

# Law Making Environment. Perspectives.

Carlo Biagioli, Amedeo Cappelli\*, Enrico Francesconi, Fabrizio Turchi  
*Institute of Legal Information Theory and Techniques (ITTIG-CNR)*

*\*Institute of Information Science and Technologies (ISTI-CNR)*

*Italian National Research Council*

**Abstract.** In this paper a model-driven module able to guide the legislative drafter in planning a new bill is presented. This module aims at helping the legislative drafter to build a new act from a conceptual point of view.

Using this module the classical drafting process is inverted: the structure of a bill is constructed on the basis of its semantics. The main phases of the planning process and the software architecture of this module are shown.

**Keywords:** Model of Provisions, Legal Drafting, Model Driven Visual Legislative Text Planning

## 1. Towards a Standardized-Knowledge Based Legislative Drafting

From its formulation in the beginning of '80, the subsequent prototypes (Biagioli C., 1992) and its concrete start in 2000, the general goal of the project is the implementation of a “law making environment” (LME) for planning, wording and management of legislative texts. The complete version of the law making environment software is done and consists of two modules: they are the textual “drafting environment” xmLegesEditor (the open-source version of NREditor (Biagioli et al., 1992), a law drafting module able to produce new law texts according to the XML and URN standards established by the “NormeInRete” (NIR) project, and metaEdit (Biagioli and Turchi, 2005b), the module for the semantic mark-up of the drafted texts, according to provisions model (Section 2) and domain conceptual dictionaries.

In this paper a sketch of a second-generation LME is presented for legislative “conceptual drafting”: a model driven approach for planning the new text deep structure as well as for its wording (“meta-drafting environment”). Therefore the global “law making environment” will allow two ways of drafting: textual and conceptual.

LME in general is based on a double vision of the legislative text: formal and functional (Biagioli, 1997) (or rhetorical and illocutive<sup>1</sup>). Articles, paragraphs, etc., are entities belonging to the formal profile,

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<sup>1</sup> As those document profiles were called in (Branting et al., 1997)

while functional entities are provisions and their arguments, represented as analytical metadata in the NIR standards<sup>2</sup>.

The formal management of texts is based on their formal entities, mainly concerned with legislative technique. Moreover metaEdit commands, based on the functional entities, allow the handling of substantial aspects of the texts and, more in general, they allow to look at them from the point of view of their content and meaning, making possible to explicit basic meanings through metadata.

The new frontier of the semantic Web will move the information searching more and more on the substantial aspects of documents, requiring the availability of advanced editing instruments, able to handle not only the body of documents, but also their semantics. The ability to deal with meaningful semantic aspects of legislative texts, is mandatory in LME, based on XML, where meanings are effectively expressed by metadata.

The law text conceptual planning system presented in this paper aims at coping with such requirements, not only providing the legislative drafter with facilities in law text semantics management through metadata, as LME already does, but also allowing the construction of a new bill directly starting from the definition of its semantics, so turning upside down the drafting process.

This paper is organized as follow: in Section 2 the two knowledge models required by LME are briefly described; in Section 3 the main features and purposes of the LME textual drafting and semantic markup environment are presented; in Section 4 an overview of the meta-drafting environment is described; in Sections 5, 6, 7 the process of planning a new bill from a conceptual point of view as well as the software architecture of the meta-drafting environment is shown; finally, in Section 8 some conclusions are discussed.

## 2. Semantic models

### 2.1. PROVISION MODEL

Even if the structure of legislative texts is both formal and functional, the current logistics is more concerned with formal features of legislative texts than with their semantics.

The formal structure of texts and its elements, partitions, are well described, while less attention is paid to the deep structure, viewed as a collection of “provisions”, this one not deeply described and not widely involved in the organization of the text.

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<sup>2</sup> NormeInRete project standards.

Paragraphs and provisions are the elements respectively of the formal (syntactic) and functional (semantic) perspective. In a paragraph every term belongs to the corresponding partition (e.g. paragraph), while every meaning belongs to the correspondent provision. For instance a cross reference is a meaningful element, but is also a part of a provision and its meaning is fully understandable only in the global provision meaning context.

