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Abstract

Due to the changes in the structures of public administrations within the European Union, business process management has moved into the focus of public decision makers. Several projects with established modelling and reorganisation approaches from the private sector show (Fraser et al. 2003; Seltsikas and Palkovits 2006), that the specific legal, personnel, and political conditions rule out a careless adoption of these approaches for the public sector. Especially, the high amount of public services requires an efficient representation of the entire process landscape in order to measure the overall reorganisation potential. Focusing on isolated processes only leads to small local improvements (Raster 1994). In this paper the PICTURE-approach for an integrated business process management in public administrations is presented. The PICTURE-method allows for an efficient documentation of the entire process landscape in a public administration and a detailed analysis of the resulting process descriptions.

Keywords: Business Process Management, E-Government, Information Modelling, Process Building Blocks, Public Administration, Process Landscape

Process Improvements in Public Administrations

The political consolidation process within the European Union strongly affects the public sector. The harmonisation of member state laws exerts a significant influence on the organisational structures of public administrations. In many member states the administrations are facing new challenges like cost reduction and an increased service level demand from citizens and companies. To cope with decreasing tax revenues and a reduced financial scope they are forced to rethink their resource allocation and to reduce costs. This situation moves business process management into the focus of public decision makers. However, the common public administration service portfolio is much diversified. Municipal processes include more than 1,000 interconnected and interdependent services and underlying processes for citizens, companies, and other administrative parties (Becker et al. 2006). On the other hand the space for necessary adjustments is limited by legal restrictions and political interests. This raises the question of how business process management can address these particular circumstances.

With the reorganisation of processes two approaches were established and are regularly the subject of academic discussion (Becker et al. 2003). On the one hand the deductive, evolutionary approach where individual processes will be gradually improved incrementally and on the other hand the revolutionary "green-field" approach by Hammer & Champy,

which fundamentally questions all workflows and promises dramatic improvements (Hammer and Champy 1993). To solve the specific problems of public administrations (e. g., Bretschneider 1990; Palkovits et al. 2003; Scott et al. 2004), both approaches are inadequate. The approach by Hammer & Champy is unusable in public administrations due to the legal, personnel and political conditions. The incremental approach creates little transparency and only covers limited reorganisation potential thus only leading to small local improvements (Raster 1994).

In this paper we present the process management approach PICTURE that was developed to address the specific conditions of public administrations. Like the evolutionary approach the PICTURE-method focuses on the current processes in order to identify reorganisation potential. However, PICTURE takes the entire process landscape of a public administration's organisation into account. Not only isolated processes are analysed but a complete overview on the practices of an organisation is accomplished. This overall view allows for reorganisation decisions being based on the consideration of structural analogies, potential synergy effects, and economies of scale. Contrary to the revolutionary approach PICTURE does not provoke a radical change in an organisation but indicates technical and organisational measures to improve the efficiency of the process landscape (Davenport 1993).

The remainder of this article proceeds as follows. Firstly, based on the specific characteristics of public administrations, requirements for a process management approach are defined. Subsequently, the PICTURE-method is described as a core contribution, which works to efficiently capture the process landscape of public administrations. PICTURE aims at both enabling an integrated description of the processes as well as an analysis of the entire process inventory to identify reorganisation potential. Afterwards, the utility of the method in modelling projects at the University of Münster and at the City of Münster is illustrated. Then based on the experiences made in these projects the degree of performance regarding the requirements defined in this paper is explained and limitations are shown. The paper closes with a summary of the results and an identification of further research.

The research method being used for developing the PICTURE-method is based on the work from Takeda et al. (1990), Walls et al. (1992), and Markus et al. (2002). As the objective of this paper is the creation of an artefact in form of a method, the work belongs to the design-science oriented research (Hevner et al. 2004). The PICTURE-method has been engineered with a paradigm-based strategy (Ralyté et al. 2003) by taking established process modelling techniques such as Business Process Modelling Notation (BPMN) (Object Management Group 2006), Event Driven Process Chains (EPC) (Scheer 2000), and UML Activity Diagrams (AD) (Object Management Group 2004) as baseline for adaptation and specialisation.

