NETWORK OF LEGAL METALEVELS

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Abstract:	*This paper concerns the legal system and legal documentation, as well as their interconnectedness. In the term metalevel, we use the prefix meta with the meaning of with and across and not beyond. The granularity problem is in our view. Legal documentation does not reproduce a legal source one-to-one. Examples of legal metalevels are legal terms, ontologies, annotations, commentaries, etc. We see a challenge for legal informatics to represent legal networks explicitly. We find the idea of a network in the interdisciplinary approach that was proposed by Van Hoecke and Ost in 1993. We project the core and peripheral areas around the legal system onto Schweighofer's 8 views/4 methods approach. Making the core-periphery networks more explicit would also contribute to the evaluative synthesis of legal decisions. Thus, explicit visual navigation through a legal information system would support the wandering back and forth of the glance between the normative and the factual.*

1. Introduction

This paper is about 1) the system of the law, 2) legal documentation and 3) their interconnectedness. There are networks in the field of law that are directed outwards. In the term metalevel, we use the prefix meta with the meaning of with and across (German *mit*), and not higher or beyond. Examples of legal metalevels are legal terms (legally indifferent substrate; cf. [KELSEN 1991, ch. 16]), thesauri, taxonomies, legal ontologies, annotations, commentaries, etc. We think about the legal metalevels in light of SCHWEIGHOFER's 8 views/ 4 methods approach in legal data science.

Granularity. Legal documentation does not reproduce a legal source one-to-one, and the granularity has to be taken into account (Figure 1). A law does not need to be represented as a single document. Granularity raises the question, «What is the smallest entity?» In legal documentation, this question can have different answers: the whole text of a law, an article, a paragraph, a sentence, or even a word. In the Austrian Legal Information System (www.ris.bka.gv.at), a paragraph is the smallest entity. Smaller entities provide flexibility in legal information systems. A big document can be synthesized from its parts. However, making entities too small significantly increases the amount of metadata, because each entity type has its own metadata.

The granularity theme remains aside from the norm-institution relationship, but emerges in the law-legal informatics relationship. There are structures in the background that are independent from the norm-institution

relationship, but that are important for the functioning of legal documentation, namely, for back-office software systems. The granularity could produce structures that differ from the current documentary structures.
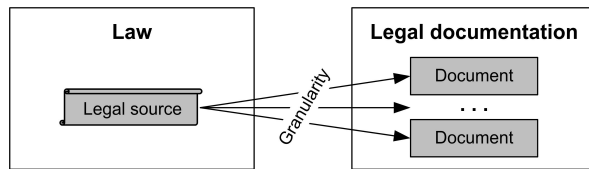

Figure 1: Representing a legal source in a legal documentation system

Both systems – the system of the law and the legal documentation system – have their own metalevels and metadata. The subject matter of this article can be split into two parts: the network of metalevels in the law and the network of metalevels in legal documentation.

2. A Shift from a Hierarchy to a Network

We do not propose to turn Kelsen's pyramid upside-down. Instead, our target is to explicate the network of legal metalevels. Constitution, law, statute and decision form a hierarchy; see Kelsen (1967, part V, especially § 35). Kelsen speaks about a hierarchical system of norms «whose highest level is the constitution whose validity is founded on the presupposed Basic Norm, and whose lowest level is made of the individual norms decreeing particular concrete behavior to be obligatory» [Kelsen 1991, ch. 59.i.F p. 258]. Political values are stressed in Figure 2, as they have been topical since the 2010s.
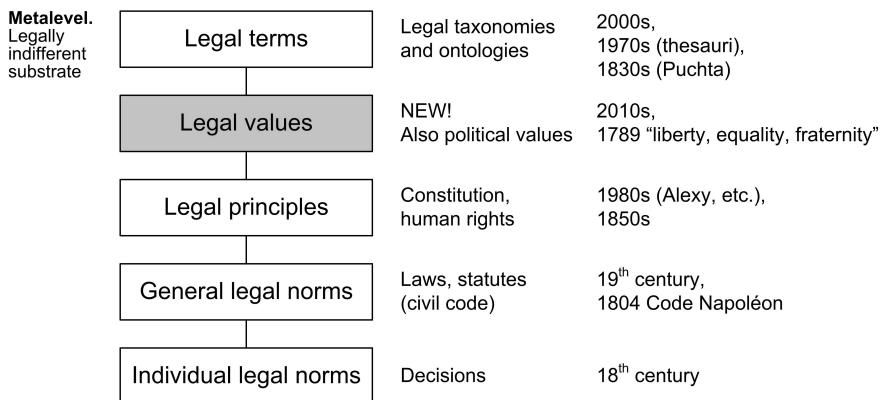

