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## **Requirements Specification for Process Building Blocks**

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## 1 Summary

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The deliverable describes the activities to investigate adequate requirements for modelling administrative processes with Building Blocks. This is an important prerequisite for the further developments of Building Blocks, Landscaping Methodology and the PICTURE Tool. The identified requirements are discussed from different view points. Therefore the main chapter of this document is divided into three sections following the top-down approach (from general, over domain-oriented to specific aspects). With this approach the deliverable covers a wide range of requirements relating the modelling activities with PICTURE.

The first section initially describes some general requirements for proper modelling. The discussion focuses on the aspects that are relevant for PICTURE such as the principles of correctness, relevance, efficiency and economy, clearness, comparability and systematic structure. Additionally formal, user-related and application-oriented requirements are explained. Furthermore the levels of abstraction, flexibility and adaptability as well as the support of different perspectives have been identified as interesting and important aspects for PICTURE.

The second section details and completes these aspects with requirement for modelling administrative processes. Therefore the specific characteristics of administrative processes are presented before the according requirements are derived. The discussion focuses especially on the exact, consistent and standardised depiction of the modelled part of the real world. Furthermore the support of organisational responsibilities and the transparent presentation of interfaces (between different organisational units as well as between information systems) are defined as essential requirements for the modelling of administrative processes.

The third section goes into detail again and discusses the specific requirements for Process Building Blocks within the context of PICTURE, starting from the targeted group of users and their characteristics. So Process Building Blocks will be designed to represent activities within an administrative process. The blocks are considered to be definable units with a high cohesion out of an internal view, and low cohesion out of an external view. Because the mainly targeted users are officials in charge (they are considered to intensively work with the PICTURE Tool), the contents have to be intuitively comprehensible and unique. To achieve a high level of reusability, manageability and consistency, the Process Building Blocks should not depend from any department or specific domain.

Finding adequate levels of detail and abstraction, which are further important requirements, the number of Process Building Blocks should range between 25 and 40. In that way the repository will be easily manageable. For the detailing of general Process Building Blocks individual and even dynamic attributes have to be supported as well as the possibility to link single blocks to responsible organisational units, related documents or used information systems. Furthermore the aspect of translations to the native language of users was mentioned as an important requirement.

Beside these requirements for Process Building Blocks, some general requirements for process modelling complete the holistic view on this topic. In that way the deliverable will build up a useful framework to influence the development of Process Building Blocks, Landscaping Methodology and even the PICTURE Tool. It is furthermore an instrument to assess and ensure the quality of these components.

During the following iterations of design and evaluation these requirements should be permanently validated and (if necessary) re-engineered or completed.

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## 2 Introduction

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In order to design appropriate Process Building Blocks some requirements have to be defined. This deliverable describes the activities during the related investigations within work package 1 and specifies the requirements looking from different view points. Therefore the main chapter is divided into three sections (top-down approach).

The first section describes some very general requirements for proper modelling and focuses on the aspects that are relevant for PICTURE. The second section details and completes these aspects with requirements for modelling administrative processes. Therefore some important characteristics of administrative processes are presented before the according requirements are derived.

The third section goes in detail again and discusses the specific requirements for Process Building Blocks within the PICTURE context. Additionally some surrounding aspects (concerning constructs of the modelling notation, the methods of gathering information and work with PICTURE etc.) are mentioned.

In that way the deliverable will build up a useful framework to influence the development of Process Building Blocks, Landscaping Methodology and even the PICTURE Tool. It is furthermore an instrument to assess and ensure the quality of these components.

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### 3 Requirements for Process Modelling with PICTURE

In addition to the Description of Work the investigated requirements are not limited to Process Building Blocks. Because Process Building blocks cannot be designed without an idea about their presentation and the corresponding modelling notation, the PICTURE partners tried to find requirements for process modelling with Process Building Blocks in general.

