



**No question is more central
to power relations within society or
to issues of equality and income distribution
than land.**

Danilo Türk (1990)

Standards for land use and planning - Only for specialists?

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Abstract

Standards have become vital instruments for describing and structuring e.g. real property rights and planning information, such as the international Land Administration Domain Model and the national Swedish standard for detailed development plans. However, the publication of a standard does not automatically ensure that it is used or understood. Standards are primarily technical documents and not easily accessible by non-specialists. This article discusses the problems of using standards; such as the use of terminology and to access specific target group(s) when implementing standards in the geoinformation sector in general and standards on property rights and planning in the public sector in particular. Conclusions are that a standard in itself may be of rather little value if not assisted by additional, non-expert documents for a broader group(s) of decision makers and other non-experts within the organization, aiming at different organizational levels.

1. Introduction

Standards can be introduced within many different areas in order to for example agree on a specific way to do something or to specify terminology within a specific domain such as land administration. The generic nature of most standards should make them universally applicable to a wide range of organizations, authorities, etc. The purpose of standards is to further the exchange of information and to achieve a standardized terminology for a domain, e.g., real property rights or public planning regulations. However, the publication of a standard does not automatically ensure that it is used or understood. Standards are primarily technical documents and tend not to be easily accessible by non-specialists.¹ The implementation of standards in an organization must therefore be done at different levels, such as technical descriptions for development of IT systems descriptions of possible organisational or workflow changes and practical application in e.g. public planning.

Standards are part of a nation's *invisible infrastructure*, a term used in a Swedish government ordinance (SOU 2007), stating that standards are unnoticeable when they are in place and function properly. It is only in their absence the lack of them is noticed and problems arise. There is a need for acceptance

and understanding of the standards throughout the organizational hierarchy in order to achieve a successful implementation and the benefits have to be analysed.

Standards are used within a wide range of sectors and are even used to describe real property rights and planning information. Examples are the Land Administration Domain Model, LADM, published by the International Organization for Standardization, ISO, in 2012 (ISO 2012)² and the national Swedish standard for detailed development plans published by the Swedish Standards Institute, SIS, in 2010 (SIS 2010).

1.1 Problem description and aim

In 2011, a Swedish governmental ordinance stressed the importance of using standards for furthering information interchange in the private and public sectors with the motto "make it as easy as possible for as many as possible" (SOU 2011). However, studies have shown that standards often are inaccessible and difficult to understand for non-specialists (SOU 2007). Moreover, standards often refer to other standards. Substantial knowledge is therefore often needed in order to clarify and decide what is the most important in the standard, what to prioritize and how to apply it.

¹ Author's personal opinion after working with geographical information standards for two decades.

² The standard has been accepted as Swedish standard (SIS 2012b).

Much research has been conducted on the Land Administration Domain Model³, but a recent study showed that related research has focused on technical and registration issues, whereas legal, and especially organizational issues, have been given less attention (Paulsson and Paasch 2015).

This article is based on Swedish examples on how to further the use of standards. The aim is to discuss problems regarding an organizational issue, namely the implementation of standards; such as the use of terminology and how to address specific target group(s) when implementing standards in the geoinformation sector in general and standards on property rights and planning in the public sector in particular.

1.2 Structure of the article

This article starts by presenting standards in general and how they are and have been used. It continues with a section on terminology which is closely related to standardization. Then two examples of standards within the public sector follow. The following section describes the implementation of standards. A discussion of the findings and a final conclusion end the article.

2. Standards

The International Organization for Standardization has described a standard as being “a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose”.⁴ The use of standards to further manufacture and exchange of goods and services are found in most areas of society today, such as the international system of Units, SI, and the series of standards for quality management (ISO 9000), and the series of standards providing practical tools for companies and organizations to manage their environmental responsibilities (ISO 14000).⁵ The examples are chosen to illustrate the huge impact standards have on our daily lives. Many more exist; the International Organization for Standardization has for example published in excess of 20,500 standards.⁶

The concepts of standardisation go back in history. For example, the Indian Sanskrit legal text “Manusmriti” dating from about 400 BC, contains a table of 13 units of weights and their inter-relationships. The text also states that “the king should inspect weights and measures and have them stamped every six months and punish offenders and cheats” (Verman 1973).

