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Vanessa Greger

Petra Wolf

Helmut Krcmar

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### Recommended Citation

Greger, Vanessa; Wolf, Petra; and Krcmar, Helmut, "Perception of Benefits Achieved by IT Management Accounting in the Public Sector" (2015). *Wirtschaftsinformatik Proceedings 2015*. 41.  
<http://aisel.aisnet.org/wi2015/41>

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# Perception of Benefits Achieved by IT Management Accounting in the Public Sector

Vanessa Greger, Petra Wolf, and Helmut Krcmar

Fortiss – An-Institut der Technischen Universität München, Munich, Germany  
{greger,wolf,krcmar}@fortiss.org

**Abstract.** Information technology (IT) is of high relevance in public administrations. Thus, a systematic management and control of its usage is required. IT management accounting is an instrument addressing this issue. However, public IT-managers do not perceive its supposed benefits due to the way in which it is currently implemented. This leads to a low usage of IT management accounting in public administrations. To analyze the gap between its supposed and perceived benefits, we reviewed literature and conducted a case study in a German public administration. Our findings show that - out of the various benefits of IT management accounting according to the literature - public IT-managers only focus on transparency and support for decision-making as benefits. The findings contribute to a better understanding of IT management accounting in public administrations and support practitioners by designing IT management accounting according to the potential benefits for departmental and cross-departmental IT-managers.

**Keywords:** IT management accounting, public sector, private sector, benefits.

## 1 Introduction

The relevance of information technology (IT) in the public sector has increased rapidly due to its role as a driving force for modernization [1, 2]. Almost all administrative actions are currently dependent on IT [3]. Since IT has become such an important resource in public administrations, the effective usage of IT is also of increasing relevance [3]. Consequently, IT usage and IT provision need to be managed and controlled in a systematic way. However, the systematic management and control of IT usage and provision are hindered due to missing management accounting information [3]. In consequence, many IT managers within public administrations do still not have a clear overview of IT costs or the detailed IT usage and IT provision. Thus, the systematic management and control of the IT usage and IT provision is hardly possible [3] and hence, a major issue for public IT managers.

IT management accounting, amongst others, addresses the described issue. It aims at providing and analyzing key performance indicators (KPIs) on IT performance and IT costs in order to support the management and control of the IT usage. Further, it supports the collection and reporting of information about the efficiency, effectivity and quality of IT services to the IT management [4]. It is a set of instruments to plan,

coordinate, monitor and control the IT usage as well as the IT provision [5]. As a result, IT managers can make informed decisions based on objective KPIs. For an overview of IT management accounting concepts, we refer for example to Kütz [6] or Gadatsch [7].

In the private sector, IT management accounting has been used as an instrument for decision-making for a long time [8]: IT managers link their IT objectives to KPIs so that they can monitor and control the degree of target achievement. Therefore, they mostly use a balanced scorecard (BSC) [9]. Besides, they plan the IT provision and IT usage based on information provided by IT management accounting [5].

In contrast, public administrations are still facing big challenges with management accounting and especially the management accounting of IT [3, 10]. IT management accounting concepts transferred from the private sector, like the BSC, do not achieve the expected benefits. As a consequence, public IT managers use IT management accounting information more rarely than one would expect. Obviously, there are some major differences between the public and private sector with respect to IT management accounting [11]. For example, the private sector aims at maximizing value and profit due to competitive pressure. IT management accounting supports the alignment to these objectives. In contrast, public administrations need to pursue political objectives, observe laws and regulations and act in accordance with economic objectives [3]. As this example shows, the differences most likely result in a different usage of IT management accounting and in different potential benefits of its application. Thus, we need to further explore the differences regarding IT management accounting. Reviewing the existing literature, we noticed a lack of research regarding the analysis of benefits which public IT managers can gain from IT management accounting. Hence, as a starting point for the improvement of its usage in the public sector, we aim at analyzing its benefits and identifying the factors influencing IT management accounting. For this purpose, the paper is guided by the following research questions: Which benefits regarding IT management accounting do public IT managers perceive? To what extent do these perceived benefits differ from those of the private sector? Which aspects influence this perception of benefits?

The remainder of this paper is structured as follows: In chapter 2, we illustrate the characteristics of public administrations in Germany and present IT management accounting benefits identified in literature. Chapter 3 describes the methodology and presents the findings of the case study conducted in a German public administration. Chapter 4 compares the findings of literature and practice and discusses them. Finally, we conclude with a summary and further research possibilities in chapter 5.