Since the law structure should be one, those (syntactic and semantic) elements must correspond each other in some extent. The most simple relation is 1-to-1, but others are acceptable, if only well-known. Any known relation is necessary, to achieve the starting point: law has one structure and two faces, or, in other words, is considerable from two perspectives.

In the Italian legislation there are many cases, depending on the quality of the legislator. It is a matter of legistic quality of legislation, the degree of correspondence between the two aspects of the structure. In that vision a lack of correspondence is a lack of legislative technique quality, until a new legislating techniques will not arise. For instance in US the plain language movement suggested legislative texts based on flat common language, but, at least in Italy, the provisions approach seems to be well-grounded.

## 2.2. LEGAL AND DOMAIN CONCEPT MODELS: GENERAL-STATIC AND CONTINGENT-DYNAMIC MEANINGS

Legislative texts contain two kind of semantic elements: speech acts (linguistic element equivalent of the legistic element provision) and atomic concepts. The meaning of terms contained in a paragraph belongs, from a general-static point of view, to the related concept and has various relations with many others terms, as explained in the dictionaries and in terminological ontologies. On the contrary from the contingent-dynamic point of view, the meaning of every term contained in a paragraph belongs to a speech act - provision. In other words terms can be seen as atomic elements belonging to concepts and at the same time playing their role in the provision they belong to, as well explained in the speech acts theory.

Such distinction relies on Breuker and Hoekstra statement, when they speak about “epistemological promiscuity”, referring to “the common practice of indiscriminately mixing epistemological knowledge and domain knowledge in ontologies” (Hoekstra and Breuker, 2004).

Therefore two kind of interacting models are needed, dynamic and static: provision theory and concepts networks (terminological ontolo-

gies)<sup>3</sup>. Semantic drafting supporting tools have to be based on both models, in a way that makes it possible their interaction. A provision theory has been developed (Biagioli and Grossi, 2007), while, as regards concepts, a conceptual dictionary has been made (Cappelli et al., 2006), even if every domain ontology is more or less useful and can be adopted.

### 3. LME - Drafting environment

The LME “drafting environment” components are xmLegesEditor and metaEdit.

xmLegesEditor (Agnoloni et al., 2007) is a specific environment for legislative drafting. It is the open-source version of NREditor, that has been implemented within the NIR project to handle legislative documents in XML native format, within the established URN-NIR and XML-NIR standards. xmLegesEditor is conceived as a visual editor, supporting users to produce valid documents according to the NIR-DTDs. No XML validation is necessary since it allows only valid operations according to the established standard.

Specific facilities are: the insertion of partitions according to the insertion point context; the automatic numbering of the divisions; the updating of internal references in case of text movements or variations as well as the external and internal cross-references construction.

On the basis of the twofold vision of a legislative text (formal and functional (Section 2.1)) two possible text organization strategies can be followed: the *formal* and the *functional organization strategies* (Biagioli, 1997).

In the *formal organization strategy* text is considered as made up of divisions (formal profile): partitions of similar rank, to be grouped in a new partition of higher rank, are chosen explicitly by the drafter.

In the *functional organization strategy* text is considered as composed by *provisions* (functional profile): provisions to be grouped are chosen with respect to their content, affinities, etc., making queries according to the provision model; then it is decided where they should be placed, according to the preferences of the drafter and the customary procedure of presentation.

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<sup>3</sup> “Ontological knowledge: Typically regulations are not given in an empty environment; instead they make use of terminology and concepts which are relevant to the organisation and/or the aspect they seek to regulate. Thus, to be able to capture the meaning of regulations, one needs to encode not only the regulations themselves, but also the underlying ontological knowledge. This knowledge usually includes the terminology used, its basic structure, and integrity constraints that need to be satisfied.” (Antoniou et al., 2005).

metaEdit is a web based tool and allows the semantic mark up of the drafted text, according to the two mentioned models, epistemological (or dynamic) and ontological (or static). The user can describe the semantic contents of each partition firstly qualifying its provision type through the provision model, so capturing the basic ruling intention of the legislator. Secondly qualifying the provision contents (arguments) through the concept models available, so describing, in some extent, content and details of each provision.

