

Information Management Systems for Ensuring the European Administrative Harmonization

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Abstract. Administrative harmonization is one of the main political orientations of the European Union (EU), aiming at establishing a homogeneous and interoperable framework between public administrations. This paper aims to facilitate administrative harmonization by creating a multilingual knowledge management system for the representation of all EU public administrations in absolute correspondence. The proposed architecture (a) encodes the organizational charts of state members (b) interlinks all EU public administrations and (c) provides parallel information in all official languages of the EU.

Keywords: Knowledge Management Tools, Administrative Harmonization, Taxonomies, Thesauri, Semantics, Interoperability

1. Introduction

One of the main political orientations of the European Union (EU) is administrative harmonization among Member States, reflecting the need to proceed from “government” to “governance” within and among States (Olsen 2002, Rosenau and Czemieli 1992). The foremost requirement of administrative harmonization is the convergence of all EU Public Administrations towards a common model that implies “a reduction of variance and disparities in administrative arrangements” (Olsen 2002). Specifically, the EU aims to establish a certain uniformity in public structures, as this would ensure the efficient adoption and implementation of EU legislation. The main requirement for the identification of all EU public administrations is the determination and depiction of similarities and diversities between the organizational charts of individual States. Establishing a representation of all public structures that is in absolute correspondence contributes to a clear statement of administrative disparities with the goal of facilitating administrative convergence. However, the main concern regarding the encoding of Public Structures of all Member States is administrative diversity, which results in differing organizational structures of a nation’s system of Public Administration. Moreover, another drawback is the rendering of government information in all foreign languages, resulting in a lack of data homogeneity and administrative harmonization within the borders of the EU since foreign citizens have little or no access to the government information services of fellow nations.

This paper aims to contribute to administrative harmonization by creating a multilingual management system for the data derived from government information resources. In particular, it suggests a model for the representation of all EU Public Administrations in absolute correspondence through the use of knowledge management tools. Since public administration is based on law and hierarchy (Olsen 2002), this model uses those legal acts that determine the structure of public administrations. More specifically, our approach aims to: a) develop a digital library of those legal acts that refer to the administrative structure of EU States’ Public Services, b) encode and integrate the

organizational charts of each country by associating them in a hierarchical interlinked taxonomy, and c) to interconnect the corresponding taxonomies of States' Public Administration systems in absolute correspondence. The development of a unified EU organizational chart ensures the administrative harmonization of EU Member States, while the encoding and depiction of parallel information in different languages enables: a) the retrieval of the required information, no matter if the latter resides in different information environments, b) the navigation through, and review of, the organizational structure of a nation's Public Administration system. The section thereafter analyses the importance of the administrative convergence in the establishment of harmonization among European state members, while section 3 presents the architecture of the proposed system. Section 4 examines the problem of administrative diversity among Member States and also offers a solution for the problem of information rendering in all official languages of the European Union. Finally we present our conclusions.

2. Current situation

The EU is aiming for the establishment of a "common administrative space" between Member States via administrative convergence, in order to create a homogeneous environment in Public Administration under broadly applicable principles, rules and regulations that are uniformly enforced (Cardona 1999, Olsen 2002). This requirement contributes to: (a) information exchange, (b) coordination of regulatory objectives, (c) consultation in advance of rulemaking, and (d) mutual participation in rulemaking processes (Florida State University College of Law 2001). However, international bibliography has addressed the lack of administrative convergence among Member States, due to their differing legal, administrative and cultural systems revealing unique local administrative needs, characteristics and functions (Callaghan 2002, Olsen 2002, Waarden 1999).

Public Administration is a "legally constituted instrument governed by law and hierarchy" (Olsen 2002). However, the EU sets no practical guidelines or instructions for the adoption and implementation of legislative regulations in order to accomplish and establish administrative convergence. Hence, it is more difficult for Member States to adapt and apply any legislation to their administrative system, as no guidelines or methodologies are provided. Moreover, local administrative characteristics influenced and originated by each State's own needs and traditional functions have become inflexible to adjust to a common framework. Therefore, given the fact that the EU is oriented towards legislative convergence, each Member State is called upon to define and create its own implementation methodology. This procedure is actually connected with the right to self-determination which needs to be upheld, since each State is the most suitable authority to determine its own administrative needs and features and therefore to define the required framework for its adoption and implementation of the EU directives.

Therefore, due to the lack of absolute uniformity between EU public administrations, electronic governments aim to (a) provide efficient tools for facilitating document interchange procedures, and (b) establish e-Government Interoperability Frameworks (e-gif) and trans-European networks characterized by the interoperability feature. The

main scope of such actions is to facilitate communication and collaboration not only between people but also among systems and different information environments. Moreover, the electronic Interchange of Data between Administrations (IDA) aims at defining a context within which the Member States may exchange data, regardless of the local administrative system implemented (European Parliament 2002).