Because the evaluation of process modelling notations and elements actually will be part of work package 4 (task 4.1, subtask 1), the identified requirements do not assert a claim to be complete. The requirements are differentiated into three sections. The first section contains the very general requirements for proper process modelling. The second section describes the more detailed requirements in the context of modelling administrative processes. In the third section specific requirements of Process Building Blocks are discussed. This approach helps to filter relevant requirements as well as to detail and to complete them.

The presented requirements are derived from the aims of process modelling in general (section 1), the characteristics of administrative processes (section 2) and the specific goals of the PICTURE Project (section 3). The results of this work package have been collected within personal interviews in the City of Winterthur as well as by review of scientific literature.

#### 3.1. General Requirements for Proper Modelling

A model is the abstract representation of specific parts of the real world, e.g. an object or system, from a particular point of view. In this first section some very general requirements for proper modelling are described. The following list contains some important points analysed by Prof. Dr. Joerg Becker at the University of Muenster [1]:

- Principle of Correctness
- Principle of Relevance
- Principle of Efficiency and Economy
- Principle of Clearness
- Principle of Comparability
- Principle of Systematic Structure

The Principle of Correctness claims that the modelled part of the real world must be represented in an adequate way. This representation has to filter unneeded elements and to describe them on the right level of detail. Thereby the consistency of semantic and syntactical correctness must be ensured. For that demand an adequate modelling notation should be found and conventions for notations must be defined.

The Principle of Relevance says that a model need not contain all the details of the described part of the real world (demand for completeness, e.g. in accounting). Regarding complexity and comprehensibility of models it is much more useful to select only relevant objects.

The third bullet point means that the economic aspects of modelling should be considered, too. The effort for modelling increases with a rising level of detail and a rising breadth of the modelled part of the real world. So both, the depth and the breadth, of a model should be carefully defined.

The Principle of Clearness contains the demand for comprehensibility, readability, and presentiveness. For instance a minimal number of elements overlapping edges should be aspired.

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The Principle of Comparability has a special relevance in the context of administrative processes. Because services provided by European municipalities are very similar, the comparison of the processes behind will be very interesting for an administration. So the development of a repository of processes or even best practice cases could be one important aim of process modelling. Furthermore there are many processes with different participating partners. So it must be possible to connect separate parts to one coherent process. Therefore the Principle of Comparability is an important prerequisite.

The Principle of a Systematic Structure helps to ensure referential integrity over different views and levels. So the consistency, e.g. between organisational chart and process model, will be ensured.

In addition to these principles Dr. Reinhard Schuette (University of Muenster) mentioned some other relevant aspects [6]:

- Usage of Adequate Modelling Languages
- Adequate Construction

Complementing to the Principles of Correctness Schuette explicitly emphasises that the usage of an adequate modelling language is a necessary prerequisite to describe the focussed situation in a problem-oriented way and to ensure the correct syntax.

Because each model is derived from a specific perspective and influenced by different aims the Principle of an Adequate Construction asks for the initial point of the modelling construction (definition of a problem) and the representation of the focussed problem. In that way especially the conflicts between the different users of such models can be identified (e.g. analyst and employee).

To consider all of these requirements, conventions have to be found. Conventions represent the framework for all modelling activities defining elements and constructs, rules for naming models or objects, conventions for the layouts and the definition of the level of detail [3]. Elements and constructs may be the types of models, objects and attributes, responsibilities, events, decisions and branchings, loops and so on. Naming conventions aim at the clear characterisation of objects e.g. An example therefore is the demand to use verbs for the description of activities. Layout conventions define breadth, form, colour of edges and symbols as well as their arrangement. The level of detail mostly depends on the aims of modelling. Sometimes it is really difficult to find the right level. The principle for that should be: As much as necessary, but as less as possible. Also aspects of using different levels of detail in the same model and the comparability of models should be considered when these conventions are defined.

At last in this section some research results of Prof. Dr. Ulrich Frank and Bodo L. van Laak (University of Koblenz-Landau) are presented [2], because they complete the list of very general requirements and especially focus on the modelling of business processes.

