

Programme
Integrating and Strengthening the European Research Area
Strategic Objective
ICT Research for Innovative Government
Integrated Project / Programme Title
Process Identification and Clustering for Transparency in Reorganising Public Administrations
Acronym
<b>PICTURE</b>
Project No
<b>027717</b>
PICTURE- Work Package Name
<b>WP4: Development of Process Landscaping Methodology</b>

## Deliverable D4.7

# Process Landscaping Modelling Methodology

Leading Partner: ERCIS

Security Classification: PUBLIC

Delivery: November 2007

Final Version

STREP- Project	PICTURE	Project - No	027717
PICTURE		Workpackage	WP4
Document	Process Landscaping Modeling Methodology	Date	Nov. 2007

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## 1 Summary

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The goal of the PICTURE project is to provide an instrument that supports decision makers in Public Administrations to develop successful and long-term ICT investment strategies. To facilitate this, the PICTURE approach follows three steps:

- Model: Domain experts from Public Administrations (PAs) model the Process Landscape including all core processes of the PA with predefined Process Building Blocks (PBBs).
- Measure: The IT department measures the impact of certain ICT components on the Process Landscape in quantitative, qualitative and monetary dimensions.
- Analyse: Based of an analysis of these results, decision makers derive appropriate ICT investment strategies for PAs.

This deliverable is concerned with the development of the Process Landscaping Methodology. The Process Landscaping Methodology is a central element in the first step of this three step approach. This methodology describes how the processes of the Process Landscape will be captured. The resulting models provide the basis for the following steps of measurement and analysis. As one main concept of the PICTURE approach is to let the domain experts from the PAs model their processes by themselves, it is a central point for the development of the Process Landscaping Methodology that it is comparably easy to understand and to use for this target group.

The Process Landscaping Methodology consists of two parts, the process landscaping modelling language and the process landscaping procedure model. The process landscaping modelling language (chapter 2) is the language in which the process models are created. It consists of four different sub models to allow for different perspectives on the information: The organisational model describing the organisational structure of a PA, the Process Object (PO) Model describing the documents produced and processed by the PA, the Supporting Element Model describing resources supporting the services delivery like ICT and finally the process model describing the PA's processes in detail and integrating all previous perspectives. This deliverable describes the elements of these sub models in detail. Additionally, some basic concepts to support the modeller in creating the process models are presented. Finally, the language specification also contains an updated attribute configuration for PBBs and POs.

The PICTURE procedure model (chapter 3) describes how a PICTURE project in a PA will be conducted. As PICTURE aims to let the domain experts model the Process Landscape by themselves, the presented procedure model facilitates modelling in a distributed manner. The procedure model consists of five phases. In the first phase – project management - the goals and scope of the project are defined. The second phase – preparing the modelling – deals with defining the needed information and configuring the method accordingly. The third phase – modelling the process landscape – is concerned with the actual capturing of the Process Landscape through modelling as well as the training of the domain experts. In the fourth phase - using and designing the Process Landscape – the process models will be analysed using the ICT impact measurement concepts developed in WP3 and decisions are derived based on the results. The fifth and last phase – continuous process management – is concerned with the continuous maintenance of the Process Landscape.

All of the developed concepts have been evaluated in several workshops and other events. Therefore, their overall acceptance with the users has been assured. However, the development of the Process Landscaping Methodology is an evolutionary approach of continuous refinement. Thus, there might be a need for smaller changes and refinements in future steps of the project, especially in the implementation phase as it has already been the case during the development of the Process Landscaping Methodology.

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## 2 Process Landscaping Modelling Language

This chapter deals with the process landscaping modelling language, which will be used to model the process of the PAs. The first section of the chapter describes the elements of the process landscaping modelling language and their relations to each other. The second section specifies some guiding modelling concepts, which should simplify the usage of the developed concepts for the domain experts using the process landscaping modelling language. The third chapter finally deals with assignment of attributes to PBBs and POs and changes, which were made to the initial configuration given in D1.7.

The research method used to develop the PICTURE-approach belongs to the design-science oriented research [7] and is based on the work of Takeda et al. [18], Song and Osterweil [16], and Avison et al. [2].

### 2.1 Elements

The PICTURE modelling language consists of four sub-models: A Process Model, an Organisational Model, a Processed Object Model and a Supporting Elements Model (Fig. 2.1). The Process Model depicts the process organisation of the PA. It is the core model of the PICTURE modelling language and is based on the PBBs. The other models originate from the general attributes identified for PBBs in D1.7. The organisational model represents the organisational structure of the PA. It is connected to the Process Model through a Sub-Process-Attribute and a Process-Attribute (Organisational Unit) as well as through a PBB Attribute (Executing Position). The Processed Object Model is used to depict the Processed Object (e.g. an application). The Supporting Element Model describes elements that support the user while performing an activity (e.g. IT or qualifications). They are connected to the Process Model through the attributes of the type *Processed Objects* and *Supporting Elements*, respectively.

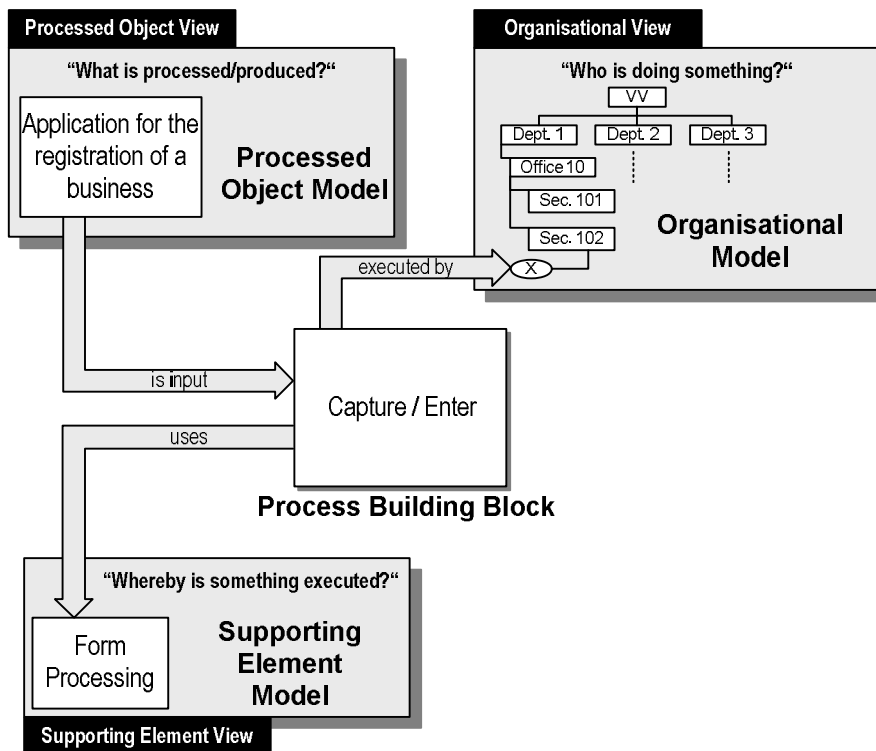
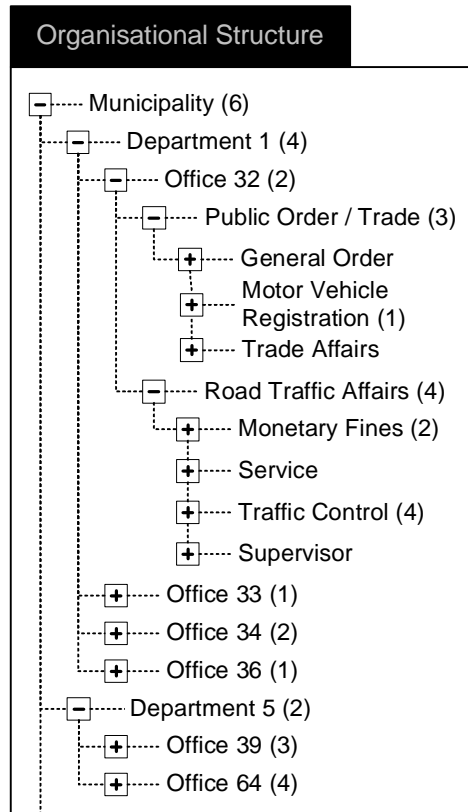


Fig. 2.1: Sub-models of the process landscaping modelling language

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### 2.1.1 Organisational Model

As already mentioned above, the organisational model depicts the organisational structure of a PA. Thereby it is possible to capture both: who carries out a process or part of a process, and who is responsible for a process. Fig. 2.2 shows an example of the organisational structure.



**Fig. 2.2: Example of an organisational structure**

This information is very important to meet some of the requirements documented in Deliverable 3.2. Cost reduction by Information and Communications Technology (ICT) is something the interviewed municipal partners are very interested in. Since processes in PAs are service processes and therefore quite people-intensive, personnel costs are very likely to form a sizable amount of the costs associated with a process. Thus, capturing who is involved in a process builds the foundation for measuring the personnel costs. Additionally, other cost rates, for example printing costs, depend on the organisational unit associated with a process. The Organisational Model consists of the following elements:

- *Organisational Units*: Organisational units encapsulate a number of positions with similar tasks. They are organised hierarchically to depict the organisational structure of the PA. Usually PAs are organized in a functional manner. Typical organisational units are departments or offices. Organisational units have a name and a description as attributes.
- *Positions*: A position is responsible for performing a certain set of tasks. This set of tasks is constitutive for the position. Therefore a position is an abstract concept, which exists independently of the persons assigned to the position. One or more persons can be assigned to a position and one person can be assigned to one or more positions. Each position is associated with their respective organisational unit. Positions are organized in a hierarchy to depict the authority structure within the PA. Positions also have a name and a description as attributes.

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- *Persons*: A person depicts the actual official of a PA. As described above, a person can be assigned to one or more positions. Persons have a name and contact information (phone, email) as attributes. Furthermore the hourly wage of the person can also be captured. It can be used as help for the modellers when specifying personnel cost related cost rates.
- *Cost Rates*: Cost rates allow the specification of monetary dimensions for (numeric) attributes, e.g. printing costs for printed pages. These rates will most likely be average figures as it is not possible to identify the exact costs for e.g. a printed page. The cost rates are assigned to the attribute types on the basis of organisational units. If there are no cost rates specified for a certain organisational unit, the rates in the next highest organisational unit are used. This makes it possible to specify the cost rates as detailed as the available information allows.

### 2.1.2 Processed Object Model

The PO model's view describes "what" will be dealt with and what will be produced in the administrative processes. In administrative behaviour, mainly information from different information carriers is consumed and other information is produced, e.g. a paper form, an electronic specialised procedure, or an oral transmission. Alongside information, material things can be the subject of processing on in a few cases, e.g. building land that is inspected in one step.

Every administrative process "produces" its own specific product, which should have an external or an internal consumer. This product can be seen as the overall process' final output. That is why an administrative process should define itself through its aspired final product – its work performed – and should delineate itself from the other processes.

While creating the final product, in many cases the production of intermediate goods is required. This can include writing a statement or expertise, for example, or retrieving information from another department, e.g. a path length's measurement for the calculation of distances. Producing these intermediate goods or intermediate information, one should also be able to document them in the process models. The effort for the production of these goods should not be disregarded, especially concerning transport times and the duration of idle periods for the retrieving processes.

*Processed Object (PO)*: In PICTURE this is depicted using process objects (PO). A PO was identified in D1.7 as a general attribute for each PBB. A Processed Object describes the information, document, message or any other object that is processed by the corresponding PBB. Thereby one PBB can process one or several POs.

POs can be further divided into *elementary POs* and *Containers*. Elementary POs are single documents like applications, certificates or allowances. Containers can aggregate several of the elementary POs. An example for a Container is a file. A file for a building application could for example contain the application itself as well as the final building allowance and statements from different departments. The concepts introduced above allow for a representation of the file structure of public administrations.

*Processed Object Category (PO Category)*: POs can be classified using PO Categories. These categories are organised hierarchically in a tree structure. This allows for the standardisation of POs and therefore facilitates easier retrieval by the domain experts during the modelling and easier analysis by the ICT Measurements Methodology through standardisation. The following PO categories are predefined by the PCITURE method.

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## **PO Categories**

- Documents / Information
  - Request
  - Petition/Standard Form
  - Announcement
  - Document
  - Report
  - Notification
  - Objection/Complaint
  - Ascertainment
  - Information
  - Statement
  - Certificate
  - Judgement
  - Attestation
  - Autorisation
- Payment
  - Incoming payment
    - o Duty
    - o Contribution
    - o Fine
    - o Charge
    - o Disciplinary Fee
    - o Tax
  - Outpayment
    - o Refund
    - o Social benefit
    - o Earnings
    - o Expenses
- Material Object

The given basic structure of the PO categories can be extended and specialised as needed. If a concrete PO cannot be classified into the proposed structure, it will be assigned to the next higher level. Thus, the classification the POs is conducted in a very structured way, which makes the results profoundly comparable and interpretable. On the other hand it is flexible enough to be adjusted according to the individual needs of public administrations.

