative implications caused by the choice of management control system than others. As for our study, the impact of the management control environment appears to have a much clearer effect on role conflict and cost consciousness of the physicians than on the subjective perception of organizational performance. But this is not surprising, in view of the many internal and external factors that influence organizational performance.

Fourth, our research suggests that risks involved in implementing certain management control mechanisms must not be underestimated as the resulting consequences are precarious. The top management of public hospitals would be well advised not to take the assumption of a positive performance effect for granted. Rather, for management control mechanisms to result in tangible performance improvements, appropriate tailoring is essential. In particular, the corresponding decision-makers need to be conscious of the fact that the implementation of any management control system is likely to create professional-bureaucratic conflict. But they also have to consider that the extent of this conflict depends on the special characteristics of the selected management control environment. Our empirical results indicate that a finance-oriented control environment is preferable to an operations-oriented control environment with respect to cost consciousness, but with respect to role conflict the reverse is true. Regarding the perceived organizational performance, our findings indicate that an operations-oriented control environment is more advantageous than a finance-oriented control environment. Interestingly and confusingly, this relative advantage of operations-oriented control systems also applies to cost as the only financial performance dimension included in our study.

However, this apparent contradiction resolves if we consider that the outcomes of public hospitals are strongly dependent on the willingness and motivation of the physicians to perform well on the job, which in turn depend on the compatibility of the relevant professional norms and values with organizational work conditions. Therefore, encouraging medical professionals to develop a pronounced organizational commitment at the expense of their commitment to professional norms and values is not a promising strategy for public hospitals^[5]. The increased cost consciousness resulting from a finance-oriented control environment may very well be offset or even overcompensated by the concomitant adverse motivational consequences. To enable effective coordination without creating unnecessary conflicts, top management needs to match the management control system to the specific requirements of the hospital, that is, it has to find an appropriate balance not only between professional autonomy and monitoring requirements, or between trust and control, but also between financial and operational performance measures.

Last but not least, our analyses indicate that the performance of public hospitals is heavily influenced by the professional orientation and the organizational commitment of their physicians. With respect to professional orientation we found a clear positive impact on role conflict, but also indications of a positive effect on perceived organizational performance in terms of research and teaching. These results confirm the ambivalent role of professional orientation in bureaucratic contexts: it causes conflicts, but it is still essential in order to achieve key organizational goals. Hence, the top management of public hospitals should refrain from – or at least be very careful when – adopting measures that aim at reducing the commitment to professional norms and values of their physicians.

Limitations

Finally, we would like to mention that this paper contains obvious limitations that should be recognized. The most important limitation is certainly the fact that the present paper builds on the actual existence of different management control environments in the two investigated university hospitals, which is the result of participatory research and therefore quite vulnerable to formal criticism. Participatory research is typically accountable – and has to demonstrate its quality and utility – to protagonists as different as public administrators, politicians, managers, and, of course, academics. For many of these protagonists the traditional scientific quality criteria are of only secondary importance, as they rather rely on the justificatory arguments employed in the institutional or contextual discourses in question. Consequently, research projects following this emergent research approach generally lack academic recognition^[28].

Furthermore, we investigate the management control environments of only two public hospitals, that is, we use “hospital” as a proxy for the management control environment. In spite of our justification of this research approach and the plausibility of our results, we cannot rule out that there are potentially many other factors that might explain why there are differences in our dependent variables, such as governance structures, characteristics of the workforce, *etc.* Furthermore, we have to mention the very low response rates, which obviously limit the explanatory power of our study. These limitations cannot be corrected within the scope of the present study but may serve as suggestions for follow-up studies, which should lead to interesting findings in this largely neglected field of research.

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