Regulation management

– new tools for the process of lawmaking

Seminar
25 October 2001

En rapport från
det IT-rättsliga observatoriet

Foreword

On October 25 2001 the IT Law Observatory of the Swedish ICT Commission organised a seminar on regulation management and new tools for the process of law-making.

Extensible mark-up language in regulation management was the subject for the first presentation of Prof. Cecilia Magnusson Sjöberg. Prof. Larry Lucardie and Dr. Reynier W. Overhoff talked about decision logic tables and gave a presentation of MatchTM in regulatory environments. Finally Tom Ritchey from the Swedish Defence Research Agency talked about morphological analysis and how it can be used in regulation management.

The seminar was recorded on tape and edited to this report by Jan Wiklund and Kjell Skoglund. The report gives a summary of the seminar.

Stockholm , May 2003
Peter Seipel
Chairman of the IT Law Observatory

Content

Introduction

Peter Seipel, The IT Law Observatory:

I am a member of the Swedish ITC Commission and I also chair the IT Law Observatory of the Commission. The Observatory is engaged in many activities involving law and information technology, and one of them has to do with the subject we are approaching today.

It is certainly an interested subject and I am perhaps a bit disappointed that we haven't got the room filled with rule-makers. The rule-makers all think they have the professional knowledge needed for their task and profession, but I think it can be at least complemented with some of the things we are going to talk about today.

We have three rounds of speakers. We will begin with my colleague and friend, Cecilia Magnusson Sjöberg from the Swedish Law and Informatics Research Institute. She will present some basic notions having to do with the XML mark-up language. Then we will switch over to our guests from the Netherlands, Professor Larry Lucardie and Dr Reynier W. Overhoff. We look forward to hear your presentation which has to do with a tool sometimes called decision logic tables, and you will also tell us about more complicated things than that – regulation management. Then as the third and final presentation we welcome Tom Ritchey from the Swedish Defence Research Agency. Tom will present a tool for so-called morphological analysis, which is also a form of tabular representation of problems that may come up in the context of rule-making.

So, without much further ado I give the floor to Cecilia Magnusson Sjöberg.

Extensible Mark-up Language in regulation management

Cecilia Magnusson Sjöberg, Swedish Law and Informatics Research Institute

This is a presentation of XML – as such, as a tool – and also a reflection upon its possible advantages and disadvantages, in particular with regard to regulation management but also with regard to legal information management in general.

What is, briefly speaking, the situation of legal information supply today? Why is there a need at all to reflect upon information standards like XML? One reason is the rapid growth of legal information. A second one is that the law and legal information related to the law is becoming much more global which implies a kind of internationalisation of legal information. Furthermore we still have access barriers; apparently it is not easy to produce, disseminate and retrieve information. So, to a very large extent we are still stuck with methods dating back to the 1960s. This is why there is a need for legal information retrieval methods, and a need for harmonisation, not least with regard to membership in the European Union, but also with regard to the globalisation of law on the whole. And with regard to the topic of today: there is a need for enhanced support methods for different kinds of legal investigations, especially for the law-making process itself.

This presentation focuses primarily on documents reflecting the system of law-making, e.g directives for public committees, public inquiries, government bills, different kinds of laws, rules, and regulations. But of course, one can not disregard from the impact of court cases and other kinds of legal documents – hence with regard to add-on interests in terms of linking variuos legal sources together. But the primary focus is public legal information.

Why introducing XML?

XML is the acronym for Extensible Mark-up Language. It is a W3C recommendation and has partly its origin in HTML – Hypertext Mark-up Language. We commonly use HTML when publishing information on the web, and consequently HTML is primarily oriented towards presentation of text on a screen. We also have an ISO standard called SGML – Standard General Mark-up Language, and it was designed originally for publishing purposes and contents representation of document structures.

HTML is simple. It has very limited possibilities of expressing document structures and contents. SGML on the other hand is quite complex. XML is an attempt of taking the best out of the two standards.

Many actors can benefit from taking advantage of XML. The legislators today need to improve legal document management. One is to achieve improved version control in different documents. We all know that legal acts change over time. If we could accomplish better version control by introducing XML there is one benefit.

Representatives for the legal domain would also like to have improved data quality validation and better means for exchange of legal data. And, possibly we would also like to have a tool for streamlining, customising different ways of producing and presenting legal information, taking into consideration different kinds of users – the professional, the layman etc.

XML is a mark-up language, meaning that you have a text or a document in which you insert tags. The tags may have different characteristics. The purpose of inserting tags is to add extra information to the text or document, either with regard to the format or the structure of the document or the content of the document.

If for instance we have a legal text in an act, and parts of the act deal with penalties or damages, we can insert a tag that indicates that this section of the text deals with penalties. That element shows the contents of that document.

We may also insert tags describing the structure of a document, for instance, that a particular text is subdivision number one. We may also give a part of the text an attribute, e.g. a unique ID.

The whole idea with mark-up is that you insert different kinds of

tags as a kind of metadata layer on a piece of text. Basically there are *elements* or *attributes,* and there is no distinct roles for what is supposed to be an element and what is supposed to be an attribute. You may for instance have an element that says that this is a decision by the Data Inspection Board. You may then add an attribute whether this decision is to be made publically available or kept secret. This is one way of working with elements and attributes.

Furthermore, what you also do when you apply a mark-up language is that you make a decision how theses elements are to be put together. For instance, working with a government bill you can make a decision in advance that there must be a table of contents in the bill, and that the table of contents must be inserted before the other parts of the documents. We can also design the application so that it is a table of contents in the beginning of the government bill or at the end. We do not only decide the order of the elements, we also make decisions with regard to the occurrence of a certain element, for instance that we in a government bill only allow one table of contents.

When you apply a mark-up language you make decisions on what kinds of things you would like to bring forward. You make a decision about how different text structures are supposed to appear and also the occurrence of these pieces of text.

You may formalise your decision in a so-called DTD – Document Type Definition. To some extent a DTD decides how the mark-up will be carried out. You may have a DTD containing rules about which elements will be included in a document, the order of these elements, and then you mark up a whole set of documents in accordance with this DTD. Afterwards you can validate the mark-up of the particular documents and have a check whether you have applied the pre-defined rules for mark-up correctly. You check whether you have processed you document in accordance with the rules you have decided in advance.

What is the major difference between HTML and XML?

The major difference between HTML and XML is that when you apply HTML you only have a predefined set of tag elements, for instance font size, whether you use bold or italics, how you insert tables etc – i.e. difining a predefined set of tags format and layout. But when applying XML you are free to make a choice. You can use any kind of elements, such as content oriented ones, penalties, decisions,

heading, chapter, underline related EC directives, authority. Any kind of word can be used as a tag as an indicator of contents of a document. When you use XML you have full expressiveness with regard to the content you would like to mark up. This is of course a vital difference.

In any kind of document management approach you have to start with some kind of *document analysis*. This is necessary regardless whether you are going to use a conventional database system, or whether your ambitions are to design a more advanced decision support system. In any kind of legal information management you need to start with a document analysis. A document analysis is rather demanding and you need to allocate human resources to it. There is a need for legal skill. There is also a need for the legislator to "sit down" with a pile of document bills and go through the structure, the contents and analyse what are the important aspects that we will like to retrieve further on. You cannot do without the analysis, no matter how the supplier may market that it is just to go ahead and implement XML.

You probably have a situation where you have a whole set of different formats you need to manage. You probably need to, within your system, manage quite a few documents represented in conventional text formats, RTF, ASCII formats etc. You might have a whole set of HTML documents, some documents in SGML from publishers for instance, you may, furthermore, have some documents stored in XML. In real life you will probably have to face a situation in which you will have to handle different formats.

The next step is to *convert* these formats into some kind of common format and then *store* them in some kind of database management system. You store your documents in the system with an attempt further on to retrieve the information by ways of boolean search mechanisms, and hopefully also some more advanced mechanisms for getting out the information.

The next step is to *communicate* the information and make it available in some kind of network.

As previously mentioned it is important to be aware of the fact that you can not get away from the document analysis. There is also a need to realise that in the real life situtation you will have to live with a whole set of different formats, and that you will have to think in terms of databases and future retrieval possibilities.

What can XML do?

HTML will not be the major component in any kind of legal information system. There is a need for XML, which is actually a true subset of SGML, because of its expressiveness and because of the possibility to validate a certain mark-up in relation to predefined rules.

One should also be aware of the fact that document mark-up is not a given strategy. Document mark-up may be focusing on such different aspects of a document as layout, structure and contents.

Applying XML has nothing to do with using a particular software product, and it has nothing to do with using a particular system development method. It should rather be conceived at as a method of managing document contents.

With regard to regulation management there is no doubt possible to take advantage of XML in the process of law making – definitely in the context of document production. It is much more commonly being used all over the world. Historically quite a few publishers have used SGML, but now XML is used much more frequently. One advantage of applying XML in context of regulation management is to prepare for feedback with regard to for instance authorisations to issue norms at different hierarchical levels. More precisely, you can indicate explicitly right from the beginning in a law which rule permits the government to issue more detailed regulation provisions. Then at the government level you have a similar mark-up of the relating rule of authorisation. And at a possible third level of authorisation you may also have an indication that you have taken advantage of the higher up authorisations. Then it will be possible to retrieve how different kinds of authorisation in practice have been taken advantage of. This is one example how law-makers may take advantage of XML.

Furthermore, XML – and other mark-up languages – may be taken advantage of for *norm analysis*. One may focus on specific targets of a law with the prospects of future amendments. It could be a particular algoritm or a particular rule setting up how to calculate social benefits, different taxation rules etc. It may for instance be interesting to use XML mark-up as a kind of rule differentiator at a fairly low norm hierarchical level, at the level of public authorities issuing rules. In Sweden there are situations where you have a normative document containing a quite complex combination of formally binding rules and non-binding recommendations. At the stage where these documents

are supposed to be updated, it would definitely facilitate that procedure if it was possible to extract different kinds of rules, not only to retrieve different normative status, but also because there are different procedures relating to the different kinds of rules. If you have recommendations there may be another decisions procedure compared to rules that are formally binding.

Rules simplification is another possible advantage of XML. It is not easy to accomplish, but it is interesting in the context of dissemination of legal information not the least on the Internet.

XML makes it possible to have the same source document and then *customise its presentation* with regards to different users or readers. These different representations may in the context of regulation management, and in the context of conveying legal information to the public, be oriented to different kinds of users or readers of a legal text.

Possibly one of the most interesting aspects of XML is to take advantage of this standard in the *context of translation* and the need for multilingual representation of legal text – within the European Union and in a global perspective. You may have a way of easy shifting between different language versions of the same EC directive, between relating national implementation of e.g. an EC directive.

The wisest thing is probably not to go for the most advanced applications of XML, but settle for the almost trivial ones.

Already today XML is being used for information exchange within the public sector of Sweden for message labelling. It is not an advanced application but it is a basis for further advancements in terms of large scale communication and data exchange.

XML has also been discussed in the context of how to manage what may be referred to as fundamental – basic – data in the context of public legal information. We have such basic concepts as income, data identifying actual persons, etc. XML could be a tool for simplifying handling of these kind of data and making them more data policy oriented.

Critical factors

One critical factor in the content of XML related regulation management is a need for *consensus* of the purpose of the given application. This is of course a classical system development issue. If you do not know what kind of system you like to design there will be confusion

and failures. There is a need for clarifying the *legal, organisational* and *financial conditions* for any kind of system development including XML.

With regard to the Swedish ongoing activities and the plans for designing a new public legal official information system there have been extremely high ambitions expressed in a public report, but in practice so far we have seen only limited results in terms of a portal.

Analysis – you have to sit down and work with conventional printed documents and go through them. This is not a task for a technical expert or an administrator, it is a task for the legislator, the representative for the law-maker, a legally skilled person who is used to work with these documents. The document analysis is a highly qualified task, and you can not buy consultants on the market to do it. This has to be performed by in-house experts, by the Parliament, by the law-maker, by the public authorities themselves, because it is the spirit of the document that has to be analysed. What you have to do is to end up with an analysis focusing on the kinds of aspects of a certain document you like to represent – is it the content? Is it the structure?

Hypertext links – rightly demanded today. It is the true add-on to any kind of document. But be careful – anyone inserting hypertext links knows that the administration and updating of hypertext links can be extremely costly and practically more or less impossible.

You have to make a choice with regard to the style, structure and contents. And do not settle for HTML, because HTML is altering very little in terms of legal document management. It is easy to use and you can do quite a lot of things with HTML, but it has no expressiveness with regard to the kinds of things that one would like to accomplish in the context of regulation management.

Think of the *future* applications. It is not enough to add a lot of mark-up in a document. You have to handle the hen and the egg at the same time. When inserting the mark-up you need to consider future applications in terms of dissemination of the document on the Internet, storing and containing the information in a conventional database etc.

In spite of the fact that W3C, ISO and vendors ommonly market XML and HTML as being platform and software independent you are still stuck with the same kind of problems with regard to cable formats not matching etc – when applying XML you still have the conventio-

nal *software problems*. But remember that applying XML does not include a choice of a particular software product or system development approach. Do not forget that the needs for document conversion, the migration of ageing data, reflect on related document standards and standards of communications between computers.

Rush for complexity. Developers may be enthusiastic about the possibility of adding mark-up, but the end result may be too complex and you may end up with tag pollution in the document. Stay with a fairly simple model.

There is a need to check *development trends*. There are quite a few international networks conferences and websites that even address legal issues. One needs also to follow the development in the international standards community. And not the least the commercial actors.

Peter Seipel: I'll just mention a few of the things I wish to come back to – perhaps not now but after the other presentations. You have touched upon them but it could be interesting to go into some depth:
– changes of the rule-making procedure,
– basic and derivative uses,
– connected applications,
– costs and relationships among cost elements.

We can return to these general matters afterwards. But are there any immediate questions to this presentation?

Question: You mentioned that it is important to do the right thing from the start when you do the document analysis. How flexible is the result of this analysis, if you want to change strategy or if you want to do modifications when you are on the way?

Cecilia Magnusson Sjöberg: It is not that simple to change strategy after you have invested quite a lot of time in terms of designing a DTD, and marking up a large number of documents. That is one reason why it might be the wisest thing to start fairly simple. Do not go for the most advanced application right from the beginning.