However, the concepts of standardisation are not confined to measurements and how to conduct and verify services. The

legal domain has even been subject to standardization efforts. Examples are the attempts of the conceptualist movement in the 18th and 19th centuries to describe legal relations in a “scientific” way, influenced by emerging “measurable” disciplines such as physics. A more recent attempt to describe the legal domain is the classification of jural correlatives such as “rights” and “duty” and opposites such as “privilege” and “duty” by Hohfeld, who in the first decades of the 20th century created a conceptual system for classification of human relations independent of any legal system (Hohfeld 1913; 1917).

Standards are vital for trade and consumer safety. They have increased in interest since the Second World War to ensure that products and services are safe, reliable and of good quality and can help companies to access new markets and facilitate fair and free global trade.⁷ Different attempts have during the last decades also been made to describe the legal domain in standardized terms.⁸ One reason for applying standardized thinking on land administration is to provide frameworks for classification of land use, relation between people and objects (e.g. a right) and land valuation (ISO 2012). Furthermore, computerised systems require standardization of objects and relations to be registered, processed and analysed.

Standards are also used in many areas within the public sector, for example within land administration, service and quality control. It is an important tool to assist authorities and citizens and make sure that all are treated equally, for example when the authorities make decisions that affect the public, both private persons and companies.

For example, the Swedish National Board of Housing, Building and Planning published in 2008 a report stressing the importance of establishing the basis for a harmonised, digital planning process by establishing cooperation with the Swedish Standards Institute, SIS, to start working on standardizing information described in detailed municipal development plans and more general types of development plans (Boverket 2008). The information on the content and extension of development plans are of vital interest for everyone involved in building and planning development; ranging from the construction of motorways down to the construction of a single garage (SIS 2010: 3).

Standards on geographical information are produced by national standardisation organisations (e.g. the Swedish Standards Institute), the International Organization for Standardization and in Europe the European standardization organization, CEN. Standards developed by the industry also exist.⁹ Formal international and European standards in the geographic information sector automatically gain status as national standards in e.g. Sweden. This is even the principle in other European countries. However, the standards are normally not translated into national languages due to lack of resources. The only change made is by adding a national

3 See <http://wiki.tudelft.nl/bin/view/Research/ISO19152/LadmPublications> for examples. Accessed 10 November 2015.

4 www.iso.org/iso/home/standards.htm Accessed December 15th 2015.

5 See e.g. Taylor and Thompson (2008) and www.iso.org.

6 www.iso.org/iso/home/standards.htm Accessed December 15th 2015.

7 For example, ISO was founded in 1947. See www.iso.org. Accessed December 21 2015.

8 See Johnson et al. (2015) for further references concerning standardisation within the legal domain.

9 Industry standards are e.g. published by the Open GeoSpatial Consortium (OGC). See www.opengeospatial.org/ Accessed December 15th 2015.

language front page. The content itself is in English.¹⁰ This can be seen as a hindrance for understanding the content in non-English speaking countries.

3. Terminology

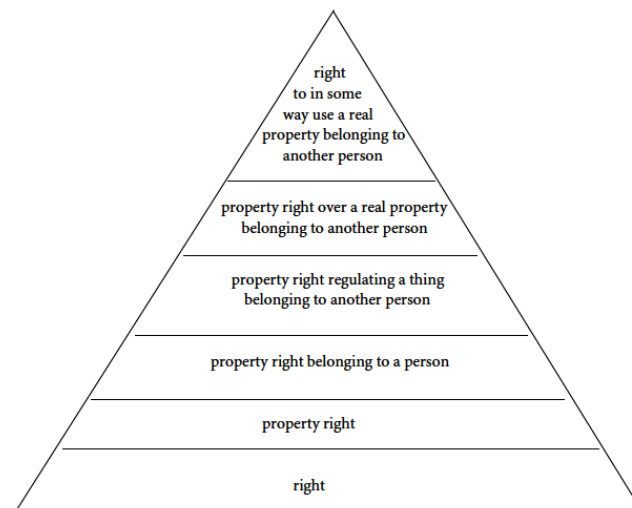
Terminology is fundamental in standardisation. Without a common understanding of the meaning of a term it is impossible to achieve any effective communication. The use of words may be domain specific where the domain has developed a specialized vocabulary of terms. This is even the case in the land use domain. However, the land use domain is not homogenous and consists of a number of legal traditions which may have their use of terms. An example is when concepts in different legal systems describe the same feature, but are named differently, or even worse, when different terms