Requirements Specification

In order to identify reorganisation potential it is necessary to gain knowledge about the processes in an organisation. We understand reorganisation potential as comprising all possible improvements that can be achieved in an organisation. Conceptual modelling has proven to be an efficient way to gain process knowledge and to allow for suggestions for process improvement (Dreiling et al. 2005). Based on the particular characteristics of the public sector (e. g. Bretschneider 1990; Navarra and Cornford 2005; Scott et al. 2004) we conducted the following requirements for a modelling method:

1. *Simple representation of the process landscape.* In order to model the process landscape of a public administration with viable efforts a simple language is required. The officials of a public administration are no modelling experts. Thus, they need a modelling language whose constructs they can understand and identify within their domain. Also the syntactical rules of a modelling language must be easily comprehensible. In order to achieve this requirement, the modelling language should exhibit a minimal set of constructs (Opdahl and Henderson-Sellers 2002). Unnecessary constructs additionally increase the complexity of the language. A less complex modelling language is easier to learn and thus allows for more efficient modelling. Hence, the modelling language should be domain specific (for domain specific languages see e. g. Guizzardi et al. 2002; Luoma et al. 2004; Rossi et al. 2004). A domain specific language comprises constructs with well known semantics as the corresponding terms stem from the domain the language is built for (van Deursen et al. 2000). Simultaneously, a domain specific modelling language is powerful enough to gather all relevant aspects of the domain.

2. *Creation of maintainable process models*. The continuous application of the captured process models saves the investment in process documentation in the long run. Especially for the continuous improvement of the organisation process models which are up-to-date are important. The maintenance of the models has to be achievable with minimal efforts. A public administration domain specific modelling language enables domain experts to apply the language on their own without the aid of a modelling expert. The capability to modify a model without a modelling expert promotes the regular incorporation of the changes in the organisation into the process models.

3. *Creation of comparable process models.* The inherent structural analogies within and between public administrations offer a high potential for reorganisation. Therefore, it is not sufficient to analyse the process models of an organisation independently from each other. Rather, it is essential to identify similar or deviating structures in models (Kashyap and Sheth 1996). Thus, the models must be syntactically and semantically comparable. However, if two models are compared, type conflicts, naming conflicts, or structural conflicts can arise (Batini et al. 1986; Lawrence and Barker 2001). Therefore, in order to identify common patterns and weaknesses which occur in multiple processes it is necessary to address these conflicts to make the models syntactically and semantically comparable. To get comparable process models in this way the degree of freedom for the modellers has to be limited. The modelling language itself should ensure that the same issue in two different cases and considered from two different persons is modelled the same way (Becker et al. 2000). Enabling the comparison of process models admits the identification of reorganisation potential by considering the entire process landscape.

4. *Creation of analysable process models.* Comparable models are a necessary condition for a detailed analysis. An examination of a single process allows for an identification of weaknesses that are specific to this particular process. For example it is possible to reveal that a couple of activities in a process are unnecessary in order to fulfil its objective or that a change of order would increase the efficiency. However, in order to discover reorganisation potential it is not sufficient to analyse only the current state of a single process. It is rather necessary to know what reorganisation measures do affect the entire process landscape and to what extend. Therefore, a connection must be made between common process patterns and reorganisation measures. Reorganisation

potential can then be estimated based on a summation of expected savings of all reorganisation measures that match a certain weakness in the process landscape. To calculate an overall reorganisation potential, detailed information on each reorganisation measure is required. Considering the many models capturing the process landscape of public administrations it is only possible to analyse them in a (semi-)automatic way. An example is the identification of so called ping-pong processes (Becker et al. 2007b). By counting the alternations between organisational units within the models these weaknesses can be identified in an automatic way.

5. *Efficient modelling*. To capture the entire process landscape of a public administration a large modelling team is required. Additionally, the inclusion of many domain experts is necessary. However, as public administrations are mainly financed by taxes they dispose of generally only scarce resources. Therefore, a modelling project must take up temporally as little as possible of the time of the staff. In parallel the costs of external consultation must be kept small. Hence, the project must be performed efficiently.

The PICTURE-Method

The PICTURE-method consists of a modelling language and a procedure model which guides the application of the language. Both parts are implemented in a web-based tool with the name PICTURE. Firstly, the PICTURE-language with its main constructs is described. Secondly, the procedure model as well as the identification of reorganisation potential is explained.

