Abstract – During the last years the optimisation of business processes has gained more and more importance in the context of modernizing public administrations. In line with the concept of electronic government (eGovernment) one demands not only the representation oriented design of internet sites, but also the creation of real added value. In dimensions of benefits (on citizens side) and in dimensions of cost reduction (on administrations side) the added value can be generated by providing fully transactional processes. The approximately 13,000 German municipalities mainly have to deal with the same spectrum of tasks. The administration processes that are necessary to fulfill those tasks share strong analogies in structure. In the framework of process oriented reorganisation projects reference models, as reusable generic models with a normative character, can render a decisive contribution to cost reduction in the phase of to-be modelling. The project Regio@KomM picks up these aims. In this paper the process of issuing a general debit note authorisation exemplifies the practical applicability and the value potential of reference modelling.

1. Process-oriented Reorganization in Public Administrations

The number of tasks accompanied by strong cost pressure on public administrations increased enormously during the last years. Tax revenues in many places stagnated or even dropped behind, which necessitates massive reduction of expenses. On the other hand public administration is confronted with increasing requirements from citizens and companies. The internet based spatial and temporal availableness of services is already common in other areas, e. g. in the banking or retailing sector. The increased requirements and tasks on the one hand and the decreased revenues on the other hand confronted public administrations with a modernisation and performance gap [7]. Public administrations recently try to close this modernisation and performance gap [11] by applying the concept of electronic government. However the prospects linked with this concept can only be fulfilled, if internet based public services in the form of electronic citizen services feature significant advantages in costs and benefits adverse pure offline solutions [3]. Besides information and communication services especially full transactional services matter. But only by the process oriented analysis of administrative processes a potential for optimisation of the public services can be revealed and implemented [15].

eGovernment initiatives can be found on all federal levels in Germany. Especially on the local level nearly all of the approximately 13,000 German municipalities deal with this topic in different levels of intensity. The results can range from a simple representation oriented design of a website to an internet based fully transactional provision of complex services. Many
of the 13,000 municipalities in line with their eGovernment efforts work on similar problems. Especially concerning solutions for optimizing business processes there is a high potential for reuse as all local governments serve under similar legal regulations and restrictions. Reference process models (reference models) can be valuable design assistance in line with the improvement of processes and workflows. As storage of domain know-how and by its universality reference models offer a high potential for reuse (see for instance [5], [16]). They enable the exploitation of synergies and the reduction of redundancies. Before a wide application of this concept it is crucial to prove the feasibility and the usefulness of the concept of reference modelling in the domain of public administration.

Thus the aim of this paper is to illustrate the practical experiences made with the application of reference modelling taking the project Regio@KomM and a subset process as an example. The experience made in this project can be used within the scope of further reference modelling-projects especially in the field of eGovernment. Therefore in the following paragraph the project Regio@KomM is presented and the questions that form the basis of the project are discussed. In section 3 it is elucidated how the most appropriate public services can be hand-picked from a large set of possible candidates. The procedure of as-is modelling and weakness analysis is described in chapter 4 considering the debit note authorisation as an example. Subject in paragraph 5 is the development of a reference models based on the findings before. The paper ends with a summary and an outlook on further research opportunities in chapter 6.

2. The Case Study Environment

The project name is derived from a German abbreviation meaning “realisation of electronic government in municipalities of the Muensterland”. On nomenclature there is both a spatial and a textual reference to the project. The spatial reference is the one to the Muensterland as the project environment. The Muensterland region is in the northern part of the federal state North Rhine-Westphalia with a total of more than 1.5 million inhabitants. In this region Muenster is a regional centre surrounded by 66 smaller municipalities in an overall of 4 counties. The district government being responsible for the Muensterland regularly recommends strategic frameworks and principles which should be considered by the dedicated administrations. The district government evolved a strategy paper called “Muensterlandprogramm 2000+” in the year 2000 that builds both the background and the textual reference for the project Regio@KomM [9]. The district government as patron, six local governments (two county administrations and four city councils), a local electronic data processing centre and the University of Muenster began to work on the task “realization of electronic government”. With reference to the “Muensterlandprogramm 2000+” the aim is to realize electronic citizen services for the public that offer an added value for the user group administration, companies and citizens. On the long run these services should be integrated into the portal mentioned above. Regarding the principle “organisation before technology” the following questions were formulated:

