Analysis of Different Organizational Forms: Towards a Framework of Influencing Factors Regarding Performance Management of IT in Public Organizations

Christoph Ertl[1], Vanessa Greger[2], Petra Wolf[2] and Helmut Krcmar[1]
[1]Technische Universität München, Munich, Germany
[2]fortiss – An-Institut der Technischen Universität München, Munich, Germany
mail@christoph-ertl.de
vanessa.greger@fortiss.org
petra.wolf@fortiss.org
helmut.krcmar@in.tum.de

Abstract: Many public organizations still face big challenges regarding the use of performance management of information technology (IT-PM). We assume that one reason for this is the fact that they have characteristics of both the private and the public sector. So far, the literature differentiates only between private organizations and public administrations when taking into account the organizational effects on IT-PM. Public organizations are not taken into consideration. Besides, almost no research is done on how the characteristics of the three organizational forms affect the way IT-PM is implemented and used. We aim at designing a framework containing the influencing factors regarding IT-PM especially for public organizations. We base this framework on four major organizational attributes (*objectives*, *stability and time horizon*, *complexity* and *managerial values*) derived from the characteristics of IT-PM. In order to identify further influencing factors aligned with the organizational attributes, we enlarge the framework by findings of an additional literature review with a focus on the public sector. The assumption that public organizations have characteristics of both private organizations and public administrations was affirmed by the findings. We identified *bureaucracy* as an additional relevant organizational attribute. The other influencing factors were affirmed by the literature review. Our analysis presents a revised framework of organizational attributes and influencing factors regarding IT-PM in the public sector. Thus, it extends its understanding by differentiating its use in a particular organizational form. Public IT managers can use the findings to enhance the benefits of IT-PM and focus on relevant factors for its implementation, use and adaptation.

Keywords: performance management of IT, public administration, public organization, private sector, hybrid organizational forms

1   Introduction

Performance management of information technology (IT-PM) has already been used in the private sector for many years and has a long tradition as a decision-making instrument (Johnson 1983). In the past, many initiatives under the term New Public Management (NPM) tried to transfer performance management (PM) concepts used in the private sector to public administrations (Meier and O'Toole 2011; Diefenbach 2009). However, many public administrations still fail to implement and use these concepts successfully. Determining factors in the public sector, such as the political influence or the departmental principle, can be seen as reasons for this failure. In recent years, IT-PM has also been implemented in public organizations. However, public organizations still face big challenges regarding the use of IT-PM when arranging internal accounting methods with the legal requirements in a regulated market environment (De Lancer Julnes and Holzer 2001).

Public organizations belong to the public sector. In contrast to public administrations, they are more cost effective and ensure economic measurability (Stölting 2001). For our contribution, we define public organizations in a narrow sense as economically and socially oriented organizations which are directly or indirectly subject to a controlling influence by public authorities. Many public organizations originate from the period of privatization which took place in the eighties and nineties - for example of hospitals or transportation organizations (Williams, Macintosh and Moore 1990).

So far, the literature differentiates between private organizations and public administrations, when taking into account the organizational effect on IT-PM. Public organizations are rarely taken into consideration. Almost no research is done on how the characteristics of these three organizational forms affect the way IT-PM is implemented and used. As a starting point for this, Ertl et al. (2014) compared the characteristics of private

organizations, public organizations and public administrations. The authors derived a framework with organizational attributes and associated influencing factors which have an effect on IT-PM. However, they have not analyzed whether there are further influencing factors regarding IT-PM especially in public sector literature. Hence, the current paper aims at enlarging the existing framework to include influencing factors which are related to the special determining factors of the public sector. Therefore, it is guided by the following research questions:

- Which organizational attributes and influencing factors affect IT-PM in public organizations?
- Which additional influencing factors can be determined regarding implementation and use of IT PM especially in the public sector?

This paper is structured as follows: chapter 2 presents the organizational attributes and associated influencing factors of the different organizational forms as well as the derived framework for public organizations. These findings are already presented in Ertl et al. (2014). The methodology for a further in-depth analysis of the influencing factors in the public sector is described in chapter 3. Chapter 4 elaborates the influencing factors regarding IT-PM in the public sector as findings of the literature review. In chapter 5, we adapt the framework presented in chapter 2.2 with the determining factors in the public sector. Therefore, we compare the additionally identified influencing factors resulting from the literature review with the organizational attributes of the basic framework and discuss the adapted framework. Finally, a brief conclusion is drawn and further possible research areas are presented.