The PICTURE Modelling Language

The basic construct of the PICTURE modelling language is the process building block. A process building block represents a specific set of activities within an administrative process (Rupprecht et al. 2000). The PICTURE-method contains altogether 29 different process building blocks. PICTURE can be extended by additional process building blocks. However, the existing 29 process building blocks have evolved in multiple projects as a sufficient vocabulary to describe administrative processes. Some examples of process building blocks are shown in Table 1.

Table 1: Examples for process building blocks with their specification

Process Building Block	Definition of the Process Building Block
Incoming Document	A document which arrives from an internal or external source.
Create Document	A new document is generated.
Print Document	A document is outputted with a printer.
Formal Assessment	A proposal is formally assessed and a decision is reached.
Forward Document	A document is internally forwarded.
Enter Data into IT	Facts or documents are manually entered into an IT system.

Process building blocks have been specifically developed for public administrations and apply the vocabulary of this domain. The meaning of a process building block is

characterised by a corresponding domain statement. Thus, the process building blocks dispose of a fixed, informally defined, domain specific semantics. Contrary to constructs of traditional process modelling approaches like activities in ADs or functions in EPCs, process building blocks in PICTURE reside at a particular level of abstraction. For example an activity in UML can be instantiated as: "to run a company", "to hire an employee", or "to sign the labour contract". These activities stand for differently abstract phenomenon in the real world. However, an instance of a process building block, for example "Incoming Document" (cf. Figure 1), has always a specific meaning, in this case that a document arrives.

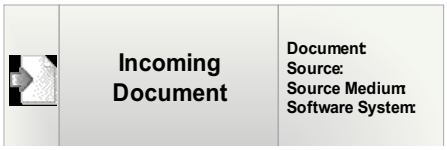

Figure 1: The Process Building Block "Incoming Document"

In PICTURE process building blocks are the only way to describe processes. Processes are represented as a sequential flow of building blocks. The use of process building blocks restricts the degrees of freedom of the modeller and simultaneously promotes the construction of structurally comparable models. Since only process building blocks can be used, the type of each model element is not just syntactically but also semantically fixed. Problems like *naming conflicts* in a model comparison are avoided, because the name of a process building block is specified by the language designer rather then the modeller.

With building blocks the sequential order within administrative processes can be specified. However, in order to identify reorganisation potential more information about the processes is required. Additional facts about the processes can be collected with the help of attributes assigned to the process building blocks. For example possible attributes for the process building block "Enter Data into IT" are "Source", "Source Medium" or "Processing Time" (cf. Table 2). Altogether, PICTURE contains nearly 50 different attributes. Attributes provide the core information for a subsequent process analysis, in which, according to the predetermined goals, corresponding weaknesses and potentials are detected.

Table 2: Examples for attributes with their definition.

Attribute	Definition of the Attribute
Document	The name of the document which is moved or processed. For example an application form or an official notification.
Source	Source of a document or information, e g. a person, organisational unit or organisation.
Source Medium	The medium in which a document or information arrives. For example telephone, fax, mail or e-mail.
Processing Time	Time in minutes it takes to complete a certain activity.
Software System	The name of the software system which is involved in this activity.

In PICTURE a process can consist of several sub-processes (cf. Figure 2 a)). A sub-process is a process section being carried out by a responsible official or a position within a single organisational unit. Sub-processes are sequentially connected and can be linked together to visualise a whole process. The majority of the modelling activities take place on the sub-process level. As processes can span over multiple organisational units the differentiation

between processes and sub-processes makes it possible to delegate modelling tasks to the responsible official who enacts the activities. Within the scope of the sub-process the responsible official can collect all relevant information and represent them in the form of process building blocks and attributes. For example the process "Towing a motor vehicle" in a public administration can have the sub processes "Execution of towing", "Creation of towing file", and "Opposition proceedings". However, some processes contain only one sub-process (cf. Figure 2 b)). An example is the process "Notification on fees for a motor vehicle".

