

# Mapping The Law: Knowledge Support for Business Development Enquiry.

Frank WILSON<sup>1</sup>, Rob PETERS<sup>2</sup>

<sup>1</sup>*Interaction Design Ltd (IDL), 13 Stonehills House, Welwyn Garden City, AL8 6NH, UK  
Tel: +441707338751 Email: fwilson@i-d.co.uk*

<sup>2</sup>*FramFab, Gerard Brandstraat 26-28, Amsterdam, 1054 JK., Netherlands  
Tel: +31206077500, Email: rob.peters@framfab.nl*

**Abstract:** The Add-Wijzer project set out to demonstrate the business value of public sector information exploitation by making ‘law information’ more accessible in support of business planning by professionals who are not lawyers. The public-private partnership formed for this task have shown that integration of various business-relevant data sources along with geographical information and tools can increase business planning capacity and can reduce time and costs associated with planning. The extension of the approach to wider usage by citizens and professionals in further usage cases is identified.

## 1. Introduction and Background to Add-Wijzer

While it was probably our ‘earliest federalist’ Johann Althuis [1] who first tried to organise our view of Law as a set of meaningfully related rules, rather than a scattered collection of the whims of people in power, it was probably Gottfried Leibniz [2] who laid a foundation for treating law and its embedded rules and intentions as something open to more formal relationship, explanation and operation. Yet despite the passage of 300 years we are still working towards widespread “knowledge support for legal enquiry”[3].

In recent years many attempts have been made to improve access to, and usage of, laws information. Early exploitation of ICT saw large scale transfer of laws to CD-ROM format for lawyers (e.g. by Context in London) and this was later replaced by online access via Internet to reduce costs and speed-up access to new information [4]. During collaboration between Context and IDL in 1999-2000 on improvement of this kind of service for non-lawyers, it was identified that a wide range of professionals have reliance on law information but lack support either for their non-lawyer status, or for their specific professional tasks. Modern business development and operation involves constant reliance on legal knowledge, and usually involves the services of expensive legal representatives (experts). Apart from the enormous complexity of law in Europe, the reliance on experts is also driven by the highly specialised nature of the content, both in terms of its specific technical language, and in terms of the knowledge required for interpretation in a specific case. Current work in this area mainly targets lawyers [5] more than business managers, and less support is available for the many ‘intermediaries’ (advisors who are not lawyers, such as business planners). This situation led to the formation of the Add-Wijzer group to investigate ways to improve access to law, and to improve usage of law information by business professionals who are not trained in law. The research is supported by the CEC eContent programme under its action to promote better use of Public Sector Information (PSI).

Early in our research work, a specific area of concern was raised by the Province of South Holland (PZH) and FramFab around spatial and environmental planning, where regulations emanate from different levels of society (e.g. local, regional, national, European), as well as from different types of regulatory authorities (e.g. water, food and

hygiene, public safety, transport, building, etc.). This often means relying on different types of legal experts to combine the required specialisations. Furthermore, law texts referring to spatial domains do not easily support reasoning about 'place', and the problem of understanding both 'where this law applies', and 'where can I do this business activity' often requires both expert legal consultation and negotiations with regional authorities. Business trying to develop in this way usually face time-consuming processes which can provide a negative result – drawing a blank. It was clear that business managers and their advisors required knowledge support for enquiries at a level where they themselves could manage to prepare a 'viable' case before taking it to a legal expert for completion. This would allow reduction of cost, speeding of process, and the flexibility to test numerous possible cases before selecting some targets for more serious consideration. For the above reasons, 'spatial planning and environmental law' became the primary focus for Add-Wijzer soon after project initiation.

## **2. Objectives**

The objectives of Add-Wijzer are to show how existing PSI can be exploited for wider business and social benefit through partnerships and arrangements between public authorities, developers, service providers and end-user groups. The target PSI content includes maps, GIS data, legal texts and other regulatory instruments, combined with population data, environmental data, economic data, and numerous other sources of information relevant to solving business problems. The integration of these to support visual display and reasoning about planning problems for business and legal intermediaries is the single development objective, and is already realised as a demonstrator available at <http://www.addwijzer.com>

The remainder of this paper briefly describes the initial results and lessons learned in what has been described by the Public Data Group as a 'flagship eContent project' [6].

## **3. The Add-Wijzer Approach, Technology, Business Case, and Results to Date**

The business case, as previously described in background, is improved access to law information and decision support for planning where law is critical, but where legal expertise is expensive and time consuming.