The given PO category structure can be filled with a reference set of PO-types. This reduces the modelling effort by the domain experts and facilitates a better standardization of the POs. During the modelling, this reference set is completed by the domain experts who supplement missing PO-Types. The separate model for PO thereby allows the reuse of already defined PO-Types and enables better standardisation and analysability for the impact measurement.

### **2.1.3 Supporting Element Model**

In an analogous manner to the Processed Object Model, the Supporting Element Model describes the objects, which support the domain experts during their activities.

*Supporting Element:* Besides Organisational Units and POs, Supporting Elements have been identified in D1.7 as the third general attribute. Supporting Elements describe the utilities that are used during the performance of an activity. They include information systems and other technological elements as well as means of transport and other Supporting Elements like specific information needed to perform an activity. An example for a Supporting Element from the category "Software/Office Application" is "Microsoft Word". Each PBB can have several supporting objects.

*Supporting Element Category:* Like POs, Supporting Elements are categorized in a hierarchical structure. This simplifies the selection, extension and maintenance of Supporting Elements. As reference catalogue PICTURE contains the following categories of Supporting Elements:

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## **Supporting Element Categories**

- Software
  - Core ECM&BPM Services
    - Catalogue Services
    - Classification Services
    - Search Services
    - Forms Services
    - Decision Management Services
    - Object Management Services
    - Publishing Services
    - XML Management Services
    - Workflow Services
    - Auditing Services
    - Library Services
    - Content Federation Services
    - Event Services
    - IDARS Services
    - Retention Management Services
    - Distribution Services
    - Lifecycle Management Services
    - Interoperability Services
  - Supporting Services
    - Input, Presentation, and Output Service
    - Data Services
    - Storage Services
  - Surrounding Services
    - Security Services
    - Integration Services
- Devices
  - Data Memory (CD, DVD, USB)
  - Printer
  - Fax Machine
  - Card Reader
  - Copier
  - Scanner
- Means of Transport
  - Train
  - Bus
  - Airplane
  - Car
- Other
  - Geographical Information / Maps
  - Judicial Information / Laws
  - Business Information
  - Demographical Information

The categories of supporting elements mentioned above can be expanded and specialised as needed. However, the suggested basic classifications already allow a simple interpretation of the forming models. Thereby automatic analysis can be carried out on the process models, identifying processes, which require special technical qualifications or demographic information, for example.

To make modelling easier for the domain experts, the supporting element categories like PO categories can be filled with a reference set of supporting elements at the beginning of a project. This reduces the effort of creating the supporting element model. Moreover, the content becomes further standardised and can be compared and analysed more easily.

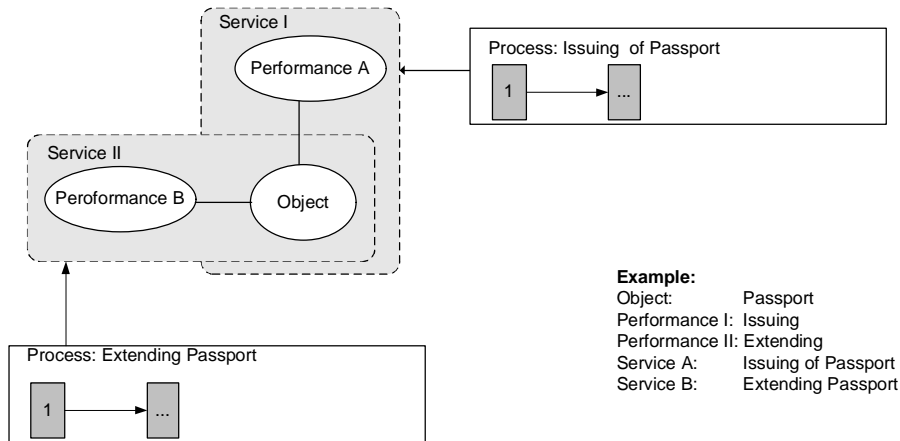
During concrete projects, the responsible carriers of knowledge can “fill” their categories with the required information. For example, the central IT department can register the systems in use in the field of “basic services”. This way the supporting element model is on the one hand completed by the users who are using the supporting elements. On the other hand the capturing in a separate model allows for a standardisation of the used supporting elements across the whole organisation and facilitates easier modelling as already predefined elements can be reused.

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### 2.1.4 Process Model

The Process Model depicts the process organisation of the PA. It is based on the PBBs that were developed in WP1, and the requirements that are mentioned in WP3. Furthermore additional requirements of chapter 2 are used to create a domain expert centred, end-user driven modelling language. In order to model and structure the Process Landscape of a PA, the PICTURE modelling language uses constructs like Processes, Sub-Processes, Alternatives, and Connections. The Process Model also integrates the other models via PBB-Attributes.

*Process:* In the PICTURE modelling language, a process is deduced from a combination of an object and a specific performance, which is performed on the object. Citizens or any other target group inside or outside of a PA can demand that object. An object is, for example, a document like a passport, a driving licence or a building application. Typical examples for performances that can be combined with such objects are *to issue*, *to extend* and *to change*. A process consists of the activities, which are necessary to perform a certain service. The relation between these constructs is visualised in Fig. 2.3.



**Fig. 2.3: Relation between object, performance, and process**

A process has several attributes to capture additional information. Each process has a name and a description. Furthermore, the number of process cases per year is annotated. This is important for further analysis, as processes, which are executed more often, hold a bigger potential when introducing ICT. Processes also have a process owner. This is the position which is responsible for the process. To measure the quality of the process, the number of complaints per year can be recorded. Additionally, it is possible to annotate the tasks and the related effort citizens have to perform during the process. These attributes are summarized in Tab. 2.1.

Attribute	Description
Process name	The name of the process. Should contain the object and the performance.
Process description	A short summary of input, content and outcome of the process.
Cases per year	Number of process executions per year.
Process owner	Position, which is responsible for the process.
Complaints per year	Number of complaints by citizens about the process per year.
Tasks of citizens	Textual descriptions of the tasks the citizens have to perform during the process.

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Effort of citizens	Time needed to perform these tasks.
Internal / External service	Determines whether the process delivers a service for external (citizens, companies) or internal (other departments, offices) customers
Produced Object	Object which is produced by the process

**Tab. 2.1: Attributes of a process**

When an employee is involved in a modelling project the scope defines whether he can be interviewed about the processes he actually performs or about the processes he knows. Most employees have relevant knowledge about much more processes than they actually execute. Collecting all this information from the employees corresponds to a *“Model what you know”* approach. In the optimal case, with this approach, only very few employees have to be involved in a project. However, by following this approach one faces the simultaneously increasing risk of overlooking relevant information as the knowledge of each employee about specific details is limited. To avoid this, a strict *“Model what you do”* approach can be applied. Following this approach every employee only describes what he or she is doing by himself or herself without stating any other information. Especially, if the processes are spanned over the organisation with many dependencies between the organisational units this option is a more efficient way. This concludes to the following definition of a *sub-process*.

*Sub-Process:* Processes are further divided into sub-processes. Each process has at least one sub-process. A sub-process is a process section carried out within a single organisational unit by a single position. The officials associated with this position are familiar with the activities that have to be performed during the sub-process. Thus, a single official or a small group of officials can model a sub-process on their own without much need for any further enquiries. This definition of sub-processes is elementary to support the distributed modelling of the process landscape and is also a central aspect for the development of the Process Landscaping Procedure Model.

Besides this organisational scope, a sub-process should also have certain characteristics regarding its content. A sub-process should be performed in one block of work without any major interruptions. Ideally a sub-process fulfils a clearly defined task in the context of the service that is delivered by the over-all process. Thereby the sub-process concept allows also for a structuring of processes regarding the content.

Like processes, sub-processes have a number of attributes to capture further information. The creation date and the date of the last change to the Sub-processes are annotated, as well as the position that executes the sub-process. Finally, a state for the sub-process is recorded. The possible states are *“in modelling”*, *“up-to-date”* and *“not up-to-date”*. The first and the last state indicate that the sub-process should not be considered for analysis.

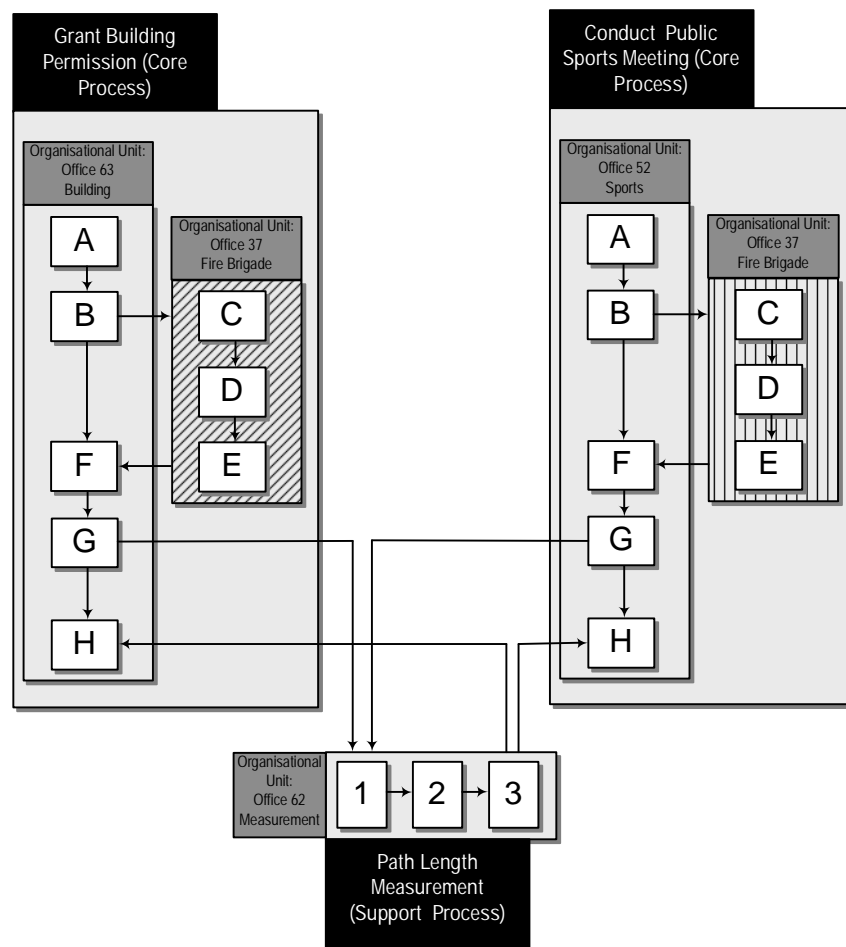
Attribute	Description
Sub-Process name	The name of the sub-process.
Sub-Process description	A short summary of input, content and outcome of the sub-process.
Creation date	Creation Date of the sub-process.
Last Change	Last Change Date of the sub-process.
Executing position	Position executing the sub-process.
Status	Status of the sub-process: <i>“in modelling”</i> , <i>“up-to-date”</i> , <i>“not up-to-date”</i> .
Sub-process result	PO, which is produced by the sub-process

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**Tab. 2.2: Attributes of a sub-process**

*Support Process:* Processes and sub-processes as described above address mainly the description of PA interactions which their external clients (citizens and companies) and are therefore also called core processes. Additionally there are a number of processes in PAs which do not have a direct connection to these external clients. Those processes perform services for clients from within the PA, and by that contribute to the successful completion of core processes. Therefore they are called support processes.

In the PICTURE process landscaping language support processes have a special roll. From the perspective of a core process, a support process is part of the service and performs a certain sub-task within a certain organisational unit. Therefore, it has all characteristics of a sub-process. On the other hand, a support process can be used by several other processes. Hence, it would be redundant to model a support for each processes in which the support process is used. This would require additional modelling activities and could lead to inconsistencies if the support process is changed. Thus, it should be modelled once and can be reused each time it is needed. So a support process is a process that is modelled just once but which can be used during the modelling like a sub-process. To support the identification and usage of support processes, respective guided modelling techniques needed to be implemented (see section 2.2).



**Fig. 2.4: Example for a support process**

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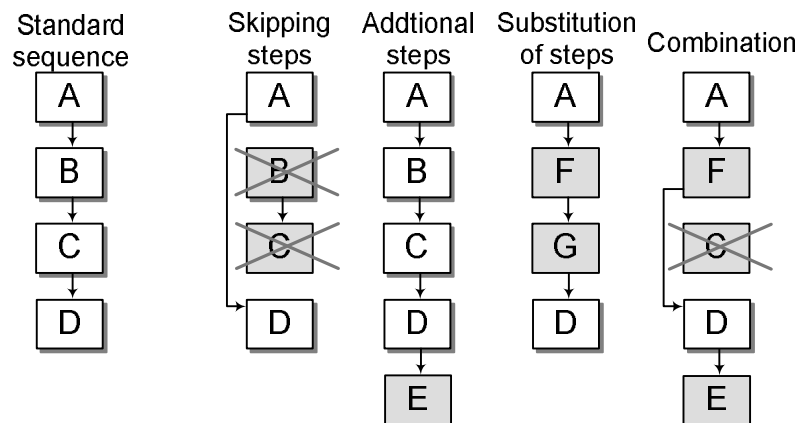
Fig. 2.4 visualizes the differences between (core) processes, sub-processes and support processes. There are two core processes, “grant building permit” and “conduct public sports meeting”. For both of them a path length measurement is necessary, which is performed by Office 62. As this process is same for both core processes it is modelled as a support process. Both also need assistance from the fire brigade (Office 37). As these services are individual in each core processes they are modelled as sub-processes within the core process.