are used to describe more or less the same legal concept. An example is given in Hoecke (2004: 174) who states that a specific type of right/restriction regulating the (partial) use of real property, 'easement', is rather similar to another right/restriction, 'servitude', but is not exactly the same. However, the United Nations guidelines on real property units describe servitude as an easement or right of one real property over another (UNECE 2004: 61).

The wish to describe and structure the land use domain is not new. An example is the 'conceptual pyramid' showing the logical components of a servitude (i.e. a property owner's right to use another property, e.g. for right of way), developed by the German legal scholar Puchta, 1798-1846. A servitude is a real property right. The property right belongs to a person and regulates a 'thing' which belongs to another person. It is a right to in some way use a real property belonging to another person.¹¹ Puchta's hierarchy is illustrated in Figure 1.

¹⁰ Standards may also be published in other languages, e.g. French, depending on the policies of the standard organization.

¹¹ Referenced in Peczenik (1974: 145).



Source: Paasch 2008: 113.

Fig. 1. Puchta's conceptual pyramid of rights

4. Examples of standards

For the purpose of illustrating the implementation of standards and the lack of non-expert documents, two examples are presented below, one concerning the Land Administration Domain Model, and the other is the Swedish standard for detailed development plans.

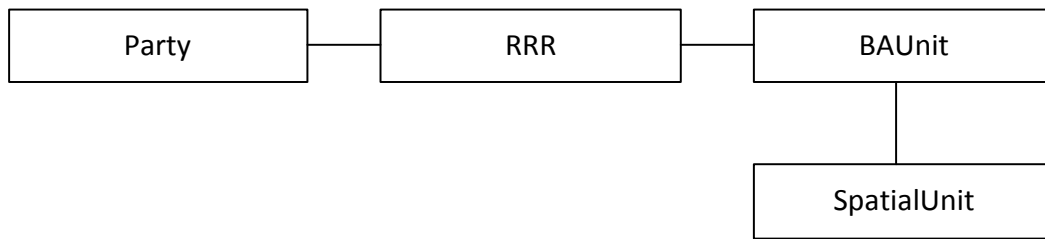
4.1. Land Administration Domain Model

The standard is a conceptual model and provides a formal language for describing systems of land information, so that their similarities and differences can be better understood

(ISO 2012: vi). The standard makes it possible to classify interests in land by providing a formal language for describing them, independent of any legal system.

The core of this standard is the four central components (in the standard called "packages"): "Party", "RRR", "BAUnit" and "SpatialUnit" (ISO 2012: clause 5.2). The packages are illustrated in Figure 2.

A "Party" describes the person, company or other legal entity holding an interest affecting the use of land (incl. water and air). These interests are classified as "RRR"s, which is synonymous with rights, restrictions and responsibilities affecting the use of land. Examples are the right to use a road located on another property, the responsibility to obtain a building permission prior to erecting a building, or a restriction for



Source: ISO 2012: clause 5.2, adaption by the authors.

Fig. 2. Core components of the Land Administration Domain Model Based on the International Organization for Standardization

the land owner and visitors to perform certain activities, such as collecting firewood, inside nature conservation areas (ISO 2012).