The "Requirements to Languages for Modelling Business Processes" differentiate into three perspectives:

- Formal requirements
- User-related requirements
- Application-oriented requirements

Formal requirements are:

- correctness

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- completeness
- homogeneity and consistency
- avoidance of redundancy
- reusability
- maintainability

User-related requirements are:

- simplicity
- comprehensibility and presentiveness

Application-oriented requirements are:

- mightiness and adequacy
- ability to operationalise

Regarding this enumeration some requirements have already been explained in this section, some differ to the already mentioned and some are newly introduced.

The demand for completeness does not ask for a complete description of a process but for a complete documentation and definition of elements and constructs used by the modelling language. Homogeneity focuses on the understandable representation of the elements of a modelling language. Similar concepts should be presented in similar ways and as easy as possible. This also includes the avoidance of redundancy.

Reusability ensures that similar aspects are presented in a similar way. So models are better comparable and the effort for modelling can be reduced. This is also a very important requirement for the PICTURE Tool because it is exactly the idea of reusable Process Building Blocks. Furthermore the identification of reusable sub-processes (group of Process Building Blocks) may be another objective.

Because Process Building Blocks can be considered as a part of reference modelling, some further requirements of this domain should be taken into account. In the context of Reference Modelling for Business Engineering reusability is discussed as the main objective of reference modelling by Peter Fettke and Prof. Dr. Peter Loos [7]. Concepts of reusability mentioned by Fettke and Loos are Configuration, Aggregation, Specialisation, Instantiation and Construction of Analogies. All these concepts are applicable for Process Building Blocks and should be supported by them. (Further information about reference modelling in the context of the configuration of eGovernment services (investigated in a parallel research project of the Information Society Technology Program in the European Union) are published in [4].)

Another requirement, the maintainability, means that the modification of a part of a model does not influence the consistency of the other part of the model.

The user-related requirements are also very important for the PICTURE Tool because the target group of people using the tool (esp. officials in charge) does not possess detailed knowledge about process modelling.

The application-oriented requirements describe that it must be possible to model each relevant aspect of the focused domain. The more aspects can be modelled, the mightier the modelling language is considered. Thereby the mightiness must stay on a usable, that means "adequate" level. In this context the level of detail, the level of abstraction and the level of formalism have to be carefully analysed and defined.

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The last point mentioned above will also be very important for PICTURE. Because PICTURE contains methodologies to measure and analyse the benefit of ICT functionalities, a set of data (e.g. durations or probabilities) has to be collected to operationalise the process model.

Beside these general requirements Frank and van Laak describe three other important aspects that are relevant for the development of the Process Building Blocks or for the selection of an adequate modelling notation within the PICTURE Tool.

- Levels of Abstraction
- Flexibility and Adaptability
- Support of different Perspectives

The Level of Abstraction differentiates between possible layers, e.g. Meta Layer, Type Layer and Instance Layer. The number of layers is flexible and depends on the purposes of the model (e.g. conceptual model vs. reference model vs. model of an instantiated process flow). An important question for PICTURE will be which levels should or must be supported for enabling the methodologies of measurement and analysis. (The abstraction level should not be confused with the level of detail which is another requirement.)

The second bullet point "Flexibility and Adaptability" aims at the ability to easily modify existing elements. In the context of Process Building Blocks this requirement also plays an important role regarding the case that Process Building Blocks are not complete. Analysts must have a possibility to create new Building Blocks as well as new attributes.

As described in the state-of-the-art analysis in deliverable 1.1 process models describe a sequence of activities, the personnel responsibilities and the used resources (e.g. documents or information systems). Different involved parties have different views on these structures. Employees with technical tasks focus on modelling information systems, employees with responsibilities for organisational issues care for the organisational chart, officials in charge know most details about their process flows. Each perspective contains its own specific types of models to represent the relevant part of the real world. To combine these views (perhaps separately modelled by distributed persons) mechanisms are necessary to ensure the consistency of the process model. Because PICTURE also targets these groups of people, the support of different perspectives is quite important for the acceptance of the tool. (The concept of different perspectives in the context of Reference Modelling in Business Engineering is also discussed in [7].)