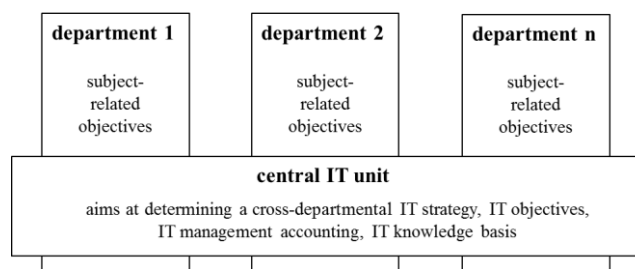
## **2 Related Work**

In order to explain the influencing factors regarding IT management accounting within public administrations, this section describes specific characteristics of public administrations in Germany. Further, it presents IT management accounting benefits identified in the literature.

## 2.1 Comparison of Private and Public Sector

Before comparing the private and public sector in detail, we briefly describe the main principles of public administrations in Germany. The German public administration is determined by two principles [12]: (1) The departmental principle determines that each minister (both on a federal and national level) leads his division in line with political requirements independently and on his own authority (Art. 65 GG). (2) According to the federal principle (Art. 20 Abs. 1 GG), Germany consists of one federal government, 16 federal states and 11,197 municipalities [13]. As a consequence, there is a strong separation of duties between federal government, federal states and municipalities. In addition, a legal principle prohibits mixed administrations. This principle determines that the administrative responsibilities between federal government and federal states are separated (Art. 83 ff. GG). In order to allow for IT collaboration, this prohibition does not apply to collaboration concerning IT (Art. 91 c GG). However, there is no obligation to cooperate in IT matters [14].

Objectives of private companies and public administrations as well as the degree of competitive pressure differ significantly: Profit and value maximization as well as business growth are mostly objectives of private enterprises [3, 14, 15]. In order to achieve competitive advantages, enterprises are often willing to take risks [12, 15]. In contrast, public administrations rarely face competitive pressure [11]. The public sector provides stability and public managers show a higher risk aversion than managers in private companies [11, 15]. Public administrations aim at guaranteeing public welfare [3, 11] as well as at observing laws and policies [12, 15]. Since each department is autonomous due to the departmental principle, it has its own subject-related objectives (figure 1). This is in conflict with the management of common, cross-departmental tasks, like the management of IT provision. Hence, it is difficult to determine a cross-departmental IT strategy with objectives for all departments on a federal or national level [2, 3]. Moreover, the lack of common objectives makes it difficult to implement a strategic, cross-departmental IT management accounting, since KPIs should be derived from an IT strategy [3].



**Fig. 1.** Area of tension within public administrations in Germany (own illustration)

Further differences between the private and public sector are caused by the organizational structures and the decision-making processes [12, 15, 16]. In the private sector, organizational sizes and structures are highly variable. Besides, different authority and autonomy levels exist [12, 15]. Decisions are mostly made hierarchically and

based on economic aspects [11, 12, 17]. In contrast, the public sector has rigid hierarchies and a complex decision-making structure [18]. Decisions are mostly derived based on consensus, as all stakeholders need to be considered [3, 11, 17]. In the context of IT management accounting, this means that requirements and interests of both departmental IT managers and IT managers of a cross-departmental IT unit need to be taken into consideration [3, 5, 19]. In addition, the management of public administrations is generally under political observation and influence [12, 15, 19]. In consequence, public managers are not authorized to make full decisions about e.g. political or financial issues [12, 20]. This political influence complicates the determination of long-term objectives. Moreover, in spite of the accountability towards shareholders, private companies have a higher autarky regarding the allocation of funds than public administrations, since the latter are restricted by fiscal borders [12, 15, 18, 21].

The perspective on IT management accounting is a further characteristic which distinguishes the public from the private sector [11, 22]: Management principles in private companies are based on the generated output [19]. IT management accounting is used to monitor efficiency and effectivity by measuring the ratio between input and output [23]. In contrast, public administrations in Germany usually focus on the input of resources due to the concept of governmental accounting [11, 18]. Thus, since measuring the output in public administrations is rarely possible, IT management accounting information is limited to information about the resources' input.

These characteristics of public administrations and the described legal principles set determining factors which hinder an easy transfer of IT management accounting concepts from the private to the public sector.