*Alternatives:* The basic idea of PICTURE is to model sub-processes in a sequential way. This is due to the fact that officials usually perform their tasks in a sequential way. Therefore there are no parallel activities in a sub-process. If the sequence of a certain set of tasks is not fixed, the most common sequence should be modelled. Capturing all possible sequences would bring no further insights for the analysis of the processes.

In order to model complex processes there is however the need to allow for control flow mechanisms to depict alternative process flows. This kind of process flow corresponds to the logical XOR (exclusive or) operator. Alternative flows are needed to express decisions within sub-processes (e.g. accept or decline an application) or differences in the delivered product (application for a small or large building). On the level of PBBs there are different reasons for alternatives:

- 1) Skipping of Process steps: The alternative process flow skips a number of activities of the main flow.
- 2) Additional Process steps: The alternative process flow contains additional activities to the standard flow.
- 3) Substitution of Process steps: The alternative process flow substitutes some activities of the standard flow by other activities

A combination of those three kinds is also possible.



**Fig. 2.5: Reasons for alternatives**

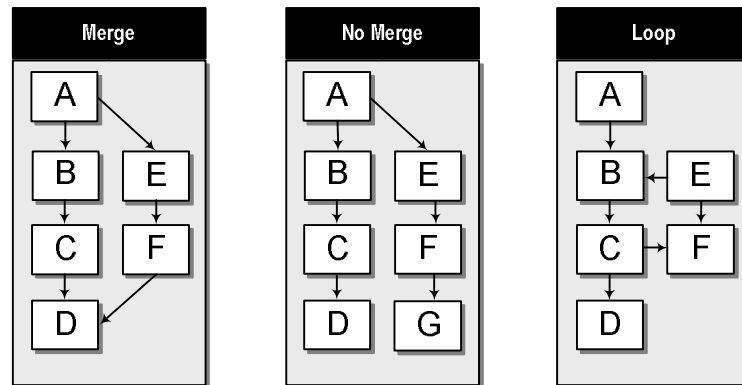
In PICTURE, this is realized using alternatives. An alternative is a sequence within a sub-process additionally to the standard sequence. It only contains PBBs, which are different to the standard process flow. There are three different kinds of alternatives:

- a) Alternatives merging back into the standard sequence: For this kind only a certain set of activities varies from the standard sequence. After those activities the standard process flow continues.
- b) Alternatives not merging back into the standard sequence: In this case, the alternative

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process continues and ends separately to the standard flow. This might for example be the case for a declined application.

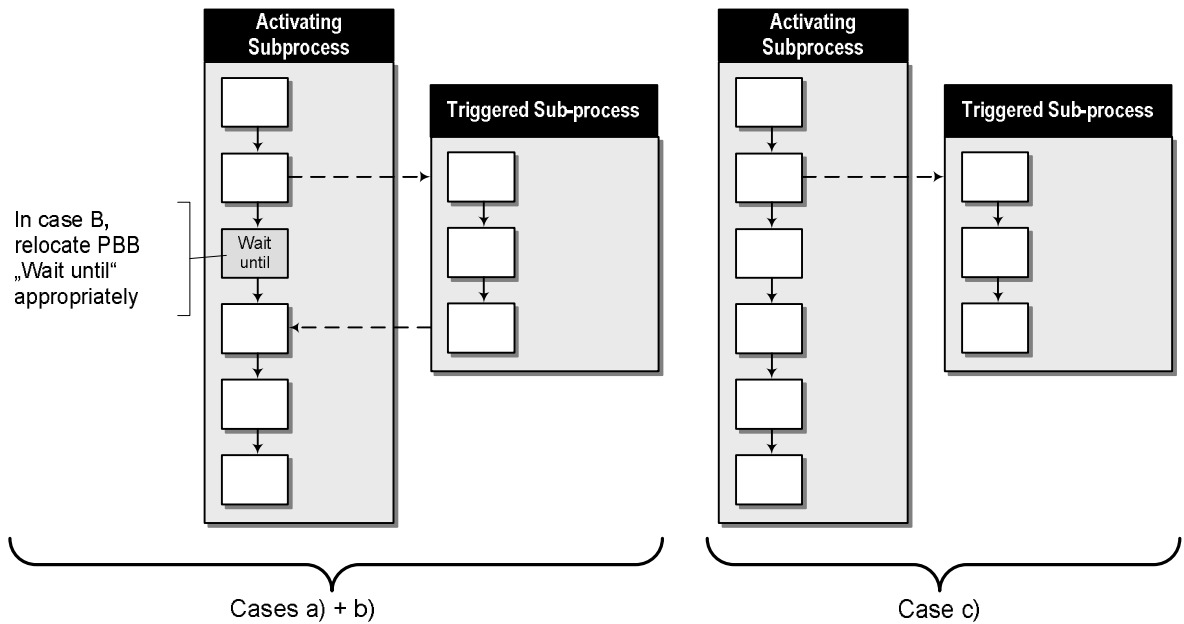
- c) Loops: Loops also merge back into the standard sequence but not after the point of splitting but before. So loops can e.g. be used if documents have to be resent by the citizen and afterwards need to be processed again by the PA.



**Fig. 2.6: Different kinds of alternatives**

*Connections:* The second kind of process control structures needed in PICTURE are parallel process flows. A parallel process flow means that different activities are performed at the same time. Parallel flows correspond to the logical AND operator. As a sub-process in PICTURE is performed by a single person, parallel process flows are not possible within one sub-process. Between different sub-processes (which are performed by different persons) parallel processing is however possible, i.e. two different sub-process can be performed in parallel. Three different kinds of parallelisation can be distinguished (Fig. 2.7):

- Immediate synchronisation:** The triggered sub-process produces results, which are necessary for further processing in the activating sub-processes. The activating process cannot continue until this information arrives.
- Later synchronisation:** The triggered sub-process produces results, which are necessary later on in the activating sub-process. The activating process can at first continue and receives the results at a later point of processing.
- No synchronisation:** The triggered sub-process is independent from the activating sub-process. Both can be processed totally in parallel. There are also no dependencies later in the process flow.



**Fig. 2.7: Different cases of parallel sub-process synchronisation**

In PICTURE, parallel process flows are realized using connections. Connections connect two PBBs from different sub-processes. Additionally to the incoming and outgoing PBB the connection also contains the POs, which are sent between the PBBs. Both PBBs involved in a connection need to have the same POs. To ensure this, the creation of connections is supported by guided modelling concepts (2.2). Only a certain subset of the PBBs is allowed to be the incoming or outgoing PBB in a connection, as specified in Tab. 2.3.

Outgoing	Incoming
Send	Receive
Assign	Take From
Notify	Take Notice
Forward	
Demand	

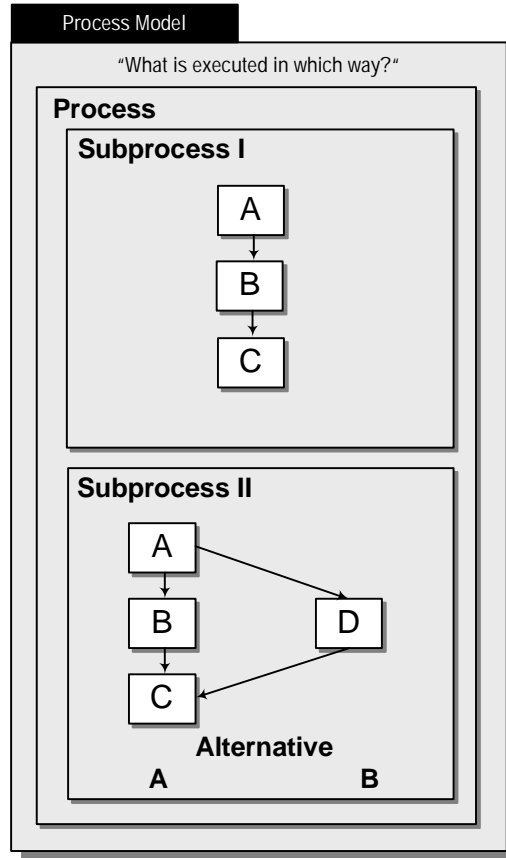
**Tab. 2.3: Allowed process building blocks for connections**

Instead of two sub-processes, a connection can also connect a sub-process and support process or two support processes.

### 2.1.5 Summary and meta model

In this section the elements of the process landscaping language were introduced. Fig. 2.8 summarises the most important of these concepts of processes, sub-process, alternatives and PBBs and shows how they relate to each other.

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**Fig. 2.8: Overview over the central process model elements**



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**Fig. 2.9: Meta-Model of the PICTURE-Method**

Fig. 2.9 shows the meta-model of the constructs presented in this section. For the sake of readability all elements which can have attributes (process, sub-process, PBB, PO) where generalized to the element "Attributable Element". Additionally it contains a distinction between PBBs and Process PBB Types, and Attributes and Attribute Types, respectively. PBBs and Attributes depict the actual constructs modelled in a certain process. PBB Types represent the 37 predefined kinds of PBBs. For the description of alternatives the meta model uses the elements "Sequence" and "Alternative". The first one describes all alternative paths, including the standard process flow. The second one only contains those alternative paths that split from the standard flow. Those alternatives have a specific PBB in the standard flow where the path splits and may have another PBB where the alternative path merges back into the standard flow.

## 2.2 Guided Modelling Concepts and Techniques

This section presents some basic concepts, with which the modeller can be guided when creating more complex process models containing alternatives, connections or support processes. How these concepts can be refined and implemented is part of WP5. As a basis for the following concepts, it is useful to differentiate between two different views on the process models created by the Process Landscaping Methodology.

- *Local View:* The local view is concerned with the view of a single domain expert. This domain expert is very familiar with the activities he performs. However, these activities are usually only parts of processes (sub-processes) and not a whole process. As a single person cannot perform activities in parallel, they are mainly modelled in a sequential way. With alternatives however concepts exist to depict alternative process flows.
- *Global View:* The global view is concerned with an overall view on the process. It focuses on sub-processes and interactions between sub-processes. On this level, parallelism is possible as sub-processes can be executed concurrently. The information of this view is relevant for coordinators and decision makers analysing the processes. As even coordinators might not always have a clear understanding of a process, which may span over several organisational units, the global view has to be constructed from the different local views.

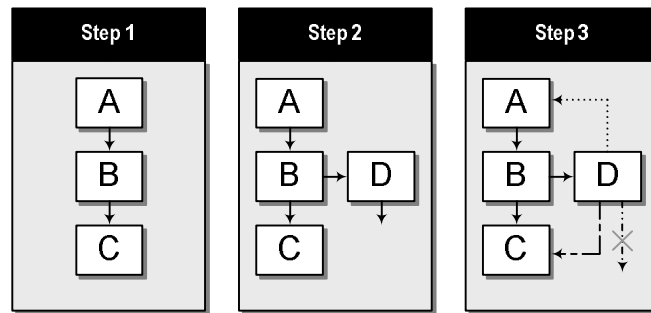
### 2.2.1 Alternatives

The alternative concept presented in 2.1.4 should be supported by adequate modelling guidance to ensure that complex processes are modelled correctly. The following approach is suggested when modelling sub-processes with variants.

- At first, the modeller models the default sequence of a given sub-process. That is the sequence of activities the domain expert sees as the standard case upon which usually most of the cases fall. This default sequence can be modelled in a strictly sequential manner.
- After the standard sequence has been created the domain expert models sub-process alternatives, which diverge from this default sequence. To model a diverging alternative, the modeller marks the PBB in the default sequence where the alternative splits from the default sequences. An alternative is then created.
- The domain expert marks the point where the alternative merges back into the standard sequence. This can be after or before (loop) the point of splitting or the alternative might not merge with the standard sequence.

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This approach allows capturing alternative flows within a sub-process step by step without having to remodel parts of the sub-process, which are identical for all alternative paths.



