The ProKMuni-Platform: Process Oriented Knowledge Management for Municipalities

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**STRUCTURE OF A KNOWLEDGE BASE FOR REFERENCE PROCESS MODELS**

The framework which delivers the structure for the knowledge bases is divided in 4 different layers [7]. Within each layer the level of refinement raises (see Fig. 1).

Layer 1 contains a functional-contextual framework which serves as an entry point in the total model and allows the navigation within the knowledge-base. For the presentation of a large number of model based knowledge on a high level of abstraction a structure according to management processes, core processes and support processes has proven valid. The elements of the framework link certain functions according to their contextual dependencies and can be compared to organisational units like departments.

On layer 2 the different functions are decomposed and hierarchically structured (e.g. by the use of function decomposition diagrams). The elements on layer 2 refer to certain services how they can be found for example in municipal product catalogues [9].

On layer 3 the processes are examined which underlie the different services. The complete process is presented as a combination of different process modules (e.g. by the use of value chain diagrams). In cooperation with a set of innovative municipalities these modules can be identified, consolidated and saved in the knowledge base in different variations. Application domain specific modules belong (e.g., for the evaluation of building applications) to the process modules as well as domain spanning process modules (e.g., payment applications, signature applications, etc.).

On layer 4 different specifications or variations of the process modules are provided which fit the application context best (e.g., manual or electronic archiving process). In order to create the process modules a certain modelling language has to be selected. There are various and diverse model types for modelling (business) processes. Petri-nets [4] and event-driven process chains (EPC) [11] are amongst the best known. Application aims, such as simulation and workflow management, require model types which produce detailed, precise, formally itemised models. This excludes, for example, the use of added-value chain diagrams. Application objectives such as process-oriented reorganisation require less formal models. The most important requirements of a modelling method in the given context are summarised below:

- Simple principle, clear presentation
- Comparability between various models
- Presentation of information systems
- Presentation of organisational units and places
- Presentation of information flow

Based on these requirements, the Event-driven Process Chain (EPC) is selected as a method, because of its high degree of clarity, and its potential for integrated evaluation. Moreover the process modules have been easy understandable for a range of individuals with heterogeneous backgrounds (e.g., mayor, or information technology officer).

As smallest elements in the framework certain types of additional information are linked to the process modules and hence increase the knowledge about the process.

The process modules become knowledge modules which contain organisational as well as technical information.

**APPLICATION OF A KNOWLEDGE BASE FOR REFERENCE PROCESS MODELS: WEB-BASED PROKMUNI-PLATFORM**

The possibilities of the knowledge base are made applicable by means of a web-based knowledge management platform [5], called ProKMuni-Platform (process oriented knowledge management for municipalities) (see Fig. 2). We aim at the following application scenario:

A municipality can use multimedia based manipulation tools in order to construct their as-is
processes (e.g., a specific building application procedure) based on ready-
made knowledge modules. Furthermore they can perform certain adap-
tation procedures to enhance the reproduction quality (e.g., by changing
the sequence of the process modules). When implementing the tools it
has to be made sure that on the one hand the functionality is powerful
eough to describe the problem area adequately. On the other hand the
modelling tools have to be easy and intuitive enough to allow a high
number of users and get their acceptance. The modelling of the processes
can for example be done with graphical drag and drop-techniques (like
the web based ARIS Easy-Design) or interactive surveys.
The as-is-processes are the base for a knowledge management on
different levels:

Intra-Municipal Knowledge Management

With the web based reconstruction of processes using knowledge modules
municipalities create a systematic and structured description. At the
same time the municipalities acquire the relevant contextual knowledge
which is encapsulated within the knowledge modules and can use it during
the process execution (e.g., laws and regulations). According to different
user groups different views on the process models can be provided (e.g.,
a compact view for the mayor with focus on core processes and a detailed
more technically focused view for the chief of the IT-department).
The web-based access to the ProKMuni-platform allows furthermore
exporting the process models including the inherent contextual knowl-
edge in a municipal intranet where it can be used as an organisational
handbook or as a e-learning-platform for employees. In addition a fast
notification time is made possible for changes in different modules (e.g.,
when laws are modified) according to the push-principle. Eventually one
can link the created processes to certain performance figures. These can
be aggregated over the 4 layers described above enhancing the ProKMuni-
platform with functions of a management information system.