Using metaEdit the user, before getting involved in the semantic mark-up process, is allowed to edit and modify the dictionary of concepts to be used in the semantic mark up, as well as to create if it is not already available from the beginning. Terms can be inserted and deleted and their relations can be introduced or modified, as well as the classes structure can be modified. It is conceived as a tool for creation and maintenance of bottom-up ontologies, starting from the relevant terms of the domain texts.

Moreover, as the ruled domains are unlimited, the system is conceived to be used with every existing dictionary, where domain relevant terms are organized into concepts and their meaning is in some way described.

#### **4. Benefits in using semantic models**

The model of provisions can be used to handle legislation with three main purposes: managing the normative system, searching for provisions and text meta-drafting.

Firstly the description of amendments (insertion, abrogation, substitution) can be used to automatically obtain the consolidated text, thus promoting the upkeep of the legal order.

Moreover it can be used to enhance the accessibility of the legal texts, giving the users advanced semantic search and retrieval facilities on legislation. To this aim a tool (metaSearch, (Biagioli and Turchi, 2005)) has been developed in the LME project able to query the functional profile of legislative texts through metadata. This module allows to query a legislative information system on the base of two modalities of reasoning: a reasoning on provisions and their relations and/or on domain concepts and their relations.

Finally the model of provisions can be effectively used to provide law-makers with tools to plan organic and well structure bills.

The use of the semantic model of provisions allows to plan new bills according to a conceptual point of view, enhancing the quality of text, structure and semantics in legislative documents. In this project the process of planning a new bill from a conceptual point of view has been

called “Meta-Drafting”, therefore the system implementing such legislative drafting strategy has been called “Meta-Drafting environment”.

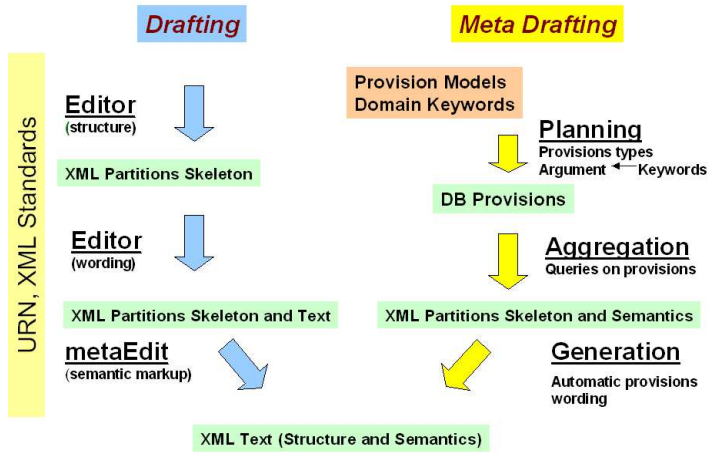


Figure 1. Drafting and Meta-Drafting

### 5. LME - Meta-Drafting environment

As discussed here and previously (Biagioli and Francesconi, 2005) the aim of this project is to provide the legislative drafter with facilities able to plan a new organic and well-structured bill. In particular the Meta-Drafting environment aims at providing users with facilities to help the organization of a new legislative text according to a semantic point of view, so that the formal profile of the text will be obtained as a result of the organization of the semantics of the text itself.

In the traditional activities of constructing a new bill, at the end of the drafting process the formal structure of the document may not be the best one to express the semantics of the text. The Meta-Drafting planning module, on the contrary, aims at turning over the traditional drafting process, providing facilities to firstly express the semantics of a legislative text, in terms of the functional profile, and only in a second phase, to organize the semantic components in a well-suited formal structure.

The semantics is expressed, as mentioned, in terms of type of provisions and arguments, usually added to the documents as metadata, chosen by documentalist or by specialized software. In our framework they play a different role: firstly they are chosen by the legislative drafter himself

and, secondly, they are chosen during the text drafting, helping the drafting process itself. Therefore, firstly they are authentic metadata, as chosen by the legislative drafter, and moreover they are used not only in the searching process, but also in the drafting phase. The first point, authenticity of metadata, is a very crucial issue in Legislative XML community, as recently pointed out (Lachmayer and Hoffmann, 2005).