A “basic administrative unit” (BAUnit) is an administrative entity, which is subject to registration or recordation, on which one or more unique right, restriction or responsibility can be attached (ISO 2012: 2-3). An example is a municipal development plan, regulating to use of an area for specific purposes. Another example is a real property, being an administrative unit in which a party (i.e. the owner) executes the right of ownership. A basic administrative unit normally has a spatial extension on land, water or air. This is in the standard referred to as having a relation to a “SpatialUnit” (ISO 2012: 6).

The Land Administration Domain Model is part of ISO’s family of standards describing geographical information. It may be argued that the standard has a mostly legal content, describing (legal) relations between (legal) spatial objects and therefore should not belong to that group of standards, but the initiative to produce the standard came from the geo-spatial research community (Lemmen 2012).

The Land Administration Domain Model was in 2012 accepted as a European standard, automatically making it an official national, e.g. Swedish, standard. However, the standard is not in much use in Sweden yet¹², but Lantmäteriet, the Swedish mapping, cadastral and land registration authority, has planned to decide on a strategy on how to implement the standard (Lantmäteriet 2015). An investigation concerning the implementation of the standard will be made during 2016.¹³

4.2. Swedish standard for detailed development plans

In 2010 the Swedish Standards Institute published a national standard for detailed development plans. The main purpose of the standard is to further information exchange of regu-

lations contained in detailed development plans in regard to planning, examination, analysis, and information search (SIS 2010). The standard is a step towards achieving a full digital handling of planning information, which is part of the government’s e-policy, developing means for self-services and other types of interaction between public organisations and the public. The standard is an expert document and uses for example the Unified Modelling Language, UML, to describe relations between different types of regulations. See Figure 3.

The standard consists of requirements concerning the division into areas, formulation of planning regulations and their data representation. It is based on a handbook on planning published by the National Board of Housing, Building and Planning (Boverket 2002) and intended to be used for producing new development plans. There is a demand for digitalisation of existing plans, which however has not been taken into consideration during the making of the standard.

The standard is currently under revision¹⁴ by the Swedish Standards Institute. The revised version will only be partly in accordance with the Land Administration Domain Model standard.¹⁵ The content of the Land Administration Domain Model and how it relates to the Swedish standard is however described in an annex (SIS forthcoming: annex E). The current standard does not describe boundaries, but only areas. This will be changed in the revised version which uses the principle from the Land Administration Domain Model of describing areas in relation to its boundaries.¹⁶

The description of future land use is a complex process. Huge amounts of information has to be collected, combined and presented. To ensure effective and digital procedures there is a need for structured information, among others. The standard is intended to provide support and structure for exchanging digital information within and among organisations, act as a basis for the development of e-services and reduce costs when changing data systems due to standardized information structures.¹⁷

¹² According to a survey conducted by the Swedish Standards Institute (SIS 2015).