Figure 2: Formation of the legal hierarchy

A hierarchical model of the legal system is presently too simple and strict. A network would be better suited. Such a network would be partially hierarchical and contain horizontal links. In addition to explicit links, implicit links are important. The reason is that the field of law is characterized by a variety of relationships such as strong and weak, Is-Is and Is-Ought, etc.

Kelsen's pyramid (Figure 3, left) – the hierarchy of legal sources – can be depicted differently depending on the focus. However, we see a challenge for legal informatics to represent legal networks explicitly (Figure 3, right). A network is a graph, and therefore, is a simple structure for reasoning in comparison with other formalizations such as formal logic. A graph consists of nodes and edges that connect some pairs of nodes.

Paraphrasing [Vᴀɴ Hᴏᴇᴄᴋᴇ & Oѕᴛ 1993, p. 1],[1] we see a task for legal informatics to transform the network of metalevels into a more «scientific» discipline by mathematical means.

Legal hierarchy.
Ordered

NEW: **Network.**
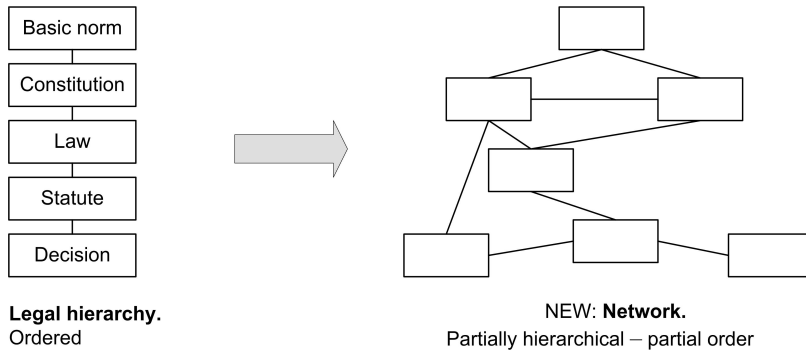Partially hierarchical − partial order

Figure 3: A shift from a legal hierarchy to a network in the law

The shift from a hierarchy also applies to legal document systems. Peripheral areas – metalevels – can be separated from the core, both in the legal system and in the document system (Figure 4).
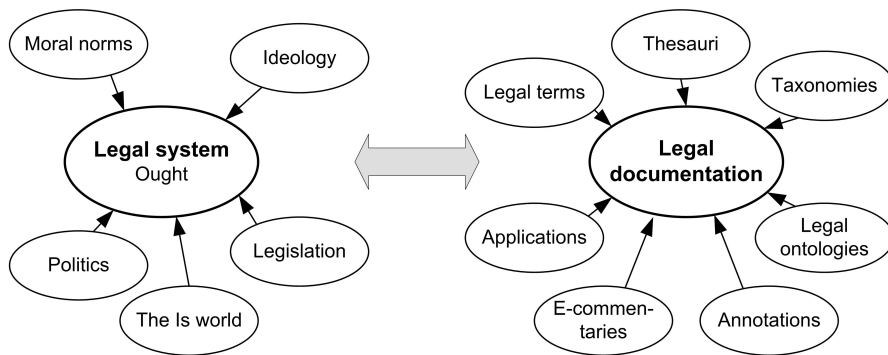

Figure 4: Core-periphery networks around the legal system and the legal documentation system

Core-periphery networks are important for the «wandering back and forth of the glance between the normative and the factual»; cf. [Pᴀᴠčɴɪᴋ 2008].[2] His concept of the evaluative synthesis of legal decisions is based on this wandering. We think that the implicit wandering through the legal system can be supported by explicit visual navigation through a legal information system.

