Performance Management of IT in Public Administrations: A Literature Review on Driving Forces, Barriers and Influencing Factors

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Abstract. The increased importance of IT in the public sector results in a greater need to establish IT performance management mechanisms. Public administrations need to control IT related investments by using performance management in order to assess and reduce IT costs. However, public sector organizations are only slowly adopting performance management of IT. So far, the driving forces, barriers and influencing factors regarding performance management of IT in the public sector have not been analyzed. The aim of this paper is to identify, analyze and discuss these driving forces, barriers and influencing factors by conducting a literature review and to show how performance management of IT can be designed in the public sector in order to improve its acceptance.

Keywords: performance management of IT, public sector, barriers, driving forces, influencing factors.

1 Introduction

The relevance of information technology (IT) in the public sector has increased rapidly [1]. Currently, many processes in public administrations are dependent on IT. Not only the reduction of IT costs, but also the effective use of IT has become more and more important. As IT is such an important resource, it needs to be managed and controlled. Until now, many public IT managers have no transparency over IT costs or the detailed IT usage, since basic performance management (PM) data, e.g. the number of IT projects, hardware or software licenses, are missing. Performance management of IT (IT PM) is an instrument which addresses this issue. It is defined for the public sector as "the regular collection and reporting of information about the efficiency, quality, and effectiveness of government programs" [2].

In the private sector, IT PM has been used as a decision-making instrument for a long time [3]. In contrast, public administrations are still facing big challenges concerning the implementation and use of IT PM concepts [4-8]. How IT PM can be implemented and used in public administrations is still an under-researched field [9]. As a starting point for the improvement of the implementation and use of IT PM, driving forces and barriers as well as influencing factors need to be identified and analyzed. For this purpose, this contribution is guided by the following questions:

- Which driving forces, barriers and influencing factors regarding the implementation and use of IT PM can be identified?
- Which consequences can be derived from these findings that can be used to design IT PM within public administrations in order to improve its acceptance for different stakeholder groups?

The remainder of this paper is structured as follows: First, the research methodology is described. Second, the findings of the literature review are presented. Third, these findings are discussed and a solution for designing IT PM in a way so that it can augment its acceptance is given. Finally, a conclusion is made and further research possibilities are presented.

2   Research Methodology

A literature review according to Webster and Watson [10] with focus on peer-reviewed journals of the VHB list of 2011 and the WI journal list of 2008 as well as e-government specific conferences, like FTVI, HICSS and IFIP eGOV[1], was performed. Journals were classified as relevant if their journal name indicates that they deal with information management, performance management or issues of the public sector. Table 1 shows the three categories of search terms used in the literature review. The search terms of category one were combined with those of category two and/or category three by using and- as well as or-combinations.

Table 1. Search terms for the literature review

Category 1	Category 2	Category 3
- performance measurement - cost benefit analysis - evaluation - management accounting - controlling	- IT - information system (IS)	- government - public sector - public administration - e-government - new public management

Altogether, 583 papers were found with these search terms. From these, 197 papers dealt with the topic of PM. These PM papers were read and searched for descriptions or enumerations of driving forces, barriers and influencing factors. The identified driving forces, barriers and influencing factors were analyzed and further classified. The number of references behind the particular driving force, barrier or influencing factor shows how often it has been found in literature (see Table 2, Table 3 and Table 4). 48 contributions describing driving forces, barriers or influencing factors concerning PM were

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[1] FTVI: Fachtagung Verwaltungsinformatik, HICSS: Hawaii International Conference on System Sciences, IFIP eGOV: International Federation for Information Processing Electronic Government.

identified. From these, 37 contributions are descriptions of case studies within public administrations in the U.S. (7), Australia (7), U.K. (6), New Zealand (3), Italy (3), Greece (2), Finland (1), Danmark (1), Sweden (1), Suisse (1), Netherlands (1), Canada (1), Russia (1) and Germany (1) as well as a comparison of different countries of the European Union (1). Six contributions have an empirical research approach. Two have a change management view regarding PM. Three contributions are based on theories, like institutional theory or public choice theory.

After the analysis of the identified driving forces, barriers and influencing factors, the databases Emerald Management and Ebsco were searched using the search terms in order to strengthen the methodology. This search did not induce new findings regarding the prior search in the journals and conferences. Hence, we conclude that our search within these journals and conferences has been sufficient and general enough to derive our findings for the discussion and conclusion.

3   Findings

3.1   Driving Forces and Barriers

This section summarizes the driving forces and barriers identified in the literature review. We defined a driving force as a reason why IT PM is implemented and should be used within public administrations. The driving forces for the implementation and use of IT PM can be classified into driving forces which are related to the internal management and those which come from requirements from outside (Table 2).