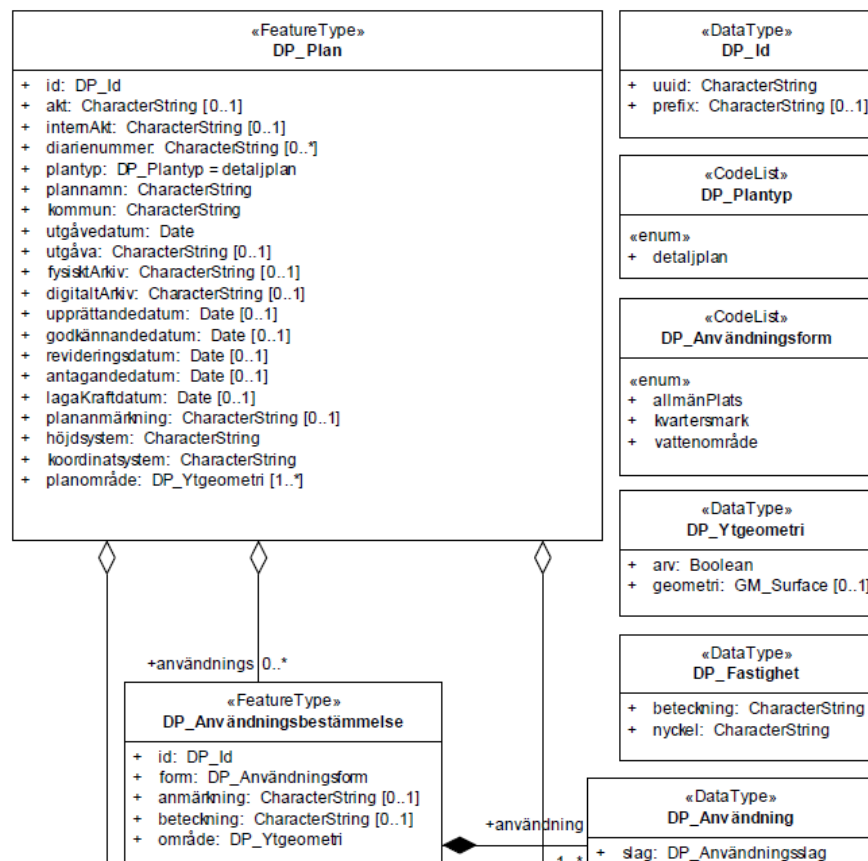
¹³ Personal communication on December 15th 2015 with Anna Eriksson, Director of development at Lantmäteriet.

¹⁴ Formal standards undergo scheduled revisions to ensure that they are up to date.

¹⁵ Estimation based on the draft of the revised standard (SIS, forthcoming).

¹⁶ Email communication with Mr. Anders Skog, the Swedish Standards Institute, SIS, 7 December 2015.

¹⁷ www.sis.se.



Source: SIS 2010: 12.

Fig. 3. Part of the standard's graphical description of planning regulations

The standard presents demands on digital representation of planning provisions in detailed development plans. The standard also includes clarifications and formalisation of how the planning provisions should be formulated, how they relate to each other and to geographical areas within the plan area.

5. Implementation of standards

International standards are mostly (very) technical documents presupposing a high level of expertise in e.g. information modelling, such as the Unified Modelling Language, to illustrate the content and relations between information described in the standard, as shown in Figure 3 in the previous section.¹⁸ These technical documents may be difficult to access by non-specialists. There is thus a need for additional information about the content of a standard. This communication problem concerning the use of standards has been noticed by the Swedish Standards Institute, who commissioned a survey among its members active in the field of geographic information, mostly consisting of governmental agencies and other

organisations. The survey identified, among other things, the need for publication of non-technical information concerning standards (Nicolausson et al. 2011).

5.1. Guidelines from the International Organization for Standardization

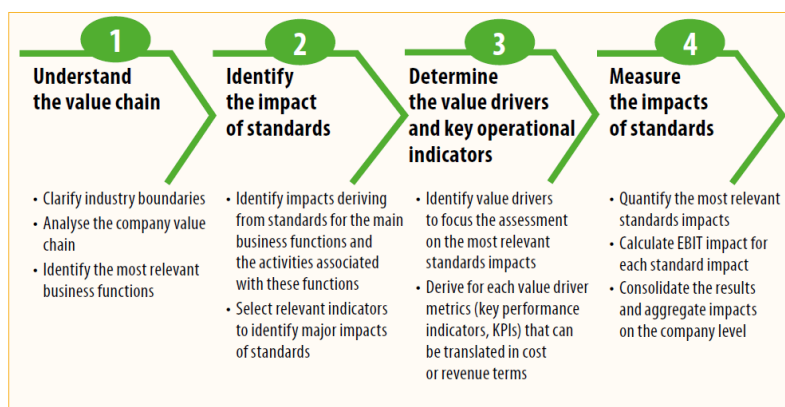
In order to function properly there is a need for acceptance and understanding of the content of standards and how they can be implemented, e.g., in public-sector organizations.

The International Organization for Standardization has published a methodology for implementing standards (ISO 2013). The primary scope of the methodology is to assess the economic benefits of standards for a company, but it even mentions that the methodology also can be used to describe the non-economic benefits of standards independent of the type for-profit or non-profit organization in the private or public sector (ISO 2013: 8-9). The value chain is illustrated in Figure 4.