Beside these requirements Frank and van Laak also discuss important constructs for flow control (e.g. sequences or rules), conditions for integrity (e.g. cardinalities) and some other relevant topics concerning process modelling. Although these aspects are quite interesting, esp. for the landscaping methodology of PICTURE, they do not enhance the requirements for process modelling and because of that they will not be further analysed in this document.

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### 3. 2. Requirements for Modelling Administrative Processes

Administrative processes differ significantly from industrial processes. These various characteristics cause specific requirements that correspond to, specialize or even complete the above presented aspects. To derive and understand the necessity of these specific requirements at first some of the administrative characteristics are presented. The following information has been investigated by analysis of scientific [5] and practical literature [11].

The following list contains a small overview of some characteristics of administrative processes in contrast to other industries.

- Repetitive processes
- Decision-dependent process flows (including parallelism, loops etc.)
- Structure, stability and consistency
- Bilateral or multilateral relations
- Decentralised structures
- Organisational structure oriented by functional responsibilities
- Service character
- Immaterial services

The first point describes a characteristic that does not differ from industrial processes. Depending on the processes and the departments a lot of routine work has to be performed by the officials in charge. Partially there is a quite high number of cases.

The process flows are organised in a different way than in industrial processes. In most of the administrative processes a lot of checks and decisions occur. Because the process flow depends on these checks and decisions (combined with internal and external parameters) there are sequenced and parallel steps as well as loops. These complex structures have to be modelled by adequate constructs.

Another point concerns Structure, Stability and Consistency of administrative processes. These characteristics are caused by legal regulation. That means the scope of decisions is rather limited. Although processes mostly are well comparable, the modification of structures (of processes and organisation) is quite difficult or even impossible.

The next aspect describes the relations between a municipality, its customers and suppliers. Many processes involve a lot of various internal and external parties with different expertise, authority, responsibility, role and technical equipment. So there are many interfaces between organisational units and heterogeneous information systems.

Regarding the involved parties, the tasks within one process are quite distributed (decentralized) and fragmented. Each sub-process needs similar or different information and documents. So information and document flows (or the access to needed information) within one or between different organisational units are a key factor for efficient and qualitative services.

The two last bullet points concern the service character of administrative "products". The speciality is the work on information (immaterial good). Information work differs in many aspects from the conventional production of physical goods and implicates important potentials regarding the usage of information systems.

Of course there are some more peculiarities of administrative processes. In the following the requirements that can be derived from these characteristics are discussed more detailed in [5].

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(These requirements concern different components of process modelling, e.g. notations, tools and methods. So the relevance for the Process Building Blocks is still limited. Nevertheless these requirements are relevant for the success and the acceptance of the PICTURE Tool and its methods.)

- Support of different users of the model
- Holistic perspective
- Publicity and diffusion of used modelling notation
- Simplicity
- Exactness of depiction
- Consistency and standardisation of contents
- Mechanisms for process controlling
- Support of process simulation
- Modelling of processes spanning over organisational units
- Representation of interaction and interfaces

Because of the decentralised organisational responsibilities and the different aims and qualifications there will be different users of process models. People working within the processes know the relevant details (e.g. structures of organisation or process flows, information systems landscape etc.) and are able to gather necessary information. They can even belong to different involved parties describing their part of the whole process (different sub-processes). Nevertheless these employees mostly do not have the knowledge about techniques of process modelling or the time to learn it. So there are other specialists (e.g. responsible for process and organisational structures or pushing the modernization of the public administration) who care for the graphical edition of process descriptions, for the analysis of the actual state and its deficiencies or for the conception of the target state. Often they are also responsible for the development of concepts for new information systems (technical view). These experts must have the necessary knowledge about modelling languages and adequate tools as well as a relation to the process owners. Another involved group of people are decision makers who have to assess and initiate the recommendations for changing existing structures. These employees need information on a more consolidated level of detail.