### *3.1 Studies of Users of Existing Legal Databases*

To inform the initial design of Add-Wijzer, a set of studies were conducted at Queens University Belfast [7, 8] to examine how people with some level of legal knowledge, or experience in fields using legal information, deal with existing law information systems. This was intended to provide a baseline for improvements over current practice. The evaluation used scenarios from an earlier requirements study which clearly showed that typical users start with a domain-specific task-support requirement, and then transform this to an information-seeking strategy, and finally secure relevant information to use in satisfying a task (work) need. Each scenario had a set of known problems relating to how people develop an information-seeking strategy, how they find the necessary information, and how they then understand and make use of it in a satisfactory way. The set of scenarios and related problems was used to design an enquiry using interviews of experts, plus protocol analysis of observations of users carrying out example tasks. Tests were then carried out with seven non-lawyers who came from a planning or environmental background, but who had no specialist experience in law, and five professionals who had a background in law but were not necessarily fully qualified lawyers.

Significant examples of problems for users with no legal experience included making sense of the legal texts found (understanding), knowing which documents were relevant to

their problem, completing search forms in a way that conforms to system requirements, targeting relevant information inside lengthy legal texts, identifying ‘amendments’ to law, and finding the ‘commencement date’ and ‘extent’ of laws. In addition, numerous usage problems were seen which derived from poor interface design in the systems observed. A set of design guidelines were then derived to address both classes of problem [9].

A key finding was the need to provide summary data and interpretation for all legal instruments to ensure the barriers of ‘specialist language’ and ‘complex document structure’ were overcome. It was noted that the user interface problems could be remedied through good interface design practice following current standards and good practice guides [see 9 for examples].

### *3.2 Studies of Business Users of Add-Wijzer Prototypes*

The evaluation study [7, 8] also included demonstrations of prototype interfaces under development for Add-Wijzer, and these were provided to candidate business users who were interviewed to ascertain their perceptions of the designs offered and their knowledge of likely problems in law information usage.

*Prototype ‘document search’ interface* : Tests were conducted with seven candidate users. Example problems related to structure of search forms for non-lawyers, categorisation of information and terminology, labelling of results in lists, and highlighting of ‘target’ information in displays of finds.

*Prototype ‘scenario enquiry’ interface* : A group of specialists were interviewed/tested and included coverage of the areas of event organising, architecture, geographical information system usage, environmental planning, soil science, notaries, planning enforcement, and placement of ‘liquid petroleum gas’ (LPG) stations. Example problems and benefits identified for these types of users were quite varied, as may be expected from the wide area of professions covered. For example, the event organiser found it very useful that ‘prohibited’ areas were masked on the map, but could not see why some ‘explanation’ could not be provided. He also found it very attractive that all of the relevant information could be provided via a single interface.

In the case of the architect, he found it particularly useful that the system would allow him to identify archeologically sensitive areas, since the Treaty of Malta places specific requirements on architects in this regard. Another attractive feature for architects was the ‘standardisation of municipal information’ in Add-Wijzer, plus the ability (e.g. when making zoning plans) of being able to access many different types of PSI (e.g. pollution, noise, traffic, etc.) in a single interface.

The LPG specialist also noted the significant advantage of being able to access many kinds of information in a composite model of planning space, built environment and applicable laws. He emphasised the complexity of gathering data on zoning plans, historical information (archaeology), soil, cables, piping, sanitation, etc. Normally an enquiry with municipal authorities can take a long time, and the instant results of an Add-Wijzer system would show significant business benefits.

The results of our tests illustrate significant differences in usage characteristics between the user types, but show business experts can adapt to law as well as law experts can adapt to business issues with the help of an appropriate interface backed up by PSI content. A key finding in our business user studies was the need to introduce new GIS objects (geographical information system objects) to deal with legal instruments and other data necessary for addressing business problems. It was noted that the essential model of GIS was expandable to allow inclusion of any data that could be meaningfully linked to the core concept of spatial representation, and this is currently done in Add-Wijzer.

### *3.3 Technical Challenges*

Development of Add-Wijzer has addressed a number of significant technical challenges. A set of candidate technologies is considered in detail elsewhere [10] and here we consider the rationale for selection of the elements implemented in the Add-Wijzer platform. It was planned that Add-Wijzer would operate within a web-service model, importing well defined data sets from a diversity of sources marked up via extensible markup language (XML). For our purposes, the information had also to be contained within well defined metadata sets, while at the same time leaving the maintenance of the data where it belonged.