But if you from a commercial point of view want to design a specialised product, e.g. support with regard to the application of, for instance, the Data Protection Directive and national implementation in the member states, then of course it might be commercially interes-

ting to insert lots of mark-ups, lots of hypertext links, because there you have the added commercial value. So it depends on the purpose of the system. The general system – keep it simple; a commercial system – go for it. Or if you work at a business law firm – go for the complex application right from the beginning, for there you have the added value.

Question: Maybe this is the same question. You speak about XML as something you can use in order to mark-up or analyse style structure and content of legal documents. My reflection is: do we have enough knowledge about the function and dynamics of legal texts? I think style structure and content to some extent are related to the texts themselves, but the texts, the legal documents are merely a representation of something we want to accomplish. You mentioned that it is possible to mark-up e.g. penalty, but do we know enough about the different functions that are inbedded in the legal texts – like e.g. incentives, licensing, giving bonuses for conforming, authorisation, delegation. My question is perhaps: wouldn't it also be interesting to analyse the functions of the rule? If we start to mark up poorly developed documents – what do we accomplish by that, if we don't try to reach a deep understanding at the same time?

Cecilia Magnusson Sjöberg: Two reflections. It is not merely a question of reading a text and then adding markup to it. I agree with you that this work has implications also with a need for a deeper understanding of what a legal document more in depth represent.

The other reflection is: I have been talking about XML as if it was one thing, but in fact there is a whole family of XML-related information standards, bringing in not only text components but also means for handling sound, images etc. Possibly we may have a technical input – if we start to apply XML text oriented for the law there is technology, means, tools for having also other kinds of knowledge representation. Possibly the technology will have a possitive impact on what is possible to manage in terms of law. So that will perhaps go beyond conventional text representation. Technology development might open up the historically conventional text orientation of legal knowledge management.

XML and Regulation Management

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1. The current situation of legal information supply

- **Rapid growth** of legal information
- **Internationalisation**
- **Access barriers**

- A need for improved legal **information retrieval** methods
- A general need for **harmonisation** as a result of European Community Law
- A need for enhanced **support** for legal investigations of different kinds

What do we mean by legal information?

In this context primarily:

- Documents reflecting the system of lawmaking
  - e.g. government bills and laws
- Court cases
- Decisions by public authorities

But do not neglect:

Contracts
Literature
etc.

2. The introduction of XML

- Who will benefit?
  - the legislator
  - the public official
  - the citizen
- What can be accomplished?
  - improved legal *document* management:
    - **more precisely, legal documents as a true information resource in society, for example:**
      - version control in the process of legal information production
      - data quality validation
      - global information exchange
      - customised information supply

Requirements

- Improved accessibility
  - search facilities
- Rationalised production
  - updating facilities
- Enhanced multilingual features
  - Community law...
- Regulatory management
  - e.g. feed-back on legislative actions
- Electronic archives
  - long term storage

How?

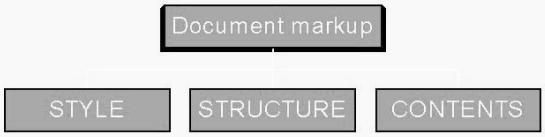
"The black box" with modern enabling tools

What´s in it?

HTML?

- Yes, probably some but not as a major component in modern legal information systems!

The approach



Why is there a need for XML(/SGML)?

- Expressiveness
  - legal information is not just any information
- Validation
  - there are special data quality demands

3. Regulatory management

(a) The process of lawmaking
(b) Norm analysis
(c) Rule simplification
(d) Translation work
(e) Information exchange
(f) Markup of fundamental data
(g) Legal labelling
(h) Computer programs defined as XML documents

(a) The process of lawmaking

- Document production
- Feed-back
  - e.g. on given authorisations to issue (more detailed) provisions at lower normative hierarchical levels

(b) Norm analysis

- Specific targets
  - e.g. a certain aspect of a legal regulation with the prospect of future amendments
- XML-markup as a rule differentiator
  - e.g. in legal acts containing both binding rules ("shall") and non-binding ("should") recommendations

(c) Rule simplification

- XML as a means for functionally authoring of law-texts
  - consider e.g. distinctions between:
    - (normative) purpose
    - comprehension, and
    - original text level

(d) Translation work

- The need for European harmonisation of national law
  - as a result of European Community Law
- Enhanced understanding of international conventions and recommendations

(e) Information exchange

- Within the public sector
- Between the public and the private sector

(f) Markup of fundamental data
- generic concepts with legal implications

- For example:
  - data identifying a natural person,
  - taxation: income
  - social insurance: benefit (parental, household, study loan etc.)
- The need for special routines
  - rationalisation and efficiency enhancement
  - improved data quality
- Strategy:
  - generalised systems for collection, storage and dissemination of data

(g) Legal labelling

- The administration of:
  - privacy
  - openness and secrecy
    - e.g. attribute: publicity status
      - allowed values: secret or public
  - intellectual property rights

(h) Computer programs defined as XML documents

- Object:
  - Source code before execution
    - fields of public administration:
      - social insurance, taxation, study administration, environmental protection, etc.
- Reason:
  - Embedded rule transformation in regulations
    - from vague criteria characterising natural (human) legal language to more precise (strict) criteria in the sense of programmable data

- Purpose:
  - Clarification of normative work
    - i.e. the handling of legal information in "the electronic public administration"
- Example:
  - Attribute: Authorisation
    - Allowed values:
      - Government, Supervisory Authority etc.
- Result:
  - **Improved regulatory management!**

"Costs"

- Political initiatives
- Legal awareness
- Technical competence

4. Development trends

- Data base technologies revisited
- New attempts to program legal information
- Legal information "wants to be free" but managed

What can we learn from the Swedish history of legal automation?

- Public sector computerisation
  - IT is not merely a tool but a powerful resource which needs to be analysed in detail from the legal point of view
- Development of decision support systems
  - It is not a trivial task - if at all possible - to "programme" legal information
- Webification" of legal information
  - Avoid the trap of "presentation fascination"...

5. Critical Factors in Legal Document Management

(a) Reaching consensus on the purpose of the system and its application area(s)

- Clarify the legal, organisational and financial conditions

(b) Document analysis

- The investigation of common components in (the applied) legal markup system
- Desirable (hypertext) linking objects
  * an appropriate linking technique

(c) Choice of markup levels
- style, structure and content(s)

(d) Strategy for DTD-design

- Flexibility (logical constraints, etc.)?
- Markup optimisation?
- Openness (e.g. internal and/or external references)

(e) Preparation of future IR functions taking applied document standard, into consideration e.g. XML

(f) Compatibility issues
- Document conversion
- Related document standards
- Related standards for communication
  - e.g. Z39.50

(g) Complexity
- The risk of alienation from the user's point of view

(h) Development trends
- In the standard community
- Commercial actors

Presentation of decision logic tables and Match. Discussion of regulation management

Dr Reinier W. Overhoff, Knowledge Economies:

As soon as the words management of legal processes and regulatory processes are in play, there comes an enormous world to one's mind that is not at all disciplined but rather chaotic. In the world of the rule-makers, in the craft-rooms where the craftsmen are trying to write down functional texts to make things go round, it is a rather chaotic life. Very pressurised, very chaotic, and not at all in the disciplined manner we would like to see.

As Cecilia Magnusson Sjöberg said, any legal information system needs document analysis. In the pro-active scenery in creating legislation there is very little document analysis in play, as far as I have seen it. And in addition, in the products that are being made, a lot of documents may in fact never see daylight: they are created, they are presented, they are discussed in some way or another, and suddenly they disappear.

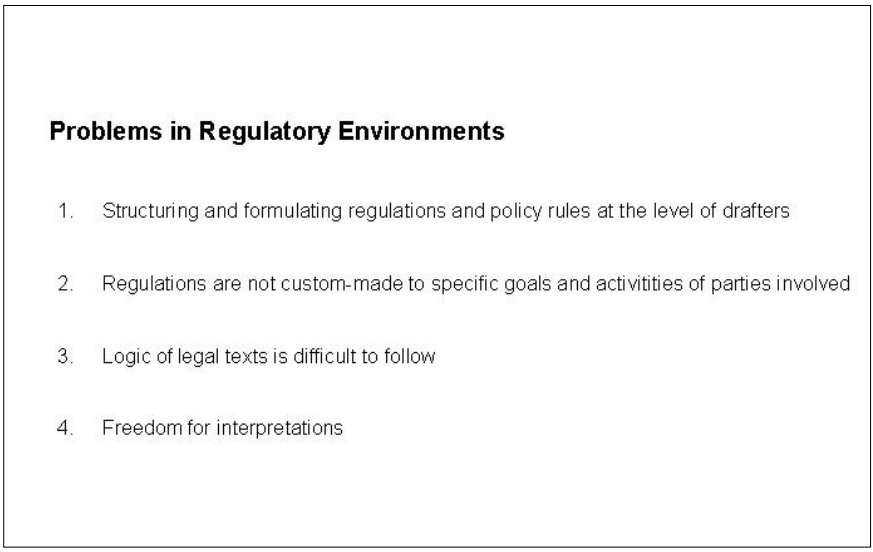
Nonetheless, we create in a country like the Netherlands, an enormous amount of legal output on the national level in terms of laws and royal decrees. I would think that annually the Dutch Council of State is asked to provide opinions on about seven hundred regulations, that either partly change other legislations or regulations or are completely new regulations. Seven hundred on the basis of retrieval systems that in the Netherlands on the very top level ten years ago there were some 68.000 articles in force. That amounts to, if you put them on a paper, a heap of paper as large as myself. And we live with the idea that all the legislation that is in force is something the ordinary people have to live by. We ask the discipline to understand and to live along the lines of

the law. And we say to the people: it is the law you should follow, and you should understand it. And the truth of the matter is that the people don't know the law, they never read the law, and if they read the law they don't understand it. It is far too complicated.

This is an enormous problem for society, if we create the idea that the rule of law must prevail at all times. In modern societies we live by that particular creed: the rule of law is controlling us all, and the truth of the matter is that the rule of law seems to be passing as a ship in the night as nobody reads it, nobody knows it and nobody can understand it.

If you look at the legal domain we find a lot of practitioners trying to get the information at the fingertips. Cecilia Magnusson Sjöberg made reference to the enormous growth of legal information, and we want to have it at our fingertips. That is an element. It is very important and the legal machinery is in fact lacking behind if you compare it to a great many other domains of industry. In the Netherlands nonetheless a progress is made, but it is difficult and slow. But apart from that there is a pressing need with rules and regulations, and that is, apart from having the information at your fingertips, more important even seems to be to know what you should do. A lot of regulations, if you give it to people, look like a bundle of paper where people have to start to read in order to know what they should do. Very often it is very complicated to pursue in the work. It is discouraging to an enormous degree. But if they read, it is important that there is a transparent presentation of situations where the reader could immediately grasp what he should do. So legal structures should be extremely transparent with regard to the various elements of which it is composed. In order to create an optimal realisation of the objectives of a regulation it should be extremely transparent. If you want to have something extremely transparent you must proactively work on document analysis. In the proactive field of rule-makers there is much heat and very little proactive analysis. And this is complicating if you want results in the end.

This sheet is simply to clarify that it is extraordinarily important to create clarity in all details. When we drew up the particular software that you are going to see, there is a dedicated element of the software itself.



Slide 1

Another point is the problems of regulatory environments. It has been described in a great many ways, at least in the Netherlands. In the literature about complexities of regulation and law-makers the difficulties in fact have been described during the whole post-war period. Before that, there was an idea that rules would work, and even in the Netherlands a hundred years ago there was an idea that one even would describe and control the world by a group of legislation that was not more than a few hundred pages.

The problems of regulations are that drafters themselves very often find it extremely difficult to structure and formulate legal matter in an adequate manner. That is because it is difficult for humans to structure difficult things. Nobel prize winner research shows that ordinary people have great difficulty in handling a limited amount of variable factors at the same time in their minds. That account for all of us. So complex things that have to be described and ruled are too often too complex for man to handle. You have to aid the designer with tools to help him controlling all variable factors and to make it visible.

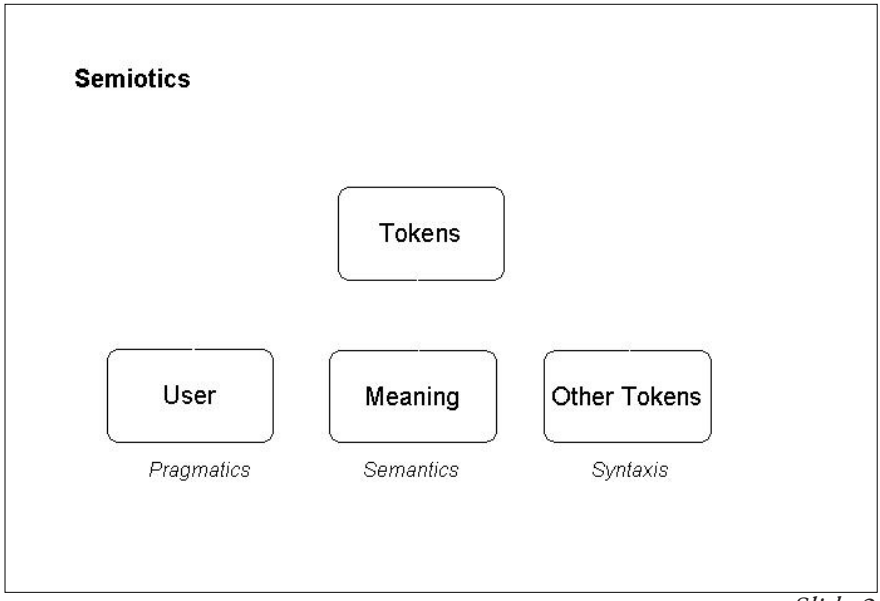
At the level of the drafter things are difficult. Because it is difficult many rules tend to show loopholes, complexities that should not be there. Then, as far as the consumer of legal texts is concerned, we simply have to acknowledge the fact that they note that regulations are

not custom-made for their specific goals. Any party involved have to search their way through the regulation. So it is difficult for parties involved to see what is relevant for them, because often the national regulation is of a broader nature.

In addition, as I said, the logic of rules is often difficult to follow, because it is full with true logical issues like the inclusive "or" and the exclusive "or"; you must understand these "ors", and "ands", and "ifs", and "nots". You must go through this as a reader, which is extremely difficult for most of us. It needs that you have an intellectual capacity of some strength to get through all this complex texts.