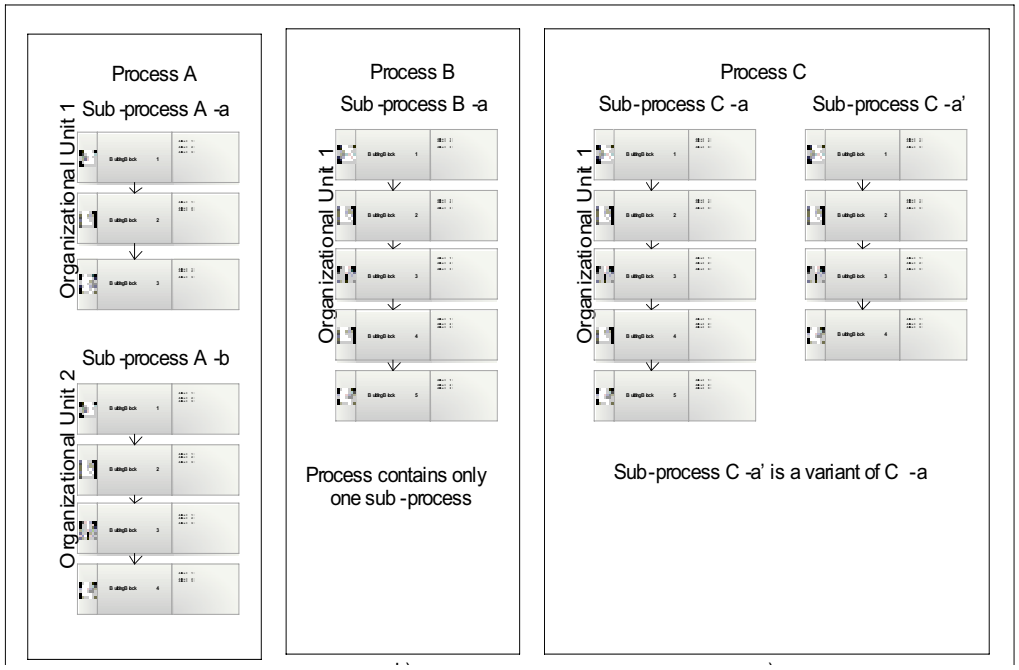

Figure 2: Processes, sub-processes and process variants.

The modelling with the PICTURE-language is strictly sequential. PICTURE offers no language constructs to represent forks in the course of process building blocks. It is also not possible to model iterations. To describe technically important ramifications in the process flow, PICTURE offers two possibilities: On the one hand attributes can be used to specify different cases with percentage values. For example an incoming document can arrive in 50% of the cases through the communication medium mail, in 30% per email, and in 20% per fax. On the other hand it is possible to specify process variants (cf. figure 2 c)). A process variant defines an alternative sequence within a sub-process. Process variants contain in comparison with the original sub-process many common process building blocks. However, some of the process building blocks have been modified, new ones have been added and some have been removed. The frequency of a process variant can be weighted by percentage values.

The PICTURE Procedure Model

The procedure model of the PICTURE-approach contains three steps. In the first step the method is adapted to the specific circumstances of the project. In the second step all relevant data is acquired by using the modelling language. In the third step this data is analysed in order to prepare reorganisation projects and to identify savings potential.

The first step during an application of the PICTURE-method is to define the objectives of the project. Based on these goals the PICTURE-method can be customised for the specific

properties of the project. The PICTURE-method comes with a list of possible project goals such as. “Development of an organisation wide IT strategy”, “Systematic identification of media breaks”, or “Discovery of reorganisation potential”. The selection of appropriate objectives is performed in a goal-finding workshop together with the subsequent users of the models. If for example the project goal is reorganisation then it is important to acquire the duration of activities. If the objective is to define a new IT strategy it is essential to document the existing software systems that support the processes and to find weaknesses like media breaks in the process chain to identify necessary points for IT-support. The configuration of the method results in a choice of the attributes which are required in order to meet the information demand derived from the project goals. These attributes decide what analyses can later be performed based on the resulting models. If there is a need for further information besides these developed goals, optional attributes can be added. Before PICTURE can be applied it is essential that the project objectives are communicated within the organisation and the project is supported by management and staff. Depending on the chosen attributes it can be necessary to inform the staff council about the project.