The Dutch national information model for spatial planning (IMRO[11]) which was derived from the Dutch real estate standard (NEN 1878/3610) did provide the basic principle for data set import and export, but many municipalities struggled with their first attempts to apply these standards in the real life planning process. There is a clear need to support migration to new standards in user constituencies not familiar with this approach (process change).

It was also seen that the software packages used by the municipalities were not up to the task of handling the new standardisation process in planning. Some of the functional variation was seen to provide a potential impact for business because the new data model is inclusive of specific detail (markup and coding of information objects) derived from a municipal planner perspective, while ignoring some requirements of ‘business planners’. Solving this problem will be crucial even at the European level of Dublin core interpretations for eGovernment archives (see also eGMS and EGCL for the UK [12]) if eGovernment is to fully support exploitation of PSI for business usage. For example, when the municipalities together decide to leave the “maximum allowed weight” out of the coding system for “roads” because the “speed limitations” is perceived as a more relevant category for them, some businesses depending on road transport (logistics) could lose important “business inquiry value” in the future. We therefore recognise that if technical experts fail to inform ‘domain experts’ about the consequences of such categorisation choices for the data model, or fail to work with domain experts to develop a common view of such consequences, then the limitations of the system will only be seen later, in early usage, when an array of design decisions may have rendered the system/software either inflexible or expensive to adapt.

A critical challenge in achieving the Add-Wijzer technical architecture has been the enormous complexity generated by inclusion of the finer information (requiring markup) derived from a broad range of business themes, related information sources (documents), maps and space-related data items for visual presentation. This mass of otherwise unstructured data included different formats (such as Word files, PDF’s, geographic shape files, spreadsheets, etc.) relating to quite diverse content (such as laws, policies, subsidies, traffic flows, populations, etc.), and all had to be ‘mapped’ to the thematic layers of the GIS system as the display vehicle. The visitor to the website must also be able to conjoin relevant documents/data-sources related to the commercial enquiry at the right regional ‘scale’ and within and appropriate business ‘context’. For these reasons our information architects had to identify/define suitable layers of policy documents deduced from the anticipated needs of business people.

A series of interviews with potential business users helped to develop a range of detailed scenarios that such professionals actually follow in real life. This allowed identification and understanding of the complexity of bringing together and analysing ‘business relevant’ information and data sources in real life planning problems. Examples showed interrelationship (co-relevance) of sources as diverse as (i) traffic density on national, regional and local roads, (ii) documented descriptions of planner intentions within environmentally protected areas, and (iii) the considerations required in planning the

relocation of Liquid Petroleum Gas (LPG) stations. Such complexity greatly influences the navigational requirements of the solution – the task support that must be provided to the end user.

In traditional GIS systems the user manipulates the interface by activating or deactivating thematic map layers (show and hide spatial features). However, as identified in Add-Wijzer, solving real business problems requires the integration of both geographic features and geo-related information that is not simply a feature of either the built environment of the natural environment. This means that traditional GIS interaction techniques cannot easily support business planning enquiry beyond simple ‘geographic’ queries, and could not relate relevant documents (such as legal texts) to enquiries with a spatial component.

The company ISIS (now part of Bentley) had produced a shell around a map engine, which enabled flexible formulation of SQL queries on the objects in the database to solve parts of this class of problem [13]. We wanted a visitor to be able to enter queries related to otherwise diverse topics such as ‘water’ and ‘building’ and retrieve documents relevant to any issues involving both these planning areas. The text query had to be ‘map sensitive’ and the maps had to be ‘document sensitive’ through an information architecture that supported semantic relationships between information domains not normally related in a single system. The ISIS navigation shell, ‘Flexiweb’, delivered the major part of that functionality, and as part of the public-private partnership in Add-Wijzer they embarked on extending it to solve our new class of problem. With their support, the core engine was extended to handle multiple document types derived from multiple information domains where content was tagged within a common information architecture.

Despite the aforementioned challenges, Add-Wijzer has been able to demonstrate PSI exploitation via an enhanced set of tools that allow data owners (public authorities) to easily ‘tag’ documents and other information sources for geographical relevance. An added benefit is the removal of duplication in the meta-tagging effort.