Within the same framework, the European Parliament proceeded with the development of a multilingual thesaurus in those fields in which the European Communities are active, in order to ensure a means of indexing documents in the documentation systems of the European institutions (EU Publications Office 2004). However, this thesaurus provides only for established terminology and a controlled vocabulary without indicating administrative actions along with public hierarchy. This initiative refers only to the semantic management of administrative terms and aims at forming a homogeneous environment regarding thematic allocation in information systems.

The representation of EU public administrations and their structure in absolute correspondence may be considered as an essential step towards administrative convergence. The development of such a tool contributes to the identification of any similarities and diversities among different administrative systems facilitating (a) EU decision-making for introducing corresponding implementation directives, (b) decision-making by Member States on the parameters required for administrative convergence, and (c) navigation, by citizens and Public Services, through the organizational charts of all EU states.

3. A digital library for public administration mapping

The depiction of Public Service structures may be derived from those institutional laws that enact the functions of public authorities. The identification and selection of those legal acts within the Official Gazette presupposes the digitization and creation of bibliographic meta-fields indicating identity characteristics (e.g. title, publication information such as date, issue number). Most countries have proceeded to the encoding of the Official Gazette by creating full-text databases with indicative access points (Juristisches Internetprojekt Saarbrücken 2004, Ministerio de la Presidencia 2004, National Printing Office of Greece 2004, Parlamento Italiano 2004, République Française 2004, United Kingdom 2004). Therefore, these information bases could contribute to the location of the relevant institutional laws within public authorities. It is envisaged that the legal acts resulting from such a weeding-out and subsequent extraction could be imported into a digital library in which a bibliographic and semantic analysis of its content could be performed specifically with regard to the structure of the Public Sector. Each Member State would need to implement this procedure separately.

3.1. Bibliographic Metadata

Bibliographic metadata are considered essential not only to uniquely identify a legal act, but also to ensure multiple access points and therefore easy navigation of controlled meta-fields. The existence of a common layout in which legal acts are written,

facilitates the time- and person-consuming tasks of public information encoding and metadata production. Most European Official Gazettes maintain a certain layout for the publication of their legal acts. Figure 1 indicates the format used in the Official Gazette of Greece. The layout of certain elements, such as the publication information, the type of legal acts, the signing authorities, and even the way acts are structured in paragraphs and sections, is unified and homogeneous across all years and types of legal action. For this purpose an intelligent wrapper that is able to learn the structure of particular documents might be developed to parse the digitalized legal act and propose to the user-cataloguer a set of predefined values for the bibliographic meta-fields.

