Process-Based Knowledge Management and Modelling in E-government – An Inevitable Combination

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Abstract. As the processes in e-government are diversified and complex the need for an appropriate knowledge management strategy for governmental employees and citizens as well arises. In this paper an approach is introduced how to define and implement a process-based knowledge management tool which takes e-government processes and transform them into valuable knowledge measures.

1 Introduction

Today the expression "e-government" (electronic government) is a synonym for a modern and efficient administration. In the area of information and communication technology a number of new terms came up in the past few years. A huge amount of different, partly contradictory definitions can be found in the literature. As e-government has an internal as well as external administrative perspective, the following definitions may be most appropriate.

"Under the term electronic government we understand all measures of the public administration that have the aim to primarily external, but also internal service improvement concerning defined tasks or the satisfaction of customer needs".

What can be criticised on the above definition is the missing explanation of the important term "electronic". The following definition emphasising on the important of information and communication technology seems to be more suitable.

"E-government is defined as the redesign of internal and external governmental relations with the help of internet-supported flows, information technology and communication with the aim to optimise governmental services as well as to increase the involvement of private persons in the decision process"

E-government and Business Process Management with all its reorganisation and optimisation aspects became crucial topics in connection with the administration engineering in the past few years. Governments and public administrations are facing the same problems than business organisations with respect to the management of their knowledge.

In the following chapters process-oriented Knowledge Management and process modelling in e-government are described in detail. Later on these two approaches are combined.

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2 Process-Oriented Knowledge Management

Rapid changes of the technological model and business models of today's public administrations demand critical changes within the organisation. Knowledge Management has become a serious management discipline[1] to co-ordinate the transfer of today's linear business processes (BP) to a web-based process view and to deal with the complexity of new technological models. Knowledge Management should "enhance customer value" (Beckman), "aim to achieve the company's objectives" (van der Spek) or "produce biggest payoff" (Hibbard).

This article introduces the concept of the EU-Project PROMOTE[2] where an overall framework for process-oriented Knowledge Management, starting with modelling knowledge intensive business processes in a web-environment and focusing on the knowledge management processes, such as identification, validation, distribution, usage and evaluation of knowledge, that have been developed.

Within the project three challenges have been defined. The first one resulted from the quotations above: "How can PROMOTE guarantee, that a knowledge management approach creates additional value to an organisation?" The PROMOTE approach therefore starts with the analysis of business processes to identify "knowledge intensive tasks" and to select activities where "an explicit control of knowledge" leads to a better performance of the business process.

This "explicit control of knowledge" is seen as identification, development, distribution, usage, storage and evaluation of knowledge (in the following summarised as "knowledge activities"). The second challenge is therefore: "How can PROMOTE support the explicit control of knowledge, in a transparent, well structured and platform independent way?". The PROMOTE® approach therefore introduces the so-called "Knowledge Management Process Model" that defines the knowledge interaction between knowledge workers in a process-oriented manner.

In this context knowledge is seen as "humanised information" (Karagiannis) where information can reside in "databases, on papers, or in people's heads" (Hibbard). This leads to the third challenge: "How can PROMOTE describe the location, the availability and security aspects of knowledge?"

The PROMOTE® approach therefore introduces the so-called "Knowledge Structure Model" that categorises knowledge resources (the categorisation is based on Topic Maps, the ISO13250 standard) and defines access rights.

The benefits of using a model based knowledge management approach like PROMOTE® are listed as follows[3]:

- On the basis of business processes, knowledge intensive activities that strongly influence time, quality and cost of a process are easily identified and supported via knowledge management processes.

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[1] Wickli, A., Jonischkeit, R., Kunkler, B., Give your people canoes and compasses (translated), in Chemie und Fortschritt, Clariant 2/2000 in Muttenz, p28-31

[2] Karagiannis, D., Prackwieser, C., Telesko, R., The PROMOTE® project: Process-oriented knowledge management, in Proceedings of the 3rd European Conference on Product and Process Modelling, Lisbon, 2000

[3] Woitsch, R., Karagiannis, D.: „Process-Oriented Knowledge Management Systems Based on KM-Services: The PROMOTE® Approach"

- The integration of knowledge models with business process models and evaluation models supports an overall management view with consistent analysis, evaluation and coordination.
- The definition of a knowledge management approach by knowledge models is tool and method independent. To realise the approach several different knowledge management tools can be combined.
- With evaluation models like Balanced Scorecard models it is possible to evaluate the knowledge management approaches, successful approaches can be distributed through knowledge model documentation.

In the following chapter we briefly describe the characteristics of process modelling in e-government and the approach for a tailor-made modelling methodology developed in a project of BOC.

3 Process Modelling in E-government

The main characteristic of e-government applications is their complexity, as a number of actors (citizens, clerks, etc.) as well as business processes according to more or less defined roles and heterogeneous technologies have to be integrated. The modelling of processes with respect to electronic administration therefore is a big challenge. It is not enough to use traditional modelling tools for the Business Process Management in e-government, it is moreover necessary to be aware of the flows, the necessary resources, the responsible roles and the competencies of the authorities[4].

The approach of BOC is to develop a modelling tool which realises the most important requirements of e-government. Some of these requirements are the identification of actors and their roles, the definition of possible communication channels, the transparency of the flows, the standardisation of terminologies for an efficient and transparent communication, the holistic modelling from the portal to the back office and the integration of the citizen as service consumer.