## 6. The process of planning a new bill

According to a semantic point of view, planning a new bill may be seen as an activity that consists basically in describing how the domain of interest of the human activities (a scenario) will be regulated by the new act. The formalization of this can rely on a model of the scenario to be regulated and on a model of the possible ways the act will be able to regulate the scenario. The scenario will consist of terms and concepts of the real world that can be drawn from or organized into term hierarchies (thesauri) and concept taxonomies (ontologies).

Similarly, a possible model of the legal order can rely, to some extent, on the concept of provision. According to this point of view “a legislative text may be seen as a vehicle that contains and transports provisions and the legal order as a set of provisions rather than of laws”(Biagioli, 1997).

For the activities of planning a new bill, facilities can be provided which are able to help the legislator to establish relations between instances of the provision model and the entities of the scenario to be regulated. The collection of the established relations and the instances of these models will represent the semantics, namely the functional profile, of the bill under construction.

After having defined the functional profile of the new bill, facilities will be provided helping the organization of the semantic components (provisions) into formal partitions of the constructing act, according to several criteria (expressed by query selections) derived from legislative technique rules. At the end of this process, the formal partitions of the act will contain semantically correlated components (provisions), and the semantically qualified formal structure skeleton of the new act can be obtained.

Partition wording can rely upon the user, or proposals of partitions wording can be generated on the basis of the semantics of the provision associated to each partition.

In Section 6.1, 6.2, 6.3 and 6.4 the main phases of construction of a new bill by using the Meta-Drafting environment module are described in more details.

## 6.1. DEFINING THE SCENARIO TO BE REGULATED

Traditionally the body of legislative acts begins with the introduction of definitional provisions concerning the most important concepts that are: the description of the involved actors (norm addressees), the main activities, the regulated actions, and in general the entities belonging to the domain regulated by the law.

The terms (subjects, actions, etc.) introduced by the drafter will update the description of the scenario to be regulated and defined (this can be done using a specific module within the Meta-Drafting environment, for example the functionalities of metaEdit dealing with terms and concepts management), giving place to voices, composed by the name of the entity and the correspondent definition.

Moreover, the drafter can be given the possibility to correlate terms under construction by means of the basic relations (“is a”, “is part of”, etc.), creating therefore a taxonomic tree structure, in the metaEdit application. Graphical instruments can be added to such application. The outcome will be a set of graphs representing the key-terms of domain to be regulated by the bill under construction.

## 6.2. CONSTRUCTING PROVISION INSTANCES (PLANNING)

The next step will consist in the construction of provision instances by correlating (regulative correlation) terms of the adopted conceptual dictionary to the provision arguments. Basically, such terms become contents of provision arguments; so instances of provisions are constructed. To obtain a provision instance from the corresponding model the drafter may choose among the arguments those which are relevant for the provision under construction; such arguments will be filled by the drafter with terms. In constructing a provision instance, the drafter is therefore guided by the provision model and by the tree-structure associated to the terms of the domain to be regulated.

For example the following fragment of the Italian privacy law:

*“A controller intending to process personal data falling within the scope of application of this act shall have to notify the ‘Garante’...”*

can be described, according to the NIR metadata scheme, as a provision instance of type *Obligation* and arguments *Addressee*, *Action* and *Counter-party* as follows:

Obligation

*Addressee*: “Controller”;

*Action*: “Notification”;

*Counter-party*: “Garante”.

### 6.3. GROUPING PROVISIONS INTO FORMAL PARTITIONS (AGGREGATION)

This phase will consist in the organization of provision instances into formal partitions by means of aggregations. The drafter will be allowed to group, directly or by means of meta-commands (basically queries on metadata), semantically correlated provision instances. Criteria of aggregation can be both thematic, depending on contents of the arguments, and regulative, deriving from the types of provisions and their typical structure.

Following legislative-technique criteria on the organization of the texts, the selected provisions will be collected in higher hierarchy level partitions of the formal structure. For instance, according to a common and simple criterion followed at least by the Italian legislative drafter and in the European directives drafting, the provisions of type *Definition* will be grouped in a single partition, on the beginning of the text. Another typical criterion is the aggregation of the type of provisions *Obligation, Procedure, Derogation*, related to a specific *action*.