3. Relating the Network with Van Hoecke and Ost's Multidisciplinarity

We relate the idea of a network with the interdisciplinary approach, which is advocated by Van Hᴏᴇᴄᴋᴇ and Oѕᴛ (1993); see also [Vᴀɴ ᴅᴇ Kᴇʀᴄʜᴏᴠᴇ & Oѕᴛ 1993a; Vᴀɴ ᴅᴇ Kᴇʀᴄʜᴏᴠᴇ & Oѕᴛ 1993b; Oѕᴛ & Vᴀɴ ᴅᴇ Kᴇʀᴄʜᴏᴠᴇ 2002]. They point out deregulation as a consequence of the policy of intervention by the Welfare

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[1] «Econometrics, for example, attempts to transform economic science into a more ‹rigorous› and hence more ‹scientific› discipline by mathematical means.» [Vᴀɴ Hᴏᴇᴄᴋᴇ & Oѕᴛ 1993, p. 1]

[2] Mᴀʀɪᴊᴀɴ Pᴀᴠčɴɪᴋ quotes the idea of «Hin- und Herwandern des Blickes» (zwischen dem Normativen und dem Faktischen) in [Eɴɢɪѕᴄʜ 1963, p. 15] and also the works of other authors.

State, while discussing the perspectives of legal science. They tackle the demarcation of legal theory [ibid., p. 5–6]. Van Hoecke and Ost note that the endeavor of legal theory to develop an approach that is normative and value-free presupposes that there is no conceptually necessary connection between the law as it is and the law as it should be. Analytical and ideological elements are sometimes interlinked. Further, Van Hoecke and Ost note that Kelsen's belief in keeping the law as it is and the law as it should be apart has now been replaced by a more modest belief in the possibility of segregating ideology from legal research. After noting that «the general dominant epistemological monism leads to exclusions and mutual criticism and condemnation» [ibid., p. 9], Van Hoecke and Ost write about a pluralist epistemological perspective to legal science.
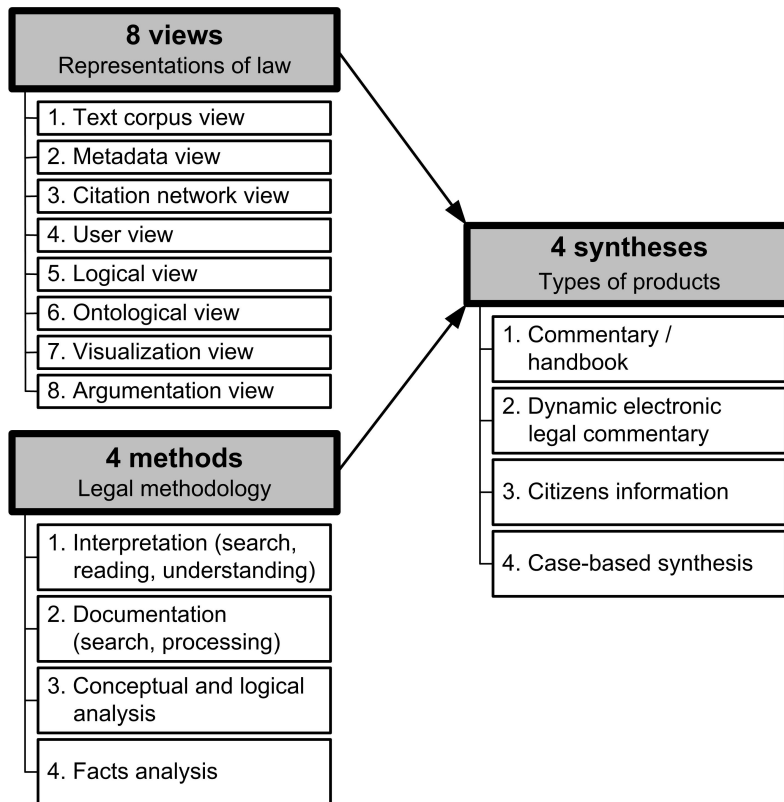
8 views
Representations of law