In the course of a number of projects, BOC has developed a framework called E-BPMS which integrates business-oriented modelling approaches and approaches for the modelling information systems (IS) and IT infrastructures[5]. E-BPMS is ideal for the use in e-government as it provides a generic procedure model for the development of e-business applications. This framework is not restricted to a specific kind of e-business applications, but can also be used for business to business, business to administration, business to customer, administration to customer or administration to administration applications.

Basis for this E-BPMS framework is the modelling on four levels, to get control over the complexity of e-business applications. On the strategic level the business model is depicted. Additionally decisions about objectives, the common organisational structure and the core business processes are made. On the business level the business processes as well as the working environment are modelled and on

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[4] Karagiannis, D., Palkovits, S., Prozessmodellierung in der öffentlichen Verwaltung – Ein ganzheitliches Rahmenwerk für E-Government, October 2002, for eGOV day 2003

[5] Bayer, F., Kühn, H., Junginger, S., Petzmann, A., E-BPMS: Ein Modellierungs-Framework für E-Business-Anwendungen, September 2001

the implementation level the organisational and technical realisation is executed. The aspects of runtime environment and the IT infrastructure are considered on the execution level.

With this tool, which is currently being developed within a project, the problems of modelling in e-government should be cleared up. With the integration of the perspectives of the organisation and the technology as well as the inside and outside perspectives, the consideration of the specific characteristics of administrative processes and the strategic reflections of the administrative development a holistic realisation of process modelling in e-government is guaranteed[6].

When modelling business processes in e-government two different steps are identified[7]. The first step is the design and the optimisation of the process models of the public administration. The focus is laid on the development of a tailor-made modelling methodology within a business process management tool. In the second step the addressed business type (business to business, business to administration, business to customer, administration to customer, etc.) has to be defined. With the use of information technology, new business models should be introduced to be able to realise the tight integration of the authorities with the citizen. The next few paragraphs mainly focus on the first part of the realisation.

For the success of a project it is important to select and develop the appropriate modelling methodology respectively. Starting from the E-BPMS paradigm different modelling types are defined according to the concept of life events[8].

On the strategic level questions like: Which processes and products/services should be realised?, Who are my participants and partners in e-government? and Do the strategies of the participants and partners match with each other? can be answered within a business model.

The business level contains a number of different model types. The life event map should give an overview of the different process models related to specific life events and business situations. The product model helps describing and managing the offered products and services. To structure the working environment within an authority, a ministry or a city an organisational model will be used. The skill profiles of the employees should be depicted here to guarantee the best management of each individual's knowledge. Business process models are the main point within the modelling in the public administration. How these processes are linked with Knowledge Management will be described later on in this paper.

Last but not least the IT level is described with the help of different models, like for example an interaction model depicting the process flow directly on the platform level. Security aspects like the digital signature can be modelled here.

When these processes and models are engineered within a public administration a defined knowledge management group analyses the processes according to the knowledge management approach described in a previous chapter of this paper.

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[6] Palkovits, S., Europaweite Ansätze zur Modellierung im E-Government, Präsentationsunterlagen BOC ITC GmbH, May 2002

[7] Karagiannis, D., Kühn, H.: Metamodelling Platforms

[8] Wimmer, M.: Geschäftsprozessmodellierung in E-Government: Eine Zwischenbilanz, in: Computer kommnikativ 03/02, page 23

4 Knowledge Management in E-government

The introduction of Knowledge Management into e-government is done on two levels. The above mentioned process management phase ends with the definition of business processes and other process types. Knowledge Management is seen as an improvement of business process management in this case[9].

The organisational driven business process models turned out to be insufficient for a detailed analysis. In most cases a knowledge based business process has to be modelled on the basis of the business processes to focus on knowledge management aspects. Some activities that are in an organisational aspect not so interesting become more important in the context of knowledge management and therefore need to be re-designed. Some aspects that are interesting on an organizational aspect do not influence knowledge management at all and should therefore be removed. Each knowledge-based business processes is linked to the according business process and describes knowledge intensive aspects in more detail. Within a knowledge-based business process knowledge intensive tasks (KIT) are detected and analysed. The main problem is to rate the difficulty of the knowledge intensive task, as each knowledge worker tends to under estimate the difficulty of his colleague's activity.

This analysis is performed for each activity in the knowledge-based business process during a pre-analysis phase; the result is the distinction between KITs and non KITs.

On the second level the working environment model, where the organisational structure is depicted, is analysed in more detail introducing skill profiles. Skill profiles describe the competence of either a topic (from the semantic network) or of activities within a business process. Using this framework, it is guaranteed that the skills of a person are well designed and categorised. There is also the possibility to enter "Should-" and "Is skills" at each profile to analyse "skill gaps". The focus of this approach is not to identify skill gaps, but to identify experts who voluntarily enter the skill documentation. Skill profiles can be also directly imported from other data sources, like Lotus Notes or SAP.

5 Conclusion

We come up with the conclusion that knowledge management in the public administration is inevitable and should go hand in hand with the currently conducted administration engineering. Knowledge management is enlarging the scope of process modelling in E-Government to an extended and holistic approach.

To evaluate the implementation of a knowledge management system, an evaluation model will be defined based on the concept of the Balanced Scorecard. Criteria are linked to either the business process (in this case we speak of a business goal) or to a knowledge management process (this would be a knowledge goal).

The PROMOTE approach is open to be enlarged with whatever requirement coming up from different business fields. The specific requirements of the public administration can be easily adapted and implemented within this knowledge management framework.

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[9] Abecker A., Hinkelmann K., Maus H., Müller H.J., (2002) *Geschäftsprozess-orientiertes Wissensmangement*, Springer Verlag, Berlin, Germany

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