The Use of Business Process Management during the Implementation of Electronic Records Management Systems

Kerstin Fink and Dominik Grimm

Department of Information Systems
University of Innsbruck
Universitätsstraße 15
6020 Innsbruck, Austria
kerstin.fink@uibk.ac.at
dominik.grimm@uibk.ac.at

Abstract: The "eEurope 2005" initiative of the European Commission has the objective to develop modern public services and a dynamic environment for e-business. In particular the public administration and their services should be modernized by an increased usage of modern information technologies. Besides many other e-government initiatives like e-procurement, e-learning and e-health, e-administration including the management of electronic records is one of the most important issues in the government's eEurope program. Thereby an important role plays the modernization of public administration not only in a technological form but also regarding to organizational and structural aspects. Doing so, in introducing e-government solutions, in particular Electronic Records Management (ERM) systems, public authorities require a comprehensive framework to meet the multidimensional integration need. According to this, before the implementation of new software, processes analysis and design should be conducted.

Focusing on administrative internal procedures the electronic processing of files should lead to a higher service quality and to higher effectiveness, transparency and economies in particular financial resources. In comparison to the process optimization in the private industry the guarantee of civil rights and stability of the national law plays an important role. In public administration a lot of different products and services are produced within different more or less complex processes. Process analyses, design and reorganization have to meet these special requirements.

This paper examines the difficulties confronting public administrations in introducing an ERM system and the usage of software tools supporting the (re-)design of business processes. Focusing on the back office processes – in respect of the handling of files in governmental departments in Austria, Germany and Switzerland – the empirical study reveals that BPM methods are mostly not in use. This paper discusses the results of an empirical survey concerning the impact of BPM methods in implementing ERM Systems conducted by the authors in 2007.

1 Introduction

Within the eEurope 2005 action plan there are efforts on the one hand to offer online public services and on the other hand to increase productivity, effectiveness within the public authorities and across organizations and national borders by means of digital technologies accompanied by organizational change and new management skills [EU05; Grö02]. E-government is defined as the use of information and communication technologies in support of all governmental and administrative issues [WK03]. This includes not only e-government Online Services for external operations (front office) but also e-administration for internal operations (back office) by the use of different software applications like GIS[1], ERM[2], WMS[3], ERP[4], etc., in combination with modern management methods like Change Management, Project Management, Business Process Management, Controlling, Quality Management, and much more [Grö02]. Focusing on administrative internal procedures the electronic processing of administrative affairs should lead to a higher service quality and democracy for citizen and to higher effectiveness, transparency and economies in particular financial resources [AM06]. The objectives for e-government solutions are according to an e-government study of the German Research Center for Artificial Intelligence (DFKI) in 2003 illustrated in figure 1.

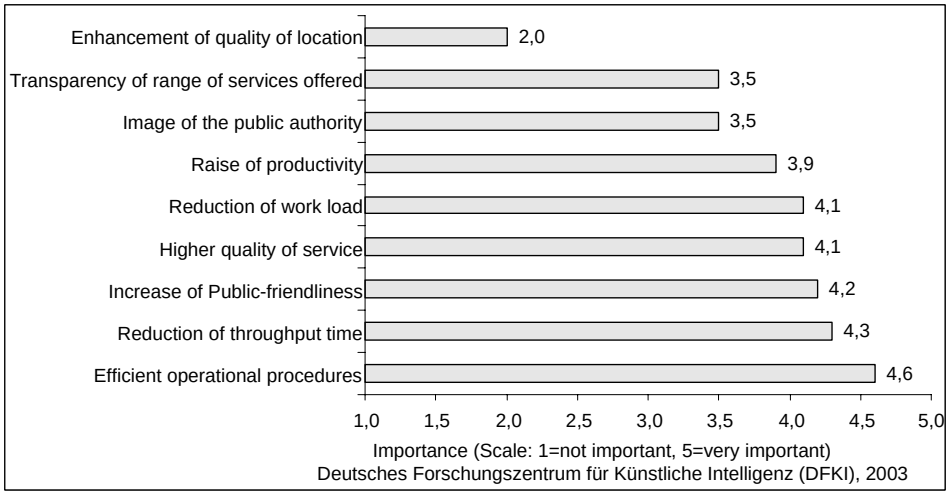

Figure 1: Objectives of Implementing e-government [SKH03]

