



# REGNET: Regulatory information management, compliance and analysis



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## ABSTRACT

This paper provides an overview of a research effort that aims to investigate methodologies and tools to facilitate access, compliance and analysis of government regulations. The complexity, diversity, and volume of government regulations are detrimental to business and hinder public understanding of government. The burden of complying with regulations can fall disproportionately on small businesses since these businesses may not have the expertise or resources to keep track of the regulations and the requirements. Regulations emanating from different agencies, each has its own objectives and scopes of concerns, may overlap on similar and related issues and may have inconsistency. The situation can potentially be improved by developing appropriate methodologies and tools that can help facilitate the development and analysis of regulatory documents as well as compliance process. To illustrate, this paper discusses the applications of information technology for selected services related to regulations, such as compliance assistance and comparison of regulations.

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## 1. Introduction

This paper provides an overview of the REGNET research project, which aims to gain insights on information infrastructure and tools that can facilitate access, compliance, analysis and use of government regulations. Regulations, in general, provide many social benefits, such as protecting our environment and improving public safety. However, the complexity, diversity, and volume of Federal and State regulations are detrimental to business and also hinder public understanding of government. As new issues arise, new regulations are promulgated; old regulations, however, are rarely removed. Regulations emanating from different agencies often overlap; because settings and objectives differ, they may be inconsistent. The scope of concern and the terminology used to express those concerns often differs among agencies. The distributed responsibilities also increase the complexity in dealing with regulations. Advances in information technology can potentially improve the situation by developing appropriate methodologies and tools that can help facilitate the regulatory process, from comparative analysis of regulations to compliance assistance.

“Deciphering and complying with federal regulations is a legal and paperwork nightmare for many businesses. To keep pace, some hire consultants – sort of regulatory accountants – to keep track of the applicable health, safety, environmental and equal-opportunity rules (Skrzycki, 2000).” Regulations can be particularly burdensome on small businesses

since they often do not have the resources to keep track of and to deal with these complicated regulations and the compliance procedures. This burden has been recognized and targeted by legislation through the Regulatory Flexibility Act (RFA), which was amended by Small Business Regulatory Enforcement Fairness Act (SBREFA). Agencies have a commitment to take into account the burden that regulations can place on small businesses. SBREFA requires agencies to establish procedures, policies and guides to promote compliance with RFA. Agencies publish, in accordance to SBREFA, Small Entity Compliance Guides that are written in plain language and elucidate the rights of small entities in enforcement actions (e.g. reducing civil penalties for violations). Furthermore, agencies, such as EPA, must provide the Congress and the General Accounting Office with copies of all final rules and supporting analyses (Romine, 1999). The act clearly recognizes the pervasive information problem facing business, particularly small businesses, in compliance with regulations. The Small Business Administration (SBA) (with participation from various federal agencies, including EPA, FDA, and OSHA) launched an initiative to build a “one-stop” portal to assist small businesses to comply with regulations (Business Compliance One Stop Workshop, 2002). In recent years, governmental portals (such as the former FirstGov.gov and the current USA.gov) have emerged to provide public access to U.S. government information and services on the web. Government regulations are available online (for examples, see [www.gpoaccess.gov/cfr/](http://www.gpoaccess.gov/cfr/) and [www.regulations.gov](http://www.regulations.gov)). However, most of the online portals are designed primarily for displaying the regulatory information and often usable only by experienced users, who are familiar with the subject and the portal. Some primitive searching capabilities may be provided; however, it remains difficult to locate cross-referenced information and to link the regulatory information with useful

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applications. Innovative computational methodologies and high quality tools are crucial to move the regulatory information available and useful to the public.

Research on information science and technology applicable to regulations and laws has been an active research area for decades. There has been a great deal of work done on building expert systems for law (Wahlgren, 1992; Zeleznikow & Hunter, 1994). T. Bench-Capon provided a review on the applications of knowledge-based systems for legal applications, particularly the research and development efforts related to the Alvey DHSS Demonstrator project in the U.K. (Bench-Capon, 1991). The reference includes several hundreds of citations that appeared before 1990 which are related to logic and rule based approaches and their application in legal systems. Erdelez and O'Hare also provided an overview of the research and status of legal informatics in the 1990s (Erdelez & O'Hare, 1997). Applications of case-based reasoning and information retrieval techniques have been proposed (Wahlgren, 1992; Zeleznikow & Hunter, 1994). A recent review on information technology and laws can also be found in a book edited by Lodder and Oskamp (2006). Additionally, there are many annual conferences and workshops that are dedicated to legal informatics and e-government research and developments. Policies and public interests concerning how IT can be appropriately and effectively applied to regulation management and compliance assistance have been actively discussed in workshops and public forums and remain active subjects of research and discussions (Coglianese, 2004a; Coglianese, Kilmartin, & Mendelson, 2009; Fontane, 2003).