- Which business processes are the ones to be considered for the realization of electronic services on the public (section 3)?
- How do administrations in the Muensterland handle these processes at present (section 4)?
- How might ideal processes as the case may be reference processes that serve administrations in the Muensterland as a guideline look like (section 5)?
3. Selection of Business Processes Regarding their Potential to Reuse
In order to inductively develop a reference model on the basis of multiple process analyses, the relevant processes have to be determined first. In this context two problems occur in public administrations:
On the one hand the spectrum of tasks prescribed by law can contain more than a thousand different services and hence business processes. On the other hand the public fiscal accounting offers only little information of process costs or revenues of a service [19], so that a selection on the basis of common monetary ratios is not possible.
For the above specified reasons a multilevel procedure was chosen for the selection of the business processes. Two segments for prioritisation have been selected in order to minimize the work for the participating pilot administrations in the run-up to the process analysis [17]. This was guaranteed by cursory structuring many services considering only a few criteria and prioritizing them. In the second project segment the remaining services were analysed in cooperation with the same people again but on a higher level of detail. The procedure for prioritising was illustrated elaborately in [4] and is only adumbrated in the following.
As a first step, in a workshop with all process participants, a list was round up with more than 100 services that were discussed to be rebuilt in the participating administrations. Each service was analysed regarding its technological maturity and the frequency of its execution by means of a questionnaire. Therefore the portfolio method was used (see for example [6], [7], [13]). As a result one can keep hold of, that the technological maturity of the most analysed processes was only lightly pronounced, so that the criterion pair frequency of execution was mainly used for the process prioritisation. Altogether the number of processed could be reduced from more than one hundred to approximately 25.
In the second project segment complexity of processes was analysed more thoroughly by using extended analysis criteria. Similar in structure another questionnaire was developed, which was handled peripherally by the participating administrations. Assessment criteria enclosed the spheres organisational complexity, technological complexity, formal complexity and application complexity, which have been combined in an indicator for the total complexity
A number of K.O.-criteria led to the exclusion of services, for example the personal compulsory attendance or the need of a digital signature. Altogether the number of services could be reduced to 15 at the end and was the discussion basis of a final workshop with the pilot administrations.

4. AS-IS Modelling and Analysis

4.1 Processes analyzed
For as-is modelling the processes displayed in Table 1 have been defined to be analysed in the participating pilot administrations. The selection resulted from the characteristics of complexity and by the articulation of individual preferences of the participating administrations.
In total, nine different business processes in six different administrations have been analysed. It is notable that not each process has been analysed in each administration, since not each administration serves each process, e.g. due to different competencies on the level of district and municipalities or depending on the number of inhabitants. Furthermore, economical aspects have been considered; not each administration could serve enough resources for participating in the analysis of each process.

By the given reasons altogether 22 process analyses (not the theoretical possible 54) have been executed. During the selection and assignment of the processes it was an aim to analyse every process in at least 3 different administrations. The idea was to extract enough information from the models in order to identify “best-practice” or “common-practice” processes, so that – with regard to possible further improvements – a reference model not only for the other participating municipalities, but for the whole Muensterland could be developed. In the following it is illustrated how to proceed with the as-is modelling using the process of debit note authorisation as an example.

4.2 Method

The structure of the processes selected by the prioritisation was documented simultaneous in multiple pilot administrations using open expert interviews [12]. The interview questionnaires were not seen as strict defaults but as a guideline [8]. Through this a constriction of creativity of both the interviewer and interviewee by strict questions was prevented. As interview partners, clerical assistants and executive officers in their role as domain experts were selected in order to get a more detailed insight on the one hand and to get an overview of the overall process on the other hand.

Apart from the actual structure of the processes, relevant administration specific terms and the organisational structure [17], weaknesses were gathered before the analysis within the interview. The administration staff articulated some working steps as disturbing in their everyday work and mentioned these in the interview. Furthermore, administration staff members pointed at obvious weaknesses in the process during the interview (e.g. media breaks caused by redundant entries of data) and questioned their necessity. Through this, a weakness list could be prepared that could be reused and completed during the further as-is and weakness analysis.

The process structures were textually gathered at first and were transferred to conceptual process models later. By this the interviews could be performed efficiently without being interrupted by modelling.

As modelling technique event-driven process chains were used, which – presented in columns and being shortened by trivial events [2] – were considered as simple and intuitive by the administration staff as well. As modelling tool ARIS Toolset [1] was chosen, that, on the one hand, provides the modelling technique of event-driven process chains and on the other hand
was already available at the university. The designed as-is models were presented to and cleared with the administration staff members in further workshops. This was necessary in order to clarify misunderstandings that occurred in the interviews and that cannot be avoided completely [17]. As an example the as-is model of the debit note authorisation is presented in Figure 1. We only present the process logic in order to ensure clarity. The presentation in columns including annotation of the used data and organisational objects is abandoned.

![Figure 1: As-is process model debit note authorization](image)

At the end of the as-is modelling phase a specific as-is model was available for each pilot administration. On the basis of these models a weakness analysis for each process could be performed. The following weaknesses were identified (excerpt; for further potential weaknesses in as-is processes see for instance [10], [14], [18]):

- media breaks,
- redundant administration of used data within the process,
- redundant work steps (e.g. not necessary, but self-imposed liability for a signature),
- deficient functionality of already used software (e.g. inadequate or missing interfaces),
- organisational barriers and unnecessary waiting time.