Electronic Records Management (ERM) – also named as Electronic Records and Document Management (ERDM) – can be defined as the electronic handling of records and documents within and across public institutions. ERM systems support the internal production process by usually offering functionality for Document Management, Content Management, and Workflow and mostly involve other special applications like

[1] GIS: Geographic Information System
[2] ERM: Electronic Record Management System
[3] WMS: Workflow Management System
[4] ERP: Electronic Resource Planning

archiving, digital signature or document conversion. ERM systems now memorize (electronically) the internal flow of files in respect of formal correct treatment and traceability, which in the past was achieved by physical files. Most requirements on Electronic Records Management Systems are predefined on national level through country specific concepts like the „DOMEA[5]“ concept in Germany, the “ELAK[6]“ concept in Austria, the “GEVER[7]“ concept in Switzerland or “The National Archives[8]” concept in the United Kingdom. These concepts differ as to the structural and procedural organization [MG06], and should assure that all deployed ERM systems meet the requirements respect to national right, organizational and operational structure and functionality, so that a quick and high quality as well as an area-wide and interoperable implementation could be realized [TNA01]. A central element of ERM is the modernization of public administration not only in a technological form but also regarding to organizational and structural aspects. The term New Public Management (NPM) unites all instruments and aspects related to modernization of public administrations [SP06]. In the last two decades this objective was driven by expanding the traditional management in the public sector with established business management techniques from the private industry like Controlling, Project Management, Risk Management, Change Management, Quality Management [Grü00; SP06] and in particular also Business Process Management (BPM) [BAF07].

BPM can be determined as a field of knowledge at the intersection between management and information technology, using methods to analyze, design, implement and control operational processes involving all necessary sources like humans, organizations, applications, documents and further information sources [AHW03]. In this case, in comparison to the process optimization in the private industry the guarantee of civil rights and stability of the law plays an important role. In public administration a lot of different products and services are produced within different processes. Process analyses, design and reorganization have to meet these special and complex requirements [WK03].

This paper examines the difficulties confronting public administrations in introducing an ERM system and the usage of software tools supporting the (re-)design of Record Management processes. Focusing on the back office processes – in respect of the handling of files in Austria, Germany and Switzerland governmental departments – the empirical study reveals that BPM methods are mostly not in use. This paper discusses the results of an empirical survey concerning the use of BPM in implementing ERM Systems conducted by the authors in 2007.

[5] DOMEA: DOcument Management and Electronic Archive in the public administration, Coordination and Information Center for ICT of the German Federal Administration (KBST), http://www.kbst.bund.de
[6] ELAK: Electronic Record (ELektronischer AKt), Chief Information Office (CIO), ICT strategy of the Austrian Federal Administration, http://www.cio.gv.at
[7] GEVER: Records Management (GEschäfts VERwaltung), Information Strategy of the Confederation of Switzerland (ISB), http://www.isb.admin.ch
[8] The National Archives: Public Records Office (PRO)

2 Research Framework

According to Wimmer [Wi02] in introducing e-government solutions public authorities require a comprehensive framework to meet the multidimensional integration need (abstraction layers, progress of a public service, different views). The transition from traditional administrative processes to e-government processes means not only an adoption of previous (non-electronic) procedures onto electronic ones but also it opens new possibilities and challenges regarding reorganization and process reengineering [Wi02]. Before the implementation of new software a process analysis and design should be conducted [MDL06]. The use of Business Process Management (BPM) methods after important technical decision or implementation of new software can only yield to a sub-optimal result. Nevertheless most of current e-government projects are in progress without using BPM [TW03]. Some reasons for that are: The diversity of public administration processes, heterogeneity of participants as well as procedure specific, local and legal regulations allow only a restricted design of standardized processes [KL02]. A multitude of administrative processes are decision-making processes which require situation specific workflows and are carried out in the person in charge's sole discretion [LT00]. In public administrations exists a lack of documentation of actual procedures and individual operating know-how of each executive [LT00]. Most of the already successfully deployed BPM methods in private industries can only be restricted applied to public administration processes [SH05].