The second step of the PICTURE-approach is to model the entire process landscape. Therefore, modelling teams must be established and modelling orders have to be assigned. PICTURE focuses on a strong involvement of the officials of an administration in the modelling project. There are certain questions for example about the execution of processes and the frequency of certain tasks that can only be answered by a responsible official or his supervisor. Due to the fact that in order to represent the entire process landscape many officials must participate, the collection of the processes is very time consuming. With the PICTURE-approach the modelling is performed in a distributed manner and the acquisition of process models is done in a coarse granular form to reduce time and effort for modelling. PICTURE has been designed as a simple and intuitive modelling method focusing on officials in public administrations. The officials can build process models independently and locally. The method supports the illustration of mutual dependencies between process models. To acquire the processes two different approaches are possible: Firstly, the officials can be interviewed by method experts. The results are documented during the interview as either paper-based including a later transfer to the PICTURE tool or directly with the tool in first place. Secondly, the officials represent their processes by themselves without an involvement of a method expert. The officials can use the PICTURE tool to describe their processes. Depending on the motivation and the standard of knowledge one alternative can be chosen. If domain experts want to model their processes on their own, a training workshop is required. While modelling the processes the PICTURE tool asks the domain experts for suggestions for improvement and collects the answers in a proposal list. These suggestions are reviewed by an official. This official has to accept the suggestions before they are released for other users of the method. The suggestions can be used as a starting point for a reorganisation project.

The third step is to analyse and use the process models. In a complete acquisition and structuring of all administration processes lies an added value, since it fosters transparency. With PICTURE a process can be catalogued according to different criteria. Possible features are the structural organisation of an administration as well as a catalogue of services. The presentation of a structural organisation is often comparatively easy because an existing administration organisation plan gives good guidance. In contrast to that, there is often no reference for a compilation of a catalogue of services. Based on the process models covering the entire process landscape PICTURE supports the development of a catalogue of services. The PICTURE tool allows for a publication of this catalogue on the internet or the intranet.

The catalogue can be used for the training of new officials or as source of information for citizens and other stakeholders.

A model that documents the current state of a process landscape can point out reorganisation potential. The organisation's efficiency is for example influenced by: the number of printed pages in an organisation per year, the travel time of the officials, or the amount of work interruptions. If these attributes are captured in the models critical elements of a process landscape can be tracked down and analysed in detail. A holistic overview shows saving potentials no longer only for single organisational units like departments or offices but for the whole administration. Additionally, by defining certain patterns of process building blocks frequent interdependencies between departments (so called ping-pong processes) can be discovered or unnecessary media breaks can be detected. An example for such a pattern is if in one sub-process a building block "Print Document" is found. In the subsequent sub-process there exists a building block "Enter Data into IT" for the same document. This could indicate an unnecessary media break and could be the starting point for an in-depth analysis as part of a reorganisation project.

Beneath organisational measures the reorganisation potential of IT basic components like document management systems, knowledge bases, or virtual post offices can be estimated. IT basic component can supersede certain activities in processes or change the sequence of activities. For example the process building block "Enter Data into IT" can be removed without substitution if a document management system provides the same information electronically. As the PICTURE-method provides information on the entire process landscape the quantitative and qualitative effects of the introduction of a certain technology on an organisation can be assessed.

Evaluation of the PICTURE-Method

Two case studies have been performed in order to evaluate the PICTURE-method. As evaluation method action research has been employed (Avison et al. 1999; Cole et al. 2005). PICTURE has been practically applied at the University of Münster as well as at the City of Münster (cf. also Becker et al. 2007a; Becker et al. 2007b; Becker et al. 2007c).

University of Münster: The University of Münster is a public institution with about 40.000 students and an administration engaging 500 officials. In this case study 34 interviews with officials of the university's administration in six different departments were conducted. The project group was composed of a project manager; four sub-project managers and seven team members. Each interview was conducted by two team members together with one or two officials of the administration. In these sessions, altogether 168 processes could be identified and modelled. During the interviews, all processes were documented on paper. Process building blocks were applied to structure the discussion. After the interviews, the processes were translated into the PICTURE-language and sent back to the interview partners for review. If any corrections were made by the administration's officials the process models were adapted accordingly. Already at this stage we received a very positive feedback about the comprehensibility of the models. It took 477 person hours to identify and document the processes, on average approximately three person hours per process. Only one person hour of these three hours was needed to model the processes. The rest of the time was used to prepare interviews, write a protocol and give feedback to the interviewers. Based on the experiences made a few missing process building blocks and a couple of attributes could be identified and were added to the language. Forty proposals for improvements could be derived from the

PICTURE process models. With help of the PICTURE tool the process models have been published on the intranet of the university.