## 2.2 Benefits of IT Management Accounting

In order to identify benefits of IT management accounting, we relied on a comprehensive literature review which is published in Greger, Wolf and Krcmar [3]. By grouping similar benefits to overall categories, we identified nine different categories (Table 1).

The category *decision-making* summarizes all benefits related to decision-making. According to the large number of benefits, support for decision-making seems to be an important benefit of IT management accounting. In contrast to this category, the increase of employees' motivation is only stated by one reference. Consequently, this benefit seems to be less relevant.

The categories *transparency*, *budget* and *reputation* each summarize two benefits which are mentioned by a large number of references. All benefits of these categories can be useful for both the internal management and the public: On the one hand, internal management gains knowledge about the IT usage and IT costs. Thus, IT managers can coordinate and arrange the IT usage systematically as well as control IT projects [5]. On the other hand, based on IT management accounting data, external stakeholders (e.g. citizens or shareholders) acquire relevant information about e.g. the IT usage, IT costs or the fulfillment of external requirements. Moreover, IT management accounting can help to improve services by monitoring their quality. Better IT services, in turn, are supposed to increase the reputation of an organization.

The benefits regarding *efficiency*, *effectivity* and *accountability* represent unique categories. The number of references highlights the importance of these benefits. The fulfillment of laws, regulations or standards - grouped in the category *compliance* - is also a highly relevant benefit. This benefit is based on the assumption that a legal requirement for IT management accounting exists.

**Table 1.** Benefits of IT management accounting (based on Greger, Wolf and Krcmar [3])

<b>Category</b>	<b>Benefits</b>
<b>Decision-making</b>	<ul style="list-style-type: none"> <li>• support for decision-making [24-35]</li> <li>• ability to identify trends [36]</li> <li>• estimation of effects from task changes on budget [37]</li> <li>• objectification of political decisions by using factual arguments [37]</li> <li>• improvement of management [26, 27, 38]</li> </ul>
<b>Transparency</b>	<ul style="list-style-type: none"> <li>• creation of transparency [2, 29, 31-33, 35, 38-41]</li> <li>• “what gets measured gets done” [38-40, 42]</li> </ul>
<b>Budget</b>	<ul style="list-style-type: none"> <li>• creation of budgetary control [27, 31]</li> <li>• distribution of budget to different IT projects due to objective criteria [37]</li> </ul>
<b>Reputation</b>	<ul style="list-style-type: none"> <li>• fulfillment of requirements / pressure from outside [25, 26, 43-48]</li> <li>• improvement of quality of services [32, 34, 39, 49]</li> </ul>
<b>Efficiency</b>	improvement of efficiency [29, 31, 35, 36, 44, 45, 49, 50]
<b>Effectivity</b>	improvement of effectivity [29, 31, 35, 36, 44, 45, 49]
<b>Accountability</b>	improvement of accountability [25, 28, 30, 33-35, 38, 44, 48, 50-52]
<b>Compliance</b>	fulfillment of laws, regulations or standards [30, 40, 47, 53, 54]
<b>Employees</b>	increase of motivation of employees [39]

### 3 Case Study

#### 3.1 Data Capture

In order to identify the perceived benefits of IT management accounting in practice, we performed an explorative single case study in an administration of a federal state in Germany. We chose this approach, as a case study allows for analyzing a phenomenon and its context in detail [55]. The particular public administration was selected due to its role as a leading state administration concerning IT management accounting in Germany [55]. This state administration implemented a strategic IT management accounting using a BSC from 2006 onwards. Since 2008, IT management accounting is established and KPIs are captured annually. The analyzed state administration has ten departments and one central IT unit. This central IT unit is located in one of the departments and is responsible for the overall, cross-departmental and strategic IT

management accounting. Thus, it coordinates the annual process of data collection in the ministries, collects IT management accounting information provided by the departmental IT managers and analyzes this information. Further, two data centers allocated in one of the departments provide IT for the departments.

We conducted interviews with experts of the particular state administration. For this purpose, we designed a semi-structured interview protocol with questions about benefits, requirements and functions as well as the internal governance and use of a departmental IT management accounting as background information. The interview partners were chosen on the basis of their experience in the field of IT management accounting. All departmental IT managers were heads of divisions and were responsible for IT management accounting in their department. We concentrated on stakeholders located within the public administrations and directly responsible for the provision of IT management accounting information. Due to our focus, we excluded stakeholders like the board of audit or budget members. We conducted 15 interviews (twelve with departmental IT managers, one with IT managers of the central unit and two with IT managers of the data centers). The interviews took place between May 2014 and July 2014. In addition, we analyzed over 180 documents, like protocols, concepts and previous interviews in order to enrich our findings.