2 Theoretical Background

2.1 Comparison of Private Sector, Public Administrations and Public Organizations

We used the structure of Boyne (2002) as a basis in order to classify the characteristics of private organizations, public organizations and public administrations, and extended it by further organizational attributes identified during a literature review. Boyne (2002) assigned the attributes of different organizational forms to four main theoretical effects of publicness: *organizational environment*, *organizational goal*, *organizational structures* and *managerial values*. These findings are already presented in Ertl et al. (2014).

Table 1 shows the organizational attributes concerning the category *organizational environment* (Nutt 1999).

- S*takeholders* place demands and constraints on managers (Mimba, van Helden and Tillema 2007). Public organizations are similar to public administrations as both are influenced by many stakeholders and are not owned by entrepreneurs or shareholders.
- The organizational environment can impact *permeability* (Ring and Perry 1985) and *stability* (Bozeman 1987; Dahl and Lindblom 1953) of organizations and of decision-making. Public organizations and public administrations are equivalent regarding the *permeability* attribute since both organizational forms are influenced by political decisions.
- The *time horizon* of IT-managers' decisions needs to be analyzed in more detail. Both public and private organizations have a long, strategic perspective due to their large fixed assets. However, public organizations are indirectly influenced by elections or political decisions which can cause unpredictable decisions. Considering this political influence, public organizations are similar to public administrations. Thus, public organizations cannot clearly be assigned to private organizations or public administrations regarding this attribute.
- The *performance management force* represents the perspective of the market and competitors (Boyne 1998). Analyzing this attribute, we noticed that public organizations are similar to private organizations, as both are bound by the market environment.
- In addition to these attributes already presented by Boyne (2002), we identified *purchase regulation* (Ziomek 2011) and *funding* (Boyne 2002) as relevant for this category. The characteristics of these two attributes show that public organizations are comparable with public administrations.

In summary, the characteristics of public organizations concerning the *organizational environment* are more similar to those of public administrations – except for the market force by which private organizations are bound.

Table 1: Characteristics concerning the *organizational environment* (own illustration)

	Private organizations	Public organizations	Public administrations
Stakeholders	Few stakeholders (Mimba, van Helden and Tillema 2007), ownership by entrepreneurs or shareholders (Nutt 1999; Boyne 2002)	Many stakeholders (Nutt and Backoff 1993)	Many stakeholders (Bozeman 1987; Bozeman and Kingsley 1998; Bozeman and Scott 1996; Boyne 2002; Mimba, van Helden and Tillema 2007)
Permeability	Indirect political influence, influenced by stakeholders (Nutt and Backoff 1993)	Political influence (Nutt and Backoff 1993; Boubakria, Cosseta and Saffar 2008)	Political influence (Bozeman 1987)
Stability and time horizon	Strategic decisions fixed for long time periods, sustainable and long term success (Dahl and Lindblom 1953)	Long managerial perspec-tive, but short-term deci-sions, changeable with elections and political ap-pointments (Bryson 2011)	Pressure to achieve quick results, instable in decision-making due to political influence and elections (Bozeman 1987; Dahl and Lindblom 1953; Nutt 1999)
Performance management force	Market forces (Bozeman 1987; Boyne 2002)	Providing services and products in a regulated market environment (Nutt and Backoff 1993)	No market pressure (Nutt and Backoff 1993; Nutt 2000), but political forces (Farnham and Horton 1996; Boyne 2002); Outputs are not measurable (Bozeman 1987; Boyne 2002)
Purchase regulations	No purchase regulations (Ziomek 2011)	Purchase regulations (Ziomek 2011)	Purchase regulations (Ziomek 2011)
Funding	Private capital (Boyne 2002)	Taxation or mix of taxation and private capital	Taxation (Boyne 2002)

The second category contains organizational attributes associated with *organizational goals* (Table 2).