1. Text corpus view
2. Metadata view
3. Citation network view
4. User view
5. Logical view
6. Ontological view
7. Visualization view
8. Argumentation view

4 methods
Legal methodology

1. Interpretation (search, reading, understanding)
2. Documentation (search, processing)
3. Conceptual and logical analysis
4. Facts analysis

4 syntheses
Types of products

1. Commentary / handbook
2. Dynamic electronic legal commentary
3. Citizens information
4. Case-based synthesis

Figure 5: Schweighofer's **8 views/4 methods approach to legal data science**

The coexistence of both hierarchical and non-hierarchical relations in international constitutional law is pointed out by Konrad Lachmayer (2007). He states that although different constitutions are related, to some extent, in a kind of a hierarchical dimension, there is no legal pyramid in which every constitutional act would fit, into and «[t]hus, describing these interrelations as a constitutional network is more appropriate than trying to establish one singular hierarchic system» [Lachmayer 2007, p. 97–98]. He grounds his statement on [Van Hoecke 2002, p. 113] and [Ost & Van de Kerchove 2002, p. 23, 69; etc.]. We think that representing these non-hierarchical relations is a challenge for legal informatics.

Multi-stakeholder governance model. The idea of non-hierarchical relations is inherent in the *multi-stakeholder governance model*; cf. [Schweighofer 2015b, p. 53]. The international players (or stakeholders) are states, international organizations, the business sector (companies, professional associations, funds, banks)

and non-state organizations (religions, NGOs, trade unions, think tanks). Global standards consist of «hard» law, e.g. legal instruments with binding force or «soft» law, e.g. quasi-legal instruments with or without a compliance mechanism but formally not legally binding.

The future «matrix of law» is discussed in [MARTIN-BARITEAU 2014, p. 11–18]. He comments about FRANÇOIS OST, although it has been 15 years since Ost's original predictive work, and points out the distinctions of law-making in the Information Society.

4.   The 8 Views/4 Methods Approach in a Nutshell

SCHWEIGHOFER's 8 views/4 methods approach to legal data science is a methodological framework to investigate legal metalevels [SCHWEIGHOFER 2015a]. He has structured newly developed methods for the representation, analysis and synthesis of legal materials as legal data science. His model of 8 views, 4 methods and 4 syntheses describes the eight different representations of a legal system and four computer-supported methods of analysis, which lead to a synthesis, a consolidated and structured analysis of a legal domain, either 1) a commentary, an electronic legal handbook, or 2) a dynamic electronic legal commentary [SCHWEIGHOFER 2011], or 3) a representation for citizens, or 4) a case-based synthesis (Figure 5). The eight views (or representations of law) are: 1) text (multimedia) corpus, 2) metadata view, 3) citation network view, 4) user view, 5) logical view, 6) ontological view, 7) visualization view, and 8) argumentation view. The four methods are: 1) interpretation (search, reading and understanding), 2) documentation (search and processing), 3) structural (conceptual and logical) analysis, and 4) fact analysis.

SCHWEIGHOFER considers LU and CONRAD's «4 views theory» (2012, 2013) and extends it with 4 more views (representations of the law). It should be noted that in the knowledge representation of law, it is not solely about the documentation; each view represents further insights on the law itself [SCHWEIGHOFER 2015a, p. 16]. We aim to apply SCHWEIGHOFER's approach to examine the core and peripheral areas, which are depicted in Figure 4.

5.   The Notion of a View

LU and CONRAD (2012, 2013) view the system of legal documents from the standpoint of legal search engines. However, the legal system (in a broad sense) can also be viewed from other standpoints, e.g. a legal philosopher's. Thus, different perspectives (a synonym for the term «view») emerge.

Both the legal system and the legal documentation system are systems. They can be described from the outside and the inside. A system can be described from the outside as a black box: inputs, outputs and their relation. A system is described from the inside perspective by its elements and the relationships between them. Figure 5 can serve as such a description.