The key issue can be described as the application of the handling of e-government projects also applies to ERM projects. Therefore, the research question can be formulated as follows: "During the implementation of ERM Systems which BPM methods and tools are mostly used and how does the use or non-use of BPM methods influence the fulfillment of project objectives?"

Based on the research question the authors formulated the following two hypotheses:

- H1: In introducing ERM Systems public authorities in German speaking countries (Germany, Austria and Switzerland) make hardly use of Business Process Management Methods to analyze and (re-)design their back office processes.

- H2: The use of BPM methods during the implementation of Electronic Records Management System has a positive impact on the successful fulfillment of project objectives according to the DFKI study in 2003.

3 Empirical Study

3.1 Methodology

Because of the complexity and the interdisciplinary approach of ERM projects and the great number of participants, the authors have chosen an expert survey as research method to do well directed interviews in an economical and time-saving manner. The

survey was conducted on public administrations in Germany, Austria and Switzerland, which have implemented or are at the moment implementing an ERM system. These countries were selected because of their similar governmental structures, historical and traditional way of administration. Furthermore since 2001 the task force "D-A-CH" is continuously comparing, adjusting and harmonizing the respective concepts for ERM systems ELAK, DOMEA and GEVER [CIO03], which allows a comparative study within these three countries. Due to their participation on all stages of the ERM project, the experts were defined as project leader and/or head of department of the public authorities which are realizing an ERM project. Because of the geographic distance an online survey was chosen as the most practicable research method [FG07].

The research process model, illustrated in figure 2, starts with the collection of project contacts for the data sample. Thereby the authors concentrated on ERM projects which are conform to the respective national ERM concept. The second part of the research process concentrates on the use of BPM methods during the implementation of ERM system and the thereby defined objectives.

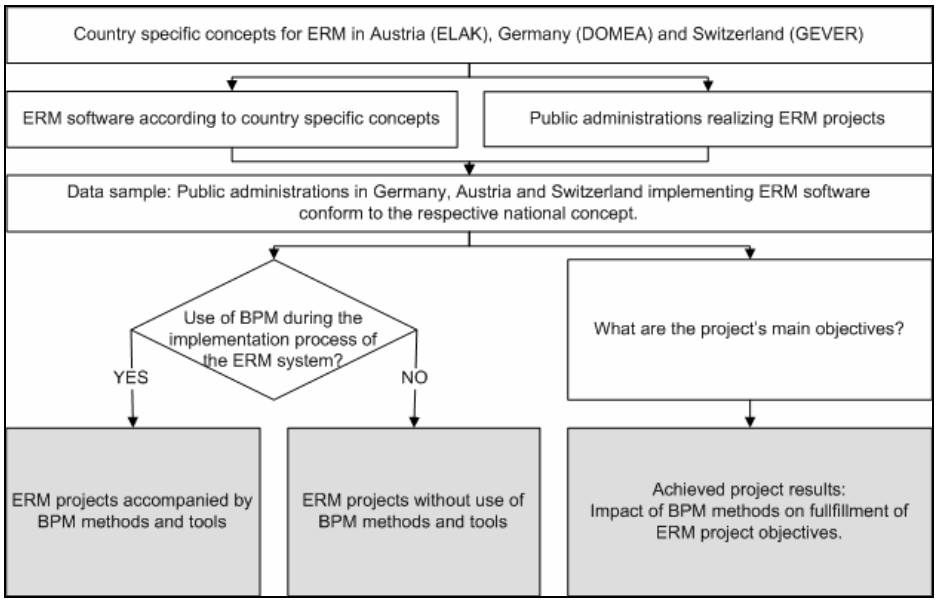

Figure 2: Research Process Model

The online questionnaire contained 22 questions about the following research areas: type and size of the organization, general project definition; primary project objects, used BPM methods, successful established electronic processes; achieved project results and estimated trend to standard or ad-hoc processes after roll out of the ERM system.