- *Primary constraints* (Dahl and Lindblom 1953) and the *objectives* themselves (Bozeman 1987; Farnham and Horton 1996) are important attributes in this category. Public organizations and public administrations have the same or similar characteristics concerning these two attributes.
- As *products* (Kuhlmann, Bogumil and Grohs 2008) of an organization are strongly linked to an organization, they also belong to this category. Besides, organization's *customers* are an important attribute in this category because all organizations want to satisfy their customers and the customers are related to the organizational goals. Analyzing the attributes of *products* and *customers*, public organizations have the same characteristics as private organizations as both have one product and a homogeneous customer structure.

In summary, public organizations are similar to either private organizations or public administrations - depending on the attribute of the category *organizational goals*.

Table 2: Characteristics concerning *organizational goals* (own illustration)

	Private organizations	Public organizations	Public administrations
Primary constraints	Economic system (Bozeman 1987)	Political system (Carver 2006)	Political system (Dahl and Lindblom 1953; Bozeman 1987)
Objective	- Value maximization and business growth as measureable goals (Lachman 1985; Farnham and Horton 1996; Becker, Algermissen and Falk 2009; Jurisch et al. 2012; Obermeier, Wolf and Krcmar 2013; Greger, Wolf and Krcmar 2013) - Objectives are clearly defined (Nutt 1999)	Few goals, difficult to prioritize (Nutt and Backoff 1993)	- Public welfare and compliance with laws and policies as goals (Mahoney, McGahan and Pitelis 2009; Jurisch et al. 2012; Greger, Wolf and Krcmar 2013) - Multiple objectives poorly defined, am-biguous, complex and often changing (Boze-man and Scott 1996; Lachman 1985; Boze-man 1987; Nutt 1999; Rainey and

	Private organizations	Public organizations	Public administrations
			Bozeman 2000; Boyne 2002; Mahoney, McGahan and Pitelis 2009; Meier and O'Toole 2011) • Political objectives (Dahl and Lindblom 1953)
Products	One product (Bozeman and Kingsley 1998; Kuhlmann, Bogumil and Grohs 2008)	One product	Many products or services (Bozeman and Kingsley 1998; Nutt 1999; Kuhlmann, Bogumil and Grohs 2008)
Customers	• Homogeneous customers • Consumption volun-tary, payment based on use (Nutt and Backoff 1993)	• Homogeneous customers • Funding based on contracts and arran-gements (Nutt and Backoff 1993)	• Citizens as heteroge-neous customer group • No choice regarding the consumption of services (Nutt and Backoff 1993)

Table 3 sums up the organizational attributes concerning the *organizational structure*.

- The characteristics of the *complexity of decision-making* (Farnham and Horton 1996; Bozeman and Kingsley 1998; Bozeman and Scott 1996; Kuhlmann, Bogumil and Grohs 2008) and *autonomy* (Boyne 2002) of public organizations are similar to those of public administrations. Both have a complex decision-making structure, rigid hierarchies and a lower managerial autonomy.
- *Complexity* is associated with the *perspective of performance management* (Bozeman and Scott 1996). Comparing the characteristics of this attribute, we noticed that private as well as public organizations are focused on outputs, whereas public administrations focus on inputs.
- By way of complement to the categorization of Boyne (2002), the structure of the information technology (*IT) landscape* is assigned to this category because the structure of the *IT landscape* is associated with the organizational structure (Mosse and Whitley 2009). *IT landscapes* of public organizations are homogeneous as they are in private organizations. However, IT is seen as a support function within public organizations and public administrations. In consequence, public organizations have characteristics of both public administrations and private organizations as far as the *IT landscape* is concerned.

Summarizing the findings of the category *organizational structure*, public organizations have characteristics of both private sector and public administration.