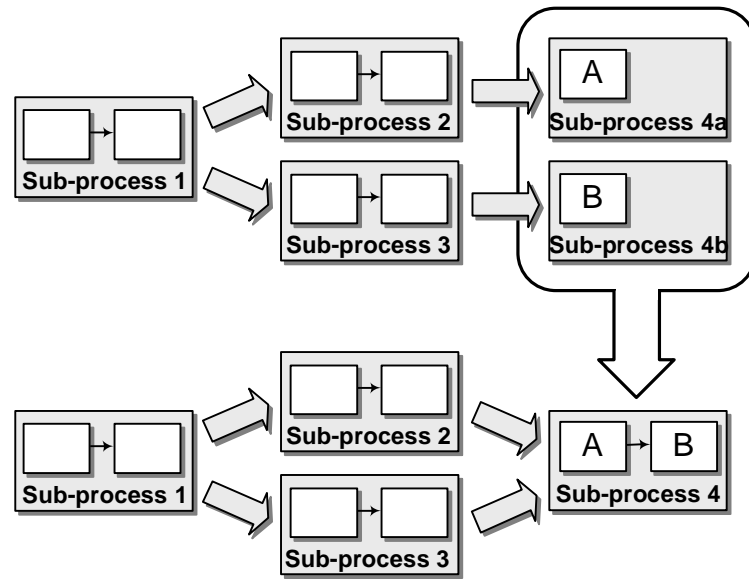
**Fig. 2.10: Steps for creating alternatives**

### 2.2.2 Connections

Connections are another construct introduced in 2.1.4 to model control structures. Connections enable the modeller to link different sub-processes or support processes to each other and thereby allow for the creation of parallel flows. As alternatives, connections should be supported by modelling guidance with the following steps:

- Starting point for a connection is an outgoing PBB (Tab. 2.3). Here the modeller annotates to which organisational units the (outgoing) PO for the PBB is sent. This creates a new sub-process for the receiving organisational unit.
- Modellers from the receiving organisational unit get notified that a new sub-process for them was created. A modeller can then model the respective process knowledge in a new sub-process.
- In some cases, if a specific sub-process merges to parallel streams a sub-process will be created for each of the parallel streams. Even though there should only be one sub-process. In this case the modeller needs the possibility to merge those to processes into one process. (see Fig. 2.11)

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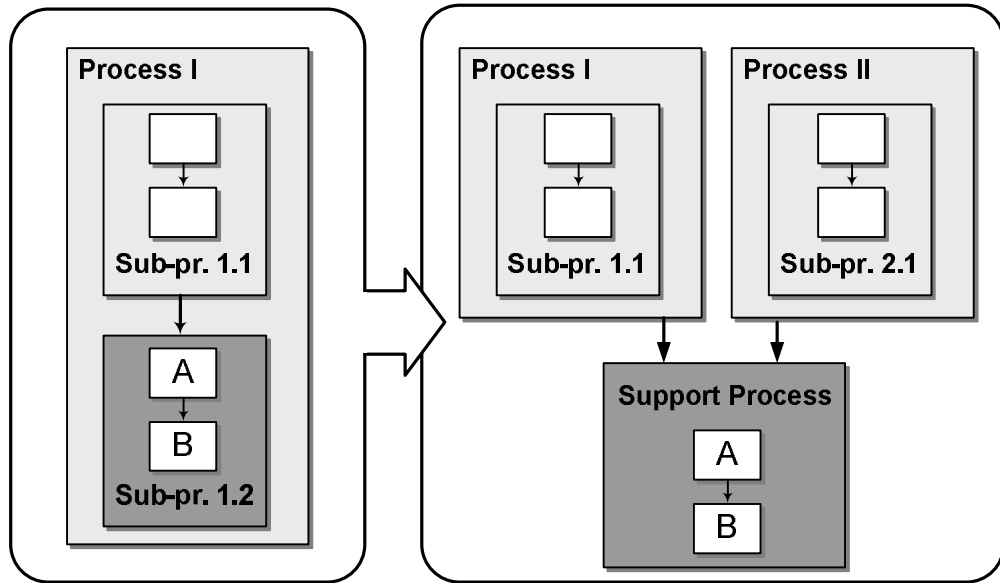
**Fig. 2.11: Merging of sub-processes**

Through this approach connections can be used to link the different sub-processes together to form the overall process. This allows for the (re-)construction of the global view on the process out of the respective local views.

### 2.2.3 Support processes

Support processes are, as defined in 2.1.4, processes that have not a direct interaction with external clients but are used within other processes to help them to provide their service. They combine characteristics of processes and sub-processes. As domain experts may not be able to identify support processes and distinguish them from sub-processes, they should be supported by adequate guided modelling concepts.

As sub-processes are always used by other processes, the first time a support process is modelled it will be modelled as a normal sub-process because the modeller does not know yet that the process is used several times. However, when the modeller gets notified a second time from another process to model the same sub-process again it becomes clear that this sub-processes is a support process. Therefore the modeller must be able to select the sub-process which is already modelled and mark it as a support process. The sub-processes should then be transformed into a support process. For further use of the created support process, the modeller must be able to access a list of the support processes of his organisational unit. This list must be searchable for all modellers as a support process might be created by a different user. For the same reason this should also be possible for the list of sub-processes in the organisational unit.



**Fig. 2.12: Creation of support processes**

### 2.3 Attribute Configuration

The initial attribute configuration was undertaken in D1.7. Several workshops and evaluations of the PICTURE methodology and its implementation were carried out since. Those workshops provided not only input regarding the construction of the Process Landscaping Methodology, which mainly is described in this Deliverable. They also showed that the attributes and their assignment to PBBs and POs need to be revised.

There were different reasons, which prompted for changes from the user perspective. Some attributes were found hard to understand so that their names needed to be changed. For some attributes user found, that they make no sense in combination with a certain PBB or were needed at different PBBs. Therefore, their assignment to the PBBs was changed. Some attributes were completely missing from a user point-of-view and were thus added.

Additionally, the development of the Process Landscaping Methodology induced some changes. In the process of designing the processes landscape modelling language POs and supporting elements were much more detailed as model elements. Therefore, attributes related to those elements needed to be revised. Attributes in relation to supporting elements are more detailed in the current version. Furthermore, the distribution of attributes between POs and PBBs was revised because of a more detailed PO-model and also based on user feedback.

	Name	Type
Simple Types	Name	String
	Comment/Description	String
	Processing Time/Duration	Time
	Time Constraint	Time
	Storage Time	Time
	Template Based	Boolean
	Number of Copies made/sent/received	Number
	Special Skills	String
	Addressed Issue	String
	Amount	Number

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Complex Types	Method of Payment	Collection
	(Incoming/Outgoing) Channel	Multiple Checkboxes, Percentages
Connections to other Elements	PBB Type	PBB Type
	Processed Object	PO
	Execution Position	Position
	Sender	Orga Unit (+ External)
	Receiver	Orga Unit (+ External)
	Used Software	Supporting Element: Software
	Used Devices	Supporting Element: Devices
	Means of Transport	Supporting Element: Transport
Other Supporting Elements	Supporting Element: Other	

**Tab. 2.4: Attributes of processed objects**

Tab. 2.4 shows the current set of attributes across all process PBBs. The attributes are structured according to their data types. Simple types are basic data types for numbers, text, time, date or boolean values. Complex types are e.g. collections which predefine the valid values for an attribute. Finally, there are attributes which are connections to other model elements like the processed object. Important changes are the addition of the attributes "Name", which allows an independent name for a PBB, "Storage Time", which captures how long a document needs to be archived and "Special Skills", which allows capturing special qualifications needed to carry out a certain task. Further on, the attribute "Supporting Elements" was split up into four different attributes ("Used Software", "Used Devices", "Means of Transport", "Other") to classify supporting elements in more detail. For the first three of those attributes, only a subset of all supporting elements from the respective supporting element category is allowed. This simplifies selection of the right element by the user as well as later the analysis of the process models. Tab. 2.5 shows the current assignment of attributes to PBBs.

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	Name (Description) [String]	Comment [String]	Processing Time/Duration	Time Constraint	Storage Time	Template Based	Number of Copies made	Number of Issues/Copies	Special Skills	Addressed Issue	amount of cash	Method of Payment	(Incoming/Outgoing) Channel	PO [PO]	Sender [Orga Unit]	Receiver [Orga Unit]	Used Software	Used Devices/Hardware	Means of Transport	Other Supporting Elements
Receive	x	x	x	x			x					x	x	x		x				x
Send / Give	x	x	x	x			x					x	x		x	x				x
Retrieve / Gather / Enquire	x	x	x	x				x				x	x			x				x
Capture / Enter	x	x	x	x				x					x				x			x
Produce / Create / Generate	x	x	x	x		x		x						x			x	x		x
Certify / Legalize	x	x	x	x										x			x			x
Assign	x	x	x	x			x					x	x		x	x				x
Take from	x	x	x	x			x					x	x	x			x			x
Register	x	x	x	x										x			x			x
Start / Open	x	x	x	x		x		x						x			x			x
Change / Update / Complete	x	x	x	x				x						x			x			x
Close	x	x	x	x				x						x			x			x
Print	x	x	x	x			x							x			x	x		x
Scan	x	x	x	x										x			x	x		x
Copy	x	x	x	x			x							x			x	x		x
Pay	x	x	x	x							x	x		x		x	x	x		x
Encash	x	x	x	x							x	x		x	x		x	x		x
Check / Verify	x	x	x	x				x	x					x			x			x
Decide	x	x	x	x				x	x					x			x			x
Take notice / To be informed	x	x	x	x			x						x	x	x	x	x			x
Sign	x	x	x	x										x			x			x

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Archive	x	x	x	x	x									x			x	x			x	
Dispose / Delete	x	x	x	x										x			x					x
Wait until	x	x	x	x										x								
On-Site Visit	x	x	x	x					x					x			x	x		x		x
Coordinate	x	x	x	x					x				x	x			x					x
Consult (external meaning)	x	x	x	x					x	x			x	x			x	x				x
Discuss (internal meaning)	x	x	x	x					x	x			x	x			x	x				x
Examine / Analyse	x	x	x	x					x					x			x					x
Calculate	x	x	x	x					x					x			x	x				x
Notify	x	x	x	x					x					x	x		x	x				x
Invalidate	x	x	x	x										x			x	x				x
Forward / Delegate	x	x	x	x					x					x	x		x					x
Reserve / Book	x	x	x	x										x	x		x					x
Demand sth. / To Follow Up	x	x	x	x					x					x	x		x	x				x
Publish	x	x	x	x										x			x	x				x
Document	x	x	x	x					x					x			x					x

**Tab. 2.5: Assignments of attributes to process building blocks**

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In Tab. 2.6 the current sets of attributes for POs is shown. Here, a "Name"-Attribute was added as well to allow individual naming of POs. Furthermore, each PO has a document type that corresponds to the PO-Categories described in section 2.1.2.

	Name	Type
Simple Types	Name	String
	Comment/Description	String
	Average Number of pages	Number
	Structured Document	Boolean
	Signature (of Citizen) needed	Boolean
Complex Types	Medium	Collection
	File Type	Collection
	Special Format	Boolean + Collection
	Confidentiality	Collection
Connection to Model Element	Document Type	PO Category

**Tab. 2.6: Attributes of processed objects**

The experiences with the attributes in the different workshops also suggest that there is not one single attribute configuration that fits for all PAs. Each PA will have different goals for a PICTURE project. Therefore, the PICTURE method allows for an adjustment of the configuration to serve the individual needs of different PAs. For analysis purposes however, the basic set of attributes presented in this section should always be part of the attribute classification.

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### 3 PICTURE Procedure Model

In this chapter the procedure model of PICTURE is introduced. This procedure model describes how to conduct a PICTURE project in a PA. Firstly, the five different phases of the procedure model are explained: project management, preparing the modelling, modelling the process landscape, using and designing the Process Landscape, and administering the Process Landscape by a Continuous Process Management.

#### 3.1 Phases of a Modelling Project

##### 3.1.1 Project Management

To establish a proper project management is the basis for a successful completion of a project. This is particularly important for modelling projects using the PICTURE-method, because in addition to the classical task of project coordination the methodological specifications have to be developed and defined.

Projects can be seen as complex, temporary tasks that are usually interdisciplinary[15]. In order to successfully realize a project, the single subtasks as well as the resource and staff assignment have to be organized, determined, lead, and controlled. This is performed by the project management [11].

##### 3.1.1.1 Determine the Project Objectives

Project objectives are critical success factors for planning and controlling a project. Once these objectives are defined, they have to be operationalised and subsequently communicated to all parties [10].

On the one hand, a project objective includes a factual goal, which means the specific aim of the project. This could be the adoption of activity-based costing, the design of products, the evaluation of investment potentials, or the adoption of information technology. On the other hand, it comprises formal target values like cost and time objectives[4]. Whereas the formal target values are often the same for every project (minimize costs, meet the project deadline), the factual goals are very diverse.

The goals of a project should be specified carefully. The use of concise a wording makes it easy to remember, but the publication of undifferentiated criteria will result in ambiguous objectives. The emerging scope of an interpretation may lead to the problem that different employees strive for different goals. Therefore, the objectives should be clearly defined and should be measurable. An objective has four elements that must be specified to make it concise, measurable and checkable:

- A description of the purpose - e.g. documentation of all administrative processes.
- A specific quantitative measurement ratio that can be used as an indicator to identify to what extent an objective has been met. As the total number of administrative processes cannot be foreseen, you can use auxiliary measurement ratios like the number of examined administrations or the number of interviewed employees.
- The definition of the expected extent to which the measurement ratios shall improve during the execution of the project. In the given example, there shall be interviews with at least 60% of the employees of 12 selected administrations.
- The specification of a time-frame in which the management ratio shall change to the given extent. In our example we choose 4 months.

The complete objective is: Make workshops with at least 60% of the employees from 12

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selected administrations to document all administrative processes within 4 months. An objective should be defined in a way so that

- the purpose is aligned with the strategy of the organization,
- the measurement ratio actually represents the purpose, and
- the quantitative framework of the objective is accepted, realistic and motivating.