These examples show that there are a few groups of people working with process information out of different perspectives and with different objectives. To successfully execute such projects and especially to reduce complexity, all of them should be considered by adequate views on the process. This could be realized by supporting different methods of information gathering on the one side (input), by transforming or selecting relevant information (e.g. into a graphical representation) or even generating reports on the other side (output). Beside these specific perspectives (e.g. a structured view onto the process and information flows, organisational structures, information systems and documents) also a holistic view can help to find out deficiencies or potentials for fundamental optimisation.

Another bullet point says that publicity and diffusion of modelling notations are important requirements. In order to maximise the acceptance of any tool used for modelling the contained notations should be known and established in practical use. Of course simplicity (which is the next point) contributes to this requirement as well. Especially comprehensibility and lucidity are an important prerequisite for the acceptance by the heterogeneous group of parties involved into the process analysis.

The exactness of depiction is another requirement for modelling of administrative

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processes. Especially a rising level of detail or an automatic analysis and reporting of process information require a very high level of formal accuracy. A high formal level additionally supports automatic checks of plausibility or syntactic (and even semantic) correctness and enables the use of models for implementation of processes by workflow management systems. So especially for the technical purposes a highly formal level is preferable whereas for changing organisational or procedural structures often a lower formal level is sufficient.

Another point concerns the consistency of process models. The consistency can be ensured by a high formal level, the existence of an ontology, the definition of special terms or the standardisation of contents. This approach is very important for PICTURE because consistency is an essential prerequisite for automatic analysis and reporting. The standardisation will be realised by the repository of Process Building Blocks.

The next bullet point defines process controlling as a requirement for process modelling in public administrations. This aspect will also be a basic part of PICTURE represented by the methods of measurement. Process controlling has to assess qualitative and quantitative information by analysis of business ratios. In this way public services will become better comparable. (Process simulation, mentioned in the following bullet point, is another instrument to measure and assess selective business ratios.)

With the last two requirements the cycle closes. At the beginning we discussed the different involved parties. Of course modelling of these decentralised structures is another very important demand. Especially information flows (or document flows) between separate partners contain a lot of potentials for process optimisation and support by information systems. The depiction of the points of interaction and the visibility of interfaces (e.g. using swimlanes) will be necessary to easily recognise process fragmentation and to measure the level of service quality.

Recapitulating one may say that most of these requirements are quite important for the modelling with PICTURE. Nevertheless the weight of each requirement differs and their relevance should be carefully rechecked during the phases of design and evaluation of the Process Building Blocks.

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### 3. 3. Requirements for Process Modelling with Process Building Blocks

After the discussion of general requirements of modelling and the requirements for modelling administrative processes, this section tries to identify the relevant aspects for Process Building Blocks. Although the analysis focuses on the Process Building Blocks also some requirements for the modelling notation and even for the modelling tool (representation of the model, gathering and output of information etc.) are presented. The following information is based on the requirements gathered by the online survey described in Deliverable 1.1 [9], personal interviews in the City of Winterthur [8], some identified deficiencies of Event-driven Process Chains in Deliverable 1.1 [10] as well as further ideas developed during the research process.

To identify requirements for Process Building Blocks it is quite important to know who will work with PICTURE. The description of work lists the following three groups of targeted users:

- Project initiation:
  - Management staff of Public Administrations who want to apply PICTURE for their administration
  - Consultants who want to sell the PICTURE approach together with consultancy services
  - Industrial ICT companies who want to use PICTURE as a pre-sales instrument to show the benefit of their products
- Project execution - staff from the Public Administration where PICTURE is applied:
  - From the organisational division in order to put in master data about staff and structure
  - From the controlling division in order to put in general figures and indicators about staff, processes and structure
  - From process owners and executors of all other divisions in order to put in their process knowledge
- Project exploitation – decision makers from the Public Administration where PICTURE is applied
  - From the IT management unit (CIO)
  - From the organisational management unit (CEO)

The first group uses PICTURE for different reasons *before* a project starts. The third group uses the outputs of PICTURE to derive specific decisions (e.g. for new strategies of investments in information technology). The second group works intensively with PICTURE during a project. There are partners named who will gather information for the development of the new process models. Because the Process Building Blocks are designed as instrument to easily collect information about the processes, we focus on the process owners and executors who are responsible to collect and document their knowledge about all the details of the process flow. These employees mostly are not familiar with the methods and techniques of process modelling. As investigated in the former deliverables even the idea of process orientation is not extensively developed. So the repository of Process Building Blocks helps to document processes in a structured and consistent way without extensive knowledge about process modelling but nevertheless with the possibility for a further automatic processing in order to analyse processes and generate reports. (Of course the already described concept of different perspectives supports the integration of other experts, e.g. employees with focus on organisational issues or with responsibility for specific sub-processes.)