Table 3: Characteristics concerning the *organizational structure* (own illustration)

	Private organizations	Public organizations	Public administrations
Complexity of decision-making	• Lean decision struc-tures (Nutt and Backoff 1993; Boyne 2002) • Process-oriented organization (Nutt and Backoff 1993; Boyne 2002; Jurisch et al. 2012) • Low bureaucracy (Nutt and Backoff 1993; Boyne 2002)	• Complex decision structures (Bozeman and Kingsley 1998) • Rigid hierachies (Boze-man and Kingsley 1998)	• Complex decision structures (Lachman 1985; Nutt 2006; Bozeman and Kingsley 1998; Boyne 2002; Brewer and Brewer 2011) • Rigid hierachies and high bureaucracy (Lachman 1985; Boze-man and Kingsley 1998; Williamson 1999; Boyne 2002; Brewer and Brewer 2011; Jurisch et al. 2012) • Consensus between all stakeholders necessary (Obermeier, Wolf and Krcmar 2013)
Perspective of performance management	Focus on outputs (Bozeman 1987)	Focus on procedures, rules and outputs (Boyne 2002)	Focus on inputs (Boyne 2002; Budding 2004)
Managerial	• High managerial auto-	• Lower managerial auto-	• Lower managerial

	Private organizations	Public organizations	Public administrations
autonomy	nomy (Rainey, Backoff and Levine 1976) • Limitations by law or internal consensus (Nutt 1999)	nomy (Nutt and Backoff 1993) • Limitations by tradi-tional roles (Nutt and Backoff 1993)	autonomy of a cross-departmental, central unit (Bozeman 1987; Farnham and Horton 1996) • Little control over sub-sidiary units (Dahl and Lindblom 1953)
IT landscape	• Homogeneous • IT as support or core function	• Homogeneous • IT as support function	• Heterogeneous (Clarkson 1972) • IT as support function (Kuhlmann, Bogumil and Grohs 2008) • Poor understanding of IT value by employees (Wiredu 2012)

Table 4 shows characteristics concerning the attitude of managers and employees and their effect on *managerial values*. This category contains the attributes of *economic theory of property and rights* (Clarkson 1972), *sanction and reward mechanisms* for employees (Reed 1986; Verbeeten 2008) and *organizational commitment* of employees (Perry and Porter 1982). Analyzing the managerial values, we noticed that this is the first category in which public organizations have more attributes in common with private organizations since IT-managers of both are driven by a strong financial motivation and both work with a financial reward system. The main difference to private organizations is that public organizations have less sanction mechanisms. The organizational commitment with the characteristic of *medium* lies in the middle of private organizations (high) and public administrations (low).

Table 4: Characteristics concerning *managerial values* (own illustration)

	Private organizations	Public organizations	Public administrations
Economic theory of property rights	Strong financial motivation (Boyne 2002)	Financial motivation	Less materialistic (Boyne 2002)
Sanction mechanism	Monetary penalties for unterperfoming	Less sanctions in the case of underperforming	Less sanctions in the case of underperforming
Reward mechanism	Financial reward systems (Nutt and Backoff 1993)	Financial reward systems (Nutt and Backoff 1993)	Fewer incentives (Rainey and Bozeman 2000; Brewer and Brewer 2011)
Organizational commitment	High, due to strategic decision making and standard procedures (Perry and Porter 1982)	Medium, due to many interpreta-tions of action taking (Carver 2006)	Low, due to lower job involve-ment and organizational commitment (Buchanan 1975; Lachman 1985)

2.2   Framework for Organizational Attributes affecting Performance Management of IT

The following section analyzes the identified organizational attributes in terms of their influence on IT-PM. Analyzing the organizational attributes (Table 1, 2, 3 and 4), we noticed that the assumption that public organizations possess a mix of private organizations' and public administrations' characteristics can be confirmed. We focused on the characteristics influencing the use and success of IT-PM. Those attributes which do not influence IT-PM are excluded from the framework. The attributes *permeability*, *funding* and *primary constraints* are not classified as relevant because they affect the decisions on a high, strategic, corporate management level, but not the implementation or the use of IT-PM itself which is on an operative level. As the name indicates, *purchase regulations* ensure compliant procurement processes and decisions, but they are not related to IT-PM. Apart from this small number of non-relevant attributes, most attributes are classified as relevant. Figure 1 summarizes all attributes which affect IT-PM.
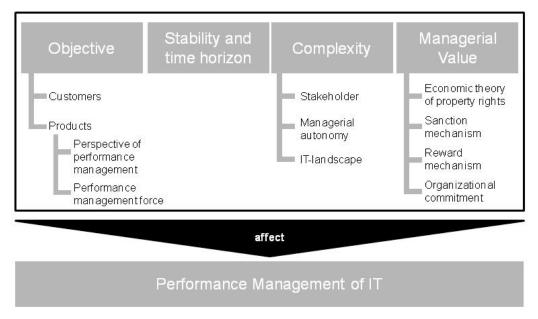
Figure 1: Framework for organizational attributes affecting IT-PM in public organizations (own illustration)