As a mnemonic you can say the objectives should be „SMART“. This is an acronym for Specific, Measurable, Achievable, Relevant and Timed.

To achieve objectives, concrete actions are necessary. Similar to objectives that are not SMART, ambiguous action plans are of little value. The actions have to be clear and comprehensible. The following questions must be answered to specify actions:

- Who executes the action (e.g. the department, division or administration concerned and the respective employees)?
- What shall be achieved with the action (operational or process objective with checkable quality definition)?
- When shall the results be available (time specification for sub-ordinate objectives, milestones and the result)?
- Whereby shall the results be achieved (predominantly the given resources like staff, budget and material)?
- How shall the results be realized (predefined procedures, special methodology and practices)?

Based on the factual goals of the project formal target values for deadlines and costs have to be planned and specified. Regarding the scheduling, the intended time frame of the project must be stated. Within a detailed planning of both the activities of the project plan and the available resources the end date can be calculated. These end dates are called *milestones*. The date for the end of the project can be verified or falsified by a detailed planning of the milestones. An integrated view on the dates and resources is important for the planning, because otherwise no realistic requirements for milestones and the end of the project can be given. Particularly, the availability of domain experts is critical for the success of a modelling project with PICTURE.

If there is the possibility to release domain experts from their operational duties to give them time for the modelling project, they will often be indispensable for the daily business. This act of temporal balancing of domain experts must be considered in the planning of the project. The general vagueness of the planning must be compensated by extra time. It is very important for the project and the persons involved getting advice from the upper management either to prioritize the project activities or the daily business in case of a time conflict. Also the planning of the costs is usually very uncertain. The cost categories must be identified and planned individually. The human resources needed for the project must be considered, particularly with regard to the planning of the personnel costs. The acceleration potential of the project and the additional costs for the increased staff deployment must be compared with each other.

### 3.1.1.2 Defining the Fields of Action

During a large process modelling project a high number of processes are being examined and documented over a short period of time. The processes are collected from various organizational units and are connected in many ways on many hierarchical levels. Not only persons who execute a process read its models, but also many different members of the project team. This is because a process generally consists of different sub-processes with many interdependencies. These sub-processes can take place in different locations in an organization. All these elements must be connected during the modelling.

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A conceptual framework can be very useful in this situation. It fulfils the role of putting the detailed models into context and allows navigating through the processes. In a framework the representation of the context in general has priority compared to the detailed representation of many elements and relations [5].

From a scientific perspective, a framework structures the elements and relations of an original that have been declared as relevant, on a high level of abstraction in a specific order. The purpose of the framework is to provide an overview and to disclose the connections of elements and relations located at subordinate levels of.

It is necessary to consider both the strategically and the graphical component during the design of a framework. The basic structure of a framework is derived from strategic considerations. For example a framework should be process oriented if and only if the administration wants to focus on processes. During the design of the graphical component of the framework, the strategic considerations must be transformed into a graphical form in a way that the framework reflects the strategic considerations by a systematic alignment of its elements. By following these criteria, the framework can play its role as communication platform for the scope and content of the project.

### 3.1.1.3 Creating a Project Schedule

It is the task of the project leader to create the project schedule [6]. It consists of the tasks that have to be done, the intended throughput-times of these jobs and their deadlines. Besides that the project leader has to estimate the demand of resources. Strategic requirements („next year at the first of August the recording of all administrative processes must be completed“) and the project schedule must be harmonized. If necessary, the project team must be enlarged to meet the deadlines [4].

A process modelling project with PICTURE can, just like almost any other project, be divided in multiple phases that are built upon each other systematically. Within the preparations of modelling the concrete information demand necessary to achieve the objectives and subordinate objectives must be assessed. With the aid of these explicit information demands it is possible to configure the method. The notification of all the employees involved is part of the preparation of the modelling. This paves the road for the modelling phase.

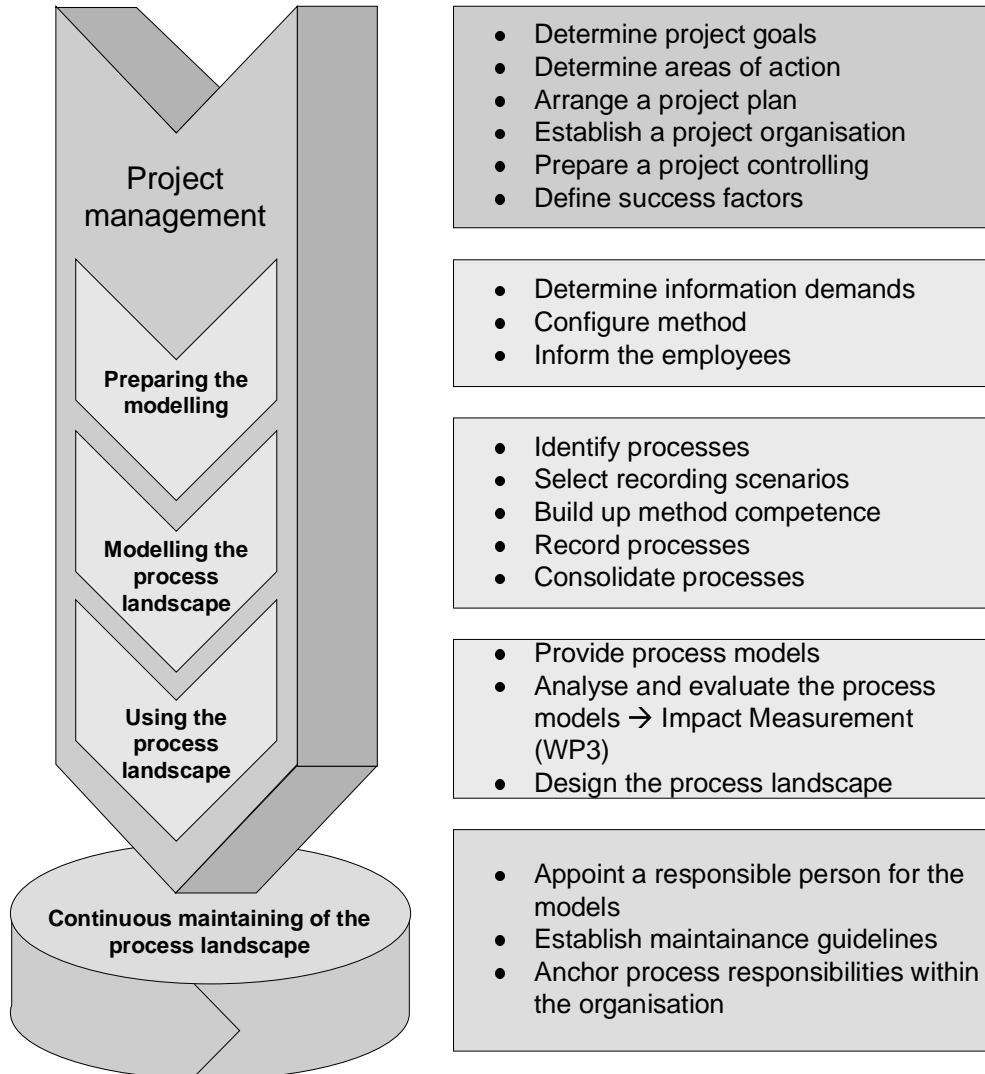
The first thing to do in the modelling phase is to identify the processes that must be recorded. Due to the plurality of different processes and the lack of transparency this point is of particular importance. Depending on the number and the organizational implementation of the processes you have to decide on how to record the processes and which resources shall be used. The process recording itself accounts for the lion's share of the work, but a systematic planning of the foregoing phases can significantly reduce this work. In turn because of the high number of processes and the high number of employees involved, the results must be revised, consolidated and improved regarding to the quality towards the end of the process recording. At the end of the modelling phase the process models at large form the process landscape. It can be used in different ways depending on the objectives.

The first thing to do in the utilization phase is the evaluation of the process landscape. This step is about the uncovering and the activation of existing potentials. The process landscape and the derived information are used within the process design of the organization either as a new form of process documentation in the intranet or as functional specifications for the selection of software or as a guideline for a modification of the organizational structure. The latter case is possibly about the assignment of tasks to positions and therefore a matter of power and influence.

Even if the process modelling project is finished the focus on processes shall not decline. An

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organizational unit only responsible for the process management has to enact process improvement as a process. This process has to become an integral part of operative and strategic management of the administration. The procedure for the execution of a PICTURE-project is summarized in Fig. 3.1 and explained in detail in the following part of this document.



**Fig. 3.1: Procedure model of the PICTURE-method.**

#### 3.1.1.4 Preparing the Project Organization

Like any other project a process modelling project needs its own organizational structure. This structure should be orthogonal to the organization of the administration.

Expert knowledge (knowledge of the official functions, the current workflows, and possible improvements) and methodological know-how (knowledge of the PICTURE-method, ideally from already finished projects) have to be brought together. Expert knowledge can be found in the specific departments, methodological skills in the organization department. Furthermore, it is possible – if necessary – to acquire methodological skills from external consultants or scientific institutions.

A project leader must be aware of the fact that the process modelling project may change the jobs of the involved employees. Therefore, his ability to empathize is a critical character trait. He

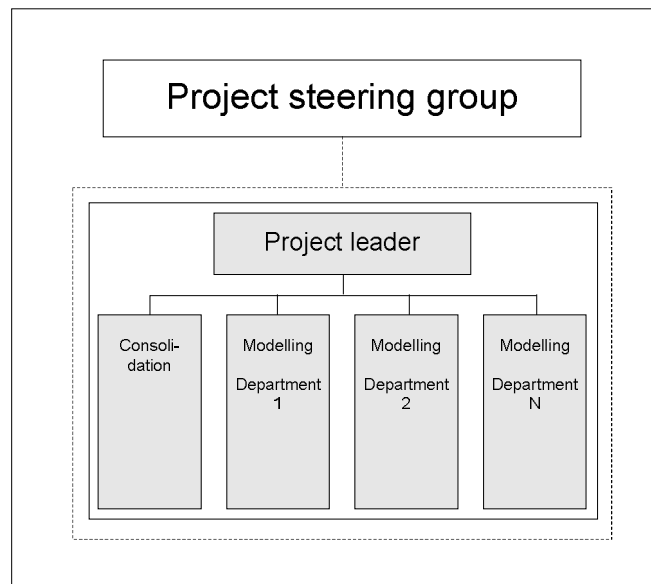
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has to deal with the anxieties, the reservation and the resistance of the employees. In case of any conflicts between the involved employees, the project leader has to act as a mediator. He must be neutral and has to take care not to increase the existing polarization.

The project leader reports to the project steering group (PSG). This group has to make the decisions based on the input of the project leader. Members of this committee are on the one hand members of the administrative management, on the other hand they should be employees who later on are responsible for the changed processes. It is also suggested to include representatives from the personnel board to the PSG. This makes sure that the interests of the staff are kept in mind and that the project is clearly communicated to the staff. The PSG meets periodically to check the progress of the project by using the milestones. It makes all decisions on factual issues that are relevant to the project.

The project team is put together by the project leader in accordance with the PSG. On the one hand it should consist of many employees to ensure a tight coupling of the project and the entire organization. On the other hand the project team should be as small as possible to enable the involved employees to work efficiently. The critical factors of team building are the choice of the adequate magnitude and the mix of domain experts and method experts. Even for very large administrations a quantity of about 6 to 9 people seems to be the appropriate. Depending on the work package, additional people might be added if necessary.

In addition to the persons in charge for process modelling there should also be responsible persons for project communication and project controlling. They also should be members of the core team. The project communication informs the staff at an early stage about the project, continuously communicates information and presents the results. Additionally, the project communication talks to executives and employees in the advance to important meetings to pave the road for the decisions to be made. In Fig. 3.2, you can see a simple project structure for a modelling project.



**Fig. 3.2: Example for a possible organizational structure in a modelling project**

#### 3.1.1.5 Establishing Project Controlling

Project controlling should be established as an independent function in the project management. It takes over a control and regulation role during the project to make sure that the factual and formal goals of the project are met.

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As a matter of routine the project leader checks the progress concerning the factual and formal goals. The PSG has to be informed and involved into the decision-making process by the project leader. Thereby, the PSG controls the milestones of the work packages and the development of costs and results. It also makes the decisions on adjustments concerning goals and scope of the modelling project.

The controlling of the factual goals is difficult as the project models are collected in a distributed way. Whether the process models lead to a consistent view of the organisation can often only be told after a certain milestone of the project has been reached. In PICTURE the PBBs are created to minimize these inconsistencies. However, some efforts are still to do. Due to this rather late evaluation, the controlling framework should be reviewed regularly.

The formal goals are supervised continuously by comparing the planned values to the actual conditions. How to measure the compliance with the goals has to be specified during the project planning phase. Using project management software can offer practical support. Planning of appointments, direct and indirect costs, the use of resources, gathering and tracing relevant data, as well as identifying and presenting the discrepancy between the indented and actual conditions can be supported effectively by such tools.