5.1.   Terminology of Viewing

The act of viewing consists of two elements: the viewer and the viewed. A viewer can view m objects. Therefore n viewers and m viewed form a network, with $n \cdot m$ edges, termed views (Figure 6 a). A $view_{ij}$ is that of a $viewer_i$ at a $viewed_j$. In the case, all of the viewers look at the same object, in our case, a system, and hence, n views are originated (Figure 6 b).
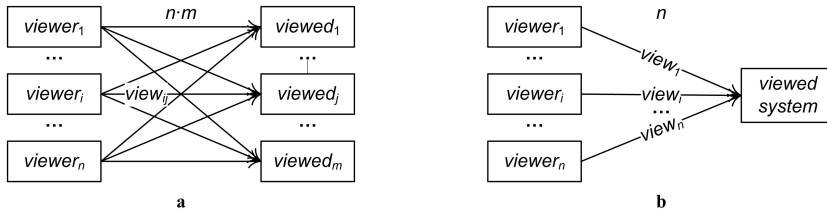
Figure 6: Terminology of viewing: (a) *m* viewers and *n* viewed, and (b) *n* views

We will compare the concept of view in Lu and Conrad's 4 views and Schweighofer's 8 views with the concept of view in software engineering. The term «view» denotes a representation of the law in the works by Lu and Conrad, as well as Schweighofer. The thesis of this paper is as follows. The concept of view (i.e. perspective) involves both the representations of law and the products (syntheses). Hence, the «view» needs a more complex formalization than a relation between the viewers and the viewed system. Each viewer looks through a «lens», which comprises the 8 representations of law, the 4 methods, and the 4 products (Figure 7). Each viewer has his own perspective and projects the legal system onto the landscape of legal data science differently.
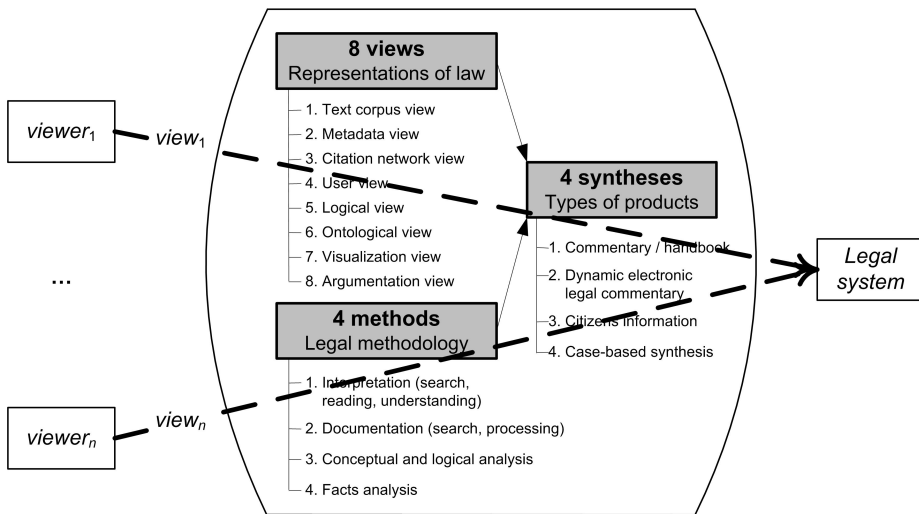

Figure 7: Different perspectives of the legal system through a «lens», which comprises the 8 representations of law, the 4 methods and the 4 products