Firstly, the stability and time horizon of IT-managers' decisions greatly influences IT-PM. The stability and time horizon of IT-managers' decisions can result in short-term instructions or change long-term strategic directions. In order to visualize these components, organizations can use business case simulations which are conducted by IT-PM. As private organizations show clear and sustainable strategic decisions, they can focus on one master business case. By contrast, public organizations are influenced by their supervisory board or political surrounding conditions (Nutt and Backoff 1993; Boubakria, Cosseta and Saffar 2008). This requires various business plans for the simulation of the consequences of the decisions and the assessment of the multiple risks which these decisions can have on the organization. Strong political influence and instable decision-making in public administrations result in rather rough budget planning without the need to plan sales volume, cost and revenues. Additionally, the time horizon in public administrations is connected to election cycles (Bozeman 1987; Nutt 1999). This short time horizon affects IT-PM because the objectives of the organization - and therefore the IT-PM goals - may change after an election.

Secondly, the complexity of decision-making has a huge effect on the way IT-PM is used. Due to complex decision-making structures in the public sector, the responsibilities are distributed over various decision-makers (Lachman 1985; Nutt 2006; Boyne 2002; Brewer and Brewer 2011). Consequently, IT-PM cannot easily take action against budget deviations, for example, because various decision-makers need to agree on a particular action. By contrast, the process-oriented and lean structures of private organizations enable their responsible IT-managers to actively compensate budget deviations (Nutt and Backoff 1993; Boyne 2002). The *managerial autonomy* also contributes to the complexity of decision-making. IT-PM in private organizations needs to consider legal restrictions or internal compliance rules as well as the customer and product perspective (Nutt 1999). This concedes a high level of managerial autonomy when deciding about methods and measures concerning IT-PM (Rainey, Backoff and Levine 1976). Contrary, IT managers in public organizations and in public administrations need to consider political decisions and topics of public interest. This can limit the choice of possible measures. High-ranking managerial roles in public administrations are often assumen by politicians who pursue their own objectives and make more political decisions (Farnham and Horton 1996; Lachman 1985). Furthermore, IT managers in public administrations need to deal with the autonomy of departments due to the departmental principle. This complicates implementing an overall IT-PM concept (Schwertsik, Wolf and Krcmar 2009). Therefore, stakeholders of an organization also affect IT-PM. Whereas external stakeholders cannot influence the internal reporting and PM processes, internal stakeholders, especially in public administrations, can influence the way IT-PM is used (Greger, Wolf and Krcmar 2013). Analyzing the IT landscape, we noticed that private organizations mostly use IT as a support or core function and they try to maximize the homogeneity in the IT landscape to ensure efficient operations. This improves the execution of IT-PM by providing decisions supported by data due to integrated IT systems. The IT landscape of public administrations is heterogeneous due to various customers and products (Clarkson 1972).

Consequently, IT-PM in public administrations struggles with poor data quality and with complex, manually executed IT-PM methods. Even though IT is seen as a support function in public organizations, the IT landscape is developed towards a higher homogeneity, seeking to lever the same advantages as private organizations (Hoch, Klimmer and Leukert 2005).