In practical project work the goals planned cannot always be met. Normally, the project management has to face a lot of unexpected events that may delay a project or increase the costs. Therefore, a crucial factor for the project success is the personal commitment of the employees involved in the project. Furthermore, the collaboration of departments is required and the resources have to be planned separately in an own budgets of the administration. A good project organisation must always be flexible enough to cope with personnel capacity changes made by the departments. Adaptations on the order and structure of the project activities due to staff shortage must not retard the progress of the project.

### 3.1.2 Preparing the Modelling

#### 3.1.2.1 Determination of Information Demands

The importance of a concise goal definition has already been described at length in the context of project management. The PICTURE methodology is a way to obtain information that is necessary to meet the factual goals of a project.

The specification of the structure of this information is vitally important to prepare a modelling project with PICTURE. To collect the right information it is necessary that the goals are clear which describe the intended use of this information [17].

For that purpose particular goals need to be connected to information demands in a first step. Thus, this phase means a refinement of the goals specified beforehand. In doing so it is helpful to develop a question catalogue which can be used to evaluate whether a target value has been met.

In chapter 3.1.1 for instance the generation of transparency in an organisation was mentioned as a modelling purpose. As transparency is an abstract term and different persons can understand it differently, several questions can be posed that help to formulate that goal more precisely.

- How many processes have been captured within the organisation?
- How many processes have been described completely?
- How many different employees have modelled by using the PICTURE-methodology?

Another example is the modelling purpose: identification of reorganisation potential. Questions like the following can be deduced from this goal:

- How many media breaks and media changes, respectively, can be found in the

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administrational processes?

- Which processes show the most media breaks?
- How many/which processes are handled by more than one employee?
- How many/which processes pass through more than one/two/three organisational units?
- How much does it cost to forward a request between organisational units?
- Which processes are similar regarding their structure?

These information demands and questions, respectively, need to be answered by a PICTURE modelling project. For that purpose the particular model elements, especially the PBBs and their attributes, need to be adjusted. This configuration has to be done in a way which allows the recording of exactly the information that is needed to satisfy the information demands and answer the shown questions.

- To respond, for example, to the question about the number of completely described processes, it has to be specified which attributes need to be recorded for a process to be considered as completely described. Depending on the requirements, attributes like *name*, *brief description* and *required standard forms* can already be sufficient. In contrast, it is also possible, that plenty of additional information is need (e.g. *legal foundation*, *information systems used* etc.) in order to consider a process as completely described.
- Another example is the question concerning the organisational interfaces. To address this issue, more effort has to be put in the recording of attributes which describe information flows and responsibilities, e.g. the process attribute *organisational unit in charge*.
- To answer the questions concerning media breaks, the occurrence of the PBBs *Print*, *Scan* and *Capture/Enter* in particular processes can be analysed.
- To answer the question regarding structural similarity, it can be examined, which processes are using identical PBBs.

As a result of this preparation step the project goals should be specified by particular questions and information demands. The attributes which are necessary for answering these questions should also be known.

Depending on the goals it can be reasonable to discuss the information demands with the personnel board at an early stage. Thus, critical questions, e.g. concerning precise actions of individual employees ("Which employee is fastest in handling requests?") can be excluded from the outset to lower the potential of conflicts.

### 3.1.2.2 Preparation of the Method in a Project Specific Way

In order to use the PICTURE methodology to achieve a particular modelling purpose, project specific modelling conventions need to be developed and the PICTURE modelling tool needs to be adjusted. The modelling conventions regulate:

- The object of modelling ("what" should be modelled).
- The procedure of modelling ("how" should it be modelled).
- The roles of modelling ("who" should do the modelling).

#### The Object of Modelling

The question concerning the object of modelling has, mostly, already been answered by the specification of the modelling goals and the corresponding information demands. By defining the modelling object on the one hand and the necessary information demands on the other hand it

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becomes transparent, what is expected as the result of the modelling project. Accordingly, this has to be documented in the modelling conventions in the first place. If necessary, it is possible to distinguish between *must-* and *can-*attributes in order to limit the maintenance effort. On the other hand, the purpose oriented attributes can be complemented by attributes, which ease the project management. These are attributes like *originator of the attribute*, *creation date*, *date of change* etc.

### The Procedure of Modelling

The problem of the modelling procedure concerns the way in which the modelling should be conducted. A modelling project should be supported by a software tool from the technical point of view and by adequate procedures and regulations from the organisational point of view.

In principle, for the realisation of modelling projects with PICTURE, existing modelling tools can be used and adjusted to the PICTURE methodology. However, the PICTURE-tool is especially adapted to the method and only this integration allows for an easy and efficient way of analysing the process models in the PICTURE-meaning as other tools mainly do not allow for an uninterrupted workflow.

Based on a reference catalogue of modelling goals corresponding PBBs and attributes can be selected. This allows an adjustment of the tool to the concrete project situation at hand. The configuration of the tool according to the modelling goals is a part of this step. In a next step the organisational structure of the administration is deposited in the software tool. The processes, which have to be recorded, need to be structured by means of at least one classification criterion. Thus, the structure of the organisation can be used for this purpose.

With the goals and the organisational structure, a good portion of the modelling conventions has been transferred into the software tool. A complete implementation of the modelling conventions through a configuration of the modelling tool is not always possible. Organisational rules are required to ensure the conformity of the created models with the given modelling conventions. The following aspects are of particular importance:

- The life cycle of the models and the process of model creation, communication and maintenance, respectively, have to be described. For the models, states have to be defined, which describe the particular life phase of a model. Typical phases are *work in progress*, *draft*, *technically reconciled draft*, *approved*, *out-dated* etc.
- In addition to the organisational rules the creation of templates for text documents or presentations may be necessary. These documents and presentations cannot be created by the PICTURE modelling tool and have to be created manually based on the templates.

### Informing the Project Participants

The first information an employee receives about a modelling project will not reach him over an official communication channel of the administration, like a circular or an announcement in the intranet. In most cases rumours and hints are spread first over informal channels. The information about the given project is imprecise in such a case and leaves much room for interpretation to the particular employee regarding the concrete contents, purposes and especially the consequences for himself. Therefore, all participants need to be involved at an early stage to avoid misinterpretations and to retain control over the perception of the project within the organisation. Every employee involved in the project, should be informed about the modelling project before the beginning of modelling activities. This can be done in different stages and steps.

Firstly, As soon as the project team is established and the management of the administration and the personnel board have agreed on the project, the heads of the departments should be informed in a kick-off meeting about the project, the project goals and the applied procedures and methodologies. The meeting participants should be invited and provided with preliminary

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information at least in written form or, even better, in a personal dialogue. The agenda for the kick-off meeting should include the following topics:

- The importance of process orientation in general and of the modelling project in particular should be highlighted by a member of the upper management.
- The concrete goals of the modelling project and the PICTURE methodology should be introduced.
- The ideas and expectations of the project participants should be mentioned.
- Furthermore, team-specific procedures should be specified, e.g. to agree upon the first appointments for trainings or first workshops.

In a second step, based on the kick-off meeting the employees of the particular organisational units have to be informed depending on the scope of the modelling project. This can be done in analogy to the previously described procedure. In personal discussions the already informed department managers can provide their employees with information about the project.

In a third and last step a description of the project can be distributed to all other employees of the administration (e.g. by circular or the intranet).

This approach ensures that the employees involved neither feel badly informed nor feel steamrolled by an information overload. At the same time the typical hierarchical information channels of administrations are used. Along with the order of the informative meetings the presentation and preparation of the information is important, as it determines the first impression and the subjective valuation of the modelling project by the employees. Along with the first presentation a continuous information supply during the project is important. The publication of intermediate results and progress reports lets the employees feel that the time they have invested into the project leads to results. This can easily be reached by simple mechanisms like newsletters or an intranet site about the project.

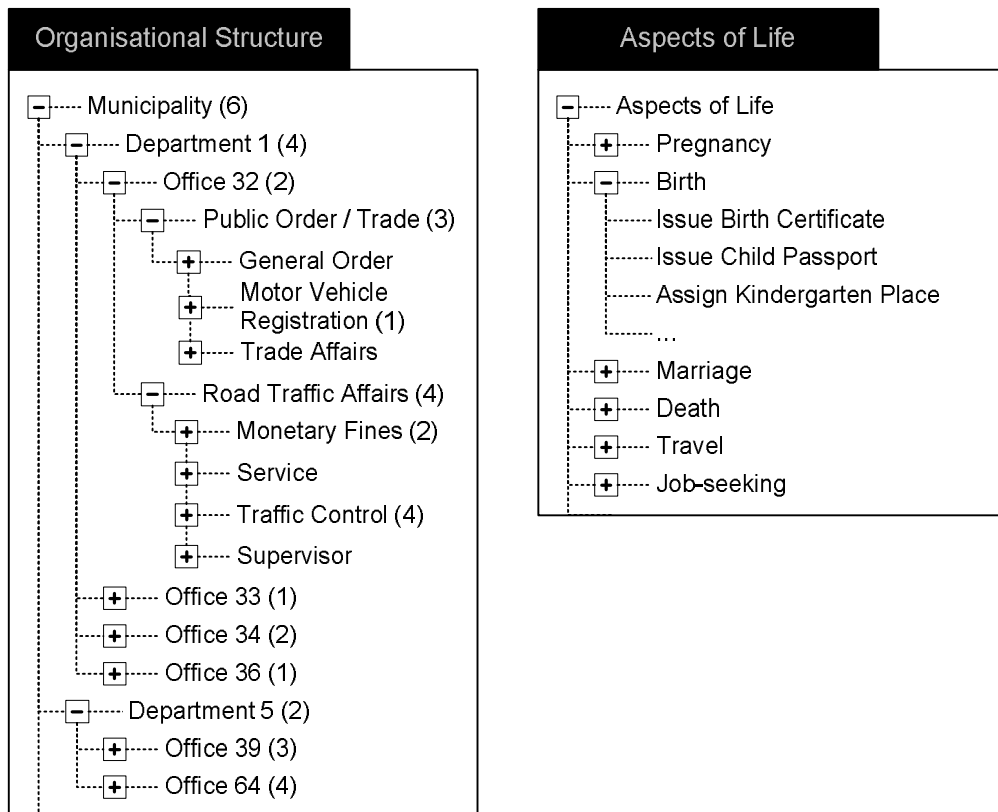
### **3.1.3 Modelling the Process Landscape**

#### **3.1.3.1 Identifying Processes**

The first step of modelling is the identification of areas which need to be considered within the scope of modelling. This can be achieved by sectioning the whole domain of a PA in order to identify manageable sub-areas which then can be prioritised individually and handled by different modellers. In the context of PAs a function orientated segmentation and a product orientated segmentation of the problem domain seems to be well suited. A segmentation which is based on the current organisational structure has the advantage that the relevant domain experts are known in advance. These experts can be consulted for the formation of modelling teams. However, the structure of the problem domain under consideration does not necessarily have to correspond to the organisational structure of the administration. A structuring along different product fields or live events allows for a modelling from a perspective which incorporates different organisational units. This is reasonable if many complex processes exist, which are collectively performed by different organisational units.

The next step consists of the identification of processes, which have to be captured by using the PICTURE-method. The basic goal is the creation of a structured overview about the process landscape, e.g. a process catalogue, which will be filled with concrete models during the process of modelling (cf. Fig. 3.3).

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**Fig. 3.3: Example for possible structuring elements for processes**

There are several information sources which should be consulted during the process collection:

- available organisation manuals describing the present operational and organisational structure,
- product catalogues describing the service portfolio of the administration,
- documentations of application systems in use (e.g. in the form of function models or requirement specifications),
- existing technical terms and processes (the investigation of technical terms is useful in order to detect differing concepts within the administration and to provide a consistent terminology for the modelling),
- existing standard forms and documents for certain processes (especially for application forms there often is a 1:1 relationship between a process and a form, so that a number of business processes can be deduced from the existing collection of standard forms),
- the existing internet presence (in many cases processes with an external consumer interface are described in the internet and provide a reasonable starting point), and
- the know-how of experts, which can be retrieved in interviews (in many cases these experts can also provide the documents mentioned above).

The data from these information sources has to be examined and structured according to their content and their relevance.

The involvement of qualified experts, who know the administration and the existing operational and organisational structure in their area, is of special importance for a successful

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capturing of the process landscape. The consultation of qualified employees is indispensable, since they are the only ones who can provide information about the actual situation in the administration [8]. Documents are often not up-to-date and do not reflect all necessary aspects of reality.

Once different persons are involved in the identification of processes, the necessity arises to perform a disambiguation: The persons involved in the process identification have to come to a consensus regarding the terms and concepts they use, especially the concept of a process. Within the scope of PICTURE the process definition of the Process Landscaping Methodology can be used as a basis for the concept of a process. Generally, the identification of processes can be divided into three phases:

- *Identification of the service object:* The service object is an artefact on which a performance is executed. It has to be identified in order to name the process, e.g. the register of trade.
- *Determining the process limitations:* The limitations of a process need to be determined. When identifying process objects the interconnections of activities within an administration can cause the identified processes to become very complex and extensive. Limitations for the identification of activities need to be defined in order to keep the processes manageable. This can be the case, when an activity obviously belongs to another process or another organisational unit. In the context of the PICTURE-method the construct of sub-processes exists for this purpose.
- *Analysis of performances on the service object:* The actual process identification and structuring is taking place in this phase. Based on the process objects from phase one all activities are examined, which concern a specific process object. In the example of register of trade, in combination with the activities registration, notification of changes, deregistration and information there are four administrative processes to be included in the process catalogue.