So the logic is difficult to follow, and finally, when people are forced to go through these legal texts, they tend to simply go for their own route. They try to see it as they see it, and they see of course their own interest, and they interpret things according to their own interest. That creates a melting point of difficulties and interpretations, which as soon as you start discussing how rules affect in real life – create all sorts of really complicated discussions, very often too difficult to handle at the short time you are around the table. That is the trick: you have to show clarity in a short time to come to quick conclusions.

What should we do to create a more appealing way of dealing with complex text? I will show you.



Slide 2

In the language science semiotics there is a particular attention to what is called the tokens that make a language as it is. It is the individual letters and all the individual things that make a language to a language. Language scientists tend to distinguish in the discipline various fields of orientation. One relates to what the *user* of the language actually does. It relates to the pragmatic aspect of language. I call this the *pragmatics* because the language scientists call it the so.

Then it is another field of interest, the *semantics,* that relates to what is actually meant by the individual words and phrases – what do we mean with the wording and phraseology etc. And finally there is the field of interest of the *syntaxis,* that relates to the logic of elements of language, the logical relationships of elements of language to other elements of language, while we are not looking to the content of these elements. That is, we are not looking at what is actually meant but at the true logic of different parts of the language.

Now, there are these particular fields, the pragmatic and the semantic sides of language that is the preoccupation of a great deal of lawyers. Lawyers like to address anybody who comes to them with stories about what is actually meant by certain phrases and certain cases, they are often completely focused in the field of interpretation. Similarly, with the pragmatics of legal language. In the Netherlands we tend to say: ”This is a rule of law but we don’t put it to activation any more, so it is virtually a dead part of law”.

So pragmatics is important, semantics is important, but the real brain-breaker is the syntax of a regulation. We tend to create regulations that are complex indeed, which are full of ifs, yes, ands, ors etc. So it is that particular area, the domain of logic, which is intellectually difficult to handle, and lawyers don’t tend to talk of it. This is a really very sensitive field that we have tried to address when we created this new software. It is based on a technology called decision-table. We now call it the knowledge table.

Structure of a Knowledge Table

Condition Stub Condition Space

order handling						
C1	credit limit	exceeded			not exceeded	
C2	important customer	yes		no	-	
C3	sufficiency in stock	yes	no	-	yes	no
A1	order handling	deliver	in back order	refuse	deliver	in back order
		R1	R2	R3	R4	R5

Action Stub Action Space

Slide 3

We will look at this particular exhibit in a conceptual manner. We will not go into detail about the content, but touch at conceptual issue of this particular condition table.

An example: What you see at slide 3 is that a rule can be broken down into what we call conditions – C1, C2, C3 – and actions – A1. The nature of a legal structure is that a certain set of conditions in a particular relationship always has to relate to certain actions. So in a legal structure we get to a conclusive result.

A condition – it is called credit limit – is described in C1. It can take all forms and shapes. The values related to this condition is exceeded or not exceeded. If it is exceeded and another condition (C2) relates to that, e.g. "important customer" , and if the value is "yes – important customer", and another condition is "not sufficiency in stock" (C3), the action is that we put the order back.

We can write all this down in ordinary language, and that is what we tend to do in the normal approach. In the massive amount of regulations we write everything down in ordinary language, and we express in ordinary language an enormous domain of text, saying "exceeded", "not exceeded", "yes", "no", "important customer", "yes", "no" – and the effect of that is that the reader is brought in a position where he has to read all sort of things that might not be relevant to him. The

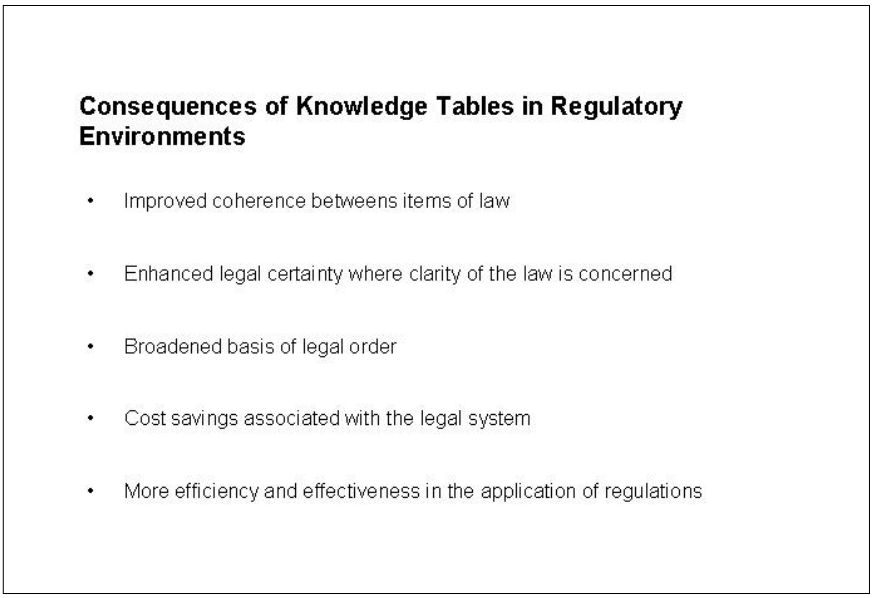
reader wants to say: "I have not exceeded the credit limit and the important customer question is not relevant to me; there is sufficiency in stock". Yet we load him with all the information. And we do this again and again. The complexity of conditions, variations, values have been described in these terms and it can not be remembered in the mind. There has been done research on this by Nobel prize winners trying to understand how many variables that can actually be handled in the mind, and it is a very limited number.

So what we ask people to do all over the world is that there is an enormous size of articles and regulations, but please understand it all. We give them the information and people are presumed to understand it. They try, and they might understand it finally for today, but if they have slept two or three nights it is very difficult to recall all the information of that particular regulation. You have to try again and again. This is a complicating factor and it puts off an enormous amount of readers because it is simply too complicated. Not because people can not talk about the interpretation of words; they like to talk about semantics and the particular situation they are in. They like to discuss such things with lawyers. But they get totally confused when they are brought into the domain of syntax of legal text.

And so in fact we create an enormous distance between the ordinary citizens and lawmakers. And we keep on going by producing regulations based on the hypothesis that we all understand it. Which is not true.

So we have to work on other means. In fact we have to work with tables. Not in all cases, but in cases that are of administrative and complex nature where we have to say "do this; yes or no". It is hopeful to analyse legal information system in a proactive manner on the basis of this type of knowledge tables. If you do that, it is very easy to see for every layman how things relate to each other. If you show this, as in Slide 3, you can say: In this particular case the credit limit was exceeded and you are not an important customer, so the reason why we refuse the order handling has to do with that. He can understand that he falls in that particular category. So if he wants to have a delivery nonetheless he has to be an important customer. And he simply knows what to do, because he can see it. It is very easy to say that he is in the domain of C2/R3. And all around the table can discuss C2/R3. But it is very difficult to discuss this with a full text in front of us, trying to

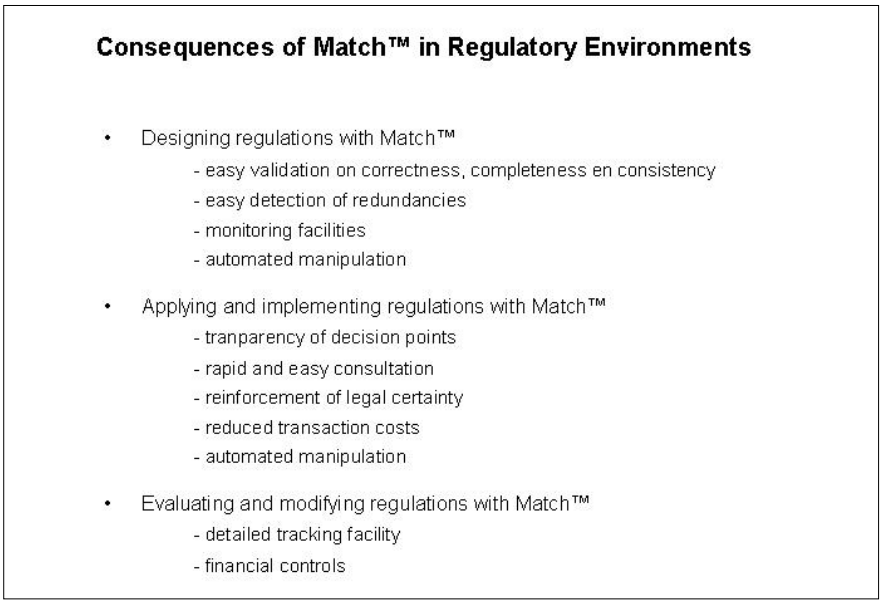
analyse the complexities of the full legal text profiles, that are provided by rule-makers.



Slide 4

So if you create these kinds of tables proactively when you create the rules, it has been claimed by us in all sorts of ways, scientifically and otherwise, that it improves the coherence between the items of law. The items of law are partly shown by the table, but can also be related to other tables, sub-tables or via your system with other particular elements of legal documents. So it improves the coherence between items of law.

It also creates a further legal certainty when the clarity of law is into play. The decision table somehow comforts people who read it, because they know what it is talking about. It creates some certainty that people are looking for. And because of that, it has been claimed by us, it broadens the base of legal order. People can more easily get to grip with things. Moreover it is a cost-saving device. As you saw in Slide 3, if you very quickly can understand why you are refused, and don't have to read the whole regulation over and over again, things are easier. And scientific research on that has been done, approving that taking notes on the decision-table more quickly relates to a correct answer than if you would work on ordinary legal text profiles.



Slide 5

So there is a cost-saving device, because it has been claimed by Ronald Coase that about 45 percent of the total cost of organisations are related to what is called *transaction* costs. That is costs that relate to searching information and digesting information. So an enormous amount of cost relates to finding out what you have to do. And if you do this there is more efficiency and effectiveness in the application of regulations.

We will leave the details to questions later.

All in all, there are great advantages to be gained that relates to an easy validation on the correctness, completeness and consistency of rules that is very interesting, because these types of decision tables can easily show the loopholes in rules and regulations which are not immediately apparent when you read the ordinary text profiles. There is also an easy detecting of redundant elements in legal texts, as they show up when you are creating these tables. If you do it in an automated fashion you also have the element of monitoring how often decisions rules are actually being read by users. So you can very well know at a certain stage that you need changes in your organisation or in your legislation.

If for instance you create a legislation that looks like this (Slide 3) and you find by automated tracking analysis that, say, 80 percent of

the issues relate to the ”Not exceeded” block, you might decide that there is no need for some of the rest, although it has been designed as part of a regulation. These things happen. One example: There was once a very complex regulation and the Council of State simply decided that it would like to know how many people actually were addressed by that regulation. They could not find any person that were addressed by it. The regulation was sprung up by a policy division unit that felt that there was an issue that had to be dealt with. This is what can happen when you create rules, because rules creating is a dynamic process in itself, and if you handle rules proactively in a automated and disciplined fashion with document analysis, you can well know what you are effectively doing with the regulation.

So in the designing there is a lot to be gained if you use this methodology. The same accounts for the application – I am not going back to show you that particular decision table, but if you look at it in a conceptional manner you can easily see that it is a strong transparency of decision points, it is easily to consult immediately, and you can immediately have a discussion about it. Again, for the readers that reinforce legal certainty, it reduces costs for the people concerned, not only for the government but also for the people that have to read all the stuff. And, in an automated fashion everything goes much quicker than that.

If you have done this proactively, then also the evaluation and modifying of regulation comes very easy. But again, you must have proactively worked on it to evaluate such regulations, and you can for every decision rule decide what it cost you. So in a more advanced manner you can simply decide that if this is all “yes – deliver” you can simply tag money to this. You can see that decision rule 1, if this comes true, will cost you this amount of money. And you can automatically understand whether you are going over budget or under budget.

These financial controls can be very helpful indeed in the area of organisational redesign of your own business or organisation or legal structure or legal department.

In fact, we have explored an area which you could say – it is not information-oriented any more but is knowledge-oriented. It is proactively stripping down and lining up every little detail of a regulation that is made in a particular manner, so that people who need information for their own specific circumstance, they can immediately track it down for their own specific position, and in the same time pre-

vent that they are overloaded with information that is not relevant to them. The approach that relates to knowledge management has been discovered also in other areas of discipline. What Knowledge Economies tries to do is to help, to step over from information society to knowledge-base society, by providing tools and make available tools that can be used by everybody, in order to make an immediate handshake with the knowledge world that is in head of us. That is an enormous difference with the type of life that we are living right now, which gives us an enormous amount of information that we do not want to have.

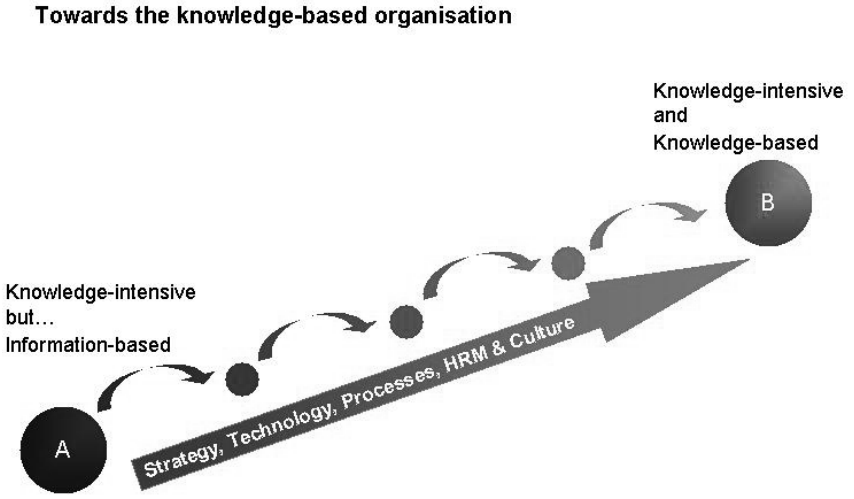
Professor Larry Lucardie, Knowledge Economies:

Reynier Overhoff told you that we are moving into a new economy, the knowledge economy. It is quite different from the information economy. Thirty years ago it was said that information was the key issue for an organisation. One of the main goals for every organisation was to have information available for everyone. But know when we are in the knowledge economy things are quite different. Information is not the solution, it is the problem. If you calculate how much it cost to produce information and to use it, you come out with very high figures.