Table 2. Driving forces regarding performance management of IT

Driving forces - internal management	Driving forces - outside
• "what gets measured gets done" [11-14] • support for decision-making [15-26] • improvement of management [12, 17, 18] • budgetary control [18, 22] • improvement of efficiency [20, 22, 26-31] • improvement of effectivity [20, 22, 26, 27, 29-31] • motivation of employees [11] • ability to identify trends [29]	• creation of transparency [11, 12, 14, 20, 22-24, 26] • fulfillment of laws, regulations or standards [14, 21, 32-34] • pressure/requirements from outside [16, 17, 27, 30, 32, 35-37] • improvement of accountability [7, 12, 16, 19, 21, 24-28, 37, 38] • improvement of quality of services [11, 23, 25, 31]

These driving forces face several barriers which hamper and complicate the successful implementation and use of IT PM. The barriers have been analyzed if they affect the implementation, the use or both (Table 3). The barriers regarding only the use of IT PM can be assigned to the domains difficulties with the use of information,

difficulties with key performance indicators (KPIs) as well as personnel resources and skills. The barriers concerning both the implementation and use of IT PM deal with strategic questions, stakeholder concerns and organizational or political factors.

Table 3. Barriers regarding performance management of IT

Barriers for implementation	Barriers for use
• resistance at top management [7, 39] • no stakeholder involvement [40]	• information not used efficiently [7, 15, 16, 25, 27, 30, 41-43] • KPIs without informative value [7, 12, 25, 27, 38, 44] • manipulation of KPIs [45] • changing KPIs [30, 46] • no skills of employees in collecting, analyzing and interpreting KPIs [7, 44, 47] • no resources available for collecting, analyzing and interpreting KPIs [7, 39, 43] • no access to performance management information so that it cannot be used for decision-making [28, 45]
Barriers for both implementation and use	
• different requirements of stakeholders regarding performance management [48] • no IT awareness at top management [49, 50] • no clear objectives [26, 30, 50] • definition of performance for public services difficult [7] • no presentation of the benefits of performance management [23, 50, 51] • autonomy of departments [50] • more bureaucratic effort [12, 24] • political determining factors (e.g. political election cycles) [23, 52, 53]	

3.2 Influencing Factors

Influencing factors are determining factors which influence the successful implementation and use of IT PM. They can become either a driver or a barrier. The influencing factors identified for the implementation as well as the use of IT PM concepts are classified into general, internal and external influencing factors (Table 4). Some of these influencing factors can also be found at the driving forces, e.g. rules and regulations or external requirements. Influencing factors like missing resources, lack of presentation of benefits or missing skills of employees lead to barriers which complicate the implementation and the use of IT PM. All these influencing factors - except for the political level - can be found in the private sector [54].

Table 4. Influencing factors concerning performance management of IT

Internal influencing factors	External influencing factors
• availability of resources (time, cost, employees) [15, 17, 27, 42, 55, 56] • acceptance at management [15, 17, 19, 23, 24, 28, 55, 57, 58] • acceptance at politics [17, 27, 33, 55] • availability of objectives from which KPIs can be derived [17, 21, 24, 26, 42, 55, 58] • technical support for collecting, analyzing and interpreting performance management data [24, 27, 28, 55] • skills of employees regarding the collection, analysis and interpretation of performance management data [19, 33] • internal requirements [17, 42] • (internal) stakeholders [17, 42] • presentation of benefits to the stakeholders [28, 32] • access to information and performance management data [42]	• external requirements [26, 42] • (external) stakeholders [17, 42] • laws, rules and regulations [21, 26, 32-34, 52]
General influencing factors	
• culture of an organization [20] • availability of a cultural change [28] • size of an organization [33] • organizational form [9] • performance of an organization [33] • political environment [23, 26, 54]	