The potentially relevant processes should be captured in a very elementary way first, including only some basic characteristics. They serve as a basis for the subsequent process modelling. The following list contains a number of characteristics which should be collected during the coarse-granular process capturing:

- name of the process,
- information about the state of maturity of the process documentation and how up-to-date the documentation is, and
- details regarding a person in charge for the process, if available (name, organisational unit).

### 3.1.3.2 Building up Method Competence

Before a process recording can start, motivating trainings for the project participants are necessary. The employees in operating departments are usually not familiar with the PICTURE-method. An introductory training for all the project participants is crucial for the acceptance of the selected means of representation. Two types of training can be distinguished: The group-based method training and the training through multipliers.

- *Group-based method training:* The group-based method training can be conducted with relatively many officials. This training approach serves the purpose of conveying the basic principles of the PICTURE methodology and the tool to the officials. Thus, domain experts are enabled to model and maintain their own processes. Depending on their modelling affinity, some of the domain experts can model their processes independently

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right away, whereas others might need assistance by a method expert when modelling their first processes.

- *Training trough multipliers:* Training trough multipliers is very detailed and is meant to enable persons from within the administration to conduct method training by themselves and provide support to other modellers. Thus, training trough multipliers takes longer and includes a thorough introduction into all features of the PICTURE method and implementation for the multipliers.

Depending on the duration of the modelling project, trainings can be conducted in stages, and refreshed in regular intervals.

### 3.1.3.3 Capturing of the Process Landscape

In this phase the actual capturing of the process landscape is performed. As the modelling is done in a distributed manner, mechanisms are needed to coordinate the modelling activities executed by the respective domain experts.

The task of the modelling coordinator is to break down the identified processes into sub-processes and assign them to the different modellers. The concept of a *modelling task* in PICTURE supports this process. Via a *modelling task* the modelling coordinator can assign the task to model a certain sub-process to a modeller. To receive a modelling task is the only way for the modeller to start modelling a certain sub-process. By following this procedure the modelling coordinator has full control over the modelling process. Furthermore, the concept of *modelling tasks* allows for controlling the modelling process by assigning a state to the task. Possible states are *assigned*, indicating that the task was assigned to a modeller, *started*, when the modelling has begun, *completed*, when the modelling is finished, *faulty*, indicating that the modelling control is not satisfied with the modelling, and *closed*, when the modelling task was finished successfully. As the modelling coordinator might not always be able to identify all sub-process, the modellers should also be able to make suggestions for sub-processes/modelling tasks. This is done by automatically generating stubs of sub-processes when sending a PO to another organisational unit or person when modelling an own sub-process.

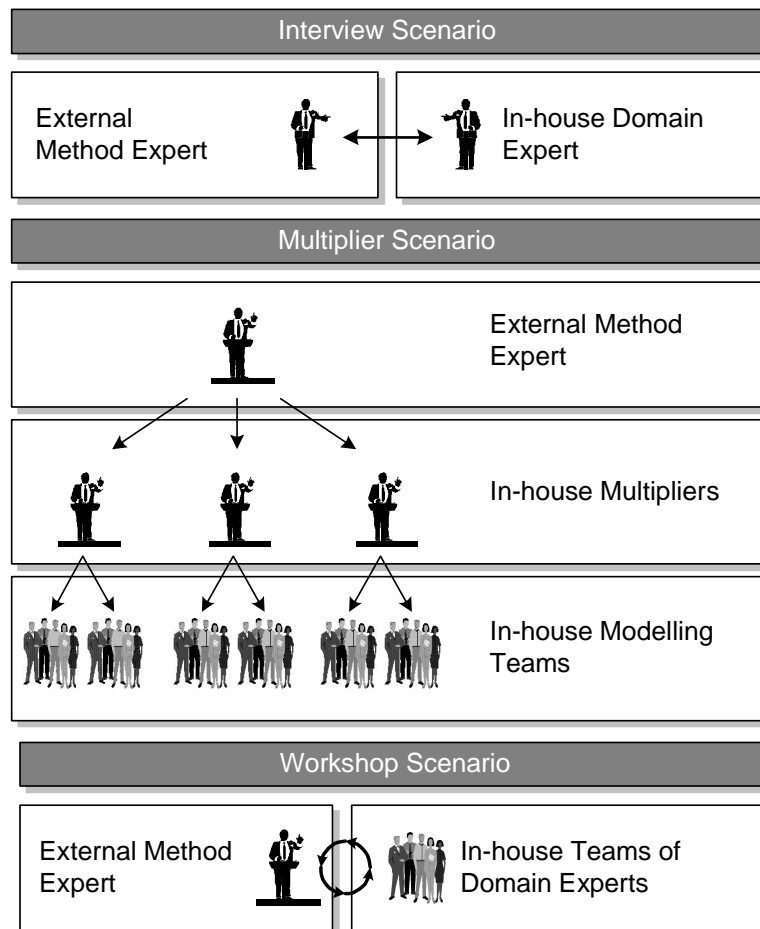
It is the goal of the PICTURE-method to enable the domain experts to model their activities by themselves. However, it might be the case that not all domain experts are able to use the PICTURE-method by themselves after receiving the training, especially in the beginning of a modelling project. To ensure a high model quality in the early stages of a modelling project and to make domain experts more familiar with the methodology different modelling scenarios might be useful:

- *Independent modelling:* As mentioned above, ideally, the domain experts are able to model their (sub-) processes by themselves. This allows an easy integration of the modelling activities in their daily work routine. Furthermore, this scenario is the most cost effective way as only one person is needed for the modelling of a specific part of a process.
- *Interviews:* During an interview, one or two method experts model the process together with a domain expert. One of the method experts leads the conversation and the other records the processes. This way the domain expert can focus on the content of his processes and can see how they are recorded with the PICTURE-method. The domain expert can give direct feedback whether her activities are recorded correctly regarding their content. This method is, however, quite costly as up to three persons are necessary for the modelling.
- *Workshops:* Workshops are similar to interviews. The main difference is the number of participants on the side of the administration. With up to ten domain experts and two or

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three method experts more people are involved. Thereby, it is possible to address a greater number of domain experts. The domain experts can also try to model by themselves under the surveillance of the method experts.

The different modelling scenarios are described in Fig. 3.4.



**Fig. 3.4: Scenarios to capture the processes.**

#### 3.1.3.4 Consolidation of the Process Models

The activities of model consolidation can be easily delimited from the activities of modelling teams. While the technical correctness of (sub-)models is already ensured by the modelling in the particular teams, the consolidation step includes the integration of individual models into an overall model. It is advisable to start early with the integration and to add successively new process models. A complete integration of all sub-models after project termination is too time-consuming, as the complexity of the integration task increases with the number of sub-processes to be integrated. The intensity and duration of this task varies largely, depending on the selected approach to represent the models. Furthermore, certain consolidation results which are achieved during the modelling can be used to make the rest of the modelling activities more efficient. The following activities, which are executed on previously modelled processes, are part of the consolidation:

##### Harmonisation of the Processes and Sub-Processes

If the problem area is sectioned with regard to its functions, primarily, the interfaces between the sub-processes need to be harmonised. An interface description documents the physical or

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information objects that are transferred between sub-processes as well as the specific state they are transferred in. The input and output objects of the sub-processes are to be specified exactly and to be verified in order to receive a consistent overall view of the process models.

While different sub-processes are joined a harmonisation of a varying process denomination is of great importance, as different organisational units tend to name their sub-processes differently.

#### Harmonisation of the Attributes

In the beginning of a modelling project it is not clear, which values an attribute can have, e.g. which information systems there are in an administration. The Supporting Elements therefore, often allows giving answers in a text field. It may happen that people using the word processing Winword 2003 may answer "Text processing", "Word", "MS-Word", "WordXP" or "Winword".

It makes sense to think about specifications of attributes already during modelling and, if necessary, to restrict certain possibilities to answer, in order to guarantee uniformity and, hence, comparability. The earlier the attribute-harmonisation is done, the lesser is the workload for adjustments at the end of the modelling project. This is an iterative process of standardization. The more PICTURE-projects are performed the more pre-standardization is possible. And – of course – the work performed in WP2 within the PICTURE-project gives a good basis for pre-standardization.

#### Adjusting the Amount of Information

After, or even during the modelling it may become visible, that certain attributes (e.g. the values of the type of an assessment-PBB) are difficult to gather and, therefore, this information is not included in all process models. For model consistency and for guaranteeing analysable models it is important to decide whether additional data is gathered in selected areas or the use of such incomplete attributes is avoided. In any case the steps carried out are to be documented to preserve the interpretability of the modelling results.

### 3.1.4 Using and Designing the Processing Landscape

As soon as the processing landscape is documented and consolidated entirely it can be used and evaluated according to the targets of the modelling project. Thereby, four different usage categories can be differentiated in general. These different scenarios will be presented below. It should be mentioned here, that in general the result of WP3 – Impact Measurement – is the background for this phase of the procedure model.

#### 3.1.4.1 Using the Processing Landscape Directly

By using the landscape directly the targets of a modelling project are mainly reached when the modelling is over. That means that the content of the created process models represents the project goals. This is for example the case when the process models have been created for organisational documentation purposes, for training of the employees, or for knowledge management.

The same applies when information that has been recorded is provided to external groups directly, e. g. by working in the modelled contents into the internet appearance of an administration or a process register across administrations.

In all these cases of direct usage keeping up-to-date of process information is of great importance. That is why the implementation of a continuous maintenance process has to be considered within this type of usage.

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#### 3.1.4.2 Evaluating the Status

The status evaluation implies certain operations that are carried out on the process landscape or on single processes and their attributes. These operations include predominantly functions like counting and sorting, which can already give hints to possible weaknesses.

Status evaluations are for example:

- number of processes in which something is paid,
- number of pages printed per year and per department,
- number of application procedures, approval procedures, information procedures, reporting procedures etc.,
- number of processes having an interface to business, citizens, other administrations,
- number of applications arriving at the administration via fax/telephone/e-mail/internet etc.,
- listing the processes with the most media breaks,
- listing the processes with the most organisational interfaces,
- listing the processes with the most involved employees, or
- listing the processes with the highest number of cases.

Furthermore the status evaluation includes comparison operations, which can help answering the following questions, for instance:

- Which processes contain similar elements concerning their functional order?
- Which processes contain similar elements concerning their IT support?
- Which processes are structurally equal?

Ultimately, even simple calculation instructions can be deposited. If for instance a certain value structure for labour and material costs (e. g. average costs per working hour or average costs per copy, printout, mail etc.) is deposited, corresponding values can be assigned to the information of the amount. This permits for instance the following evaluations:

- listing the processes with the highest resource usage (if necessary broken down by labour and material costs),
- average costs of a formal control, or
- costs for sending a written reply.
- 

#### 3.1.4.3 Ex Ante Potential Measurement of Reorganisation Activities

The processing landscape can be used as a basis for roughly identifying the potential effects of certain reorganisation activities in advance and for using them as decision support. The underlying assumption is that every reorganisation activity has impact on certain areas of the processing landscape. Changing the principles of handling of payments for example would have an effect on all the processes including a charge payment. Introducing an infrastructure for digital signature would affect in principle all process steps, where a legally binding signature is required. Combining two organisational units would influence all the processes the two organisational units have been involved in before. By introducing an electronic acceptance proposal there would be

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an impact on all application processes.

Depending on the reorganizational activities every administration has to make certain assumptions about the effects according to the local affairs. It can be assumed, for instance, that the introduction of an electronic acceptance proposal will cause a shift of ten per cent of the applications sent via the classical way like mail or fax to this channel. As soon as the corresponding costs for an electronic acceptance proposal will have been estimated, the potential monetary savings based on the complete processing landscape of the administration can be calculated. It is important to stress that with this heuristic approach only potential savings can be identified. An investment appraisal cannot be carried out only based on that criterion because the introduction and realisation costs of single reorganizational activities are hard to estimate in advance and above all they can vary strongly between the different service providers.

#### 3.1.4.4 Ex Post Performance Measurement of Reorganizational Activities

This will be the core result of WP3 and therefore we refer to the Deliverable D3.3: ICT Impact Measurement Methodology.

### 3.1.5 Administering the Process Landscape by a Continuous Process Management

#### 3.1.5.1 Necessity of a Continuous Process Management

After a process modelling project has been performed and reorganizational activities have been applied it is suggested to continue with a permanent and institutionally anchored, systematic process management of the organisation. The following reasons support a continuous examination of the collected administrative processes.