¹⁸ See www.uml.org.

To understand the value chain and to discuss how a standard can be used to gain profit for the company or to improve public services it is important to first gain knowledge of standardisation in general and how the use of specific standards affects the organisation implementing it. The standard itself may be of rather limited value for making management deci-

sions. The use of geographic information standards is rather new and organisations may not have become confident using them yet. Education in the principles of standardisation and non-technical guidelines are needed for employees and management alike.



Source: ISO 2013: 19.

Fig. 4. The value chain of the International Organization for Standardization

5.2. An introduction to standardization

An example of an introductory text on standardisation is a report published by Lantmäteriet in 2014 describing the basics and history of standardisation (Paasch and Rydén 2014). The report is in addition to being used inside the organisation even used as course material in Swedish university courses. The purpose is to familiarise employees and students with the basic principles of standardisation in general and to provide an introduction to standards in the geographic information sector.

5.3. Guidelines on how to describe geographical information

Another example is the guideline on metadata for geographical information published by the Swedish Standards Institute (SIS 2012c). Metadata is the general term for information used to describe datasets and services, such as the title, date of creation, date of revision, description of content, restrictions in access and use, etc. The content of the metadata guidelines is an extract of the International Organization for

Tabell 19 – Resurskontakt – Organisation

Elementnummer	11.1
Elementnamn	Resurskontakt – Organisation
Förklaring	namn på för resursen ansvarig organisation
ISO 19115	376: .identificationInfo.MD_DataIdentification.pointOfContact.CI_ResponsibleParty.organisationName.CharacterString
Krav	0..1 ; Obligatoriskt om ansvarig organisation kan identifieras.
Värdeomän	Fri text. Ange organisationens fullständiga officiella namn. Förkortning kan anges inom parantes efter det fullständiga namnet.
Exempel	Sveriges geologiska undersökning (SGU)
Inspire	9.1 Ansvarig part

Source: SIS 2012c: 25

Fig. 5. Example of informative text in the national Swedish metadata guidelines

Standardization (and European/Swedish) standard for metadata (ISO 2005).¹⁹

Figure 5 shows the Swedish description of how to describe the point of contact for the data provider. *Elementnummer* [Element number], e.g. 11.1, is the id-number of the metadata in the Swedish profile; *Elementnamn* [Element name] is the name of the data provider; *Förklaring* [Explanation] is a short explanation of the metadata; *ISO 19115* shows where to find the element in the standard itself; *Krav* [Conditions] describes whether the metadata is mandatory or voluntary to provide; *Värdeområde* [Value domain] describes if the text is free text or to be taken from fixed lists. In this case it is a free, narrative text. *Exempel* [Example] is an example of an organisation, e.g. The Swedish Geological Survey (SGU); *Inspire* is a reference to the European Commission's regulation for providing metadata for spatial information in Europe (EC 2008). In the example the metadata is named *Ansvarig part* [Responsible party] and is described in section 9.1 in the regulation.

5.4. Standard for development plans

A cluster of Swedish municipalities has implemented the standard as part of the development of public e-services (Jadelius 2014).²⁰ The aim of a part of the project was to make municipal planning information accessible for the public as a source of information for electronic building permission services called (translated from Swedish): "What am I allowed to do on my property?".

During the implementation it was noticed that a number of

19 Note: ISO 19115 has been revised and is now named ISO 19115-1. The Swedish profile has not yet been updated.

20 See www.harnosand.se/kommunen/framtidochutveckling/riges.454bb023f13599f076a8298d.html Accessed December 16th 2015.

textual formulations based on the handbook on planning published by Boverket (2002) were not sufficient for describing the regulations. The standard has room for individual texts, which was seen as a hindrance for the municipalities' collective effort due to existing, different terminology. A library of terms was therefore created to be used during the digitalisation process. The use of terms was then further limited in order to achieve a more consistent terminology. It was during the registration phase possible to leave comments in a comment field if the standardised formulation was not sufficient in order to avoid misunderstandings (Riges n.d.: 13). Already during the implementation phase of the Swedish standard for development plans the need for a consistent terminology and sometimes additional explanations of terms emerged.