Information technologies promise new ways for government to manage regulatory information, to improve public access and to improve government transparency. Advances in information technology make it possible to retrieve, categorize, extract and analyze information. However, an integrated approach covering the management of regulations, efficient access and retrieval of regulatory and related documents and tools for compliance assistance remains lacking. Possible innovations may include: conflict identification tools to discover inconsistent regulations; structuring rules for compliance assistance; integrating administrative guidance and supportive documents to regulations. Issues such as what types of support are needed to go from the textual information of the regulations to the formal models that can support computations, to integrate and link diverse sources of related documents to regulations, and to provide means to analyze and compare regulatory data, are fundamentally important to an effective regulatory information system. Practical applications require that the computer be able to interpret the situation or circumstances, scenarios and exceptional cases. Solutions that do emerge must support the treatment of multiple, heterogeneous regulations and related documents from diverse sources. Modeling regulations requires not only the understanding of individual content within a regulation provision, but also the relationships among and within provisions as well as mechanisms for linking applications, supplemental documents and related information with the regulations. Our research proceeds in two parallel tracks: (1) representing the regulations so that they can be accessed according to the needs of the users and the regulatory agencies, and (2) structuring the regulations so that they can be easily accessed to support applications, such as compliance assistance, and business processes.

The REGNET project aims to investigate useful information services related to regulatory information. As illustrated in Fig. 1, the research involves the development of prototype information service infrastructures that take textual repositories as a base and develop methodologies and tools to locate, merge, compare, and analyze the information. In this paper, selected examples are presented to illustrate some of the research issues and applications investigated in the REGNET project. First, a regulation-centric compliance assistance framework, where reasoning mechanisms are built upon the structure and organization of the regulation itself, is described. A relatedness analysis framework is then introduced with applications to compare regulations and related information issued by different agencies and from different sources. The paper is

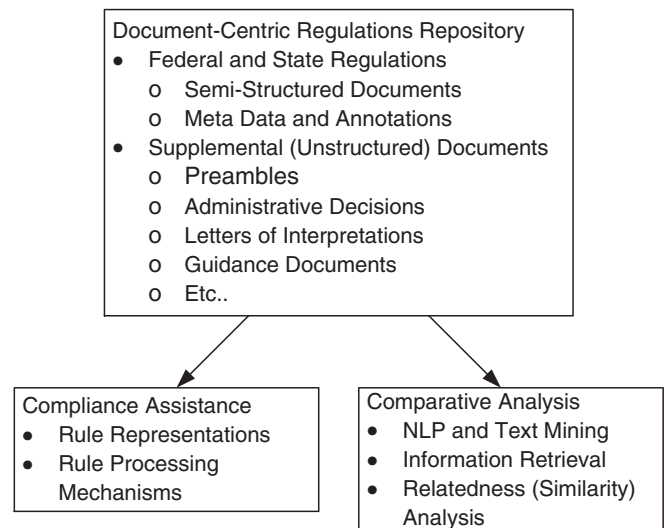


Fig. 1. REGNET: A document (regulation) centric framework for supporting compliance assistance and comparative analysis of regulations.

concluded with a brief summary and discussion on current and future research.

## 2. A regulation-centric compliance assistance framework

There has been a push for government agencies to put more emphasis on compliance assistance in lieu of enforcement to encourage companies to comply with regulations (Van Wert, 2002). Towards this end, specialized programs, using expert system technologies for example, have been built to assist users in understanding regulations and fulfilling the requirements (Botkin, 2002). Among the limitations of many compliance assistance systems is that the tools do not directly map or link to the source documents that they represent. Fig. 2 depicts the framework of a regulation-centric approach that structures a compliance assistance system around the regulation itself (Kerrigan, 2003; Kerrigan & Law, 2005). The rules together with the metadata about the regulations are directly embedded within the provisions they represent. This framework allows clear linkages to the regulation text. Because all encoded regulation rules are tied to particular regulation provisions, it is straightforward to map the compliance process to the provisions. The following briefly describes the structure of the document repository for the regulations and the regulation assistance system.

### 2.1. Document repository

The research scope and demonstrative development of a compliance assistance framework and the document repository demonstrative development cover Title 40 of the 2003 U.S. Code of Federal Regulations (40 CFR): Protection of the Environment (Code of Federal Regulation, 2003). Besides the regulations themselves, the repository also includes supplementary and supportive documents that are important for the accurate interpretation of the federal regulation(s) to which they refer (Heffron & McFeeley, 1983).<sup>1</sup> For the research prototype, supplemental documents dealing with used oil, which include the preamble to the

<sup>1</sup> Supplementary and supportive documents are an important part of regulatory information and are commonly considered in judiciary decisions. To illustrate, for the case "Beazer East, Inc. v. U.S. EPA, Region III" (963 F.2d 603, 3rd Cir. 1992), Beazer East, Inc., argued that the aeration basins were "tanks", not "surface impoundments", and were therefore not subject to RCRA's groundwater-monitoring regulations. The court ruled in favor of EPA by considering the so called "Weddle memorandum", which was issued to clarify the definitions of a "tank" and a "surface impoundment," as an interpretive rule, which can be exempted from the notice and comment requirements of the Administrative Procedures Act.

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