### *3.4 Partnerships for Service Delivery*

A key aspect of the success of Add-Wijzer has been the very successful public-private partnership. The role of the Province of South Holland (PZH) has been key to our success so far. PZH have fully embraced the need for digitalisation of plans at municipal and regional level, and have organised a very large group of municipalities to collaborate on the adoption of the new standards/approaches necessary to support future PSI exploitation in this area (IMRO, DURP). This collaboration ensures exchange of data and acceleration of local digitalisation plans to meet the project schedule, and feedback from participating public authorities suggests this was partly due to the attractiveness of the Add-Wijzer solution and the wider recognition that this approach will meet both Governmental as well as business and eventually citizen needs. In addition to the organisation of content through their collaborative activities, PZH have also worked very closely with FramFab, the main system developer, and have shown that a public-private partnership can satisfy both the needs of commerce (users of PSI) and the needs of public authorities - data holders with a duty to facilitate best usage of data for planning purposes. PZH estimate that a planning process of six-months can be reduced to three-months or less by using digital access approaches such as Add-Wijzer.

### *3.5 Public Demonstrator*

The Add-Wijzer project is now in its demonstrator phase, and full public access is given to selected operational scenarios (<http://www.addwijzer.com>). The demonstrator can be used to solve problems within those selected scenarios, or indeed within any scenarios relevant to

real business problems in the geographical areas described (PZH – including Den Haag, Rotterdam, etc.).

The early feedback from the demonstrator suggests that a general purpose ‘planning advisory’ system offers significant potential business benefits. The principal advantage is the ability to access a wide range of information critical to planning tasks within a unified interface that supports many different types of users. Their business needs may vary enormously, but their requirements for support are in common. They need to be able to reason about the spatial domain via maps and additional graphical representations, and at the same time be able to discover the implications of existing planning and legal instruments that may impact upon their business objectives (non-map and non-image data relevant to spatial planning and business planning enquiry).

In parallel with the public demonstration, we are now examining the transferability of our results to other European states and law systems. We have already completed an initial study of law information availability across Europe [14], and these results already show, in principle, that Add-Wijzer can provide benefit in the wider European context. We will complement this with the results of a further study (now being conducted by Queens University Belfast) addressing the fitness of the Add-Wijzer solution for use in other Member States, and any apparent needs for localisation or adaptation to meet local requirements.

#### **4. Key lessons learned and future perspectives**

The key lessons exposed in the body of this paper provide a firm basis for proceeding towards a pan-European adoption of planning support based around visualisation of spatial and other image data in association with non-spatial and non-image information such as laws, regulations, policies, etc.

Intermediaries and managers can reason about business development problems and law, but they need support that is sensitive to their information and task needs. Integrating the information and task requirements has been helped by focusing on one province in one country, but extension to a European scale will require adaptation and elaboration. This could be better supported by common eGovernment approaches and standards.

Business operators can take account of laws, regulations and other instruments in business planning activities, but the special language, document formalities and variety of sources and types brings new complexity. Tools such as ISIS Flexiweb+ can support these new user tasks, as can provision of summary information to support improved user understanding of content, and provision of usable interfaces.

Public sector agencies have substantial reservoirs of content but do not always realise the value for the outside world. While we have shown how such content can be made more accessible and usable for business benefit, the problems related to tagging of highly heterogeneous data sets, and the need for an intermediate metadata architecture, suggest that increased standardisation among public data owners would be of significant future benefit.

Professionals involved in business planning can develop cases to a high level, sometimes even answering the problem completely, before recourse to expensive legal expertise. The time frame can also be shortened considerably (e.g. 50%), and so savings in time and costs are easily possible.

Provision of knowledge support for legal enquiry relies on a partnership between public authorities, business, and value-added service providers. In the case of Add-Wijzer this benefited from a pro-active and progressive regional authority (PZH) but a wider adoption may not be easy unless agreements between authorities are forthcoming, especially in the area of PSI information standards (e.g. IMRO), and standard approaches to allowing PSI exploitation (e.g. UK Information Fair Trade scheme [14]).

Add-Wijzer users uniformly identify the wider set of opportunities beyond business support, especially in improving public authority relationships with citizens (eGov-Citizen). Future developments in Add-Wijzer will examine how to take account of technical needs to support this interaction area.

Add-Wijzer has provided a first value-added service in business development addressing the relationship between regulations, population statistics, built-environment data, natural environment data, economic data, and real business development problems. The intense interest in the project emphasises the need for better access to PSI, and also for better tools to make such access and professional tasks possible.

Elaboration of the Add-Wijzer approach beyond the business development arena could show a broader scope for exploitation of public sector information through an enquiry and representation method (graphical / maps) that is usable by, and beneficial for, a wide set of citizens, professionals and experts alike.

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