### **3.2 Data Analysis**

The interviews were transcribed and presented to the interview partners. This allowed the interview partners to evaluate the transcripts and to give further explanations. Besides, we could evaluate if we understood the perceived benefits correctly. Afterwards, the interviews as well as the documents were coded using a coding scheme derived from the reviewed literature. We allocated the benefits identified during the interviews to the benefits identified in the literature. If we identified a new benefit, we put it into one of the existing categories. The interviews and documents were coded and analyzed independently by two researchers. Rival explanations were resolved in discussions with the authors. By following this approach, we were able to minimize interpretation bias [55].

In order to analyze whether the complexity, i.e. the size of a ministry, or the central respectively decentral perspective influences the perception of the benefits, we classified the benefits according to four categories: central IT unit and small, middle and big departments. We determined the ministry's size by analyzing its number of IT employees. Small-size departments are departments with a number of IT employees smaller than 50. Middle-size departments are defined as departments with a number of IT employees between 51 and 200. Big-size departments are departments with a number of IT employees bigger than 201. Since big-size departments mostly have many subordinate agencies, we assume that they have a more complex decision-making structure than smaller ones. Consequently, IT managers of big-size departments might perceive other benefits regarding IT management accounting than those of small-size departments. Applying this categorization, we had 4 small-size departments (with 4 interviews), 3 middle-size departments (with 3 interviews) and 5 big-size departments (with 7 interviews). According to this classification, the data centers

were classified as big-size departments. Finally, we compared the findings of the case study with those of the literature review.

### 3.3 Findings

Table 2 summarizes the findings of the case study and compares the findings of literature and practice. Ten benefits were found both in literature and in the case study. Six benefits identified in literature have no correspondent benefit in the case study. Further, we identified nine new benefits that were not found in literature, but were mentioned by IT managers during the case study. The newly identified benefits belong either to the category *transparency*, *decision-making* or *budget*. The focus of the perceived benefits lies on the categories *transparency* and *decision-making*. None of the perceived benefits could be allocated to the categories *accountability* or *employees*.

Half of the newly identified benefits can be allocated to the category *transparency*. The creation of transparency was mentioned by almost all interview partners as a benefit. Thereby, transparency is perceived as internal, i.e. within a department, as well as external, i.e. cross-departmental. Beside this, transparency can be used for presenting the IT domain to e.g. politicians or the board of audit. The central IT unit emphasized that “a major benefit is the creation of political KPIs which give an overview of the IT usage in the whole state administration and which can be used by politicians for presenting the IT domain towards the public”. Furthermore, the central IT unit mentioned the exchange of experiences between departmental IT managers as an important benefit. However, none of the departmental IT managers noticed these two aspects as benefits. A consensus between departmental IT managers and IT managers of the central IT unit can be noticed for the benefit of benchmarking subordinate agencies. Since comparable units are a prerequisite for this benefit, only departments with homogeneous subordinate agencies can benefit from a benchmarking. This explains the fact that none of the small-size departments mentioned this benefit.

Benefits of the category *decision-making* were mentioned by a large number of interviewed IT managers. In addition to the support for decision-making in general, public IT managers mainly use IT management accounting as an argumentation aid concerning IT budget or IT staff during budget negotiations. These two benefits are reported by both departmental IT managers and IT managers of the central IT unit. Moreover, two interviewees of small-size departments mentioned that they use IT management accounting not only as an argumentation aid, but also for justifying their IT budget. Furthermore, one IT manager stated that “IT management accounting helps us creating an objective basis for decision-making and hence, improves the decision basis”. Besides, the central IT unit and two departments highlighted the importance of time series, since they support the identification of trends regarding the IT usage. IT managers of one small-size and one middle-size department proposed IT management accounting as helpful for optimizing processes in their departments: According to