City of Münster: The City of Münster has about 280.000 inhabitants and an administration with roughly 4.000 officials. Fifty-one interviews have been accomplished at five different departments of the administration. A project manager, five sub-project managers and 14 team members were involved in this project. Based on the interviews 172 processes could be identified and documented. These processes have been collected in two different ways, paper- and tool-based. Thirty-eight processes were acquired in the traditional form - first on paper and later modelled with the PICTURE-method. The remaining 134 processes were modelled directly during the interviews together with domain experts. For this purpose the web based PICTURE-tool was applied. As the process models were created within the interviews together with the administrative officials, a later review and rework was no longer required. We experienced a much higher quality of the models with this second form of acquisition. Further enquiries by the officials as in the first option could be completely omitted. With the first form of acquisition it took two-and-a-half person hours to capture a process. More than one person hour was necessary to copy the processes from paper into the PICTURE modelling tool. Another 30 person minutes were required to prepare the interviews and ask for feedback. With the second option a process could be finished in one-and-a-half person hours. Besides preparation most of the time was spend with modelling the processes within the tool. Even though, it took somewhat longer than documenting them on paper, the time for the transfer in the tool and later rework could be saved. Discussions with the administration's officials during the project showed that they appreciated the method as it is simple to understand and creates transparency in their processes.

In the Regio@KomM project processes of several municipal administrations in the Münster area have been acquired with the modelling language EPC (Algermissen et al. 2005). The processes were comparable in structure and size with those at the University of Münster and City of Münster. In the Regio@KomM project the collection of 22 administrative processes took six person hours on average. The paper based modelling of a single process with the PICTURE-method required only half of that time. With the tool based modelling the time could be further reduced to a fourth. The participants at University of Münster and City of Münster who had pervious experiences with EPC modelling evaluated the PICTURE-approach as faster to learn and its models as easier to understand in comparison to EPC. Table 3 shows the different efforts per process and per project.

Table 3: Process acquisition times.

Project	Form of acquisition	Process acquisition time
Regio@KomM	Paper based	6.0 person hours
University of Münster	Paper based	3.0 person hours
City of Münster	Paper based	2.5 person hours
City of Münster	Tool based	1.5 person hours

During the two projects the PICTURE-method was continuously evaluated and adapted if required. All inadequacies of the modelling method were documented. Obvious improvement possibilities were discussed during the project meetings and implemented during the course of the project. The reactions of the officials to the application of the method and all

recognised advantages were noted. Also restrictions of the PICTURE-method were gathered in an evaluation document.

Discussion of the Results

The experiences from the two case studies were used for a comparison with the initial requirements. We found, that all of these conditions could be met by the PICTURE-method.

1. *Simple representation of the process landscape.* Within the administration, the reactions to the method were very positive. The abstraction level of the process building blocks proved to be suitable. The predominant majority of the officials were able to formulate their workflows with the aid of the process of building block-vocabulary and a better comprehensibility of the models compared with other previously used modelling languages was explicitly emphasised several times by the officials. In the course of the project it became clear that the activities of certain departments can be modelled better than others. Especially processes that are structured and form-driven could be adequately described. In order to be able to represent less structured processes and processes without documents, additional process building blocks were added on the basis of the findings from the interviews (e.g. the process building blocks "Consultation" and “Workshop").

2. *Creation of maintainable process models*. The PICTURE-method supports the creation of maintainable models. Through modelling with the help of abstract process building blocks, structural variations could be observed less frequently compared to classic process modelling methods. Nevertheless necessary changes to the models can be carried out by the official who is responsible for a process. This lower maintenance expense, associated with the maintainable process models, strongly motivates users to keep models up-to-date, unlike the classic approaches. The experiences of the two case studies demonstrated this.

3. *Creation of comparable process models.* Through the use of same process building blocks in different process models, the comparability of the models has been promoted. The process building blocks limit the degrees of freedom with the modelling. These building blocks ensure that the meaning of a model element is entirely determined by the modelling language. Consequently, problems such as name or type conflicts within a model comparison are avoided (Pfeiffer and Gehlert 2005). Structural similarities in administrative processes can be identified in such a way. The processes found in the two administrations were modelled by multi-person modelling teams and were, in the end, nevertheless easily comparable. So, for a uniform presentation of the processes only minimum revisions had to be made.