4   Discussion

Fig. 1 summarizes the identified driving forces, barriers and influencing factors concerning the implementation and use of IT PM. In general, the findings show that the influencing factors are derived from the driving forces and barriers – except for the internal influencing factor technical support. However, this influencing factor can also be found in a private sector context. Hence, we recognized that these influencing factors identified in public management literature have a huge analogy to those of the private sector. Further, missing influencing factors lead to barriers, whereas the availability of an influencing factor can be seen as driving forces for the implementation and use of IT PM.
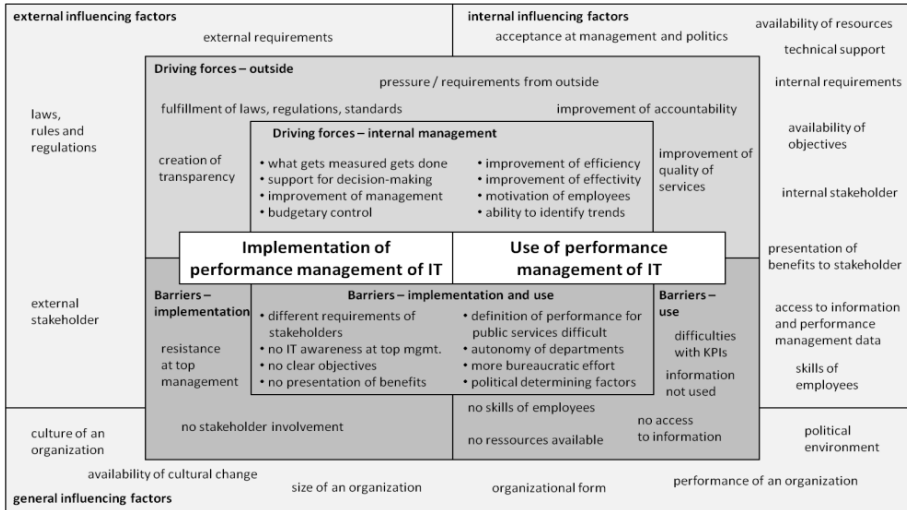
external influencing factors

internal influencing factors

external requirements

acceptance at management and politics

availability of resources

technical support

Driving forces – outside

pressure / requirements from outside

internal requirements

laws, rules and regulations

fulfillment of laws, regulations, standards

improvement of accountability

availability of objectives

creation of transparency

Driving forces – internal management

- what gets measured gets done
- support for decision-making
- improvement of management
- budgetary control

- improvement of efficiency
- improvement of effectivity
- motivation of employees
- ability to identify trends

improvement of quality of services

internal stakeholder

Implementation of performance management of IT

Use of performance management of IT

presentation of benefits to stakeholder

Barriers – implementation

resistance at top management

Barriers – implementation and use

- different requirements of stakeholders
- no IT awareness at top mgmt.
- no clear objectives
- no presentation of benefits

- definition of performance for public services difficult
- autonomy of departments
- more bureaucratic effort
- political determining factors

Barriers – use

difficulties with KPIs

information not used

access to information and performance management data

skills of employees

external stakeholder

no stakeholder involvement

no skills of employees

no ressources available

no access to information

political environment

culture of an organization

availability of cultural change

size of an organization

organizational form

performance of an organization

general influencing factors

Fig. 1. Influencing factors, driving forces and barriers regarding IT performance management

We found that IT PM is mostly implemented in order to support decision-making [15-26], to create transparency [11, 12, 14, 20, 22-24, 26] as well as to improve accountability [7, 12, 16, 19, 21, 24-28, 37, 38], effectivity [20, 22, 26, 27, 29-31] and efficiency [20, 22, 26-31]. It should contribute to make public administrations more managerial and to make the IT usage more transparent and homogenous. All driving forces categorized into internal management can be found in the private sector as well. Thus, one would expect that IT PM could be implemented and used in the public sector in a similar way as in the private sector.

In contrast to the private sector, public administrations do not have shareholders as external stakeholders, but politicians and citizens who want to know more about the performance of their administrations. As a consequence, the driving forces caused from outside mostly support a justification towards these external stakeholders concerning the effective use of IT. Most countries where PM is already implemented in public administrations have laws, standards or regulations backing the implementation of PM [14, 21, 32-34]. However, it turns out that realizing these advantages is complex and difficult in a public sector context, as these driving forces face many different barriers.

The barriers concerning only the implementation can be seen as challenges which arise during any change. Change in public sector organizations is difficult to realize, since public administrations have a structure which needs to be stable and continuous [59, 60]. The two most important barriers which could be found during the literature review are lack of an effective use of information and missing stakeholder involvement. We recognized that these two barriers affect many other barriers regarding the use of IT PM: The KPIs often do not meet the requirements of the stakeholders, since there is no stakeholder involvement during the implementation process. Hence, they need to be changed and adapted to the stakeholders' requirements. Further, as the KPIs do not consider the requirements, they do not have any informative value for

public IT decision-makers. As a consequence, the information which can be derived from the KPIs is not used by them, i.e. no control impulses are derived from IT PM and there is no strategic IT PM [7, 15, 16, 25, 27, 30, 41-43]. As public IT managers do not know the benefits which PM can have for them, they do not see any additional value, but only a greater bureaucratic effort. Hence, they provide only few resources for collecting, analyzing and interpreting PM data and they do not improve the skills of their employees regarding PM. In turn, this results in collecting and reporting data of low informative value. To break this cycle, it is necessary to find a way how and when the benefits of IT PM need to be presented to the IT managers.