Thirdly, the organizational objectives are strongly linked to the IT-PM composition. According to the literature, IT-PM is strongly linked to the organizational objectives, since key performance indicators are derived from the objectives. In private organizations, strategies and objectives are mostly clearly defined and communicated (Nutt 1999), whereas clear objectives are missing in public administrations (Greger, Wolf and Krcmar 2013). This makes designing IT-PM difficult. Furthermore, private organizations have just one measurable objective (Lachman 1985; Farnham and Horton 1996; Greger, Wolf and Krcmar 2013). By contrast, public administrations have multiple objectives, depending on each department, which makes it difficult to measure the objectives (Dahl and Lindblom 1953; Bozeman and Scott 1996). Private organizations need to establish customer- and product-oriented PM concepts. Public administrations focus, however, on internal cost allocation in view of the heterogeneous portfolio of products and customers (Bozeman and Kingsley 1998). Because of the great correlation with private organizations in terms of expressing these specific attributes, IT-PM of public organizations has comparable IT-PM methods. The *objectives* of an organization are strongly linked to its *products* and *customers* because they are mostly defined in the strategy. *Customers* do only influence IT-PM if there is a need for transparency in the organization. We conclude that the effect of this attribute is relatively small. *Products* have a larger effect on IT-PM if one considers the connection to the attribute of *PM force* and *perspective of PM:* The effect of the first attribute depends on the organizational form which is analyzed. It influences IT-PM by deriving certain transparancy requirements especially for private and public organizations which offer products in a regulated market environment. Thus, IT-PM needs to provide suitable PM processes and methods to solve transparancy issues. By contrast, public administrations are usually not influenced by market pressure. Consequently, their focus is on inputs and their outputs cannot be measured. The *perspective of PM* affects IT-PM differently depending on the organizational form. The focus on procedures and rules in the public sector requires extensive guidelines which need to be considered in IT-PM. Hence, IT-PM in the public sector is not as flexible as in the private sector.

Finally, the managerial value of an organization influences the success of IT-PM. The theory of property rights is linked to reward and sanction mechanisms. Employees in private organizations have an interest in IT-PM because they want to ensure cost efficiency in order to get rewards and to avoid sanctions. This behavior is similar to that in public organizations. By contrast, employees in public administrations have no extrensic motivation in the absence of reward and sanction mechanisms. The organizational commitment is higher in private and public organizations than in public administrations. Decisions of employees in the private sector influence the financial success of the organization. IT-PM can provide support to achieve this objective. IT-managers see IT-PM as an instrument to measure the achievement of objectives and use it as decision-making instrument.

3 Methodology

Based on the framework for influencing factors regarding Performance Management of IT, we conducted a literature review according to Webster and Watson (2002) in order to deepen the understanding of influencing factors especially in the public sector. We focused on peer-reviewed journals as well as e-government specific conferences. Both journals and conferences were classified as relevant if their name indicated that they deal with information management, IT-PM or issues of the public sector. Our search terms can be categorized into three categories:

- Category 1: performance measurement, performance management, cost-benefit-analysis, evaluation, management accounting
- Category 2: IT, information system
- Category 3: government, public sector, public administration, e-government, NPM

The search terms of the different categories were combined by using 'and' and 'or' combinations. In a first step, we found 583 papers. After abstract and title scanning, we identified 197 papers which dealt with IT-PM. We read these papers and searched for influencing factors. We defined influencing factors as determining factors which influence the implementation and use of IT PM (Greger and Wolf and Krcmar 2013). In order to structure the identified influencing factors, they are aligned with the four attributes of the existing framework.

4   Findings

Table 5 summarizes the findings of the literature review. The influencing factors identified in the literature review are aligned to the attributes of the existing framework.

Table 5: Influencing factors regarding IT-PM in the public sector (own illustration)