We are moving into a knowledge economy. It doesn't matter what kind of organisation you discuss. Everyone says that knowledge is important but the question is: What is knowledge, and in what way is it different from information?

What Knowledge Economies tries to do is to *reduce* information. There are some processes in the world that leads to more complexity, and complexity means that you need knowledge to master the complexity. What we are seeing is that organisations are getting knowledge intensive. Knowledge intensive means that you need knowledge to accomplish your goals. What we see is that when they are getting knowledge intensive they still are information based. Which means that the primary processes are based on production and use of large amounts of information, not knowledge.

Knowledge Economies tries to help companies to get knowledge based. They are knowledge intensive, but we help them to get knowledge-based (slide 6).



Slide 6

One of the differences between an information-based and a knowledge-based organisation is that if I give someone a document and tell them to do something with the information in it to accomplish a task, then I work in an information based way. But when I give someone knowledge that can be used immediately – which I will demonstrate – then we say it is a knowledge-based way of working.

There are many differences between working in an information-based and a knowledge-based way. What I see is that many large companies in the world are working in an information-based way. That creates many problems.

One of the problems is search. At least 3.3 percent of the time you have in a company is spent which searching. And why do you search? Because we have too much information. If you look at the websites of companies, or if you look at the Internet, you can work with search engines. You have to search because there is so much information. What we try to do is to reduce the information, without throwing away anything.

What is the relationship with regulations? In a regulation process, we design regulations and we use them. We are working in an information-based way. We produce too many regulations. The volume of

information in a law is often too large. We introduce our own complexities. I know that because society is getting more complex, we need complex regulations. People try to improve upon that to work in a knowledge-based way.

Reynier Overhoff told you about the complexity of regulations. What Knowledge Economies does is the following:

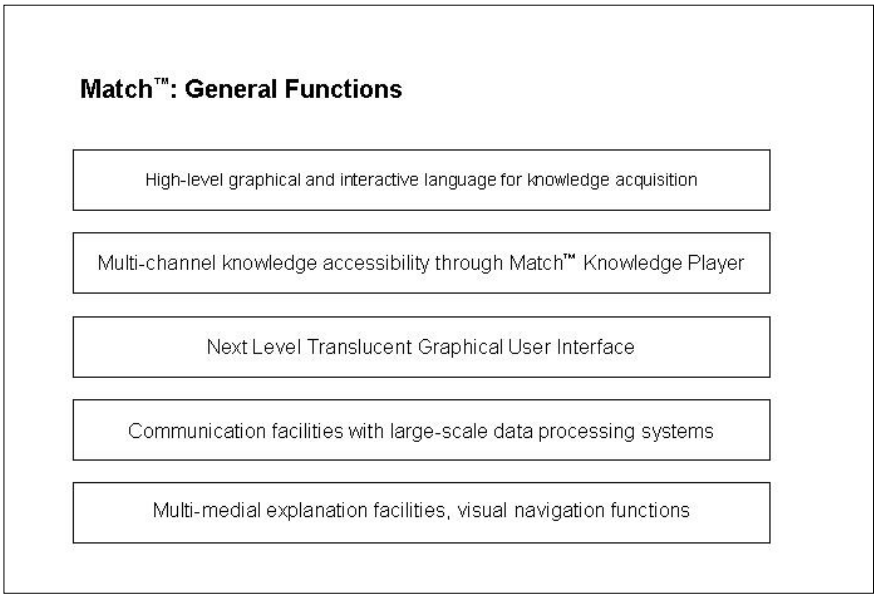
Some 15 years ago I was thinking about computer systems and about knowledge and their relationship. In that period it was very important to run the computers intelligent, to put knowledge in a computer system. I noticed from the literature that this was very difficult. In the 70s in the US many artificial intelligence companies were founded. They said that they could put one's knowledge and regulations into computer systems and then the computer systems would solve all the problems. All those companies went bankrupt. Later on researchers thought: What is the reason that it so difficult to make computer intelligent? At first they thought they needed more methodology, quicker computer systems, better tools. But the main problem was in the end, that we don't know the nature of knowledge. If you don't know the nature of knowledge it is very difficult to decide how to represent it. If you look to regulation we have the same problem. If you don't know the nature of regulations it is very difficult to represent them.

What we do as people is to store regulations partly in our heads. When we use regulations we use text. Why do we use text? Because we learned at school to write. But is text the best way to represent regulations? If you want to make decisions of that, we should know the nature of knowledge and the nature of regulations and use it to take care that we can represent knowledge and regulations in a nice way.

We have developed a theory on the nature of knowledge, a theory on the nature of regulations. From that theory we developed a system called Match. Match is a tool, but it is important to notice that behind the tool is a concept on the nature of knowledge that is foundation for the tool.

I am not now going to discuss the nature of knowledge. But I am going to discuss the tool Match, and describe it in the field of regulations management.

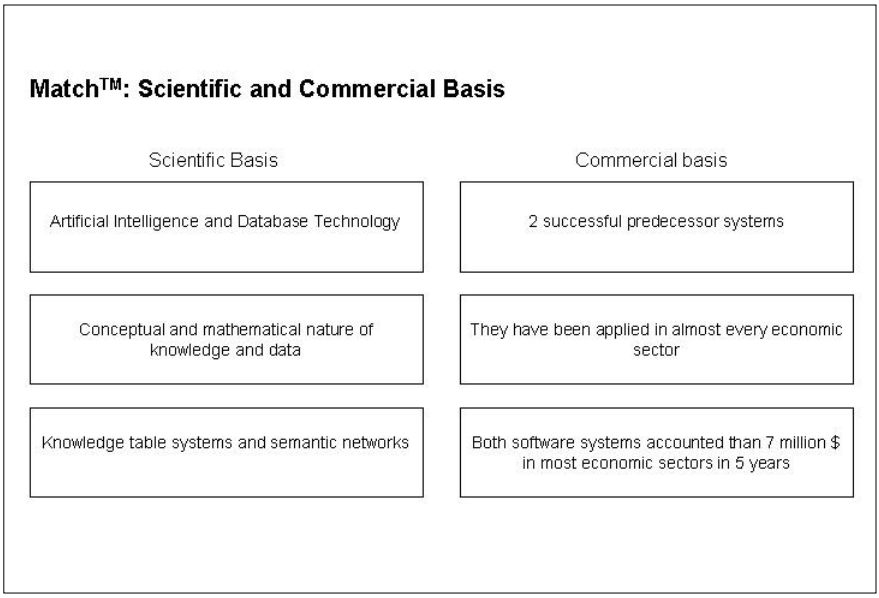
What Knowledge Economies first did was to develop a high-level of graphic and interactive language for knowledge acquisition. Why



Slide 7

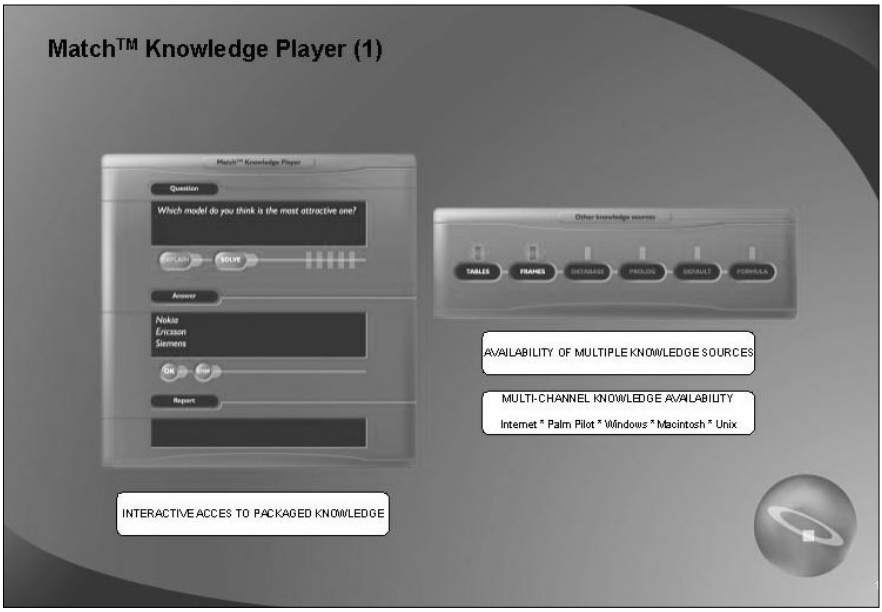
high-level? High-level means non-technical. If you represent knowledge or regulations in a technical way close to computer systems many people do not understand it. In the first project we did in the area of artificial intelligence, the knowledge of a client was written down in mathematical logic. It was too difficult for the client to understand regulations written in logical statements. In a same way it is true that understanding regulations written down in text is also very difficult.

So Knowledge Economies now work in a high-level graphical language, which is understandable by people in an interactive way. But if you put regulations in a system no-one can use it. If you put your knowledge into Match, then you have immediate access to the regulation without any programming. People say that if you develop regulations in a computer system you have to programme and validate, and each step consumes time and is error-prone. If you put some knowledge into Match, e.g. regulations, you can immediately use the regulations to the Knowledge Player.



Picture 10

Some efforts was put in the user interface, some communication facilities were developed, and also important, some explanation facilities for people who have questions when using regulations. Match was developed this year. But Match is based on two other successful systems. Some scientific research was also done, mainly in the area of artificial intelligence and data-base technology. Knowledge Economies was interested in what knowledge is – what is it someone has when we say he has knowledge? So we developed a nature of knowledge. And then it appeared that there was no real difference between what we call knowledge now and data. Knowledge and data are closely related, and it is very strange that people make difference between data-base systems and expert systems or knowledge-based systems. If you look at the mathematical or conceptual nature of what a system does, there is no real difference. Knowledge Economies did some research in the creation of artificial intelligence and data-base systems. There is a lot of knowledge in data-base systems. Often it is buried and you can not see it transparently. The research was done in the conceptual area, the mathematical area and knowledge-table system and semantic networks.



Slide 9 – User interface

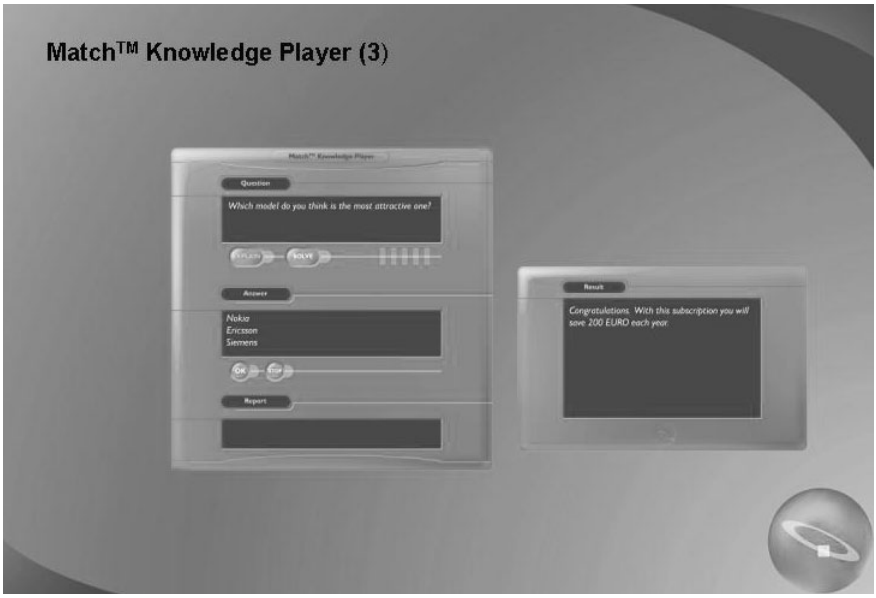
What is important if you do something with regulations, is that the design of a regulation is transparent and clear. The same is true for knowledge. You can do many things with knowledge – you can acquire it, you can represent it, but the main thing is, can you use it? If you can't use it every step before is superfluous. So we developed a system within Match which is usable immediately, which is called the Knowledge Player.

The system helps you with questions and the answers are here in the Answes box. You can chose an answer and the system gives you some reports in the Reports box. You have also the possibility to use other knowledge resources. Suppose you don't know the answer. Then you can push the "solve" button, and the system uses another knowledge source. The main thing is that the user doesn't have to do anything, or at least as little as possible. Just use the knowledge, the regulations for your own purpose.

Slide 10

Above is another picture of the Knowledge Player. You can see the explanation facilities – we can use pictures. If people don't know the answer to a question you can push "explain" and have a picture or a text or a film to help you to find an answer.

The system is goal-oriented. One of the problems of regulations is that regulations are designed in a way that is not goal-oriented. I mean several things with this. One thing is that in regulations, goals and conditions are confused. If you read a regulation, a peace of text, it is very difficult to find a goal in it and then find the variables, the conditions, which should lead to the goal. You can solve the problem in a simple way for instance in putting the goals at the left part of the paper and the conditions at the right. That can improve the text.



Slide 11 – Result window

When you reach a goal a special window comes up, the result window, and it says what you should do.

The Knowledge Player runs on the Internet, Windows, Mac, Unix, it is multi-platform and within a few weeks also on PDAs, Personal Digital Assistants.

Dr Lucardie then made a presentation at his computer. We have tried to render this representation below.

The system is called Match, because you can you view knowledge as a competence to Match. We have two Match systems, one is Match Development and the other is Match Knowledge Player. With Match Development you can do anything, you can represent knowledge, represent regulations and you can use them to the Knowledge Player. If you have the Knowledge Player you can only consult the regulations, you can not see it and you can not change it. Often in companies they work with one or two Match Developers, but many people work with the Knowledge Player, because they don't want to see the knowledge but only use it.

Structure of a Knowledge Table

Condition Stub Condition Space

order handling						
C1	credit limit	exceeded			not exceeded	
C2	important customer	yes		no	-	
C3	sufficiency in stock	yes	no	-	yes	no
A1	order handling	deliver	in back order	refuse	deliver	in back order
		R1	R2	R3	R4	R5

Action Stub Action Space

Slide 12

We will now make a small knowledge base. Then you can see how you can ensure the knowledge and how you can use it and modify it quickly.