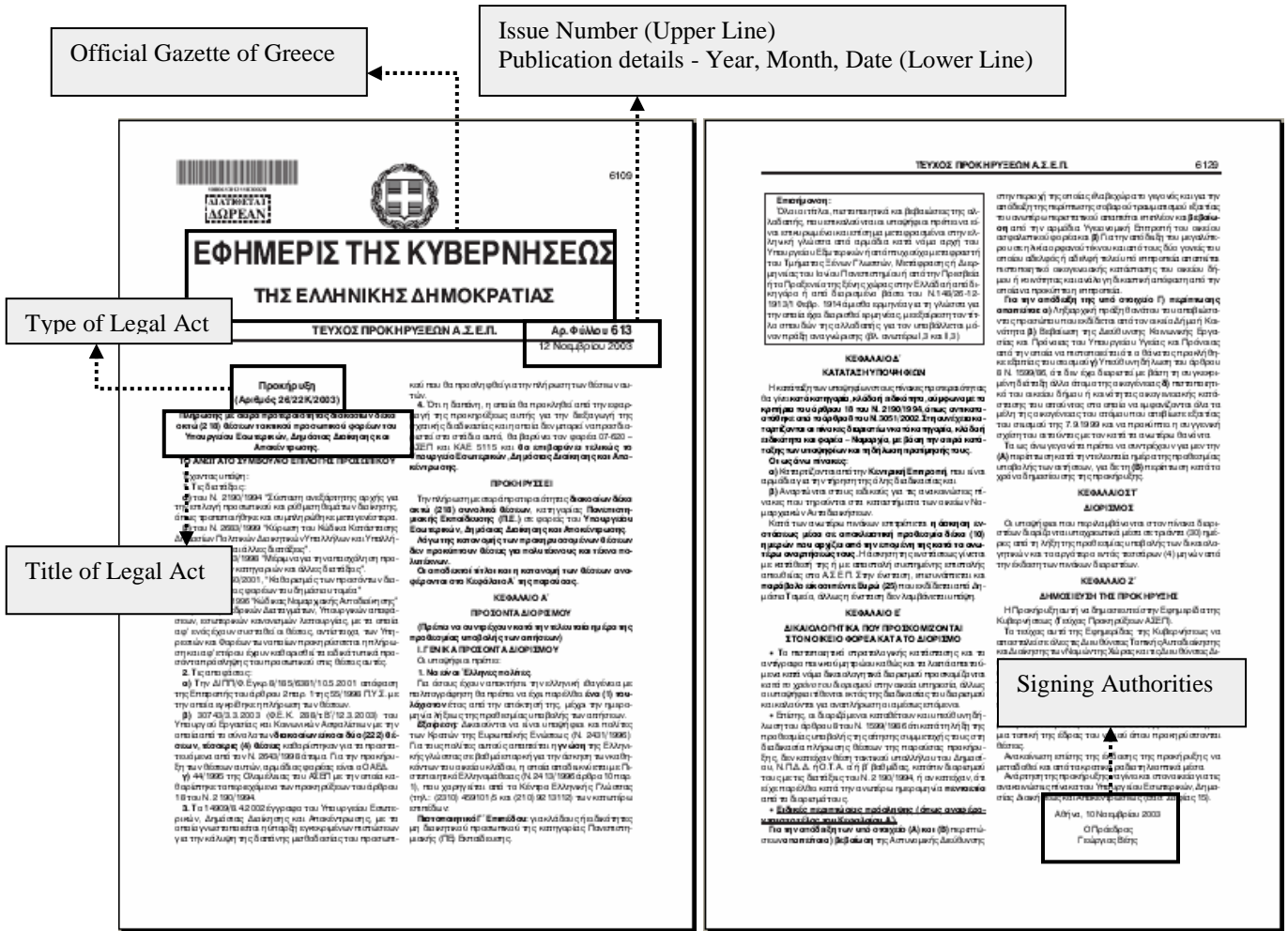


Fig. 1 Layout format of legal acts in Greek Official Gazette

The adoption of an international standard for metadata encoding contributes to data homogeneity and system interoperability for information sharing and/or exchange. Bibliographic encoding in an automated indexing environment mainly requires an open standard, such as Dublin Core, since it combines simplicity and descriptive abilities with syntactic flexibility. Although the selection of the exact format to be implemented depends on a mutual agreement between Member States, it is worth mentioning that many e-Government Interoperability Frameworks of EU Members have adopted Dublin Core as their metadata encoding standard. Therefore, this format may also be used in the description of the bibliographic metadata derived from institutional laws. In this way,

the system would not have to extract data in other formats in order to ensure interoperability.

3.2 Semantics

The semantic metadata that need to be derived from the institutional laws thematically cover the following aspects of an organization:

- the goals and objectives which form the *domain* of the organization’s wide-ranging administrative responsibilities and which characterize, control and comprise all of its administrative functions. The domains are inherent in the scope of the institutional laws of every organization.
- its *functions*, which determine all the required activities that need to be fulfilled in order to accomplish the organization’s goals and objectives
- the hierarchical *structure* that corresponds to the organizational chart and defines the departments and offices necessary for the execution of the organization’s functions.

The semantic encoding of the above information requires the organizational charts to be segregated from the legal acts and then organized into a taxonomy schema capable of representing and managing multiple hierarchical levels. The taxonomy represents the structure of Public Administration in classes and subclasses. Each of these classes and subclasses performs a set of functions and thus each function constitutes a property of the class or subclass to which it is assigned. Furthermore, each class is identified by a domain attribute, which corresponds to organization’s goals and objectives. The domain attribute is necessary so as to distinguish between the functions of different classes or sub-classes that use the same terminology. According to table 1, each class of the organizational chart has (a) the domain of administrative reference as its attribute, and (b) a set of functions as its properties.