In the weakness lists not only eliminable weaknesses were gathered, but also those, whose removal was not possible or only in a limited way (e.g. because of legal restrictions), in order to provide a better basis for decisions according to the removal of weaknesses in the context of to-be modelling. Weaknesses were also marked in the process models – depending on their possibility of being removed – in different colours. (cf. Figure 1; removable weaknesses are shown in grey, not removable weaknesses in black) Furthermore, improvement potentials and proposals gathered during the as-is modelling phase were added to the weakness lists.
It was noticeable that a comparison of the presented as-is process to processes of other administrations revealed similar weaknesses. Especially for the process of debit note authorisation no real “best-practice” was ascertainable. The analysed processes represented rather a weakness-affected “common-practice” that demands general weakness elimination. The situation was different, e.g. for the process “information from business register”. In one municipality the process was nearly optimised and supported by extensive use of information technology. Nearly no media breaks were observed. Here a “best-practice” could serve as the basis for the design of a reference model.

5. Construction of Reference Process Models

The phase of as-is modelling is typically followed by the to-be modelling. A characteristic of to-be models is that the included recommendation for redesign of the processes must be short or medium-term convertible for being realisable within the planning horizon. In contrast as-is models represent a long-term aspired situation. Having the construction of reference models for public administrations as one aim of the project Regio@KomM subsequent to the weakness-analysis an ideal model – completely cleared from weaknesses – was designed for each analysed process and provided to the administrations as a reference model.

All weaknesses – apart from legally involved ones – were eliminated independent of administration-specific conditions. Table 2 shows how the identified weaknesses were eliminated for the construction of the reference model.

The reference model for the debit note authorisation is presented in Figure 2.

An advantage of the construction of reference models in contrast to specific to-be models is their universality [5]. The reference models designed in the project can be used not only in the participating administrations but also in project external administrations as a recommendation for reorganisation projects. One can expect that the inter-municipal dialogue being activated by the distribution of the reference models provides synergetic effects. They can occur for example in the fusion and corporate use of extensive IT-infrastructure that is necessary for the elimination of actual weaknesses claimed in the reference model. A first positive feedback by the administrations concerning such considerations supports this projection. In the case of an impossible middle-term realisation of the recommended reference model the respective administration has to decide, whether model variants realisable mid-term should be constructed.

<table>
<thead>
<tr>
<th>Elimination of weakness</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination of media breaks</td>
<td>If a debit note authorisation is given over the phone the data is directly put into the application system</td>
</tr>
<tr>
<td>Elimination of redundant and unnecessary process steps</td>
<td>The data transfer to banks is integrated in the debit note management system As there are less paper based process steps no alphabetical sorting is necessary anymore.</td>
</tr>
<tr>
<td>Extension of software functionality</td>
<td>The software should be extended with a decentralised way of putting in data via intranet technologies by example.</td>
</tr>
<tr>
<td>Elimination of organisational barriers</td>
<td>Debit note authorisations are entered in the organisational unit where they are received (needs software extension)</td>
</tr>
<tr>
<td>Realisation of proposed improvements</td>
<td>Debit note authorisation over the phone is integrated in the proposed reference model The internal mail channel is obsolete as all data is directly entered at the point of creation. The online application as a new channel is explicitly considered in the reference model.</td>
</tr>
</tbody>
</table>

Table 2: recommendations for eliminating the identified weaknesses
6. Summary and Outlook

Reference modelling is highly relevant not only for the scientific discourse, but can be of significant value in concrete projects in connexion with the solution of practical problems. The high level of structural analogies, that characterise public administration in Germany as protruding, encourages the use of reference modelling in the domain of public administrations. The positive feedback of the pilot administrations shows that the applicability of reference models in the context of process oriented reorganisation of public administrations is existent in principle. One has to see, to what extend these models can be directly implemented respecting the fact that a lot of constraints have to be overcome (for instance, the willingness to corporate use of IT-infrastructure, cp. paragraph 5). The proposed reference process-models are in concrete application. Municipal specific migration concepts have been worked out. The as-is processes and the specific IT infrastructure development scenarios setting up on each other have been combined in migration plans and hence adjusted to-be processes have been provided as an orientation for the change management process. Having regard to administration-individual restrictions concrete advices have been given, which are in the first steps of implementation at present. Also the socio-economic aspects of organisational change have to be considered more thoroughly [20].

Further research work has to show, whether the reference models may be have to be enhanced with further textual aspects e.g. in form of annotated expert knowledge or legal regulations. Also it has to be checked, whether the recommended reference models can be implemented offhand in every administration – even outside North Rhine-Westphalia – or whether they have to be adjusted on regional parameters if necessary. In this context it has to be checked, if

**Literatur / References**