3.2 Data Sample

In November 2006 the research had started with the selection of the data sample and the collection of all contacts for the survey. The detection of ERM projects contacts was realized with the help of the national Chief Information Offices of each country (KBST[9], CIO[10], ISB[11]), who provided reference lists of public authorities implementing ERM systems respective to the national standard (DOMEA, ELAK, GEVER). In total, the data sample consists of 124 contacts for Germany (60), Austria (41) and Switzerland (23). The expert online survey (table 1) was accomplished from April 2007 until End of May 2007 by the Department of Information Systems at the University of Innsbruck. In total 50 public authorities responded to the survey which is a response rate of 40.3 percent. Two of the respondents have aborted the survey after the first question, which means in total 48 responses. 39 of 48 organizations had already implemented or started with the introduction of an ERM system.

Distribution of participants of the survey	Q3: Has your organization started or completed an implementation of a Records Management System?		
Country	**Yes**	**No**	**Total**
Switzerland	22.9 %	6.25 %	29.2 %
Germany	18.75 %	10.4 %	29.2 %
Austria	39.6 %	2.1 %	41.6 %
Total	81.25 %	18.75 %	100.0%

Q4: What is or was your function/role within the ERM project?	
Project role	**in %**
Project leader	27.0 %
Steering Committee	24.3 %
Project collaborator	21.6 %
Program leader	8.1 %
External experts	8.1 %
Project coordinator	5.4 %
No function	2.7 %
No answer	2.7 %
Total	100.0 %

Table 1: Participants Distribution of the survey data

Regarding to the federal differentiation of the interviewed public organizations the majority of participants (30) belong to national level which is 63 % of all participants. 11 authorities are responsible at regional level (22 %) and five are situated at local administration level (10 %). Two respondent organizations (4 %) are acting in public administrative near areas, which are a national wide post organization and a local hospital.

39 participating organizations have implemented or are at the moment implementing an ERM system. The authors decided to remove two incomplete responses for further analyses. This means, in total 37 ERM project cases represent the data sample for

[9] KBST: Coordination and Information Center for ICT of the German Federal Administration (KBST)
[10] CIO: Chief Information Office (CIO), ICT strategy of the Austrian Federal Administration
[11] ISB: Information Strategy of the Confederation of Switzerland (ISB)

analysis regarding our research question and formulated hypotheses. To ensure a high quality of answers the experts were asked to define their role within the ERM project. Nearly all participants (95 %) were involved directly in the project. Only one person had indicated to have had no function and another one did not answer to this question (see table 1).

4 Results

Analyzing the ERM project's data, more than half (54 %) of all projects had or have planed a longer project duration than 2.5 years. Only three projects could be finished within one year. This means that normally ERM projects should be seen as long term projects with duration from about two to more than three years. 58 % of the projects are already finished, 28 % are at the moment rolling out the system and 11 % are now testing the system or implementing a pilot system. One public organization has just started the ERM project. The size of the projects was measured by registered users (RU) of the ERM system. The majority of the analyzed project cases are medium-sized (200 till 1.000 RU), 39 %, up to large (> 1.000 RU) projects, 36 %. Large ERM projects for more than 2.000 employees normally take longer but the size of the project has no direct influence on duration. In comparison, smaller ERM projects are often not so time consuming than larger ERM projects.

4.1 Use of BPM Methods during the implementation of ERM systems

Traunmüller and Wimmer state that there is a lack of use of BPM methods in e-government projects [TW03]. Our survey underlines this statement. Only 10 of 34 ERM projects have been accompanied by BPM methods. This means, while the importance of focusing on processes and the necessary of BPM methods in introducing e-government is well known, nevertheless more than two third of the ERM projects are or have been realized without the support of BPM. Therefore, the low use of BPM in e-government projects in general applies in particular also in ERM projects, which verifies the first hypothesis (H1).