When the obtained aggregations are considered satisfactory by the drafter, a stable functional structure of the legislative text is obtained and the automatic conversion of the functional structure into the final formal structure will be possible.

### 6.4. GENERATING PROVISION AND HEADLINE WORDING (GENERATION)

A further phase, here reported as a future research issue, will be able to help the drafter in the formulation of the body of the single provision and the headlines of formal partitions.

It will allow to construct sentences for provision instances wording, using tools based on computational linguistic techniques for language generation. Several styles of provision wording might be possible, including at least the active and passive form of a sentence.

Similarly, a semi-automatic headline wording could complete the process of constructing the body of the bill. In the Italian legislative technique titles of the partitions express both thematic and regulative aspects of the provisions. The automatic headline function will help the drafter

in formulating a sort of virtual title of each provision, starting from its term-arguments.

Since in the Italian legislative technique a provision usually corresponds to a formal paragraph, such provision virtual title represents *de facto* the title of the corresponding formal paragraph.

The titles of the higher level container partitions will be a synthesis, as common denominator, of the titles of the contained partitions.

A possible implementation of the provision wording generation module can be based on an EBNF grammar which expresses the “productions” for each type of provision.

Ex:

$$\langle ProvisionType \rangle \rightarrow \langle Definition \rangle \mid \langle Competence \rangle \mid \langle Obligation \rangle \mid \langle Permission \rangle \mid \langle Procedure \rangle \mid \langle Penalty \rangle$$

$$\langle Definition \rangle \rightarrow \langle Definition\ syntactical\ structure \rangle$$

$$\langle Competence \rangle \rightarrow \langle Competence\ syntactical\ structure \rangle$$

...

$$\langle Obligation \rangle \rightarrow \langle Obligation\ syntactical\ structure \rangle$$

Each specific syntactical structure is related to the structure of the arguments of each provision type.

## 7. The Meta-Drafting environment software architecture

The Meta-Drafting environment system is conceived as a visual editor of provisions and it is composed by three main components:

1. a Model of *Provisions* and *Arguments*;
2. a Model, represented as *concepts* and *terms*, of the scenario to be regulated;
3. a Visual Provision Manager.

### 7.1. MODEL OF PROVISIONS AND ARGUMENTS

As discussed in Section 6, planning a new bill from a conceptual point of view can be based mainly on the model of Provisions and Arguments able to describe the semantics of the acts.

To the aim of providing a standard description of such a model, we suggest OWL as a language able to represent the model properties. An example of a taxonomic description of a provision model portion and its OWL implementation is reported in Fig. 2.

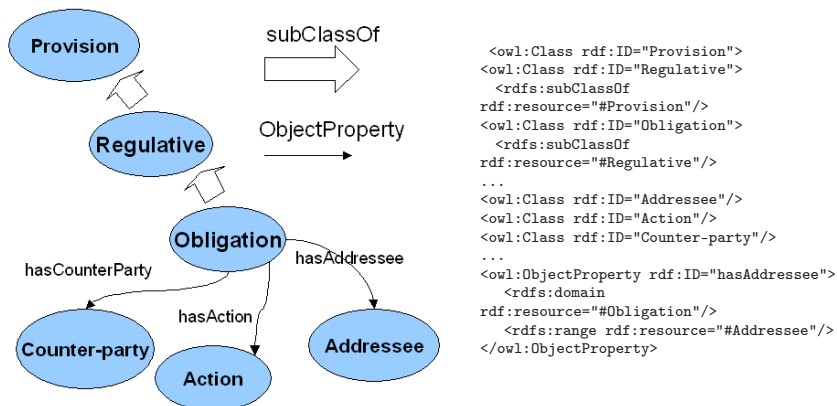


Figure 2. Taxonomy of a provision model portion (*Obligation* model hierarchy path) and its OWL representation.

OWL will provide a well-established implementation of the provision model which guarantees interoperability among the applications and a well-grounded framework for reasoning on provisions instantiation within a single act or within a legislative corpus.

## 7.2. MODEL OF THE SCENARIO TO BE REGULATED

As discussed in Section 6, the description of the main entities of the scenario to be regulated can be based on domain ontologies and thesauri.