5.2.   Views of an Enterprise System

Further, we consider an enterprise system in the role of a viewed object. Six views – the planner's, the owner's, the designer's, the builder's, the integrator's and the user's – are concerned in the Zachman framework [Sowa & Zachman 1992], which supposes that it is possible to manage an enterprise system using a multiperspective approach. Zachman's idea to decompose the system into a number of perspectives and focus areas serves as a theoretical basis for the *vision-driven approach* proposed by Čaplinskas (2009). Zachman decomposes each perspective into six focus areas to be answered: what (data)? how (function)? where (network)? who (people)? when (time)? and why (motive)? Čaplinskas calls it the H3W decomposition. The concept of

views is driven by the separation of concerns principle[3].
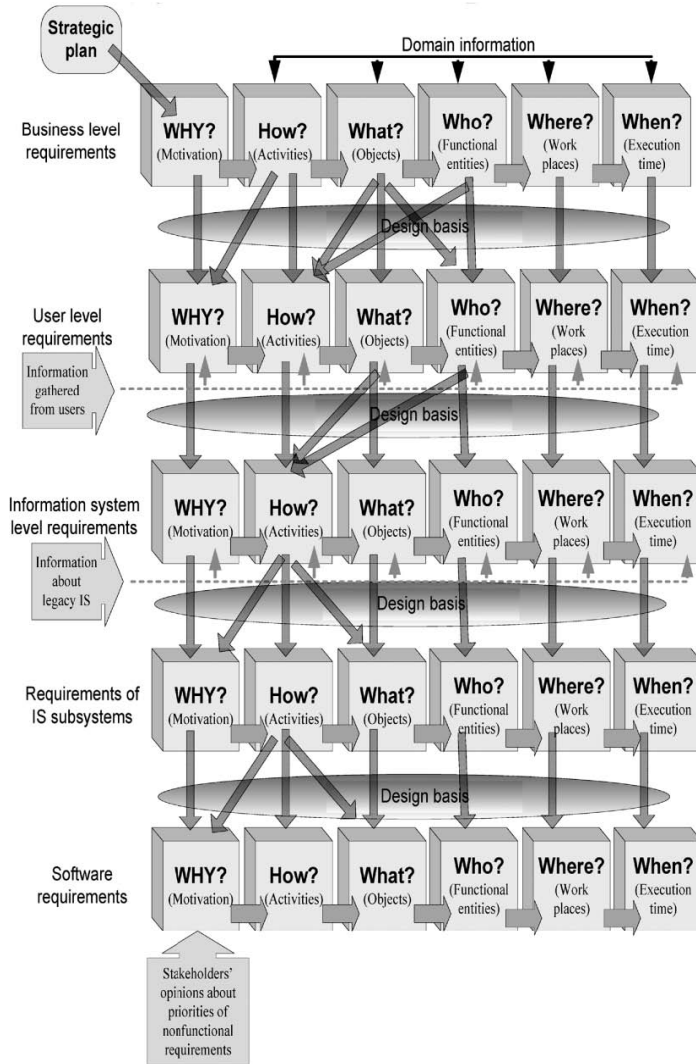
Figure 8: The vision-driven methodological framework for requirements elicitation, analysis, specification and validation by Čaplinskas **(2009)**

Five perspectives (views, levels) are shown in Figure 8, which depicts Čaplinskas» vision-driven methodological framework: 1) business level requirements (the view of a business analyst); 2) user level requirements (the view of stakeholders); 3) IS (information system) requirements (the view of an IS analyst); 4) the requirements of IS subsystems (the view of an IS engineer); 5) software requirements (the view of a software analyst).

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[3]   «The ‹separation of concerns› principle is realized by the concept of views. …The separation of concerns principle refers to the description of different characteristics of a software system that may or may not relate to the later execution of those systems. The principle will be applied in the division of complex description of even small portions of software into hopefully better understanding partial descriptions – that we call views – that must later be superimposed to form a complete description.» [Goedicke 1990, p. 5]

More perspectives can also be concerned:

> «*To be complete, it should additionally include the requirements of software components (the view of software architect), the implementation requirements (the view of software engineer), the process requirements (the view of process engineer), and the testing requirements (the view of tester)*.» [ČAPLINSKAS 2009, p. 355].

5.3. Four Views by Lu and Conrad

LU and CONRAD (2012, 2013) view the system of legal documents from the standpoint of legal search engines. However, legal search engines are not legal entities, and therefore, cannot be treated as stakeholders. Stakeholders are comprised of judges, document authors (e.g. West editors), search engine users (e.g. attorneys), etc. We treat the «views theory» by LU and CONRAD (Figure 9) as the four «viewed»: the document view ($viewed_1$), the annotation view ($viewed_2$), the citation network *view* ($viewed_3$), and the user view ($viewed_4$).