Looking at the countries in detail the diffusion of using BPM methods is nearly similar in Austria, Germany and Switzerland. In all three countries less than one third of the ERM projects have been accompanied by BPM activities (figure 3). The federal structure of the organization has also no impact on the use of BPM methods. In all three structural levels – national, regional and local – the deployment of BPM methods is nearly similar. It has to be mentioned that the diffusion of participants on federal levels is not consistent in our survey.

Depending on the project size it can be stated that the large scale projects with more than 500 employees use more BPM methods. A reason for this result can be that in large scale ERM projects the complexity is much higher. More departments, more involved people and more different procedures are to handle within one project. The ERM system has to meet requirements for a bigger environment and guarantee that all involved persons can

fulfill their tasks as efficient as possible. In this case process analyses are essential to reduce the system functionality to a common level. Otherwise an extreme function overload (function explosion) could arise and the ERM system becomes un-usable.

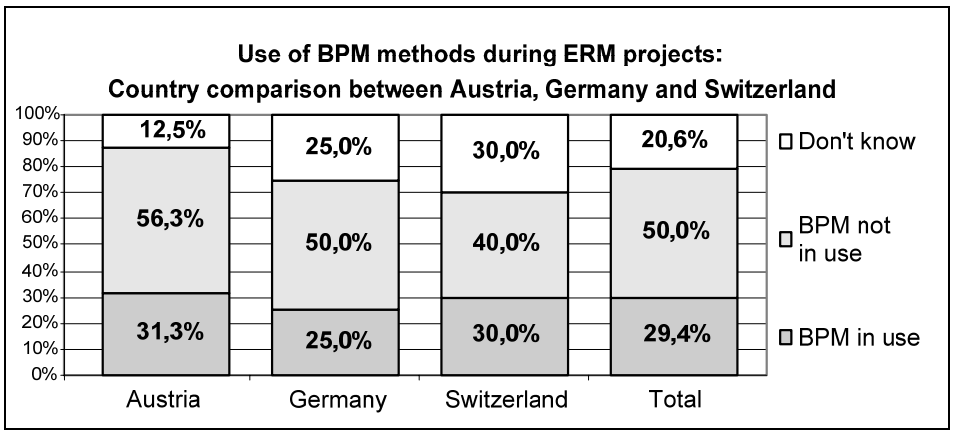

Figure 3: Use of BPM methods in Austria, Germany and Switzerland

Asking the survey participants, if they want to use BPM methods in the future (after the implementation of the ERM system), about the half of the interviewed person answered with no (48 %), 35 % want to use BPM methods in the future and 16 % could not give a definite answer. This result can be seen as a continuing medium-term approach in implementing ERM systems, which means that in managing electronic records BPM till now and in the near future is not seen as a very important management task.