In this context the use of an ontology is of primary importance. Laws in fact usually contain provisions which deal with entities (arguments) but they do not provide any general information on them: for example the Italian privacy law regulates the behaviour of the entity “Data controller” who is the owner of a set of personal data, but such law does not give any additional information on this role in the real domain-life. The use of an ontology allows to obtain such additional general information on the entities the new act will deal with. Moreover, the use of an ontology, and particularly of the associated lexicon, allows to obtain a normalized form of the terms with which entities are expressed, so that they can be indexed and used in the law document metadata querying process.

Legislative acts are made of terms both from the ruled domain and

from the legal domain. The last ones are more or less common to every legislative act.

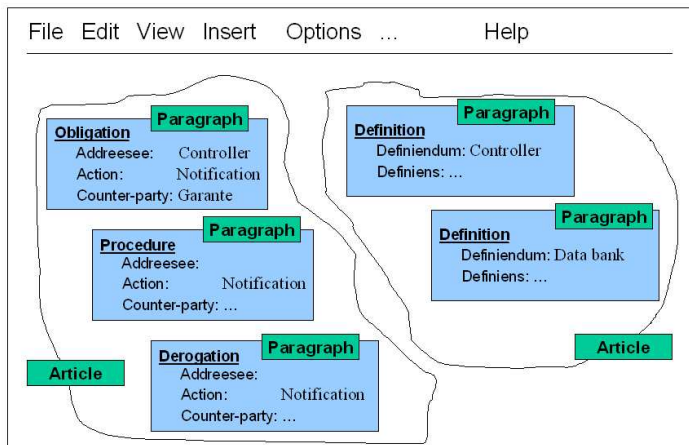
The system will rely on ontologies and lexicons: the knowledge they describe is both thematic (related to the scenario to be regulated) and legal (pure juridical concepts).

Similarly, the user may, if allowed, insert new terms or concepts of the particular domain he is going to regulate by using the functionalities of metaEdit dealing with terms and concepts management<sup>4</sup>.

### 7.3. VISUAL PROVISION MANAGER

The Visual Provision Manager is a visual panel where provisions types and their arguments can be handle as visual objects (Fig. 3).

User will be able to plan a new act from a conceptual point of view by inserting provision instances as building blocks of the act under construction. The arguments of the provision instances will be given values obtained from the ontologies or thesauri of the domain of interest. At the end of this process the functional profile of the new act is defined in terms of its regulative (provision types) and thematic (provision argument values) profiles. This way the new act is constructed starting from the description of its semantic components, basically instances of the provision model.



*Figure 3. Visual Provision Manager and the result of the provision grouping process.*

<sup>4</sup> An example of use of metaEdit for conceptual dictionary bottom up construction from domain lexicon in (Cappelli et al., 2006)

Only in a second phase the user will be able to construct the best structural organization (formal profile) of the text, with the benefit to see the building blocks of the bill under construction from the point of view of their meaning. The basic assumption allowing the organization of the structure of a legislative document while organizing its semantics, is that a “paragraph”, the basic component of the formal profile, usually contains a provision, basic component of the functional profile, assumption which is widely observed by the legislator (this is represented (see Fig. 4) by the “concrete” (Niemann et al., 1990) relation between a type of provision and the corresponding paragraph; the “concrete” relation connects different representations of an object in different levels of abstraction).

At this stage the objects, representing provision instances, introduced within the visual panel, can be grouped into semantically correlated clusters. On the basis of the previous assumption, while organizing provisions into semantically correlated clusters, we obtain the organization of the same objects, viewed as paragraphs of the formal profile, into clusters representing higher level formal partitions, basically “articles” (Fig. 3). This process can be recursively repeated, so to obtain clusters representing higher level formal partitions, organized in a tree representing the document formal profile (Fig. 4).