Document View (Judges, Clerks, Leg, Attys, Profs)	Annotation View (West Editors)	Citation Network View (Judges, Clerks, Leg, Attys, Profs)	User View (Westlaw Users)
Text — Cases, Briefs, Statutes, Regulations, Law Reviews …	Synopses Points of Law (Headnotes) Taxonomy Classifications (Topic + Key No.)	Citations In-bound (citing) and Out-bound (cited) Topic-based granularity	Queries Session Data Clicks, Prints, Key Cite, … Preferences

'Views' Available to Search & Reranking Functions

Search Engine (Text Similarity +)

Key Cite (which legal issue, and is it still good law?)

Judges, West editors and Westlaw users have generated a wealth of information. When combined with domain expertise and technology resources, R&D can build a best of breed solution

Figure 9: The set of evidence (views) that can be used by modern legal search engines; see [LU & CONRAD **2013] at http://blog.law.cornell.edu/voxpop/2013/03/28/next-generation-legal-search-its-already-here/**

The document view comprises the documents of traditional legal searches such as «cases, briefs, statutes, regulations, law reviews and other forms of primary and secondary (a.k.a. analytical) legal publications» [LU & CONRAD 2013]. The basis is the triad of norms, court decisions and legal literature; however, this can be extended by the now huge body of «soft law».

The annotation view comprises «attorney-editor generated synopses, points of law (a.k.a. headnotes), and attorney-classifier assigned topical classifications that rely on a legal taxonomy such as West's Key Number

System».[4] The annotation view is based on metadata, which can be formidable, e.g. EUR-Lex[5] metadata system. A sample headnote is shown in Figure 10.
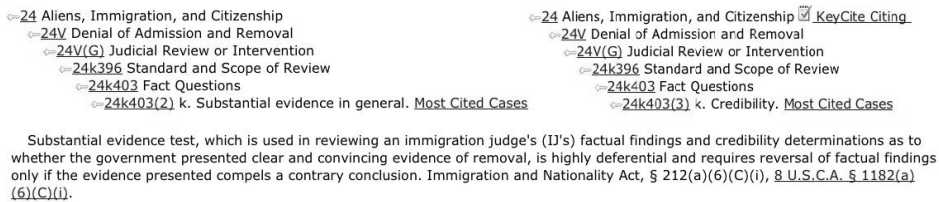
Figure 10: An example of a headnote with its assigned key number [LU & CONRAD 2012, Fig. 2]

The citation network view comprises out-bound (cited) sources and in-bound (citing) sources with respect to the document in question. The citations are very different: basis of the act, acts cited in the document, citations in the operative part of the judgment, document amending other documents, document is amended by other acts, etc.

The user view considers «aggregated user behavior», for example, how often a document was opened, document popularity through citatory services, the jurisdiction in which a particular attorney-user practices, and the kinds of sources that a user has historically preferred. In contrast to data (documents) and metadata (citations, annotations), «the aggregated user behavior data represented in the user view is produced by the professional researchers who interact with the system.»

6. Conclusions

The concept of views is a means to master the complexity of a system and can be extended to the engineering of legal document systems. Mastering the complexity of a legal system is an issue in legal informatics [SCHWEIGHOFER 2008].

This paper concerns the engineering of legal information systems (LISs). The metalevels of legal information should be taken into account in future LIS. We think that explicating the core-periphery networks would support the «wandering back and forth of the glance». In this way, the visual navigation through a LIS would contribute to the evaluative synthesis of legal decisions.

The periphery of the law can emerge in the core of legal document systems. Software engineers are the keypersons in the process of designing legal machines. To program institutional decision making, these engineers must understand the elements of the law.

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4   West's Key Number System: http://info.legalsolutions.thomsonreuters.com/pdf/wln2/L-374484.pdf (accessed 5 January 2016). This is a classification system for American law.

5   Access to European Union law, http://eur-lex.europa.eu/ (accessed 5 January 2016).

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