The whole story started with the theory of the nature of knowledge. From the theory of knowledge it appears that there are several types of knowledge, and if you want to represent the knowledge very transparently you would have to have several knowledge representation techniques. We use knowledge table systems. We use frames and we also use some logic to represent the knowledge. Tables are very clear and high-level, and so are frames, but logic is more low-level and difficult to understand for people. The reason why we did this is that if you represent some knowledge you should be able to use it immediately. So we tried to reduce the number of steps which generate a lot of advantages.

If you construct a table you have to start at A1, which means Action. I told you about the problems of information. One of the problems is that we don't work in an action-oriented way. If you say "what are our goals, what are our actions" you work in a different way. If you design regulations in that way, your regulations will be smaller and more clear. This system enforces you to work first with actions.

You have the action ("order handling"). In a knowledge acquisition

sessions you ask your client: “if order handling is your goal, what then do you need to realise that goal?” If he/she says, for instance: “If an order comes in, we look to the credit limit of the client”, then I type in “credit limit” as a condition (C1). Then the client says to me: “I always also look to the importance of the client”. Then I type that in as a condition (C2). The client can also say: “I look to the stock” (C3).

You proceed with the acquisition sessions. You say: “You said to us: credit limit is important when realising order handling. But in what way?” The client may say: “The credit limit can be exceeded, and the client may be important”, yes or no. And the stock can be sufficient or not sufficient.

Then you ask: “Suppose that the credit limit is exceeded, suppose that the client is important and that the stock is sufficient. What then do you do with the order handling?” “In that case”, the client may say, “we deliver”. “Supposed that the credit limit is exceeded, the client is important, and the stock is not sufficient”. “In that case”, the client says, “I can’t deliver. I have to put the order in an back-order procedure”.

If you work with clients in this way they are surprised by the speed with which you can draw something on the screen. But that doesn’t mean that this is correct, so we continue the discussion with them. They may say: “If the credit limit is exceeded, and the client is not important, and the stock is sufficient, we don’t deliver, our policy is then to refuse, and also rule 4 is incorrect, it should also be ‘refuse’”.

Often when you do this, it gives rise to many discussions, because people may tell us something counter to what their experts has told us, or counter to their own flow-charts, or documents, or regulations. They may say: “No this is wrong, because if the credit limit is exceeded, which is negative, and the client is not important, then we don’t deliver. So it should be ‘refuse’”. What is happening is that they correct themselves. The reason is that when the knowledge or regulation is put in such a table, people seem to understand better what the knowledge is. They see the knowledge instead of a text. People feel that this is more transparent, and therefore they can modify it easily. They can se that this is right and this is wrong.

Suppose you don’t have the knowledge but have to use it. By using “consult” the Knowledge Player comes up. The system asks me “credit limit?” and you answer “credit limit exceeded”. Then the system asks

"important client?", and you answer "yes"; "enough in stock?" and you answer "sufficient". The system then says "the goal order handling has been reached successfully"; "order handling: deliver". I know then that I have to deliver. You don't have the knowledge but I can use it. The same is true for regulations; You don't have to understand the regulations but you can apply them because the Knowledge Player helps you with this.

You can be doubtful this is a good result. You can therefore ask the system: "How did you reach this conclusion?". The system answers: "Order handling, that was your goal, is deliver. Credit limit is exceeded, client is important, and stock is sufficient". You see here that the answers – exceeded, yes and sufficient – are in red, which means that the user got the answer.

If you go back to the table, you can do a number of things. What can be interesting is this. If you design a regulation it can be very smart to be able to change the conditions in a law, because changing the conditions can reduce the law, sometimes with 30 percent. Suppose you do this. You select a condition, then you move around with the condition – "Stock", which was the third condition is now the second one. That can make a major difference how large your regulation will be. You can do this – "optimise" – and the system comes back with six rules. You had eight. The system "sees" here that rule seven and rule eight have the same conclusion: back order. The difference between rule seven and rule eight is "important client". Rule seven says that "important client" is "yes" while eight says "no". That is the difference between rules seven and eight, but the conclusion is the same. So the difference is irrelevant and the system can optimise from eight to six rules.

If you take up "stock", bring it back, and optimise, the system comes back with five rules instead of six. You can play around with the conditions to see what is the most efficient regulation if you look to the number of rules. Less rules are not always better; sometimes you need more rules because of transparency. But you can save rules just by playing with the order of conditions. If you ask a legal expert to do it with the text it will take him a few weeks. If you have a table of eight conditions it can be a rather difficult job that can take a few months. If you look to rule four – "if the credit limit is not exceeded and the stock is sufficient, then we deliver" – important client is not relevant

any more. If you look to this table we had eight rules and we now have five, that is maybe not so interesting. But what you should do with the regulations is the following. Suppose that it is difficult to determine whether a client is important or not. Then you can click here and create a sub-table for "important client", meaning that you are going to define "important client" and construct a new table. Suppose this table has four rules, and this one has originally eight rules. Then you have thirty-two rules. But after reduction you have only twenty. So we threw away twelve rules. In rather complex systems you can save maybe a million rules just by optimising. When you have a table structure the saving of rules can be enormous.

How can you apply this on regulations? One way to apply it is that you don't develop regulations in text but in this kind of tables, and then you write the text. What we did sometimes was to take a legal text, put it in a table structure, and then wrote a new legal text. The result sometimes was that the new text was seven times smaller. Without throwing away any knowledge.

One of the reasons why texts can be difficult for people is this. Here is a very small table. The table defines the case in which a customer is important. What you see is that if you look to the conditions, we have two of them: the ration of the account, and the turnover of the client. They determine if the client is important or not. If the ration of the account is lower or equal to one, then we use this categorisation of turnover: fifty, smaller or equal to fifty, or larger than fifty. But if the ration of the account is larger than one, then we use for turnover this categorisation. Scientists call this *conceptual interactio*n, which means that a classification of a variable is dependent of the classification of another variable. We noticed from our research that people have difficulties with this. Conceptual interaction occurs much in regulations. Suppose we have a client for which the duration of the account is less than one year, and a turnover of 75, then we conclude that that client is important. Remember that the client has a turnover of 75. Suppose that a few weeks later another client comes in with the same turnover of 75. People then has a tendency to conclude that it is an important customer because we had one with the same turnover that was. But if the duration of the new client is two years the turnover is 75, smaller than 100, we have to conclude no. We can see that conceptual interaction between two variables are very difficult to manage. Suppose

that you have conceptual interaction between three or four variables, and you write it down in a text. You can see that the text is very complex. When you read the text you think you understand it, but look away from the text you don't understand it. Or you read the text, you think you understand it, you make a decision, you read further and then the word "unless" is there: "this is valid unless". These kind of difficulties can be circumvented by using e.g. such a knowledge table.

Sometimes people say: This is so simple; you look to this and this and then you know that. Can you for instance with inclusive 'ors' or exclusive 'ors'? We noticed that if you have inclusive 'ors' or exclusive 'ors' in a text, you can easily transform them into these kinds of structures.

Another important thing: we talked about transparency of regulations. But transparency is not limited to one table but also to more tables with relationships. Here we have the table Order handling. If we click this away we have got the other table. But you only have to focus on one table. If both tables are correct, the whole system is correct. It is much easier to value that.

If you look how a system can look like in reality:

Maybe you don't believe me when I say that this is the knowledge structure of a peace of regulation of a bank. If you look to how they have the regulations now, it is a thick report of 62 pages, in which the same knowledge is, as in this system. This system has even more knowledge than the report. It took four or five months to develop the report. But if you work in an information-based way; the report of 62 pages is expensive to produce and you can probably reduce the report to 15 or 20 pages, at least. You have to rethink this, because the production of the information took a lot of time. You have many groups that should read you report, but it is difficult to read, working with flowcharts and text. But if you look to this it is a whole system. It is complex for instance if you look to this table.

You can see it is a large table. I think even that it is too large. It is not allowed to have large tables but I just did the same as they did in the report. I think this is more or less optimal but may give you some possibilities to work with this, you can e.g. do this:

You can make it smaller so that you can view everything you want. This is a large system. The difference also between the report they have and Match is that Match works already. You can ask the Knowledge

Player to work with it and the system comes with questions, conclusions, etc, and display facilities. You can see that this is more a knowledge-based way of working. You can quickly produce the knowledge, you can throw away superfluous elements, you can use it immediately, and it is transparent. If you read the report it would take a week to understand it. Here you can click, study the tables, see the structure and even simplify it, if you are not interested in something. Or if it is very interesting you can do this:

Question: It would be interesting if you could elaborate just a bit on the supporting a system for conceptual interactions. I'm thinking of to what extent do you support the handling of vague concepts commonly occurring in legal texts? It is one thing if you have vagueness and that kinds to be answered with yes or no, or more or less. But in for distinctions between special reasons, specific reasons, reasonable level of living etc. Do you have any embedded fuzzy logic support?

Answer: There are sorts of fuzziness. One type of fuzziness is created by ourselves in the sense that we don't know the knowledge really well, and that creates fussiness. In the Netherlands we had a big problem with the concept of student. What is a student? The information system couldn't decide which student could get a scholarship and which couldn't. What happened was that each university had its own definition of student, and the Ministry of education had another. They mixed that into an average concept "student" so it became fuzzy. That fuzziness could be disentangled by a better knowledge model, taking care that the goal of the Ministry is to have a closed budget while the goal of a university is to have as many students as possible.

Another type of fuzziness is when you talk of terms as "reasonable", which are also in law, and which are functional terms that are not determined because people have to decide on what is reasonable. If that knowledge can not be formalised you can have the system mention a person which can be consulted.

Morphological Analysis: a general method for non-quantified modelling

Dr. Tom Ritchey, National Defence Research Agency (FOI)

FOI does research in non-quantified modelling, with special emphasis on a method called general morphology or general morphological analysis. Although we have utilised general morphology in some 40 projects during the past 8 years, we have not yet applied it in a legal context.

What is general morphology? The term morphology comes from classical Greek (morphe) and means shape or form. Thus morphology is "the study of form or pattern", i.e. the shape and arrangement of parts of an object, and how these parts "conform" to create a whole or Gestalt. The "objects" in question can be physical objects (e.g. an organism, an anatomy, a geography or an ecology) or mental objects (e.g. word forms, concepts or systems of ideas).

Specific forms of morphological analysis are used in a number of scientific disciplines – for instance, linguistics, zoology and geology – in which formal, structural relationships are more important than quantity as such.

However, what I am presenting today is "general morphology" – i.e. morphological analysis that is not associated to any specific discipline. I might add that Match – the technique which you heard about earlier – uses a special, restricted form of morphology called typology analysis. I will return to this shortly.

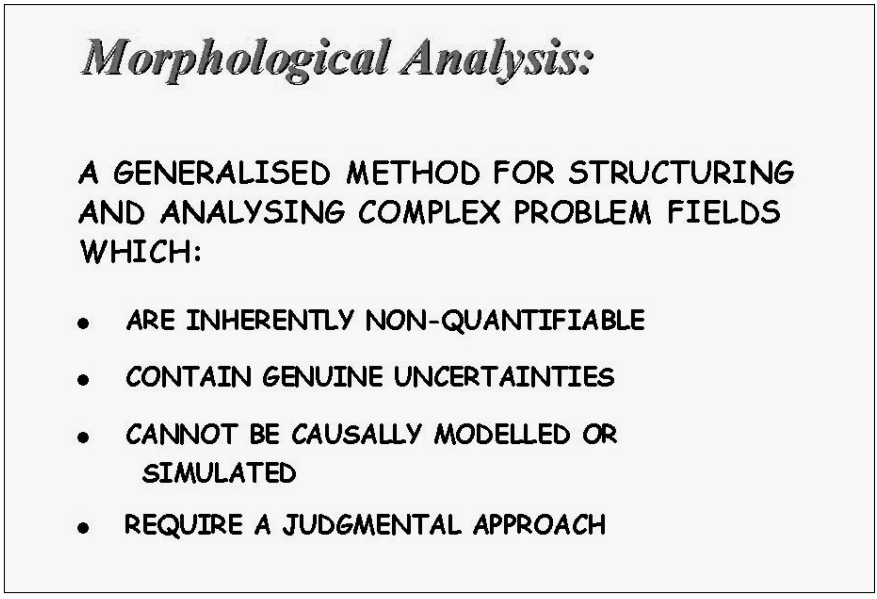
How did FOI's program begin? General morphology was not a wide-spread concept ten years ago. But then something happened that was very significant: the end of the cold war. FOI has traditionally worked with long-term planning and scenario development for the Swedish Armed Forces and Ministry of Defence. With the end of the cold war, military and international security policy issues became increasingly uncertain, and the threat spectrum broadened. At this point,

FOI was called upon by the Ministry of Defence to develop a method, and hopefully an analytic tool, to help with long-term planning in an increasing uncertain world.

What was needed in this context was a methodological framework to help construct models of things you can't put numbers on – or, at least, things where quantity is not as important as form, relationships and concepts. So FOI started to develop an extended form of what is called typology analysis, in order to help the Swedish National Defence with non-quantified modelling.

Fritz Zwicky's typology generator

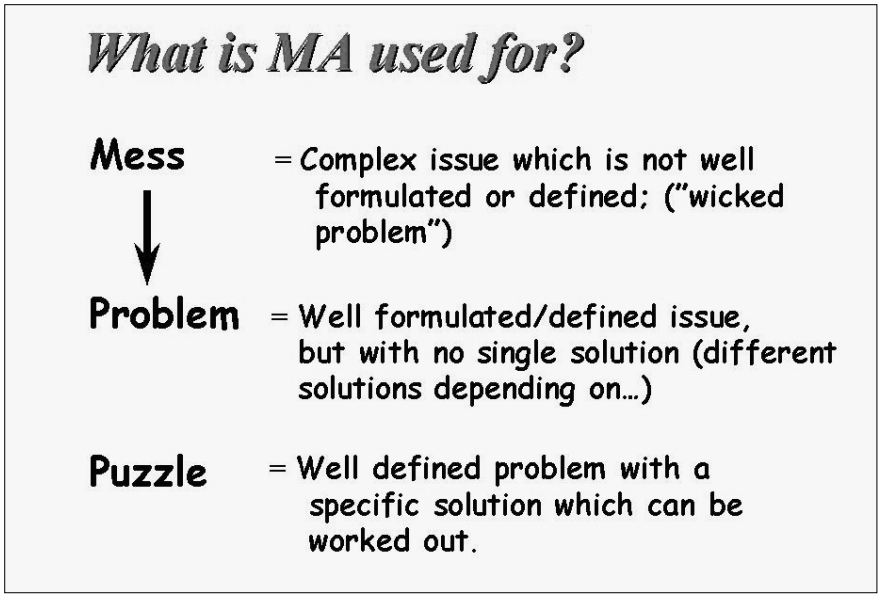
Initially, we thought we were doing something new -- but there is not much new under the sun. Extended typology analysis was invented as early as the 1930's by Fritz Zwicky, professor of astronomy at the California Institute of Technology – the famous Caltech in Pasadena. Most of you have probably never heard of Zwicky, but forty years ago he was a well know scientific personality. He coined the term super-nova, was the first to hypothesize the existence of neutron stars, and is regarded by many as being the father of the modern jet engine. He developed a general form of morphological analysis in order to – among other things – categorise and hypothesize new types of astrophysical objects, to develop jet and rocket propulsion systems, and to study the legal aspect of space travel. *Slide 1*



To summarise, MA is a general method for structuring and analysing complex problem fields which are 1) inherently non-quantifiable; 2) which contain non-resolvable uncertainties; and 3) which cannot be causally modelled or simulated. Instead, a judgemental approach must be taken. Fritz Zwicky's question was: can we put a judgemental approach – carried out in groups of subject specialists -- on a sound methodological and scientific basis? He thought that could be done with the non-quantified, but highly structured method of morphological analysis.