**Table 2.** Perceived benefits of IT management accounting (own illustration)

Category	Benefit	Literature	Case Study			
			Department			Central IT unit
			Small	Middle	Big	
<b>Decision-making</b>	Support for decision-making	X	1	2	1	
	Argumentation aid concerning budget and IT staff		3	3	2	X
	Justification aid concerning budget and IT staff		3			
	Improved decision basis		1		1	
	Ability to identify trends (based on time series)	X	1		1	X
	Estimation of effects from task changes on budget	X				
	Objectification of (political) decisions by using factual arguments	X		1		
	Improvement of management	X				
	Optimization of processes based on comparison of subordinate agencies		1	1		
<b>Transparency</b>	Creation of transparency (within the department and cross-departmental)	X	4	2	7	X
	“What gets measured gets done”	X				
	Presentation towards the public, board of audit or politics			1	1	
	Creation of KPIs for politicians					X
	Benchmarking of subordinate agencies			1	1	X
<b>Budget</b>	Exchange of experiences and best practices between departments					X
	Creation of budgetary control	X			1	

(n = 15; small departments = 4; middle departments = 3; big departments (including two data centers) = 7; central IT unit = 1)

Category	Benefit	Literature	Case Study			
			Department			Central IT unit
			Small	Middle	Big	
	Better awareness for budget				1	
	Distribution of budget to different IT projects due to objective criteria	X				
<b>Reputation</b>	Fulfillment of requirements and pressure from outside (e.g. politics)	X			1	
	Improvement of quality of services	X		1		
<b>Efficiency</b>	Improvement of efficiency	X			1	
<b>Effectivity</b>	Improvement of effectivity	X			1	
<b>Accountability</b>	Improvement of accountability	X				
<b>Compliance</b>	Fulfillment of laws, regulations or standards	X		1		
<b>Employees</b>	Increase of motivation of employees	X				

(n = 15; small departments = 4; middle departments = 3; big departments (including two data centers) = 7; central IT unit = 1)

these interviewees, decisions for structuring the department and for allocating accountabilities should be made based on insights gained by IT management accounting. Analyzing and benchmarking subordinate agencies give IT managers the possibility to improve their processes.

Benefits of the category *budget* do not seem to be of high importance for public IT managers. Only one IT manager stated the creation of budgetary control and better awareness for budget as benefits achieved by IT management accounting. The fulfillment of *laws, regulations and standards* is also not considered as a benefit: Only one IT manager mentioned this benefit by stating a Ministerial Council Decision on which IT management accounting in this state administration is based. Moreover, benefits of the category *reputation* are rarely perceived by the interviewees.

Moreover, public IT managers rarely perceived the improvement of *efficiency* and *effectivity* as benefits. Only the IT managers of one big-size department named these two benefits. In contrast, an IT manager of a different department explicitly pointed out that “you should not think that the improvement of efficiency and effectivity is a benefit for us. It is definitely not a benefit”. The improvement of *accountability* and the increase of the motivation of *employees* were also not seen as a benefit in public administrations at all.

## 4 Discussion

We identified five major issues which are discussed in the following: Firstly, the majority of public IT managers reported the creation of transparency as the most important benefit of IT management accounting. Transparency is needed as a basis for managing the IT usage systematically [3]. Public administrations in Germany are characterized by a culture in which the departmental principle often results in information isolation from other departments. Thus, transparency can be seen as a first achievement of a cross-departmental IT management accounting, as it reduces this isolation. Based on the cross-departmental request for an overview of the IT usage and IT provision, processes are shifting towards a more open and transparent culture within public administrations. On the one hand, this transparency helps departmental IT managers to justify the IT usage and IT costs by comparing their department with similar departments. On the other hand, the central IT unit can use transparency to report relevant information about the IT usage of the whole public administration to the chief information officer (CIO). Hence, transparency is the essential benefit of IT management accounting for public administrations, as the IT usage can be managed better based on transparency achieved by IT management accounting. Thus, transparency can serve as a starting point for the improvement of efficiency and effectivity as well as the determination of accountabilities.

Secondly, the improvement of efficiency, effectivity and accountability are among the main benefits of IT management accounting according to the literature (Table 1). However, almost none of the public IT managers reported one of these benefits. This is hardly surprising, since these benefits are useful in the context of value or profit maximization. The public sector has different objectives, e.g. fulfillment of political

objectives or laws [12, 15]. Since the benefits regarding the improvement of efficiency, effectivity and accountability do not contribute to these objectives, they are not perceived as important by public IT managers.