- *Dynamic Requirements:* For public authorities it becomes more and more necessary to be able to adjust their own processes flexibly according to the permanently changing legal and political requirements. A continuous process management offers the functional possibilities and the "strategic creativity" to cope with this continuous need for change.
- *Evolutionary Realisation of Reorganizational Activities:* Short-term reorganizational benefits are only achievable in practice in areas with rather simple organisational structures. For many affected processes or organisational units, more complex reorganizational activities cannot be introduced or even completed in short time projects. Here an evolutionary approach is required.
- *Changing Targets in the Process Design:* As described above, a modelling project should only be carried out if concrete goals do exist and if they have been operationalised. The more focussed such a target is, the simpler and more efficient it can be achieved by using the PICTURE-method. No modelling project should start with the demand of reaching all imaginable targets at once. Therefore, it cannot be avoided that with new strategic challenges, new questions and, thus, also with new targets a repeated examination of the affected administrative processes is necessary. If for example the goal of the first modelling of the process landscape was the documentation of the organisation, not all information that is necessary for reaching a possibly new target is available, such as estimating the reorganizational potential.

Consequently, the PICTURE-method is no one-time process. For long-term use it represents a permanent cross-sectional task that can be supported by the mechanisms of continuous process management.

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### 3.1.5.2 Phases of a Continuous Process Management

Having finished a first-time realisation of a modelling project by using the PICTURE-method, all necessary conditions for a useful and continuous process management are already given.

- For describing the organisation and the processes a binding modelling language exists.
- The single processes are defined, documented and known by the employees.
- For each process the responsible organisational units are defined and documented in the process models.
- Methods and tools for evaluating the process landscape do exist within the PICTURE-method.
- There is a pool of officials who have already gained experience as members of the modelling team within the first modelling project by using PICTURE. They are suitable for filling roles in a continuous process management.

A continuous process management can be divided into four steps:

#### Execution

The execution phase has no starting or finishing point but can be regarded as a continuous enactment of administrative processes. During the daily work, i.e. during the routine execution of administrative processes two types of data can be collected concerning the process execution:

On the one hand, key figures can be measured concerning time (e.g. average throughput time of a building application), costs (e.g. derived from the average throughput time of a building application) and quality (e.g. the share of further enquiry and respectively contradictions in the total number of building applications). The collection of these key figures is not always possible or sensible because this can be very complex. Electronic task processing systems can help as with an automatic registration and can be executed in the background.

The second data category is exception data. These are information about specific cases, for instance, about especially complex building projects or with amendments. Other elements belonging to this category are possible ideas of improvement from employees. Independent from the data collected via the processes the personnel board should always be involved because the continuous data collection is a sensitive issue within the given legal and social circumstances.

#### Analysis

Based on the execution data gathered the actual processes can be evaluated at regular intervals. This can for instance be done by synchronising certain key figures with target values defined in advance. Let us take the example where within a quality promise an administration has granted to their citizens the handling of building applications within a certain period of time. Suppose this time limit is exceeded regularly then there is an issue that has to be examined and resolved, if possible.

If variances are traced back to changed requirements (e.g. overloading by delegating additional tasks by higher administrative levels), the originally defined targets will have to be reconsidered and adjusted if needed.

#### Modelling

After the analysis phase it has to be clarified whether a need for changes can be derived. The need for changes can vary highly and can range from partitions of a single process up to a remodelling of complete process groups. Within the modelling it is the task to formulate a new

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nominal condition for the effected scope of analysis in terms of models, on whose basis the realisation effort can be estimated and project teams can be created.

### Realisation

When the nominal condition is defined, the realisation can follow. The subsequent activities are part of the realization:

- Depending on the realisation efforts a pre-study has to be performed.
- Identified weaknesses have to be eliminated by adequate optimization measures.
- The responsible process manager instructs competent employees with the operative realisation of the changes in the process model.
- The changes have to be made public in the administration.

By finishing the realisation phase the cycle of a continuous process management closes and the execution phase starts again.

### 3.2 Role Concept

As the modelling should be performed in a distributed manner, it must be supported by the PICTURE procedure model. A number of roles have been identified, which a domain expert can take when the PICTURE-method is applied. Each of these roles has its own requirements for the information it needs to fulfil its tasks. Therefore, the implementation of the PICTURE-method must provide adequate views for the respective roles e.g. by providing adequate menus with the functionality needed for the respective roles.

- *Modeller*: The domain expert concerned with the actual modelling takes the role of a modeller. Modellers have the task to document the parts of the processes they are concerned with as they have the required process knowledge. The modeller requires a detailed view on his part of the process (or sub-process) to model it adequately (local view). Besides that, he only needs a description of the relationships to the preceding and succeeding sub-process and a coarse-granular overview about the whole process.
- *Coordinator*: The task of the coordinator is to identify the processes which should be modelled in a certain area. There, they do not need to have detailed knowledge about specific processes but should have an overview of the activities in a certain area. The coordinator should break down the processes identified into sub-processes and assign tasks to the modellers to document those sub-processes. The coordinators need an overview about the whole process (global view) and needs to be able to follow the status of the different modelling tasks. Furthermore, they need support in identifying and structuring of the processes (e.g. by a life event structure).
- *Administrator*: The role of the administrator is to manage the PICTURE-tool. This includes the installation and maintenance of the software as well as the creation of user accounts.
- *Decision Maker*: Decision makers are concerned with analysis of the process models. They are the main target group of the ICT Measurement methodology. But they should also have access to the information of the Process Landscaping Methodology in an aggregated form (global view).

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#### 4 Evaluation of User Requirements

In D4.3 a number of requirements were deducted, so that the Process Landscaping Methodology can be used accordingly to the PICTURE approach. These requirements were deducted from the goals of the PICTURE approach – to model, measure and analyse – as well as from the desired modelling scenario, where the domain experts from the PAs model their activities themselves. For this scenario an easily understandable modelling approach which facilitates distributed modelling is needed. This chapter will evaluate how the presented distributed modelling approach meets these requirements.

*Requirement: The semantics of the modelling language constructs have to be easily understandable for a domain expert*

In order to apply the modelling language correctly, the domain experts need to be able to understand all constructs of the modelling language. If the domain expert is not aware of the meaning of certain language constructs it will be hard for him to identify the real world counterparts of these constructs and will therefore not be able to describe his processes. The more complex the modelling language is the more training is needed to enable the domain expert to model his processes.

In the process modelling language, the understandability of the constructs is realised through the domain-specificity of the process modelling language. The PBBs which form the core of the modelling language have a fixed semantics. They describe activities that are specific for the public administration domain. Thus, they are easy to comprehend by the domain experts. All other language constructs also use vocabulary which is familiar for the domain experts and are thereby further enhancing their understanding of the modelling language.

*Requirement: The syntax of the modelling language must be easy to grasp for a domain expert*

Even if the modelling expert knows which construct to choose in a certain situation it does not ensure that he is able to combine them correctly. Therefore, the syntactical rules of the process landscaping modelling language must be as simple as possible as the domain experts should be able to apply them on their own. To achieve this, the modelling language should exhibit only a minimal set of constructs since not required constructs unnecessarily increase the complexity of the modelling language [13]. Furthermore, options to connect constructs should also be minimal as they extend complexity as well.

The process landscaping modelling language tries to address this requirement by providing only necessary language constructs. In the course of the different evaluation step, the modelling language started with a minimal amount of constructs only including PBBs, sub-processes and processes. The additional constructs were only added after the need for them became clear in evaluation workshops with domain experts. Through the basic idea of sequential modelling the process landscaping modelling language also minimizes the options to connect the language constructs. Guided modelling techniques for the use of alternatives, connections and cross-sectional processes also ensure that these constructs are used correctly.

*Requirement: The modelling allows for maintainable process models*

For using scenarios like model-based knowledge-management, maintenance of information technology and continuous process improvement for the processes of the PA, up-to-date processes models are of great importance. Therefore, the maintenance of the models has to be achievable with minimal effort as process modelling is not the main task of the domain experts in the PA.

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This requirement is on the one hand addressed through the semantic and syntactic simplicity of the process landscaping modelling language as discussed above. This minimizes the effort for domain experts to keep their process models up-to-date. On the other hand, the presented process landscaping procedure model describes how the maintenance of the processes can be implemented within the organisation of a PA.

*Requirement: The modelling language can be aligned goal oriented*

The more information needs to be captured by the process landscaping methodology the more effort is needed by the domain experts to collect it. Therefore, it is not efficient to collect all information which could be captured by the modelling language. In fact, the goal of the project should determine the information which is collected. Thus, the modelling language must provide mechanisms to align it with the goals of the project.

In the presented process landscaping modelling language most of the information is captured within the attributes of PBBs. The scaling of the captured information is possible by aligning the PBB attributes with the goals of a PICTURE project as the modelling language allows for the adjustment of the attribute sets of the PBBs. This way only the needed information is captured.

*Requirement: The modelling language facilitates capturing the entire process landscape*

To disclose the complete reorganisation potential within a PA it is necessary to collect more than a few processes in detail. It must rather be the goal to get an overview over the whole process landscape of a PA [1]. As this can include up to 1000 services, a detailed analysis of all processes is not possible. Therefore the modelling language must be able to capture the whole process landscape in coarse granular manner to get a broad overview for further analysis.

The PBBs of the process landscaping methodology have a fixed level of detail which allow for the desired coarse granular capturing of the process landscape. Furthermore, the presented process landscaping methodology allows for a distributed modelling approach. This is realized through the differentiation between the local and the global view. Through this distributed modelling approach, domain experts are able to model their activities themselves. Thereby it is possible to model the whole process landscape as the effort is distributed over a great number of modellers.

*Requirement: The resulting models are syntactically and semantically comparable*

One reason for difficulties in the improvement of processes in PAs is that employees often have no detailed knowledge about other processes within the organisation. Hence, similarities between processes cannot be exploited. Therefore, it is not sufficient to analyse the process models independent of each other. Rather, it is essential to identify similar and deviating structures over several process models [9]. Thus, the process models must be comparable on a semantic and syntactic level. To facilitate this, type conflicts, naming conflicts and structural conflicts [3, 12, 14] must be avoided.

The central concept to guarantee comparable process models for the process landscape modelling language are the process building blocks. They provide a fixed level of detail and specific semantics. As the semantic of a process building block is fixed, type conflicts, where a fact from the application domain is modelled differently by different persons, are avoided. Furthermore, naming conflicts cannot occur as the type of a PBB is fixed and names are only used for better readability but not for analysis. Finally, structural conflicts, where reality objects are modelled at different levels of detail or abstraction, are also avoided through the PBB as they fix the level of abstraction. Additionally, the simple syntactic constructs and the guided modelling techniques lead to processes which are similarly structured.

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*Requirement: The method contains information about reorganisation potentials which can be mapped on processes models:*

In order to identify reorganisation potential within the processes it is not sufficient to analyse only the as-is models of the process landscape. It is also necessary to know what reorganisation measures influence the processes and to what extend. Therefore, a connection between the process patterns (WP 4) and the weakness patterns (WP 3) is necessary to estimate the impact of newly introduced ICT functionality.

In the presented process landscaping methodology this connection is implemented in two ways. Firstly the processes modelled with this methodology and the weakness patterns defined in WP 3 are both based on the same PBBs. This allows for the mapping of weakness patterns on process building blocks. Secondly, the supporting element model allows a detailed modelling of the ICT components used in a process. Theses ICT components can be mapped to the ICT functionalities described in WP 3. This enables the measurement of the impact that ICT functionalities have on the process landscape.

*Requirement: The modelling method allows for efficient modelling*

The collection of the whole process landscape of a PA requires the inclusion of many domain experts additionally to a modelling team. As modelling is not the main occupation of the domain experts, the capturing of the process landscape should create as little effort for them as possible.

In the presented process landscaping methodology the effort of the domain experts is minimized by two measures. The distributed modelling approach aims at spreading the modelling activities over a large number of officials, thereby minimizing the effort of a single domain expert. Additionally, the domain experts only model the parts of the processes they are familiar with, thus speeding the modelling up further. Further on, the fixed coarse granular level of detail guaranteed by the PBBs, avoids too detailed models and minimizes the modelling effort, as well.

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## 5 Conclusion and future work

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This deliverable presented the PICTURE process landscaping methodology. It consists of two main parts, the process landscaping modelling language and the PICTURE procedure model.

The process landscaping modelling language brings together different views on a process in a public administration through its different sub-models: The Organisational Model describes the structure of the PA, the Processed Object model contains the documents that are processed, the Supporting Element Model captures the resources supporting the service delivery and, finally, the Process Models describe the PA's processes in detail and thereby integrate the elements of the other sub-models. Additionally to these models and their elements, techniques were defined to guide and support the domain experts using the process landscaping modelling language.

The presented PICTURE procedure model describes how a PICTURE project in PA can be conducted. It contains all phases which are necessary for a successful modelling project: Project management, preparation of the modelling, the modelling of the process landscape itself, the use, analysis and design of the process models and the continuous management of the process models.

The development of the process landscaping methodology was guided by the requirements defined in D4.3. To assure that these requirements are met by the PICTURE methodology, it was also evaluated how the developed approach addresses these requirements.

In the next step, the developed process landscaping methodology has to be implemented in the PICTURE tool (WP5), which is in parts already realized, and has to be integrated with the ICT impact measurement developed in WP3. As the development of a modelling methodology is an incremental approach this might require some changes to process landscaping methodology. The presented approach has, however, been evaluated in three iterations with domain experts from public administrations so that only smaller changes will be necessary.

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## 6 Literature

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