In the private sector, the maximization of profit is mostly the major organizational objective, which is pursued by the whole company. In public administrations, not profit maximization, but promoting the public welfare can be seen as the major objective of all governmental departments [61]. Further common objectives from a cross-departmental view are the reduction of IT costs, cost effectiveness or quality intensification. However, there are many different stakeholders in the public sector - like IT managers of departments or IT managers of a central common IT unit - with different interests and objectives due to their regional departmental view, as each department has its own objectives derived from the departmental function [62, 63]. Thus, the cross-departmental objectives only play a minor role for departmental IT managers. The different requirements of the various stakeholders result in a great number of different objectives so that an overall, major objective can only be defined with great difficulties in public administrations. Consequently, the IT usage can hardly be controlled using one overall, cross-departmental IT PM concept. This fact makes it necessary to design IT PM in such a way so that it considers both the cross-departmental and the individual, departmental requirements [9]. Thus, IT PM of private sector organizations cannot simply be transferred to public administrations without adaptation.

As these barriers heavily influence the successful implementation of IT PM concepts, one needs to find a way to diminish or avoid these barriers. During the literature review, we found that laws, regulations or standards can help to implement IT PM by pressure from outside [14, 21, 32-34]. In many countries where PM is already implemented there are legal requirements to report and inform – mostly external – stakeholders [45, 52, 64]. However, these legal requirements do not guarantee that KPIs are not manipulated or collected without accuracy and that PM information is used effectively. According to Padovani, Yetano and Orelli [23] external pressure and requirements do not contribute to the successful implementation and use of PM. As the barriers which were identified during the literature review cannot be diminished by legal requirements or pressure from outside, we follow the conclusion of Padovani, Yetano and Orelli [23].

One way to guarantee the effective and stable use of IT PM without external pressure is to design PM in a way that it meets the requirements of different stakeholders. Stakeholders of public administrations can be internal, like IT managers, policy makers or employees, and external, like citizens, politicians, other public organizations or media. Internal stakeholders mostly use PM information for decision-making and internal management. In contrast, external stakeholders use this information to control accountability and the achievement of objectives [21, 60, 62]. As all these

stakeholders have different objectives and requirements regarding IT PM, these stakeholders and their requirements need to be analyzed and one needs to find a way on how the benefits regarding IT PM can be presented to the different internal and external stakeholders. Therefore, benefits management could help solving this issue [51]. Benefits management describes the process of organizing and managing so that the benefits of the use of IT PM can be realized. The aim of benefits management is to pursue the benefits both during the implementation and the use of an investment or in this case IT PM [65]. Until now, almost no research is done concerning benefits management – linked with IT PM – in public administrations [51].

5   Conclusion

This contribution summarizes the findings of a literature review on driving forces, barriers and influencing factors concerning the implementation and use of IT PM in public administrations. There is a great number of driving forces, like creation of transpareny [11, 12, 14, 20, 22-24, 26] or improvement of decision-making [15-26]. These driving forces face a huge number of barriers regarding the implementation and use of IT PM concepts. The barriers can be categorized into barriers affecting only the implementation, barriers concerning the use of information, barriers with KPIs as well as bariers due to personnel resources and skills. There are also barriers which affect both the implementation and use, like barriers due to strategic questions, stakeholder concerns and organizational or political factors. Some barriers are a consequence to the non-fulfillment of influencing factors. During the literature review, a huge amount of influencing factors could be identified, which range from internal to external influencing factors (Fig. 1). Further, we found that the most important issue which affects PM is the fact that there are many different stakeholders with different objectives and requirements regarding the control of IT. Thus, IT PM needs to be designed in such a way that it considers the cross-departmental as well as departmental requirements. Benefits management can be one way to identify the stakeholders, analyze their different requirements and prepare mechanisms how these requirements can be communicated to and realized by internal and external stakeholders.

This paper contributes to the under-researched field of IT PM in public administrations. Further research needs to be done concerning the implementation process of IT PM. Mechanisms which support the stable use of IT PM in the public sector need to be found, too. Moreover, benefits for different stakeholders by using IT PM as decision-making instrument need to be identified by conducting case studies or empirical research. The existing case studies need to be analyzed in more depth so that recommendations can be given on how IT PM needs to be designed in a public sector context. Further, it needs to be analyzed if an overall IT PM which covers all governmental departments is possible or sensible as each department has its own professional focus. This fact also affects the use of IT, e.g. the need for special information systems. This heterogeneity in the IT landscape makes an overall IT PM more challenging.

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