Attribute	Influencing factors
Objectives	• Availability of objectives (Berman and Wang 2000; De Lancer Julnes and Holzer 2001; Yang and Hsieh 2007; Rantanen et al. 2007; Hoque 2008; Yetano 2009; Greger, Wolf and Krcmar 2013)
Stability and time horizon	• Acceptance at politics (Berman and Wang 2000; Yang and Hsieh 2007; Maruccio and Steccolini 2009; Taylor 2009; Greger, Wolf and Krcmar 2013) • Political environment (Kuhlmann, Bogumil and Grohs 2008; Yetano 2009; Padovani, Yetano and Orelli 2010; Greger, Wolf and Krcmar 2013).
Complexity	• Organizational size (Maruccio and Steccolini 2009; Greger, Wolf and Krcmar 2013) • Organizational form (Schwertsik, Wolf and Krcmar 2009; Greger, Wolf and Krcmar 2013) • Access to information and performance management data (De Lancer Julnes and Holzer 2001; Greger, Wolf and Krcmar 2013) • Technical support for collecting and analyzing IT-PM data (Berman and Wang 2000; Rantanen et al. 2007; Taylor 2011; Greger, Wolf and Krcmar 2013) • Availability of resources like time, budget or employees (Berman and Wang 2000; De Lancer Julnes and Holzer 2001; Melkers and Willoughby 2005; De Vries 2007; Taylor 2009; Greger, Wolf and Krcmar 2013)external stakeholders (De Lancer Julnes and Holzer 2001; Yang and Hsieh 2007; Greger, Wolf and Krcmar 2013) • External requirements (De Lancer Julnes and Holzer 2001; Yetano 2009; Greger, Wolf and Krcmar 2013)
Managerial values	• Acceptance at management (Berman and Wang 2000; Ter Bogt and Van Helden 2000; Cavalluzzo and Ittner 2004; Melkers and Willoughby 2005; Yang and Hsieh 2007; Rantanen et al. 2007; Padovani, Yetano and Orelli 2010; Taylor 2011; Greger, Wolf and Krcmar 2013) • Organizational culture (Pina, Torres and Yetano 2009; Greger, Wolf and Krcmar 2013) • Performance of an organization (Maruccio and Steccolini 2009; Greger, Wolf and Krcmar 2013) • Availability of a cultural change (Taylor 2011, Greger, Wolf and Krcmar 2013) • Skills of employees regarding IT-PM (Cavalluzzo and Ittner 2004; Maruccio and Steccolini 2009; Greger, Wolf and Krcmar 2013) • Presentation of benefits to the stakeholders (Lapsley and Wright 2004; Taylor 2011; Greger, Wolf and Krcmar 2013)

Regarding the organizational attribute *objectives* we identified one influencing factor in the literature review that complies with this attribute. This influencing factor comprises the issue that objectives in the public sector are mostly missing or, if there are objectives, these are stated in a very vague way. This matches with the prior findings on the influencing factors of public administrations.

Further influencing factors can be assigned to the organizational attribute *stability and time horizon*. The results of the literature review contain influencing factors with a wider and external view. We argue that the acceptance at politics and the political environment have fundamental influence on the direction and the duration of a manager's decisions.

The influencing factors of the organizational attribute *complexity* consist of some typical influencing factors, like the organizational form, the organizational size and the availability of resources like time, budget or employees. These three factors directly increase the complexity of an organization and affect IT-PM. Besides, internal technical aspects have influence on IT-PM because they influence the ability to process long term forecasts or business cases. Complexity in IT-PM at public organizations also rises due to limited access on relevant management data as well as the obsolete technical support for collecting and analyzing this data. In addition to these direct influencing factors, a further indirect influencing factor could be identified. Especially in public organizations, external requirements generated by various stakeholders may have a severe impact on internal processes and communication rules that influence the complexity of IT-PM.

The literature review also determined some influencing factors that correspond with the organizational attribute *managerial values*. Besides the monetary influencing factors which are already part of the framework, the literature review revealed some factors with intrinsic influence, like the presentation of benefits to stakeholders or the acceptance at management. Other influencing factors deal with the culture of the organization itself and its ability to change based on the motivation and the attitude of public organizations employees. The employees' attitude and, corresponding to that, the ability to change influence the implementation and further development of IT-PM. This is often linked with a lack of appropriate skills regarding IT-PM resulting in uncertainty on the employees' site and directly affects the performance of an organization.

Besides the above mentioned influencing factors we identified three influencing factors which we could not assign to the organizational attributes of the framework. The first influencing factor derives from laws, rules and regulations (Lapsley and Wright 2004; Modell, Jacobs and Wiesel 2007; Hoque 2008; Maruccio and Steccolini 2009; Yetano 2009; Greger, Wolf and Krcmar 2013) with which public organizations must comply. Strict and formal internal requirements (De Lancer Julnes and Holzer 2001; Yang and Hsieh 2007; Greger, Wolf and Krcmar 2013) are established from this. The third influencing factor are the dedicated internal stakeholders that supervise the execution of these processes (De Lancer Julnes and Holzer 2001; Yang and Hsieh 2007; Greger, Wolf and Krcmar 2013). All of those three influencing factors comprise the formal procedures for decision making and consequently the reduced flexibility of internal processes. This results in a high bureaucracy in public organizations.