Messes, problems and puzzles

Before going into morphological analysis as such, it is a good idea to discuss what MA is good for, and what it is not good for. In the 1970's, a well know operational analyst named Russell Ackoff defined three levels of complex problems.



Slide 2

The first level he called a mess. A mess is a complex issue which is not yet have a well defined form or structure. When you have a mess, you don't even know for sure what the problem is yet. Here is an example of a mess, that our National Rescue Services Agency asked us to help

with some years ago: What are we going to do with the Swedish bomb shelter programme now that the cold war has ended? This is complex issue which concerns money, technology, ethics, politics, everything! And all of these different aspects must be treated together –and dealt with as a whole.

I would like to risk saying, that all of the really important issues in the world start out as messes. And all of us come into contact with messes on a daily basis.

The next level is what Ackoff calls a problem. This is an issue that does have a defined form or structure; it is dimensioned; it has variables and we know something about how these variables interact. But it does not have any one, single, clear-cut solution. As long it is a problem – in Ackoff's use of the term – it has many different, alternative solutions "depending on". Depending on, for example: how much money we have; what type of technology is going to be available; who is in political power; what the weather is going to be like? Since we may not know these things yet, we have to leave the problem's solution open to different hypotheses about how the future might turn out.

The last level is called a puzzle. A puzzle is a well-defined and well-structured problem with a specific solution that somebody can work out.

Morphological analysis was explicitly developed to work at the level of messes and problems. More specifically, MA is used to turn messes into problems. In the process, we build up a problem laboratory where we can generate different solutions depending on different hypothesized conditions. In a sense, we build a non-quantified input-output model: given A, B and C as input conditions, what do we have as an outcome or option space to work with?

Michael Pidd sums this up perfectly:

"One of the greatest mistakes that can be made when dealing with a mess is to carve off part of the mess, treat it as a problem and then solve it as a puzzle -- ignoring its links with other aspects of the mess."

(Pidd, M: *Tools for Thinking,* 1996)

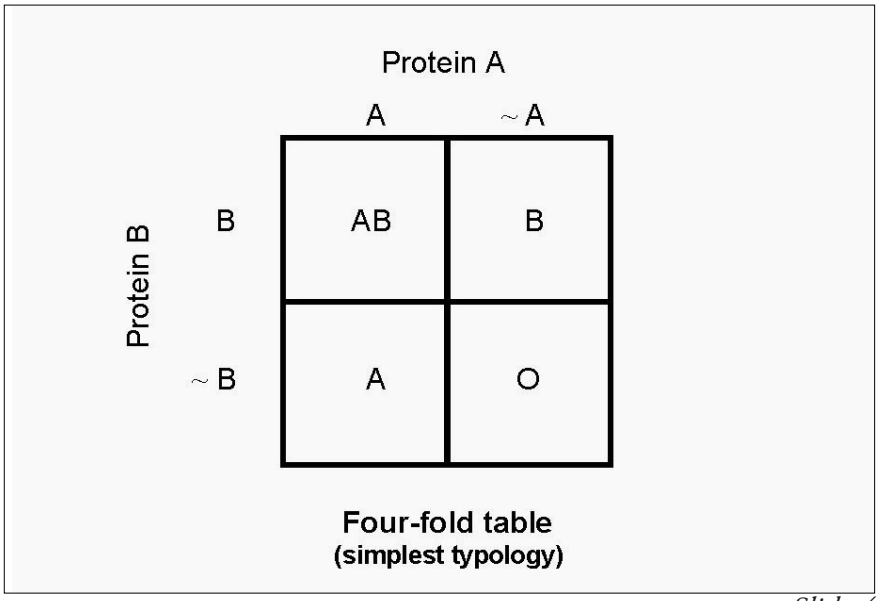
Slide 3

This type of mistake is made all the time, because we humans do not like to have to deal with messes for any length of time. Inherently, we are puzzle solvers. We want to get out of the mess as quickly as possible, and solve a puzzle. However, this can be devastating.

When we do morphological analysis, we want to define the whole mess first, stalk out its boundary values and study its possible internal relations – before going on to generate alternative solutions, and then to solve puzzles.

Typologies and morphologies

This figure (Slide 4, below) is called a fourfold table. When you get two simple variables – each one either yes or no – you put them together in a fourfold table and check out the possible combinations they produce. This is a fourfold table for Landsteiner's ABO blood-type system. In this system, you either have base substance A in your blood or not, and you either have base substance B or not. Four possible blood types are thus defined -- or hypothesized. At one extreme, if neither A or B is present, you have blood type 0, the universal donor. At the other extreme, if both are present, you have type AB – the universal receiver.



Slide 4

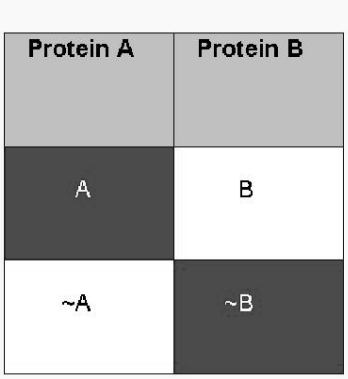
A four-fold table of this kind is the simplest form of a typology. A typology is simple model based on the possible combinations obtained between two or more variables, each variable containing a (finite) range of discrete values or conditions. Each of the possible combinations is called a constructed type.

Observe a few things about this typology. Like a little Cartesian coordinate system, it utilises (two) spatial dimensions – height and breadth – to represent the ranges of the two variables. A typology of this sort is the simplest possible form of a model. You may not think of it as model, but it is. It has inputs and outputs; and it gives you the possibility to hypothesize relationships and to generate theory.

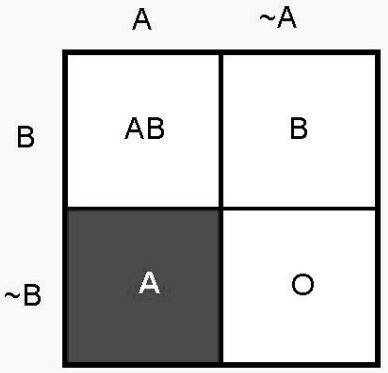
Protein A	Protein B
A	B
~A	~B

Slide 5

Here is the same model, but in the form of a morphological field instead. Here, you put your variables up at the top of the columns, and list their values underneath. So these are completely equivalent representations of blood-type A.



Morphological field

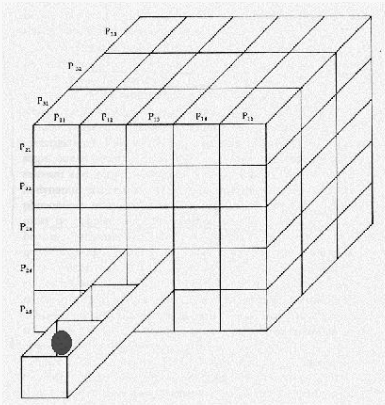


Four-fold table

Slide 6

Here is the point: As long as you are only working with two variables, typologies are fine. But what if you want to work with more than two variables? Remember: classical typologies use spatial dimensions to represent its ranges of values. What happens if you want a three-variable model?

The three-dimensional typological field to the right (below) is called the Zwicky box. Zwicky used it to demonstrate the advantages of morphological fields over classical typological fields. On the left is the corresponding, three-dimensional morphological field. Note that the blue cells in the morphological field represent the blue point in the x-, y- and z-axes in the typological box.



Zwicky Box

Parameter X	Parameter Y	Parameter Z
X1	Y1	Z1
X2	Y2	Z2
X3	Y3	Z3
X4	Y4	
X5	Y5	

3-dim morphological field

Slide 7

Four-dimensional fields (employing so-called embedded variables) are used in typology analysis, but this is about their effective limit. However, since morphological fields are not dependent in the same manner on spatial dimensions, then the models that they represent are not constrained to three or fours variables.

At FOI, we work with morphological fields of up to a dozen dimensions, and which may define one hundred thousand, a million, or tens of millions of different types or configurations.

Fritz Zwicky worked in the 30s, 40s and 50s when there were no computers. He died in 1974 and general morphology more or less died with him. Today, fast, small computers with advanced graphic interfaces have revolutionised morphological analysis. Now, computer support, we can develop complex, non-quantified models and scrutinize the many thousands of relationships in a timeframe that was impossible for Zwicky.

Morphological analysis: its use

We use MA primarily for developing scenario and strategy laboratories, for structuring and analysing policy spaces and for relating means and ends in operational planning. It is also excellent for carrying out so-called positional or stakeholder analysis – which is a necessary complement to cost-benefit analysis. Our clients include the Swedish Armed Forces and Ministry of Defence, the Swedish EPA and Ministry of the Environment, the National Rescue Services, the Swedish International Development Agency (SIDA), Columbia University and a number of large companies and international, non-governmental organisations.

For our part, we developed computer support for morphological analysis – the so-called MA/Casper process – with the following conditions in mind:

1. The method should be process and group oriented. In other words, it is the process that the subject specialist group goes through in doing morphology that is the most important thing, not what comes out of the computer.
2. It should be generic. MA is a general method for non-quantified modelling. It sets no specific preconditions on the working group. You start with a blank slate, and the group successively builds up a non-quantified model.
3. It should be transparent. There are no black boxes. All the cards are on the table. You cannot hide anything. Another way of saying this is:
4. It should leave an audit trail. You should be able to trace what you have done and how you have come to your conclusions. Although judgemental processes will never be as traceable as, for example, a mathematical proof, MA allows for as much traceability as is possible under such circumstances.

5. It should be easy to update. If we work with a complex problem area, and come back to our client a year later, and somebody says .. "a new dimension or variable has become important" .., we can build this new parameter into the prior work, without having to start from scratch.

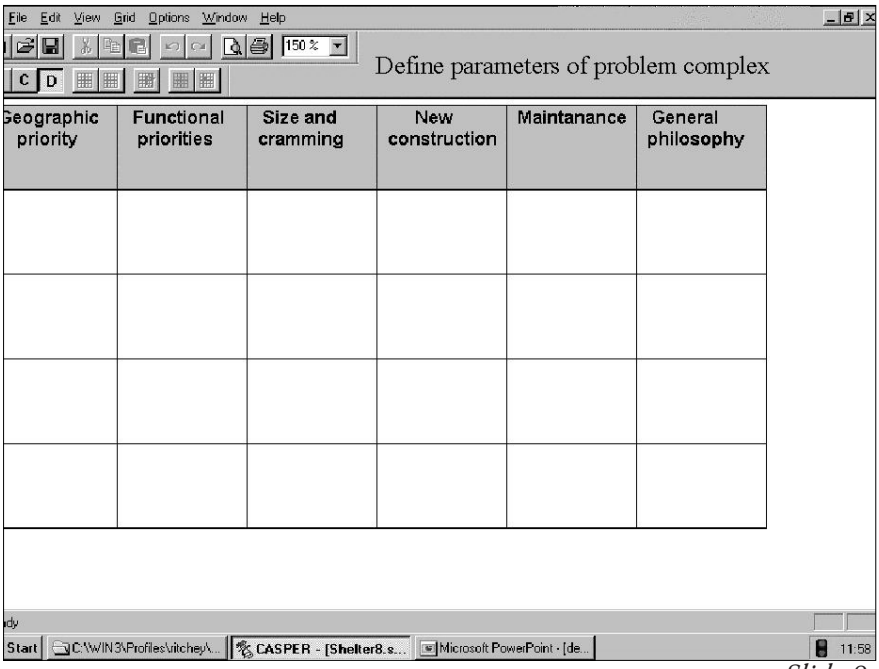
The process of morphological analysis

How do you do a morphological analysis? First, you have to have a mess to work with. The example that I am going to use for this presentation is the "bomb shelter mess" I mentioned earlier – What are we going to do with the Swedish bomb shelter programme, now that the cold war is over?

The second thing you need is a small group of subject specialists, no more than 5-7 people. Ideally, the group should be heterogeneous, representing different aspects of the issue involved. In the "shelter group", we engaged people representing financial, technical, political, military, security policy and ethical aspects of the issue.

A morphological analysis is carried out in a number of iterative steps, in which the subject specialist group continually moves back and forth in order to adjust and mould the steps to each other.