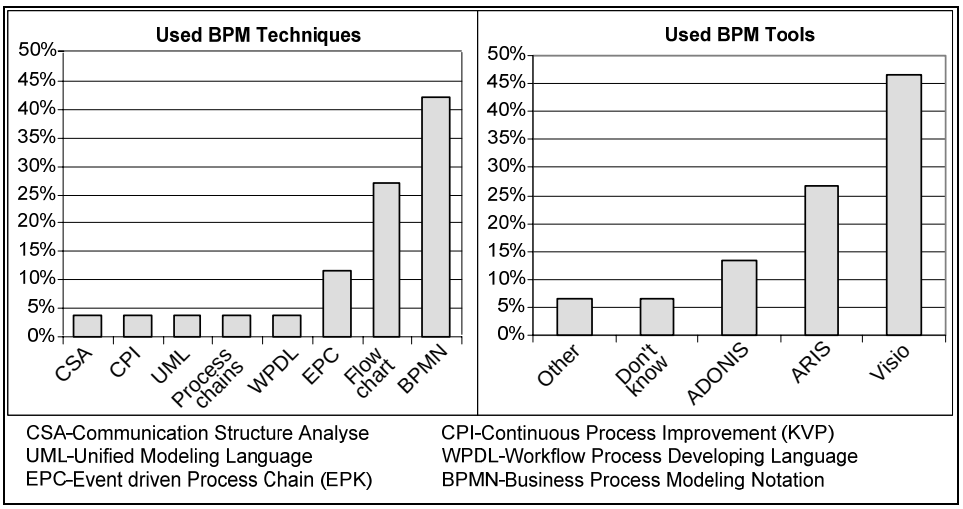

Figure 4: Used BPM techniques and tools

In the case that the ERM project has been accompanied by the use of BPM methods, the authors asked to mention which techniques and tools have been used during the ERM

project (figure 4). As the most common BPM techniques the Business Process Management Notation (BPMN) – including the Business Process Diagram (BPD) as part of it – and the flow chart (flow diagram) have been quoted. In some projects also the event driven process chain (EPC) was applied. All other BPM techniques or methods, like process chains, unified modeling language (UML) or workflow process definition language (WPDL) have been used only rarely or none. The higher use of graphical BPM methods may explain why Microsoft Visio is the preferred BPM tool in designing process models. But also professional designing tools like ARIS or ADONIS are applied in some ERM project cases.

4.2 Impact of BPM Methods on ERM Project Success

In comparison to the hierarchy of e-government project objectives of the DFKI study in 2003, the experts of the survey evaluated as most relevant objectives efficient operational procedures (91,7 %) followed by reduction of throughput-time (83,3 %) and higher quality of service (55,6%) as the third most important objective. The exact rating of project objectives is illustrated in figure 5. As alternative objectives additional to the DFKI study, the experts mentioned: better intern and extern communication, reduction of resources, reduction of division of work and reorganization or flatter organizational structure.

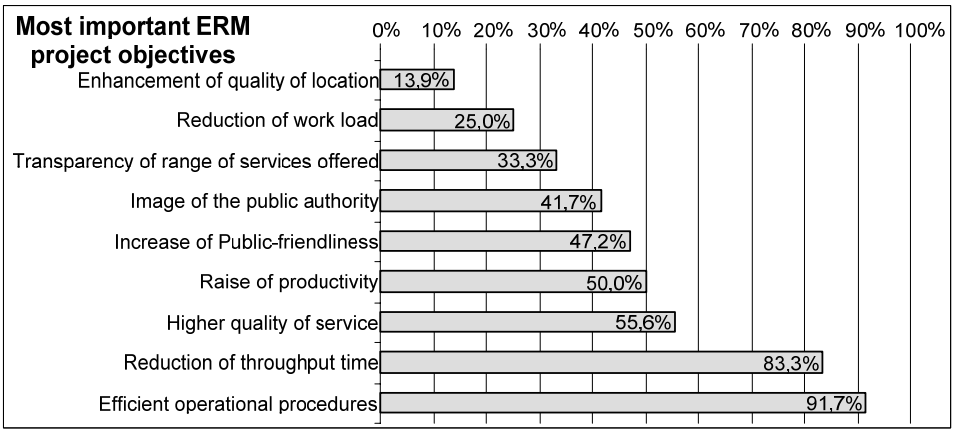

Figure 5: Frequency of ERM project objectives

The second part of the survey concentrated on the relation between the support of the ERM project by BPM methods and the achievement of project objectives. 26 persons have indicated that the ERM system is already productive. We asked this people to rate the successfully achievement of the project objectives via a seven-point Likert scale. Four of the participants stated that they did absolutely achieved their project objectives, 11 in large part, four more likely, five neither nor and only two indicated that they more likely failed their project goals. No one quoted the asked statements “In large part not correct” or “absolutely incorrect”, so these two possibilities are not shown in table 2.

Comparing the given answers after the question asking if the project has been supported by BPM methods or not, the result is that the use of BPM methods does not have an influence on the success of the project (table 5). In contrast the result shows that the participants of ERM projects supported by BPM quote the achieved project objectives more critically. Even though the most important project objectives are strongly related to process matters, the second hypothesis (H2) – a direct and positive impact of BPM on ERM project results – could not be verified.