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The following list contains the core requirements for Process Building Blocks (in the narrower sense) and the requirements for modelling with Process Building Blocks (in a broader sense).

- Representation of activities
- Logical units to depict definable services or completed parts of services
- Internal view: high cohesion / external view: low cohesion
- Intuitive comprehensibility of the contents
- Uniqueness of the contents
- Independency from special departments
- Reusability within different processes
- Documented (help, examples for each PBB)
- Multilingualism (esp. support of the native language)
- Adequate and intuitive level of detail (for intuitive usability and adequate effort for modelling)
- Adequate and intuitive level of abstraction (comprehensibility and intuitive handling, detailing by attributes)
- Specification by attributes
- Minimal number of PBBs (between 25 to 40), perhaps sub-structuring
- Possibility to link responsible organisational units (stored in an adequate repository, e.g. an organisational chart) if necessary
- Possibility to link related documents (stored in an adequate repository) if necessary
- Possibility to link related information systems (stored in an adequate repository) if necessary
- Standardized internal structure (e.g. XML) for further processing in other applications

Process Building Blocks represent activities within an administrative process. They should be defined as logical units and depict specific services or parts of services. The differentiation is characterised by a high cohesion from an internal view while the Process Building Blocks possess a low cohesion from an external view.

To support these requirements the contents of the Process Building Blocks should be intuitively comprehensible and designed as unique as possible. Although overlapping is not harmful, for an intuitive and efficient work with the Process Building Blocks it is not desirable.

Because Process Building Blocks are designed to be reusable, in this approach they should not be department-specific but named in a way that is independent of a particular department.

Another requirement, investigated during the activities in work package 1, is the documentation of the Process Building Blocks for the user. To be able to select the correct one, adequate descriptions should be provided for each Building Block. Another demand concerns the language of Process Building Blocks. Although project language is English, all Building Blocks have to be translated to the native languages of the user partners. Regarding the differing terms used for the same objects (e.g. in German-speaking countries) also regional or even local characteristics have to be considered. This is an essential requirement for the acceptance of PICTURE in a municipality.

Another very important requirement is the level of detail. The more detailed a process shall

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be described the more effort is needed for gathering information and modelling the process logic in an exact and consistent way. Additionally a high level of detail will cause difficulties regarding the analysis, consistency, clearness, comprehensibility and manageability of the process model. So this requirement aims at the careful definition of an adequate level of detail.

Furthermore the level of abstraction has to be discussed. A high level of abstraction causes difficulties in understanding the meaning of the Building Blocks (e.g. "Receive", "Send", "Delete" etc.). However a low level of abstraction leads to very specific and detailed Building Blocks ("Receive a Mail", "Receive an eMail", "Receive an Application", "Receive a Phone Call" etc.). Those are quite well comprehensible but difficult to manage because their number will increase. One approach could be the definition of abstract Building Blocks and their detailing by attributes. There is another requirement that demands individual and (if necessary) dynamic attributes. Examples for an abstract Process Building Block could be "Receiving an information". This Building Block could be detailed by attributes like "Medium", "Channel", "Type of Document" etc. Following this approach the number of Building Blocks should range between 25 and 40.

Another approach could be the design of very detailed Building Blocks that are grouped for an easier retrieval. One problem could be the additional effort to select the correct group first and to cover a wide range of possible Building Blocks. Regardless how the Process Building Blocks will be designed, an extensive evaluation will be needed to assess the practical usability.