Supra-Municipal Knowledge Management

As well for municipalities as for institutions on a higher level the
ProKMuni-platform allows a comparison and an evaluation of different
conditions (e.g., different state laws in federal republics like the US or
Germany). As many internal processes are influenced by laws and
regulations certain action recommendations for the legislator can be
identified. The contextual knowledge encapsulated within the knowl-
edge modules provides hints for improvement potential when examining
cause-reaction-chains. Summarized the ProKMuni-platform can help in
answering many questions regarding the organisational or application
design which helps to reduce knowledge deficits on an intra-municipal,
an inter-municipal and a supra-municipal level (see Table 1).

THE GENERATION OF THE KNOWLEDGE-BASE

The manual creation of an initial knowledge base can be done through
the examination of innovative processes in municipalities known to be
best practice.

Therefore in a first step the process and contextual knowledge is acquired
and consolidated according to the structure of the knowledge base (see
Figure 1).

The automated addition of new knowledge takes place during the
continuous usage of the platform by the participating municipalities.

On the one hand side existing process module specifications can be
composed differently and hence create new knowledge through combi-
nation which is then added to the knowledge base. On the other hand
existing process module specifications can be modified either by manipu-
lating or enhancing the process itself or the contextual knowledge. The
modified modules are also added to the knowledge base as a new
specification variant.

As municipalities, in contrast to companies, do not compete to each
other one can project a wide acceptance for participation throughout
the municipalities. That is also the most important reason why this
domain is the most suitable for the idea of the platform.

Table 1. Benefits of the ProKMuni-Platform

<table>
<thead>
<tr>
<th>Organisational Design</th>
<th>Application Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>how do different entities look like and how do they fit together?</td>
<td>What software applications support what processes?</td>
</tr>
<tr>
<td>What organizational units are involved in which processes?</td>
<td>How does the actual software architecture look like?</td>
</tr>
<tr>
<td>What effects had organisational changes on certain assessment figures?</td>
<td>What effects had the introduction of a new software on certain assessment figures?</td>
</tr>
<tr>
<td>What municipality has the fastest, qualitatively best or most cost efficient processes?</td>
<td>Can differences in success be justified on the software applications?</td>
</tr>
<tr>
<td>Are differences caused by the organisational structure?</td>
<td>What software is the best for a certain process?</td>
</tr>
<tr>
<td>What standards and technologies have proven best?</td>
<td>What effects do changes in law and regulations have on software applications (e.g., Digital Signature)?</td>
</tr>
<tr>
<td>What effects have changes in law or the organisation?</td>
<td></td>
</tr>
<tr>
<td>Are differences in processes caused by different laws and regulations in certain states?</td>
<td></td>
</tr>
</tbody>
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Hence the ProKMuni-platform becomes a learning system which increases in quality and quantity during the duration of usage and therefore makes itself more attractive for new participations through the well known network effect.

When adding all the different modules certain mechanisms to ensure syntactical consistency have to be implemented. In addition the correctness of the knowledge can be supervised by creating an institution which has the certain competencies (e.g., one big municipality is responsible for the building permission procedure).

**SUMMARY**

Reference processes are created, supplemented with organisational and technical information and then stored in a web based knowledge base called ProKMuni as so called knowledge modules. The ProKMuni-Platform is about to be implemented so that the framework described will be under practical evaluation.

Using certain modelling methods and tools municipalities are able to model their own as-is-processes in a formal way and compare them to other municipalities in order to identify potential for improvement. Processes which have been evaluated as good many times can hence be considered as best-practice and therefore added to the knowledge base as a new knowledge module.

The platform allows, that innovative organisational and technical knowledge which has been decentrally developed by different municipalities can be centrally presented in a structured manner therefore enabling other municipalities to adapt that knowledge.

Hence a standardisation of administrational processes can be reached on a high level. By disseminating the innovative knowledge which has been stored on the ProKMuni-platform as knowledge modules the previously described knowledge deficits can be significantly reduced. Hence the efficiency of public administrations rises. At the same time the conditions for the economy and hence for more growth and employment are enhanced.

The Platform however only exists on a conceptual stage at this time and has not been implemented yet. Feedback from local and regional municipalities shows the growing demand for such a platform and there are several research proposals running right now.

**REFERENCES**

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