Use of BPM	How do you agree to the following statement? "The project objectives could be achieved completely!"						
	Absolutely correct	In large part correct	More likely correct	Pendant	More likely not correct	…	Total in %
Yes	-	7.7 %	3.85 %	7.7 %	7.7 %	…	26.95 %
No	11.5 %	26.95 %	11.5 %	3.85 %	-	…	53.8 %
Don't know	3.85 %	7.7 %	-	7.7 %	-	…	19.25 %
Total in %	15.35 %	42.35 %	15.35 %	19.25 %	7.7 %	…	100 %

Table 2: Use of BPM Methods and Project Success

5 Discussion and Future Research

The objective of the survey was to find out which Business Process Management (BPM) techniques and tools are mostly used in public administrations and which impacts they have on implementing an Electronic Records Management (ERM) system regarding process redesign, internal administrative procedures and fulfillment of project objectives. It has to be mentioned that in particular the number of projects supported by the use of BPM methods was by far under the expectations. This limits the results according to preferred BPM techniques and tools and do not allow building consistent and normative statements. A similar survey with a larger data sample would be necessary to establish normative statements and is part of a future research project starting in the near future. Nevertheless the survey shows that there is nowadays not an increased use of BPM methods during the implementation of ERM systems in public authorities. Public administrations have still problems regarding the optimization of their processes with adequate BPM methods and tools.

With the implementation of an ERM system the majority of public authorities want to achieve more effective procedures, shorter throughput-times, higher quality of service and a better productivity. Even though these project objectives are clearly focusing on processes a bigger part of the public administrations do not use BPM methods to redesign their processes. As the results of the survey reveal, nevertheless they gain good project success. In the following section, the results are discussed from a comparative point of view.

In Austria's, Germany's and Switzerland's government all e-government related tasks – including the implementation of ERM system – has been given top priority. In all three

countries there has been established a central top agency for the coordination and development of all e-government aspects, like the CIO of Austria, the KBSt of Germany and the ISB of Switzerland. In doing so these agencies have developed major concepts to drive their eEurope initiatives in a coordinated and standardized way and this among other things – like Electronic Resource Planning (ERP), Internet Portals, Digital Signature, Online Services, and so on – also for ERM systems. For example in Germany all parts of public authorities for ERM nearly include the criteria that the software must be certified according to the DOMEA standard by the KBSt. The national ERM concepts (ELAK, DOMEA, GEVER) include standardized process definitions which are modular defined in a top down approach (CIO01; KBSt05; ISB06). The results allow the statement that, regarding to the transformation of administrative processes, for a specific use case the following top-down structure can be designed: process – activity – work step. An example for this approach is the GEVER concept, which defines a "Generic Business Model" including simple and generic process definitions like "capture incoming application", "create new file", or "allow an application". The concepts DOMEA and ELAK follow an analog approach. So in implementing an ERM system the modular structure allows a re-use of standardized activities in various public agencies [Sc05]. In the survey 86 percent of the participants stated that the implemented ERM software contains a workflow engine. An ERM standard software, which is conform to the respective national ERM concept, often already contains modular base process definitions and activities for public administrations. For this reason authorities who are implementing such ERM standard software are in a position to switch effortless from the traditional paper processes into electronic ones. Thereby the previous processes are almost completely taken over 1:1. This could be a possible answer why in implementing an ERM system public authorities gain good project success – in respect of process objectives – even though they do not use BPM methods. Future research should discuss if alone the digitalization of the traditional "paper-based" processes into electronic ones yields to higher efficiency.

Future work will be concentrated on analyzing established electronic processes and their comparison between similar authorities in Germany, Austria and Switzerland. In doing so it will be one objective to find out how public processes can be designed on one hand as standardized as possible to be efficient enough and on the other hand as flexible as possible to meet public administrations' requirements.

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