4. *Creation of analysable process models.* The comparison already represents a possibility of the evaluation. For example, through the comparison of process models they can form groups of processes that contain a similar combination of building blocks (e.g. a grouping of all processes which contain a consulting discussion or a payment). These groups can then be reviewed jointly before the background of reorganisation measures. Not only process building blocks, but also specific attributes, e. g. turn-around times, drop numbers, or costs, can be evaluated. So, the average recovery rate of mail traffic can be determined, together with the associated costs. The dismantling of processes into sub-processes that belong to exactly one organisational

unit permits a simple analysis, for example, which information flows exist between which departments?

5. *Efficient modelling*. The process building blocks of the PICTURE-method are very easy to understand for the officials of the administration, since they use the vocabulary of this domain. Furthermore the building blocks fix the abstraction level of the modelling. In this way it is possible to model much faster than with the classical approaches and also include more processes with the same amount of resources. In comparison with the use of EPCs, modelling time as well as resources could be saved considerably. We could show that the PICTURE-method shrinks the time to acquire a single process up to a fourth compared to the language EPC. EPC is a very broadly applied modelling approach and shows many structural similarities with other existing methods.

By performing the two case studies we found a couple of issues not being addressed by the PICTURE-method up to now. The following problems remain:

1. *The PICTURE-method is not suited for the detailed analysis of single processes*. The method was designed with the goal to enable the complete description of process landscapes. Therefore, the domain is described on a correspondingly high abstraction level. The purpose of the method is not to extensively model control flows or to describe processes in such detail that they, for example, could be implemented in a Workflow-Management-System. If necessary, a higher degree of detail can be achieved by the use of additional attributes. However this significantly increases the modelling expenditure, which has clear effects on the required project resources during the collection of several hundred processes.

2. *The PICTURE-method is not suitable for representing unstructured or only uniquely occurring processes*, for example the planning processes or an action in a project. Because of the fixed abstraction level of the process building blocks, such processes can be only insufficiently or not at all be described with PICTURE.

3. The success of the PICTURE-method is strongly dependent on the support of the officials. The officials as domain experts are included directly into the process modelling. It is important that they are motivated to document their knowledge with the method. Modelling projects must therefore be carried by both the different management levels and by the operational officials themselves. It is an open issue under which circumstances in detail officials feel up to cooperating with the management (Styhre 2003).

During the projects the PICTURE-method proved to be an adequate measure to represent administrative processes and to manage their improvement. With the experiences of the two case studies, the method could be further improved. Missing process building blocks as well as attributes were identified and added.

Summary and Outlook

Public administrations possess many properties that differentiate them from enterprises. A reorganisation approach must take these particular characteristics into account in order to be applied successfully. The objective of our research has been to develop a process

management method which meets the specific conditions of public administrations. Considering these particular features we have derived requirements in order to allow for an efficient representation of the process landscape as well as the identification of reorganisation potential in public administrations. With the PICTURE-method we have presented a domain specific approach that addresses an economic modelling, analysis and presentation of administrational processes. In two case studies the PICTURE-method has proved to be viable and efficient. The process transparency in the involved administrations could be increased and important suggestions for organisational improvements have been derived.

Based on the results of the evaluation of the PICTURE-method the following objectives for further research can be defined:

1. *Complex analyses:* As described in section 3 the PICTURE-method provides mechanisms to measure the reorganisation potential of IT basic components. The current version of the method requires manual support to estimate the effect of certain software systems on the process landscape. This part of the method has to be improved in order to provide valid indices for IT basic components and to evaluate whether their introduction is economically reasonable. It is subject to further research to develop improved pattern-based heuristics for a fully automatic analysis of the collected processes.

2. *Stand-alone modelling:* In the project with the city of Münster 29 of the overall 134 tool based processes have been described without the support of a method expert. Two officials modelled their processes on their own and needed only about 30 minutes to represent a single process. The quality of the modelling results was notably high. This reveals a significant additional potential to further reduce the efforts of modelling the process landscape. However, the PICTURE-method and the tool must be improved in order to employ stand-alone modelling in an entire public administration. This is subject to further research.

Currently, the PICTURE-method is applied in the cities of Bielefeld and Hamm. The focus of these projects is to identify a best practice process for commissioning management in the public sector. It is an objective of the project to compare the different processes of the cities and consolidate them if significant variations are recognised.

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