Table 1. Depicting Public Hierarchy, Administrative Functions and Domain of Responsibility

Class (Organization)	<i>National Printing Office of Hellas</i>	Domain (Goals)	<i>Publication of Official Gazette</i>
			<i>Distribution of Official Gazette</i>
			<i>Publication of Government Information</i>
Subclasses (Structure)		Properties (Functions)	
Division of Publication Planning		<i>Material Selection</i>	
		<i>Material Collection</i>	
		<i>Material Processing</i>	
Division of Phototypesetting		<i>Material Editing</i>	
		<i>Phototypesetting</i>	
		<i>Montage</i>	
		<i>Desktop Publishing</i>	
Division of Printing		<i>Material Printing</i>	

		<i>Bookbinding</i>
		<i>Packaging</i>
		<i>Shipment</i>
Division of Management	Department of Personnel Management	<i>Employee Appointment</i>
		<i>Employee Training</i>
		<i>Employee Further Education</i>
	Department of Administrative Management	<i>Electronic Register</i>
		<i>Secretarial Support</i>
	Department of Financial Management	<i>Budget Constitution</i>
		<i>Salary Payment</i>
		<i>Official Gazette Sale</i>
		<i>Official Gazette Costing</i>
Division of Technical Assistance	Department of Building	<i>Electrical Installation</i>
		<i>Electrical Repair</i>
	Department of Technology	<i>Hardware Installation</i>
		<i>Hardware Repair</i>
Division of Computer Science and Software		<i>Software Installation</i>
		<i>Information Backup</i>
Division of Public Affairs		<i>Information Rendering</i>
		<i>Citizen Assistance</i>
		<i>Subscriptions</i>
		<i>Market research</i>
		<i>Archive Maintenance</i>
		<i>Public Relations</i>

Since many organizations are either supervised or co-active with other public authorities, our model represents these relations between classes of the taxonomy, using a facet called “Instance-type” (Chandrasekaran, Josephson and Benjamins 1999). The required interlinking is realized between the highest classes of the organizational charts by assigning a property named “Corporate/Supervisory Public Authority” having value type “Instance” (this allows the definition of relationships between individuals, while the properties’ values are instances of classes).

The semantic analysis of public administration also involves the creation of a control vocabulary that refers to domains of responsibilities and therefore to organizations’ goals and objectives. Thus we extract the domain attributes from the taxonomy classes and we define a control vocabulary. This vocabulary identifies the taxonomy classes and needs to be interlinked and correlated in order to group all domains with a common administrative scope. This interlinking depicts the similarities and diversities between classes i.e. the authorities/entities within a Public Administration system, and facilitates decision-making procedures concerning the required Administrative convergence. For this purpose we propose the development of a thesaurus representing correlations of synonymy, hierarchy and the relation with each administrative domain.

4. Facing administrative diversity

Each Member State proceeds to the bibliographic and semantic analysis of those institutional laws that refer to the structure of its own administrative system. As such, the knowledge tools (taxonomy and thesaurus) developed by each State separately need to be interlinked in order to identify similarities and diversities among EU administrative systems. However, the main condition for this correlation is for the Member States to provide, along with the native language, an English translation of the public hierarchy, the domains (objectives) and administrative functions. This translation would contribute to the establishment of a semi-automated process for establishing one-to-one correspondence. Therefore, it is essential to comprehensively map out all hierarchies, functions and objectives, in order for the machine to compare and locate all the identical phrases expressing public authorities and functions. Otherwise, it would be necessary to carry out the taxonomy's interlinking manually, requiring the user to know all official languages of the EU in order to make the necessary comparisons!. The translation of the aforementioned tools into the English language sets the basis for multilingual services that can provide the ability to access all organizational charts and functions regardless of the administrative system or language used.

The proposed architecture correlates the different taxonomies by the semantic analysis of each of the taxonomy components. The correlation of the different administrative structures needs to be based on more than the name of public services, since the following situations are possible:

- Services having the same name but different objectives and responsibilities
- Services having a different name but the same objectives and responsibilities

Therefore, the main parameter and criteria for the conjunction of services between different taxonomies must be the administrative domains that are allocated to the specific authorities. At this stage of development the thesaurus plays an essential role, as it becomes the conceptual framework within which organizations' functions are developed and run.

Specifically, we propose the procedure for the correlation of taxonomies to be semi-automated as follows:

- The system parses all taxonomies and locates the classes with the same domains or similar (broader, narrower or related) according to each Member State's thesaurus.
- The system then makes the results available to the user who either accepts them or endeavours to locate all identical services manually which are then, in parallel, interlinked and connected throughout the taxonomies of all Member States.

The usage of the thesauri offers the user the ability to check the reasonability of the proposed interlinking. The domains are only used to match uniquely identical services according to their objectives and functions. Hence the thesauri ensure the safety and accuracy of the taxonomy correlation procedure since the interlinking is based not only on the domain's name but also on its semantic correlations with administrative concepts. Besides, thesauri are the entities that naturally represent the types of

correlations between administrative domains, facilitating information search and retrieval in Public Administration systems.