The next requirements mentioned above demand for possibilities to link organisational responsibilities, related documents or used information systems. Of course these details have to be collected and stored in an adequate repository before modelling and should be integrated into the process model.

The last requirement for Process Building Blocks listed above concerns their internal structure. This structure should be oriented towards established standards like XML to enable further processing of the information in other applications.

Of course the discussed list of requirements cannot be considered complete. During the following activities in all work packages, a permanent careful consideration can help to detail the requirements and to improve the Process Building Blocks.

In addition to these core requirements for Process Building Blocks and detailing the general requirements to software tools for process modelling, the following list contains some further requirements for the PICTURE Tool (modelling notation and methodology) that have been investigated during work package 1:

- Dialog-oriented gathering of information (Process Building Blocks, attributes, relations and control flow)
- Adding of new (empty) Process Building Blocks (with flexible attributes)
- Flexible attributes (obligatory, optional, adding new, edit existing, delete existing)
- Intuitive handling (e.g. drag and drop) with as little effort for initial orientation as possible
- Scalable view (zoom)
- Support of necessary elements and constructs (loops, and, or, xor, joins)
- Support of necessary repositories and models (e.g. for organisational structures, information systems and documents) and possibility to link them to the Process Building Blocks
- Grouping of Process Building Blocks to sub-processes (aggregation)

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- Possibility to flexibly export into popular formats (HTML, XML, JPEG, GIF, PNG, ...)
- Standardised interfaces
- Perhaps: possibility to import existing process information out of other applications
- Transparent arrangement of Process Building Blocks for fast and easy retrieval within the repository
- Existence of mechanisms to check validity and consistency of process models (e.g. branching after a check or a decision)
- Automatic arrangement of Process Building Blocks within the process model (minimal overlapping)
- Swimlanes to describe organisational and technical responsibilities and to easily identify interfaces between units and systems
- Compatibility to other popular notations
- Minimal number of symbols
- Visible modelling of aspects of time (e.g. duration, times of delay or for transport)
- Existence of example processes (perhaps repository of reference processes)
- Existence of adaptable process templates

Because Deliverable 1.3 focuses on the requirements for Process Building Blocks these further demands are not discussed in detail. Nevertheless they contain some useful hints for the selection of an adequate modelling notation, the development of the landscaping methodology or the design of the PICTURE Tool.

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## 4 Conclusion

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Summarising the last sections one can say that the requirements for modelling with the PICTURE Tool have to comply to a diverse range of requirements. Breaking down the general requirements for proper modelling into the specific requirements for modelling with Process Building Blocks in the context of administrative processes, a lot of aspects have been discussed.

Some of the requirements seem to be quite self-evident, nevertheless they have to be considered for the development of the Process Building Blocks, the landscaping methodology and even the PICTURE Tool.

The following facts give a small insight regarding the most important characteristics of Process Building Blocks that have been identified within this work package. Process Building Blocks represent activities within an administrative process. The blocks have to be designed as definable units with a high cohesion out of an internal view, and low cohesion from an external view. Because the mainly targeted users are officials in charge (they are considered to intensively work with the PICTURE Tool), the contents have to be intuitively comprehensible and as unique as possible. To achieve a high level of reusability, manageability and consistency the Process Building Blocks should not depend from any department but must be applicable without relation to wording used in a specific department.

Finding adequate levels of detail and abstraction the number of Process Building Blocks should range between 25 and 40. In that way the repository will be easily manageable. For the detailing of general Process Building Blocks individual and even dynamic attributes have to be supported as well as the possibility to link single blocks to responsible organisational units, related documents or used information systems.

Additionally the aspect of translations to the native language of users was mentioned as an important requirement.

Beside these requirements for Process Building Blocks, also some general requirements for process modelling completed the holistic view on this topic. So the collection of requirements will give some important hints for the selection of adequate modelling notations or the development of the PICTURE Tool and is even an instrument to assess and ensure the quality of these components.

During the following iterations of design and evaluation these requirements should be permanently validated and (if necessary) re-engineered or completed.

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