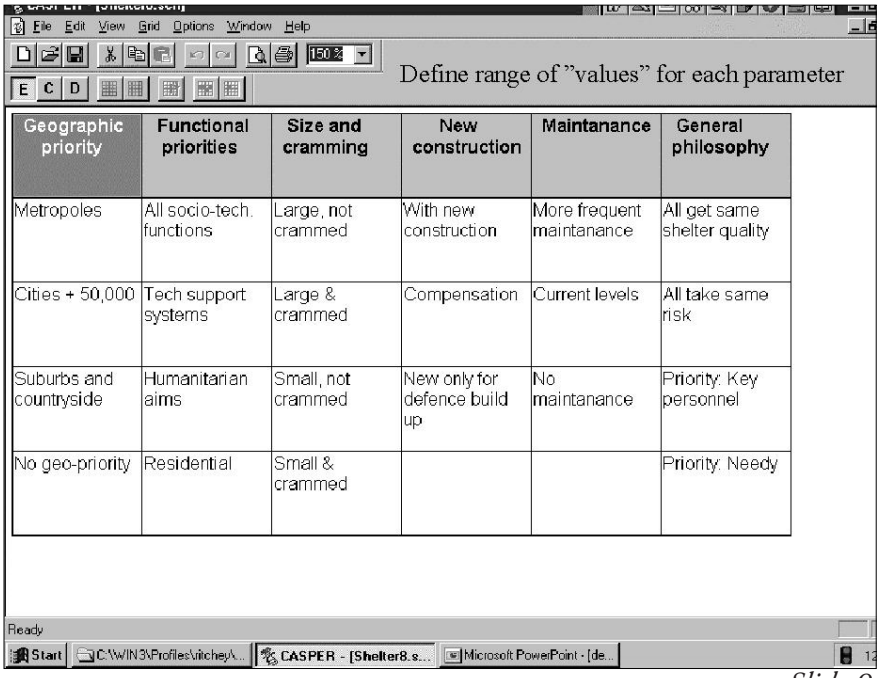
The first step is to define the primary parameters of the problem complex (slide 8, below). For instance, for the shelter issue: Where are we going to build shelters? Who and what do we actually shelter? Size and degree of cramming? What are we going to do with new construction and maintenance? Finally, what is the general philosophy behind the bomb shelter programme? (In reality there were more parameters than those shown here -- including economic and military parameters. But let us use these six parameters as an exercise example.)



Slide 8

Defining the primary parameters of a problem complex may seem relatively simple, but it certainly is not. We have carried out some 40 projects in morphology during the last 8-9 years. It takes a long time and a lot of discussion to agree upon the most important parameters. We have found, however, that 6-8 parameters – if chosen and moulded carefully – suffice to cover some 70-80% of even the most complex problem areas. If you want to converge on 100% coverage, however, you will need hundreds of parameters. So forget it!

The second step (slide 9, below): For each parameter, define a spectrum of values – or what we call conditions – which are alternative solutions to the particular issue that the parameter expresses. Sometimes this is a scale, as in "Geographical priority"; sometimes a complex binary combination such as "Size and degree of cramming"; sometimes small scenarios or idea-packages such as the four points under "Shelter philosophy". If you are working with a scale, start with the boundary values. In general, it is good practice to draw out the boundaries of the parameters as far as possible, and attempt to define the extreme limits of each variable.

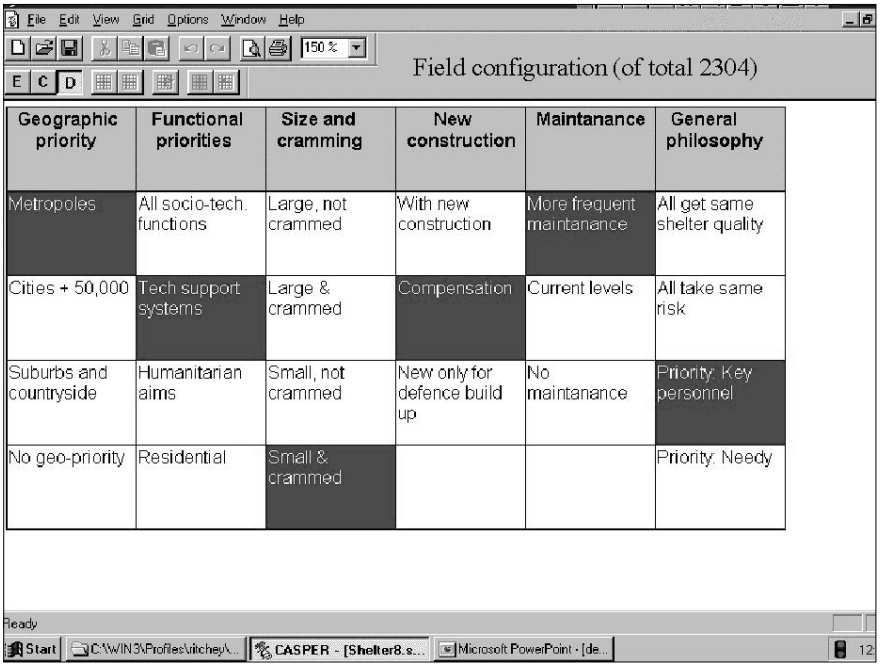


Geographic priority	Functional priorities	Size and cramming	New construction	Maintanance	General philosophy
Metropoles	All socio-tech. functions	Large, not crammed	With new construction	More frequent maintanance	All get same shelter quality
Cities + 50,000	Tech support systems	Large & crammed	Compensation	Current levels	All take same risk
Suburbs and countryside	Humanitarian aims	Small, not crammed	New only for defence build up	No maintanance	Priority: Key personnel
No geo-priority	Residential	Small & crammed			Priority: Needy

Slide 9

The totality of the parameters and their respective values is a morphological field. When you get a good field defined, the working group is really happy, because this represents your whole problem universe. It might be six variables or eight or ten. It is good to keep the field relatively small at the beginning. You can always expand it later.

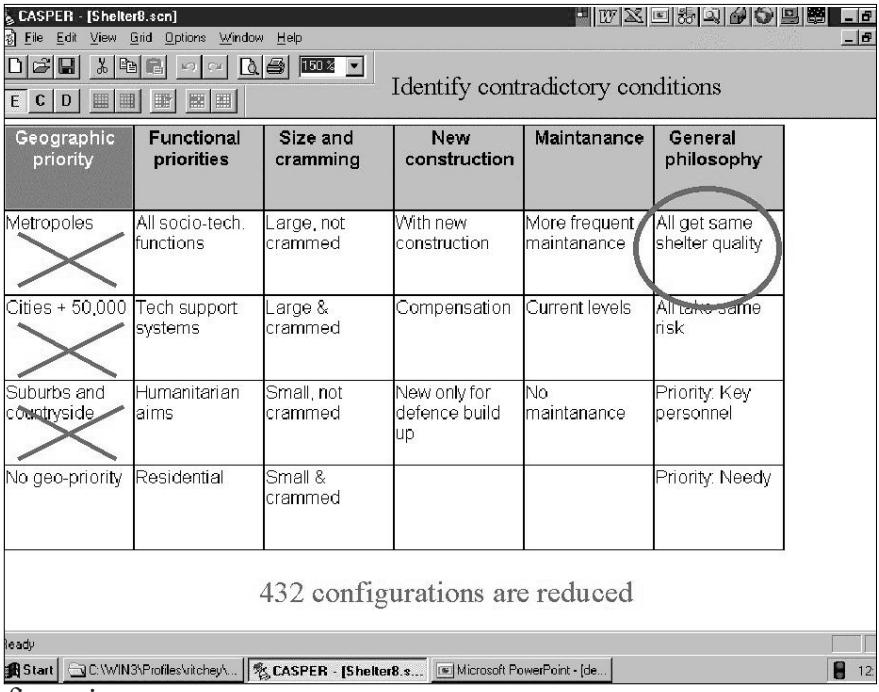
There is an enormous amount of potential information in a well developed morphological field, especially as concerns how the different parameter conditions are related to one another. Remember, this is not a table. It is a multi-dimensional configuration space. Within this space, we want to start defining configurations (corresponding to types in a typology), that is, combinations of conditions, which represent different formal solutions to the problem complex. For instance, here is one solution (shown in slide 10).



Slide 10

How many solutions or configurations are there in a morphological field? You simply multiply together the number of conditions under each parameter. In this case 4x4x4x3x3x4 = 2,304 possible configurations. This is a relatively small field. Normally, when we work with 6-8 parameter fields, we have hundreds of thousand or even millions of possible – formal – configurations. The point is, that there are far too many to look at and check by hand. Somehow, we must be able to reduce the number of configurations in a field, so that only those that meet certain criteria remain. The main criterion is, that a configuration be internally consistent, i.e. that is does not contain conditions that are mutually contradictory.

Take a look at slide 11(below). If everyone is going to have the "same shelter quality", then you cannot have any "geographical priority". This is a logical contradiction. Thus any configuration that contains any of these pairs of conditions can simply be thrown out. They are logically inconsistent. In this case, the field is reduced by 432 con-

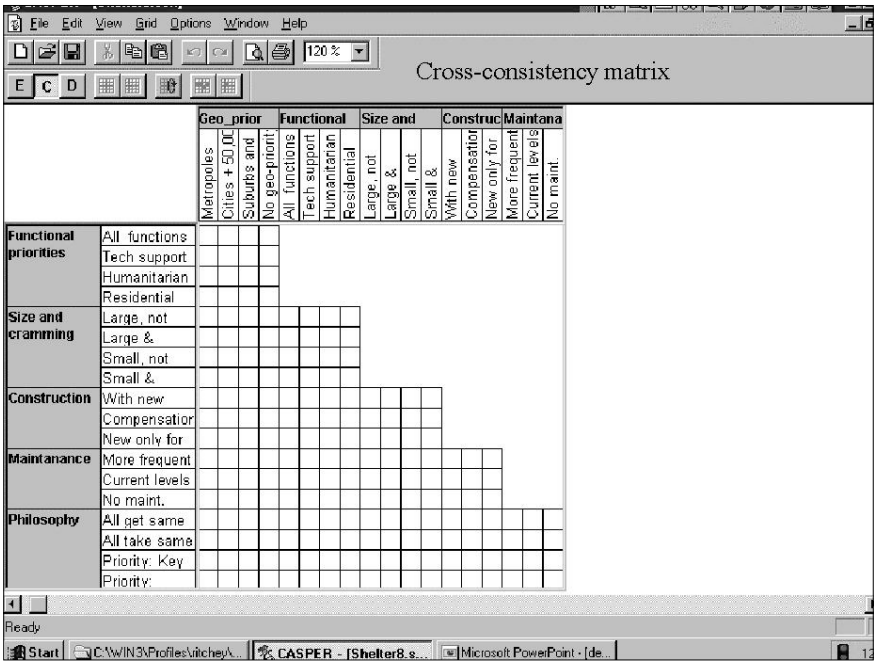


figurations.

Slide 11

How do you reduce the field? You do this by comparing each condition with every other condition, and asking the question: Can these two conditions coexist or not? This is done by constructing a cross-consistency matrix (below).

Classical morphological fields are full of contradictions, both logical and empirical, which must be weeded out. In fact, most morphological fields can be reduced by up to 90 or even 99 percent. We are thus left with a manageable number of configurations – i.e. solutions – to examine and work with.

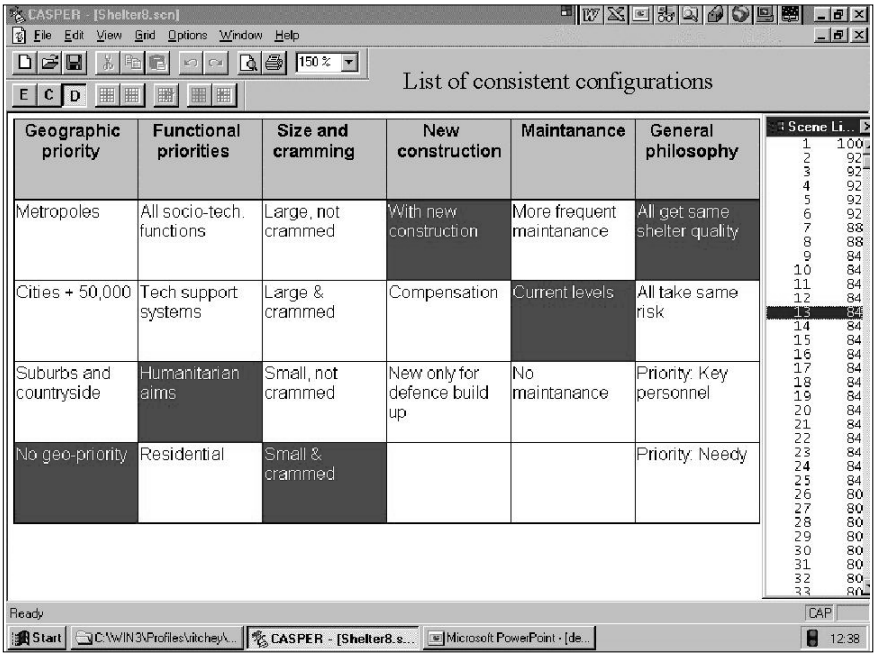


Slide 12

The cross-consistency assessment does three things. Firstly, it functions as a garbage detector. The garbage it detects is in the form of vague concepts, concepts with different meanings for different participants; different terms meaning the same thing, etc. When these are revealed – and they absolutely will be revealed when you put them to the text of a cross-consistency-assessment – then you must go back to the morphological field and review the concepts, redefining, adding and subtracting parameters and conditions. When everyone is in agreement about what the content of all the cells in the field mean, and the cross-consistency assessment starts working, then you have an acceptable prototype field.

The second function which the cross-consistency assessment fulfils is that it is a deep dive into the problem complex. Everyone that works through the field in this way learns something new – since the whole point is to relate different aspects of the problem complex to each other. No one has a total mastery of the type of complex problem fields we usually work with. The cross-consistency assessment forces a dialogue between different areas of knowledge.

Finally, when you have completed the assessment, the third function is to reduce the field. We push a little button, which starts a function in the software we developed to support morphological analysis, and the computer does in 6 seconds, what took Fritz Zwicky six weeks to do by hand. The field is reduced and we are left with a list of the surviving configurations. This list represents the solution space of this particular problem complex.