The system may locate cases such as:

- exact matches without any discrepancies in the class's name, structure and/or services
- the required domain that is assigned to a differently named class but with the same structure
- the required domain but with discrepancies in the class's structure and hierarchy (i.e. different ministry / hierarchical level / structure with more or fewer subdivisions).

The user using the thesauri is able to correlate the appropriate classes. It is essential to mention that the interlinking is not realized between procedures and domains, but only between Public Authorities that have been defined in terms of classes and subclasses.

5. Conclusions

Administrative convergence is the main prerequisite for achieving the efficient implementation of communal legislation between Member States since it removes variations and administrative disparities to form a common and homogeneous environment for public administration in different countries. However, the EU provides for the legislative regulations and calls all Member States to adopt them by adjusting their administrative systems to accommodate them. As such, all States need to produce implementation methodologies in order to convert legislative directives to applicable regulations.

This paper aims to approach the issue of administrative convergence with a knowledge management system that plainly represents and depicts the administrative disparities between organizational charts of States. This approach is oriented to (a) present the EU with the administrative reality in order to prompt any necessary adaptation of legislative directives required to ensure they are easy to implement by all Member States and (b) facilitate the efforts of Member States in establishing the required framework and parameters for applying those legislative directives. The proposed system, together with its knowledge management tools, does not solve the problem of administrative convergence but provides a tool for depicting the current situation in public administration systems.

The development of taxonomies for all EU organizational charts and their interlinking ensures a clear statement of the administrative similarities and diversities, and enables the navigation within the public hierarchy for all Member States both separately and jointly. Moreover, the allocation of a domain of responsibility to each class of the public hierarchy supports the filter of the imposed queries and contributes to (a) the limitation of the search space and (b) the efficient correlation of the EU public authorities. Furthermore, the existence of parallel information in all official languages of the EU facilitates retrieval and sets no barrier in parsing and locating information derived from different administrative and lingual environments. The creation of the thesaurus on the domain of activities for each public authority facilitates (a) the accurate and efficient

interlinking of the EU organizations, since it provides a global framework for each range of administrative activities and (b) resourceful search and retrieval by guiding the end-user. Finally, the bibliographic encoding of the institutional laws enables the creation of multiple access points, while the semi-automated technique for assigning values to meta-fields facilitates a task that would otherwise consume a significant amount of time and human resources.

References

Callaghan, H. (2002) “*Corporate law harmonization in the European Union: what makes it so difficult?*”, [online], <http://www.unc.edu/depts/europe/eui/msie.html>.

Cardona, F. (1999) “*Civil services for the European administrative space*”, [online], <http://www.oecd.org/dataoecd/32/0/2078529.pdf>.

Chandrasekaran, B., Josephson, J. R., Benjamins, R. (1999) “*What are ontologies and why do we need them?*”, *IEEE Intelligent Systems*, Vol 14, No.1, pp20-26.

European Parliament (2002) “*Electronic interchange of data between administrations*”, [online], http://wwdb.europarl.eu.int/oeil/oeil_ViewDNL.ProcViewCTX?lang=2&procid=5542&HighlightType=2&Highlight_Text=IDA.

EU Publications Office (2004) “*Eurovoc thesaurus*”, [online], <http://www.europa.eu.int/celex/eurovoc/>.

Florida State University College of law (2001) “*Code of federal regulation*”, [online], <http://www.law.fsu.edu/library/admin/acus/305911.html>.

Juristisches Internetprojekt Saarbrücken (2004) “*Bundesgesetzblatt*”, [online], <http://www.jura.uni-sb.de/BGBI/>.

Ministerio de la Presidencia (2004) “*Boletín Oficial del Estado*”, [online], <http://www.boe.es/g/es/>.

National Printing Office of Greece (2004) “*Official Gazette of Greece*”, [online], <http://www.et.gr>.

Olsen, J. (2002) “*Towards a European administrative space*”, [online], http://www.arena.uio.no/publications/wp02_26.htm.

Parlamento Italiano (2004) “*Leggi dalla XIII legislatura*”, [online], <http://www.parlamento.it/parlam/leggi/home.htm>.

République Française (2004) “*Journal Officiel de la République Française*”, [online], <http://www.loc.gov/law/guide/france.html>.

Rosenau, J., Czemieli E-O. (1992) *Governance without government: order and change in world politics*, Cambridge University Press, Cambridge.

United Kingdom (2004) “*London, Belfast and Edinburgh Gazettes*”, [online], <http://www.gazettes-online.co.uk/>.

Waarden, F. (1999) “*European harmonization of national regulatory styles?*” in *Compliance and Enforcement of European Community Law*, John A. E. Vervaele et al (Eds), Kluwer Law, Deventer, p95-124.