Thirdly, in accordance to the literature (Table 1), public IT managers mostly perceive the support for decision-making as a major benefit. However, they see decision-making differently compared to the private sector: In the private sector, IT management accounting information serves as a basis for decisions. Future decisions are mostly derived from IT management accounting information and based on KPIs [7, 41]. In contrast, public IT managers focus on using IT management accounting information as a justification or argumentation aid for budget or IT staff. Thus, they use IT management accounting information after the decision has been made, so that they can underline and justify past decisions with objective KPIs. This difference can be explained by the fact that IT decisions in public administrations are influenced by political decisions. Further, they need to be compliant with budget or economic criteria. Hence, the justification of a past decision is of high importance.

Fourthly, the perception of these benefits seems to be influenced by the organizational complexity, i.e. the size of a department: Small-size departments with a simple organizational structure estimate the benefit of IT management accounting as marginal. This might be the fact, since IT management accounting creates more additional tasks than benefits for them. They do not need to collect data in a systematic manner due to their easily manageable environment. Besides, they state more often than big-size departments that they use IT management accounting as a justification for budget negotiation. In contrast, middle-size or large-size departments, especially those with homogeneous subordinate agencies, can benefit from IT management accounting in several ways: It is used as an information basis based on which objective decisions can be made. They can benchmark their subordinate agencies or use IT management accounting information to present their IT unit to the public, e.g. politicians or boards of audit. As a result of the complexity of their departments, they need a systematic data collection to create transparency. In sum, the organizational complexity has an influence on the perceived benefits of IT management accounting.

Fifthly, the perceived benefits seem to be influenced by the perspective of an IT manager: Comparing the benefits perceived by the central IT unit with those perceived by departmental IT managers, we rarely found consensus. The central IT unit perceives transparency, the availability of political KPIs, the possibility of benchmarking, the exchange of experiences between departments, the argumentation aid and the identification of trends as benefits of IT management accounting (Table 2). These benefits are not surprising: The central IT unit needs to support the CIO with relevant information about the IT usage. Additionally, it wants to foster the cross-departmental collaboration. Out of these benefits, departmental IT managers only name transparency, argumentation aid, the possibility of benchmarking and the identification of trends as benefits. As already discussed, the first two benefits are perceived as the most important benefits by public IT managers. The low consensus regarding the possibility of benchmarking was to be expected, as homogeneous subordinate agencies are a prerequisite for this. No consensus can be found concerning the creation of political KPIs and the exchange of experience. This is also not surprising, as

departmental IT managers have no need to report to the CIO and to exchange experiences with other departments due to the departmental principle. Hence, the perspective's influence on the perception of benefits is understandable. When designing IT management accounting in the public sector, these different perspectives need to be considered. We conclude that a central, cross-departmental IT control still needs to find its place in the context of an administrative environment which is determined by circumstances like the departmental principle. Currently, a cross-departmental IT management accounting can be used to create political KPIs. However, the central IT unit cannot control the IT usage within the departments due to the departmental principle. Thus, the control function needs to be fulfilled by departmental IT managers. However, since IT management accounting is a task which lies cross-functional to the budget, it generates a huge effort for collecting the data. Hence, an automatic allocation of budget to KPIs might unburden IT managers from the effort to collect the data. Up-to-date information about the IT domain could help to improve the IT usage.

## **5 Conclusion and Outlook**

Whereas literature proposes a large number of different IT management accounting benefits, the usage of IT management accounting by public IT managers is lower than one would expect. We assumed that IT management accounting is used in a different way in the public than in the private sector. We analyzed the differences between private and public sector regarding IT management accounting benefits. We reviewed literature and conducted a case study in an administration of the federal state level in Germany. The findings show that transparency and support for decision-making are perceived as major benefits by public IT managers. Whereas the private sector presents the improvement of effectivity, efficiency and accountability as important benefits, these benefits are not seen as relevant in the public sector. This is not surprising due to differences regarding the objectives of the private and public sector. Besides, we noticed that the benefits' perception depends on the organizational complexity as well as the central and decentral perspective. Our findings support practitioners by designing IT management accounting according to the potential benefits for departmental and cross-departmental IT managers.

Further research is required towards a more detailed analysis of the perceived benefits, e.g. the analysis of cause and effect linkage. Further case studies can be conducted to enrich and evaluate our findings. Besides, the influence of the organizational complexity can be further elaborated. Finally, it needs to be analyzed to what extent a cross-departmental IT management accounting can cover the requirements of all departments, since each department has its own professional focus and concerns.

## **Acknowledgement**

This paper was written in the context of a research project funded by the Bavarian State Ministry of Finance. We thank our sponsor for making this study possible.

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