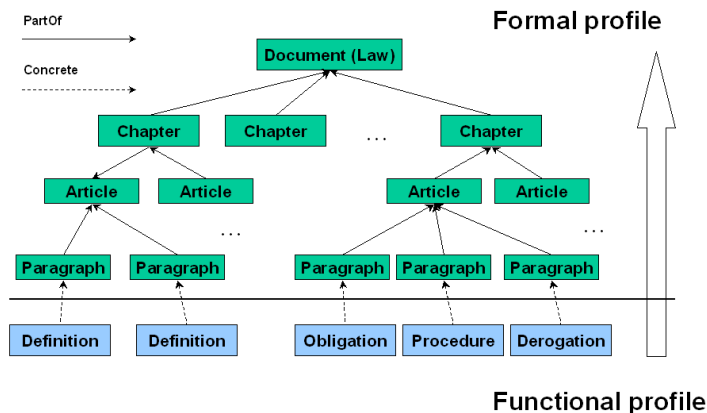


Figure 4. Building document tree.

The user will have the possibility to use an interface where grouping criteria can be expressed by queries on the provision model structure and on the content of its current instances (provision argument contents). Predefined criteria derived from legislative technique rules can be foreseen.

At the end of this process the document tree, where leaves are semanti-

cally annotated in terms of provisions and their arguments, is obtained. At this point the XML skeleton of the new bill can be generated according to a specific standard (in Italy, for example, the NIR standard), composed by semantically annotated formal partitions. Then the user will be allowed to complete the document structure, by wording each paragraph, being guided by the semantic annotation (Fig. 5).

<pre> ... &lt;capo id="cap1"&gt; &lt;disposizioni&gt; &lt;analitiche&gt; &lt;dsp:definizione xlink:href="#art1-com1"&gt;   &lt;dsp:definiendum&gt;Controller &lt;/dsp:definiendum&gt; &lt;/dsp:definizione&gt; ...   &lt;articolo id="art1"&gt;...&lt;/articolo&gt; &lt;/capo&gt; &lt;disposizioni&gt; &lt;analitiche&gt; &lt;dsp:obbligo&gt;   &lt;dsp:destinatario xlink:href="#art7-com1"&gt;     Controller   &lt;/dsp:destinatario&gt;   &lt;dsp:azione&gt;     Notification   &lt;/dsp:azione&gt; &lt;/dsp:obbligo&gt; &lt;capo id="cap2"&gt;   &lt;articolo id="art7"&gt;...&lt;/articolo&gt; &lt;/capo&gt; </pre>	<p><b>Law n.</b></p> <p><b>Art. 1</b></p> <p>1. [to be filled]</p> <p>2. [to be filled]</p> <p>...</p> <p><b>Art. 7</b></p> <p>1. [to be filled]</p> <p>2. [to be filled]</p> <p>3. [to be filled]</p>	<p><b>Chapter 1</b></p> <p><i>Definition(Controller, ...)</i></p> <p><i>Definition(Data bank,...)</i></p> <p><b>Chapter 2</b></p> <p><i>Obligation(Controller, Notification, Garante)</i></p> <p><i>Procedure(..., Notification, ...)</i></p> <p><i>Derogation(..., Notification, ...)</i></p>
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Figure 5. XML-NIR skeleton of a new bill and its WYSIWYG view.

As discussed in Section 6.4, a further development could be the semi-automatic provision wording phase by using NLP techniques on the basis of each provision model instance and the automatic summarisation of the meanings of provision groups to generate their titles.

## 8. Conclusions

In this work a system able to guide the legislative drafter in planning a new bill has been presented.

The new system, called “Meta-Drafting Environment” (MDE), is conceived to help the legislative drafter to build a new act from a conceptual point of view. Using the Meta-Drafting Environment system the classical drafting process is inverted: the structure of a bill (formal profile) is constructed on the basis of its semantics (functional profile), so to obtain a well-structured legislative text, where the chosen formal profile fits well the functional one.

The system can contribute to improve the legislative process, in particular the phase of legislative drafting, enhancing the quality of legislative texts.

In particular the “planning” and “aggregation” functionalities will improve external quality (semantics and structure) of legislative texts, while the functionality of “generation” will improve their internal quality in terms of coherency, consistency, improvement of the quality of provision wording, by using a key-language limiting the ambiguity of legislative texts. This will improve the accessibility of legislation for legal experts, decision-makers as well as citizens, thus promoting a democratic participation in the legislative process.

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