Geographic priority	Functional priorities	Size and cramming	New construction	Maintanance	General philosophy
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Cities + 50,000	Tech support systems	Large & crammed	Compensation	Current levels	All take same risk
Suburbs and countryside	Humanitarian aims	Small, not crammed	New only for defence build up	No maintanance	Priority: Key personnel
No geo-priority	Residential	Small & crammed			Priority: Needy

Scene Li...	
1	100
2	92
3	92
4	92
5	92
6	92
7	88
8	88
9	84
10	84
11	84
12	84
13	84
14	84
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16	84
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22	84
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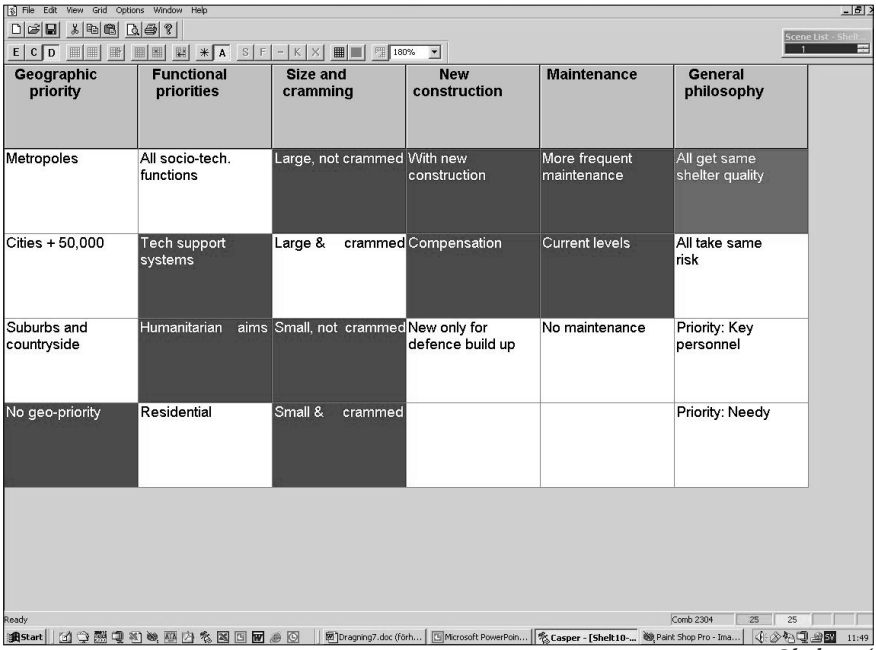
25	84
26	80
27	80
28	80
29	80
30	80
31	80
32	80
33	80

Slide 13.

In this case, with our "bomb shelter exercise", we are left with 25 solutions, out of the original 2304 formal configurations. We could go right down the list and look at one after the other. However, with computer support, we can do much more. For instance, we can use any particular variable as a driver, or even several variables as multiple drivers.



Geographic priority	Functional priorities	Size and cramming	New construction	Maintenance	General philosophy
Metropoles	All socio-tech. functions	Large, not crammed	With new construction	More frequent maintenance	All get same shelter quality
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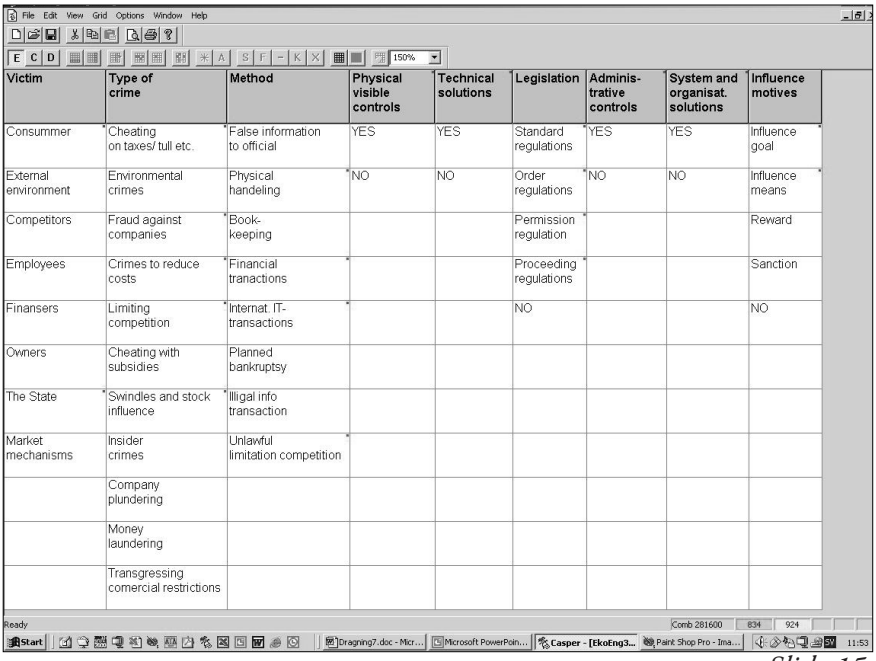
No geo-priority	Residential	Small & crammed			Priority: Needy

Slide 14

For example: If you want to see all the solutions that include the condition "Everyone gets the same shelter quality", we can treat this particular condition as an "input" by locking it, and see what the resultant outcome space is (slide 13, above). In a morphological field, any parameter can serve as a driver (or the "independent variable"); anything can be input and anything can be output.

I have used this field simply as an exercise. Let's take a look at something more complex.

The example below is one of the laboratories developed in a study done for the Swedish Agency for Economic Crime and a number of other law enforcement organisations. We wanted to look at the complex structure of economic crime and relate this structure to different methods of mitigation. This was a real mess: economic crime concerns everything from me cheating on my income tax to organised drug trafficking to state-led international economic sabotage. The issues involved include: What types of crimes are involved? Who are the victims? What are the different methods for perpetrating such crimes? What types of controls or sanctions are available? What type of legislation could be used in alternative cases? And so forth.



Victim	Type of crime	Method	Physical visible controls	Technical solutions	Legislation	Adminis-trative controls	System and organisat. solutions	Influence motives
Consummer	Cheating on taxes/ tull etc.	False information to official	YES	YES	Standard regulations	YES	YES	Influence goal
External environment	Environmental crimes	Physical handeling	NO	NO	Order regulations	NO	NO	Influence means
Competitors	Fraud against companies	Book-keeping			Permission regulation			Reward
Employees	Crimes to reduce costs	Financial tranactions			Proceeding regulations			Sanction
Finansers	Limiting competition	Internat. IT-transactions			NO			NO
Owners	Cheating with subsidies	Planned bankruptsy						
The State	Swindles and stock influence	Illigal info transaction						
Market mechanisms	Insider crimes	Unlawful limitation competition						
	Company plundering							
	Money laundering							
	Transgressing comercial restrictions							

Slide 15

Now we are getting a little bit closer to the general problem of parameterizing legal structures and investigating how different aspects of these structures are related both to one another, and to developing social processes. It is hard to say how such a study would precede at this point, but it would be an enormously interesting undertaking.

Further reading

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Discussion

Peter Seipel: We have heard three very interesting presentations, and you can also see the idea behind it all. To start with a rather specialised tool for mark-up of legal text, then to go into the construction work, involving rule design, rule management with also broader aspects involving general knowledge management, and in the third presentation with general morphological analysis.

Of course these three things tie together in many ways. We are looking at a spectrum of possible formalisation of legal regulatory work. Many attempts have been made over the years to achieve this. Legal logic is an old branch of law. There are also recent efforts such as the ones made by Professor Allen over the decades at Yale university. One thing that has struck me is of course that the ideas have been there but the tools to implement the ideas have been too weak. I have myself worked with paper-form matrices when I did my doctoral study work – manual cards where you put needles through the holes to make certain cards fall out. You can have this desperate feeling that things could be far better and the ideas could be developed. But now we are there. For me and many others it is an important aspect that these tools should now be brought into ordinary legal work. It should not only be a matter of discussion among academics and people working in AI theoretical etc. These tools are now handy, practical, they have been developed, they are available. There is much to be gained by using them. This is the whole idea behind this IT Law Observatory seminar. We will certainly see to it to follow up and try to make the best of what has come out.

Seminar participant: Three points come to my mind listening to these excellent presentations. The first thing I wanted to comment on is that all these theories and all these means of analysing knowledge, and especially legal knowledge, as a by-product get a deepened knowledge, just by doing this. This is perhaps the most important thing.

When you have used these tools you are able to, if you want to, translate it back into text. Then you will probably have a much better text. Even if we don't want to use these tools as technical tools or computers, I suppose it would be possible to use them as analytical tools. And that I think is as important as this automation.

The second thing is that there are also other representation forms that have not been mentioned today. They also appear necessary if you want to really do something interesting of this. One thing is of course semantic networks and logical graphical representations which perhaps would make it possible to live with messy problem areas for a longer time, because it is possible to include more things. I see a risk by means of using these tables and matrices in the sense that they are a bit too narrow. There is a risk that they become too narrow and that you lose the whole view. I think law and legal problem are often of this nature, that things appear to pop up, and it is sometimes difficult to see how things relate.

The third thing is perhaps what Peter Seipel mentioned, that these methods are not very new. They have been around for a rather long time. It has been shown and proven for quite a long time that they work in practice and in research projects. But the question is why noone is using them in the administration, in the government. Isn't that the big problem? And how to sell these things to those who should use them? That is something I have experienced as frustrating for quite a long time.

Tom Ritchey: Your last question: I think we have some theories on that, and one is: In doing morphological analysis you need a very strong facilitation. For instance, this programme is not for sale. We don't sell it because you can very easily trivialise. We give it away under certain conditions. We don't sell it because we don't want people coming around, buying it and then go out and do something absolutely stupid with it, ruining the method. I think it would probably be the same at least in the beginning with the Match system and of course working with XML also. I think this is what is needed in the future, that it has to be an effort to work with these things under a longer period of time.

Cecilia Magnusson Sjöberg: I have a question or reflection addressing the mess dimension of the legal domain, and that is whether it would

be fruitful to make a distinction between the kinds of applications and the goals of the kinds of the applications we have been discussing today. Because from my point of view the last presentations are directed more to decision support. My presentation how XML may be taken advantage of in the context of regulation management and legal information retrieval is more oriented towards management, not to decision support. Perhaps there is a risk to describe the legal domain as too messy if we are going to improve legal information management. You said that regulation processing industry is lagging behind. I agree with that – lagging behind in comparison with other legal information industries. For example the pharmaceutical industry – they are bound by legal rules, demands to have good trails of their information management. And they are able to come up with really advanced information systems. But perhaps we are trapped here if we talk about legal information regulative processing industry – we are trapped in the semantics, to some extent.

What it boils down to is that the legal domain may not be such a mess if our goal is to accomplish better regulation management.

Reynier Overhoff: It is indeed, I feel, very strange that the legal industry is lagging behind. What could be the reason for that while the methodology of work was in fact already invented.

The decision-table started to be done just after the war by Americans in the defence industry, in the defence department. That table, that very strong powerful table, in fact lost ground in the sixties as it appeared to be too difficult to do the graphical work, and the mathematical or the arithmetic behind these tables. Nowadays we have such powerful machines that we can do this work in a couple of seconds. When I did my thesis, my Ph.D. in the eighties I had a computer that took about a week to do one particular exercise, so I asked it to do the particular work on Saturday and it took a full week before it actually gave up the precise architecture of that table. Nowadays under Match it is so quick that you can't even see it.

So, yes indeed, we had these methods in place but we didn't have the tools. The tools were too week. That is a reason, not the reason but a reason. An addition is also a culture between lawyers. Legal people, people who are trained as lawyers find it very difficult to understand that regulation or a rule can be actually checked by doing arithmetic.

They find it very difficult to understand that the numbering people are dominating or getting in a position to dominate their domain. They feel that it is a field of words. And it is partially a field of words but in essence, if we are talking about the completeness of structures, it is an element of arithmetic. They find this very difficult to understand and they take great distance from it.

But they should embrace it. The problems of the lawyers should be very much concentrated on the semantics of things, and clarify the semantic issues. As far as regulation concerns, the syntaxis of regulation study something that should be set by regulators. And that should in all cases be absolutely clear for everybody. We always should know under what conditions, what actually should happen. That clarity is what we owe to the general public, under all circumstances. But for some reason, and it has to do with culture, often that syntaxis is being a little bit put away by the legal community. So I feel that is another reason why it is difficult to get these powerful tools to work.

Cecilia Magnusson Sjöberg: Possibly a complicating parameter would be the growing impact of case-law. In Sweden we are brought up with a civil law system very much focused on norms. But we can not disregard the fact that case-law is at least not diminishing in impact. What would you say about possibly different syntaxes in case-law, and have you considered how to integrate that into the system?

Reynier Overhoff : As far as syntaxes concerned there should never be any controversial elements concerned. The syntax should always be clear for a regulator. As far as the semantics, the particular conditions concerned there is a complex issue of interpretation, and that remains. And that is in my view the core business of legal work. To find the correct wording to work good and fair results. But syntactical issues should always be clear.

Sometimes we leave to people to decide how to fill in or interpret things like for instance the phraseology “a medical indication”. Something can be triggered off in the Netherlands on the basis of ”a medical indication”. We authorise people to give medical indications, and the might say, on their own accord, because they are professionals, that there are medical indications for doing this or that. But a medical indication, however you interpret it, that is an issue of semantics and

we leave that for the professionals to fill in themselves. But the syntactical issue is something we have to try to be very clear of to any person, any layman, any ordinary citizen, to be clear under what circumstances we get to what particular actions. And that is very basic. And if people or lawyers or whoever says that it is not necessary to have that clear, they say that they don't care about the precise nature of the regulation. For the sake of this discussion we have brought forward that legal structure must always be clear. It must always be clear to anybody who takes note of legal structure under what particular conditions, what particular consequences can be met. You can take a political discussion, a political measure to accept unclear regulations under syntactical point, but that is not our business. Our business is that the syntaxis should always be clear and we leave the semantics to others.

In our view the controversial element of syntax should in fact not be there. We owe to everybody to be clear on that. But it is the most difficult thing to understand.

Peter Seipel: I think one of the many wise things that have been said this afternoon is: try the simple things. Bring in the tools, give them time, don't expect to produce marvels by using one or the other, because, because this will not happen. But why stay only with ordinary legislative work with two secretaries working, experts meeting once a month, a political committee meeting on four or five occasions during the work, and with only written records, no way of tracing reasoning, no way of presenting alternatives etc. I mean at least we and our colleagues ought to be curious about these new possibilities. And I thing also a simple thing to keep in mind is something cognitive science is working with. That is the extension of human abilities by using tools of different kinds, from ordinary eye-glasses to computers and rulers. And the dramatic things that happen when you start using tools – eyeglasses, an invention of the thirteenth century, doubled the working life of skilled artisans. People who are really enthusiasts believe that this is one of the reasons why Europe ahead of other parts of the world.

I think one of the things to have in mind is not to get bogged down in all these complications and obstacles, but start doing the simple things, be curious and almost play with the tools.

If no other wants to intervene I am prepared to give my warm thanks to all who participated and made this a very interesting and

valuable afternoon for us all. I look forward to see as many as possible of you again. Thank you for the afternoon.