6. Discussion

The studies revealed a number of problems and challenges related to the implementation of standards for land use and planning within the public sector.

The survey made by the Swedish Standards Institute (Nicolausson et al. 2011) illustrates the need for auxiliary and easy to access documents describing the contents of standards. For example, land use experts and managers in the public sector may not be familiar with descriptive languages such as the Unified Modelling Language or rather comprehensive texts in standards.

It might also be the case that the officials of an organization or authority can understand and implement the standard, but the question is if the general public who are affected by implications of these documents also do that. Should there even be two versions of every standard; one for professionals and one for laymen? This should be further investigated.

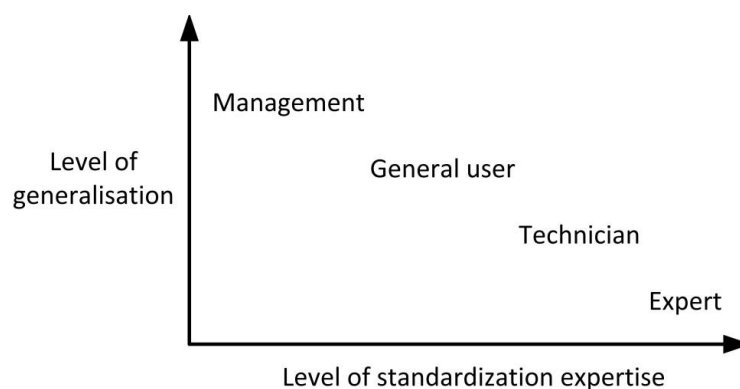


Fig. 6. Example of level of generalisation when implementing a standard

Another issue is how to supply documentation on different levels within a domain. There is a need for descriptions of standards on different levels, such as the standard itself (expert level), how to implement the standard (technical level), how to use a standard in general (general user level) and

overview of the content of the standard (management level). Those levels are not fixed, but have to be defined for each organisation implementing a standard. See Figure 6.

The authors were not able to identify any examples of in-

formative documents for implementing the Land Administration Domain Model and Swedish standard for detailed development plans in Sweden. The reason may be that the standards are not yet in widespread use in Sweden according to a recent survey by the Swedish Standards Institute (SIS 2015). The survey showed that the national metadata profile on geographical information (SIS 2012b) is the most implemented standard document of that group of standards in Sweden.

This may indicate that one of the keys to implementation is easy-to-access documents on the subject. However, more research is needed on the factors making standards accessible to confirm that. Other solutions to that could be to add sections of informative text to the standard itself or to increase focus on the publication of informative auxiliary texts in the standard's publication process.

It is often a long process to develop a standard, involving the use of personnel resources thus resulting in extensive costs. For example, the Land Administration Domain Model took five years to develop, even though, already before this, initial theoretical research on which the standard is based was published in e.g. 2003, 2005 and 2006 (Lemmen 2012). The Swedish standard for detailed development plans took four years to develop. Developing standards may be time consuming and it is therefore of importance to investigate what factors that are important to secure their future use. Those issues are however not dealt with in this article, but may be subject for future research.

7. Conclusions

A standard is of rather little value in itself if not assisted by additional, non-expert documents for a broader group(s) of decision makers and other non-experts within the organization, as well as for the public. These auxiliary documents describe the benefits and content of a standard, aiming at different organizational levels, being part of the organization's strategy for implementing a particular standard or a group of standards to be used in the organization's daily administration. It can be used, for example, for providing a standardized classification of land use and planning regulations as a basis for the development of digital solutions for e.g. on-line application for building permits and other types of public communication and participation.

If such standards are not implemented at all, or implemented but the people working within the field cannot use it, or the citizens will not understand it or the consequences of it, it seems like a waste of time and money to develop them.

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