5   Discussion

Two major conclusions can be determined after aligning the results of the literature review on public sector influencing factors with the organizational attributes of the framework presented in chapter 2.2. Firstly, the additional literature review confirms essential attributes of the framework and adds further influencing factors to these basic attributes. Secondly, the framework does not include an attribute that represents the *bureaucracy* of public organizations, which base on the demand for monitoring and accountability of public sector organizations (Boyne 2002).

The literature review reveals some new influencing factors that supplement the framework based on the different organizational attributes. As described above there are influencing factors that can be aligned with the organizational attribute *objectives*. Hence, these are very specific for public organizations. This was also a result of the analysis of different organizational characteristics in chapter 2.1. Thus, we do not need to change the attributes or influencing factors related to *objectives*.

The incorporation of the attribute *stability and time horizon* in the framework can be extended. The literature review identifies two new influencing factors for this attribute, as political aspects are not explicitly delineated in the framework so far. The attribute *complexity* as represented in the framework shows a high level of alignment with results of the literature review. The influencing factors *external requirements* and *IT landscape*, which encompasses the technical aspects as identified in the literature review, are included in the framework. However, the analysis of the literature review shows that the influencing factor *managerial autonomy*, which

was formerly assigned to the attribute *complexity*, does no longer fit to this attribute. As complexity in IT-PM is mainly driven by external requirements, the organization's size and form or the maturity of its IT landscape, the managerial aspect, which has many internal restrictions, does not apply here. Based on the results for the attribute *managerial values*, two new influencing factors are added to the adapted framework. The first one considers the change availability of public sector employees. This aspect was missing in the prior framework as the comparison of the different organizational forms did not consider change aspects within this attribute. Since this influencing factor encompasses the aspect of organizational commitment, the former influencing factor is replaced by the new one. Another additional influencing factor on IT-PM allocated with the attribute *managerial values* takes into account the skills of employees. Now the attribute *managerial values* represents major aspects of public organizations' employees affecting IT-PM.

Furthermore, the literature review yielded three influencing factors which could not be allocated to one of the four existing attributes. We noticed that these newly identified influencing factors can all be assigned to the *bureaucracy* of an organization. This new attribute contains the influencing factors *strict formal internal procedures* and *various internal supervisors*. Besides the additionally identified influencing factors from the literature review, this attribute applies for the inclusion of *managerial autonomy*. Thus, it encompasses all influencing factors that are required in order to comply with the demand for monitoring and accountability in public sector organizations.

Figure 2 finally illustrates the combination of organizational attributes and specific influencing factors affecting IT-PM in public organizations.
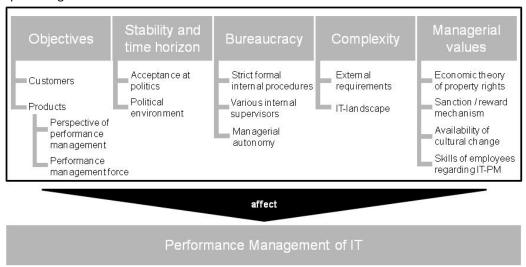

Figure 2: Adapted framework for influencing factors of IT-PM in the public sector (own illustration)

6   Conclusion

This contribution revises and extends the framework of influencing factors on IT-PM in public organizations. The attributes of the framework are adapted based on the characteristics of private organizations, public organizations and public administrations and the additional findings of a literature review on influencing factors in the public sector. As a new fifth attribute, *bureaucracy* is added to the framework. This attribute explicitly represents the formal procedures in public organizations and the strict implementation of laws, rules and regulations. The five organizational attributes (objectives, stability and time horizon, bureaucracy, complexity and managerial values) have a significant influence on IT-PM in the public sector. Hence, they should be considered when analyzing the implementation, use or change of IT-PM.

In order to enhance the analysis of organizational attributes and influencing factors on IT-PM, they need to be prioritized in the next step. Therefore, a representative survey with public organization managers will be conducted. The survey will ask the managers to arrange the influencing factors according to their perceived relevance. This will indicate the different importance of the organizational attributes and influencing factors on IT-PM in public organizations and give an insight as to which attributes and factors researchers should focus on most when analyzing IT-PM in public organizations. Based on this analysis also new recommendations for researchers and practitioners in the area of public organizations management can be determined.

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