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STANDARDS
-a survey

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1 INTRODUCTION

Imagine yourself in a hotel in a foreign country. You want to use your hairdryer, but you cannot fit it into the wall socket. And even if you could, you would find that it does not work anyway. What´s the problem? The answer to that question is: there is no standard. This is just one small example of the importance of standardization.

A standard is an agreement to do something in a certain way. It can be seen as a recommendation or a specification to design a product or use a production method.[1] The purpose of the standardization process is to reach the state of the art[2] and the best practice for a product. A good standard will pass unnoticed in our daily lives, but we will know when there is need for it.

Standards cover all parts of our existence, for instance languages, terminology, measurements, production methods, electricity, environment, health, medicine, computer communication and space technology.
To begin with, standards defined physical things. During the industrial wave they referred to physical relationships between things. Later on, standards used for information transfer designated virtual relationships between things, e g between a radio transmitter and a radio receiver.[3]

The evolution of the Information Technology Era[4] in the last 30 years has fundamentally changed the structures of all parts of society. In the society following the industrial revolution the economy was organized in stable hierarchies within national borders. The structures of the new society are much more unstable and mobile[5] and accordingly the new economy is characterized by systems that are quite complex and difficult to predict.[6]

Since the 1970s, the macroeconomic theories have become obsolete because they do not put enough emphasis on innovation and technology, which is just what is characteristic of the dynamic IT era.[7] Now, the focus is on knowledge and there is an increasing need of finding ways to protect that knowledge.

In the business world the information technology has made communication between companies easier by changing the infrastructure of doing business and by creating new ways of trading.

There are new methods of interaction between companies, for instance the build-up of complex networks that is characteristic of the new

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[1] Standards The Common European Language, SIS
[2] The expression means ”on the best current technical level”, it is also used in patent law, Koktvedgaard, Mogens, Immaterialrätt, p 220
[3] Krechmer, Ken, Technical Standards: Foundations of the Future, Standards View, 1996, s 6 http://www.csrstds.com/cubit.html
[4] A definition of Information Technology is: A technology for the collection, storing, adaptation, retrieval, communication and presentation of data. Bo Viklund ITS
[5] Benner, Mats, Nätverkens samhälle är mobilt och instabilt, SvD 20/8-99
[6] Fimmerstad, Lars, De komplexa systemens vägar äro outgrundliga, Svd 26/7-99
[7] Drucker, Peter F, Den nya verkligheten, page 193

economy. Another example is the ”creative dissent”, a combination of co-operation, creative competition and insolence.[8]

The business community has developed from being multinational to being transnational. Today even small companies operate on a global market.[9] There is no longer a need for a head office in one country, and subsidiaries or branches all over the world. Product development takes place anywhere in the organization, not only in a central research department in the head office.[10]

The financial sector has been globalized, and the separate nation-states do not have the importance they used to have. The increased mobility in the new economy has facilitated the opportunities for investors to act globally and place investments where the return is highest and also move them faster. This development would not have been possible without the new technology.

At the present time this new era may seem rather chaotic, and it is necessary to find new strategies to organize the fields of industry, business and commerce. Standardization is one way of bringing this about.

How has the IT era affected the standardization system?

At the beginning of the age of information and communication standards were regarded only as instruments of rationalization *within* companies. Now, with advancing Europeanization and globalization standards have developed into being important strategic tools with economic relevance when the object is to create new markets.”[11]

The companies in the IT sector have created a new structure in the standardization world by collaboration in fora and consortia. The main reason is the need for shorter lead times for developing standards and direct participation for the industry. The old structure with formal standard bodies was unable to meet the new demands but now there are some signs that the two different structures are being brought closer to each other.

The research activity in the IT sector is almost running wild, therefore there is clearly a need for standards to facilitate commercialization and create new markets.

2 PURPOSE AND METHOD

The purpose of this essay is to give a general view of the world of standards. There will be a descriptive account of the nature of standards,

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[8] Magnusson, Lars, IT-samhällets kreativitet förutsätter trygghet, SvD 2000-06-02
[9] Drucker, Peter F, Den nya verkligheten, page 150
[10] Ibid page 152
[11] Hesser, Second Interdisciplinary Workshop on Standardization Research, Press release 4/99 http://www.unibw-hamburg.de/PRWEB/presse/releases.html

and of how and when they can be used in order to protect knowledge in companies.
The essay is part of a Law Management-project at the Gothenburg School of Economics and Commercial Law. The Law Management perspective means that the legal system should be used as a strategic tool in managing a company. This way the company can take full advantage of its legal rights, while hopefully avoiding future law suits.
A presentation of different types of standards and the structure of the standardization bodies will be given, along with an account of the way they work on different levels.
There are two formal organizations presented on each level, one dealing with IT standardization in particular and the other is the main body for standards. The five forums have been chosen because each of them represents something specific. One, the OMG (The Object Management Group) is very large, with 700 members. ECMA (a body that is Standardizing Information and Communication Systems) is comparatively old and very well recognized, IETF (The Internet Engineering Task Force) is new and has a different approach to the whole process of developing standards. WAPforum (The Wireless Application Protocol Forum) is chosen because it deals with a new technology the future success of which is still uncertain, and finally SEIS (The Secured Electronic Information in Society), included because it is based in Sweden. SEIS is found as an integral part of GEA (Gemenskapen för elektroniska affärer).
Questions on how a company can use the standard system to get the best results from its research and development are dealt with. Standards and IPRs[12] are ways for companies to control and protect knowledge. The most important message to managers in this essay is that strategies for standards and IPRs will have to be coordinated. For a company, IPRs are the foundation for the market and standards are the foundation for the marketplace.
As an example of a standard the EID-card (Electronic Identification Card) will be presented. It is being developed right now at the international level. It started as a de facto specification before it was turned into a national Swedish Standard. Both consortia and formal standard bodies are involved in the process of developing this standard.
Some legal implications that have an effect on standards will also be discussed, for example the different nature of standards compared to IPRs. Suggestions are given that might be useful in deciding upon a company strategy. The IPR policies of two standards bodies are accounted for.
Some aspects of standardization and competition law are pointed out concerning both standards as such and the organizations.
Questions on standard strategies for companies are discussed. Company managers have to make decisions on several issues such as the positioning in organizations, the degree of activity of their involvement, the optimal time to join a standards body and what kind of standards they want to develop.
Controversial issues that have caused problems for companies and organizations will be treated, such as IPRs, consequences of the different

[12] Intellectual Property Rights

laws on patent and some issues concerning the actual development of standards.
Finally, some conclusions and suggestions for the future will be put forward.

Method
There is not much literature directly on standards so I have studied various books on the new economy, management, software and IPR, apart from offline and online articles and homepages of organizations.

The main source of information for this paper has been the Internet. By far the most useful homepage turned out to be the one of ITS[13].

I have interviewed Mr. Bo Viklund, Managing Director of ITS. He very kindly provided me with a lot of material such as papers, overheads, PMs, brochures, directives and information about the various processes. At ITS I also met Ms. Susanne Björkander who gave me valuable information about the development of the EID-standard and the organization behind it. The value of talking to people involved cannot be overestimated when it comes to dealing with a subject such as standards, where it is not possible to grasp the full picture from studying what has been put down in writing.

I also talked to Ms. Monica Widegren, who is heading the International Secretariat of the Swedish Competition Authority, who gave me information on competition law and standards.

Some comments on **terminology**

In the world of standards a lot of different terms and expressions are used that stand for the same things. In this paper the terms formal standards and de facto standards have been chosen, because they are the most common ones although it would in fact be more appropriate to use the correct pair of words like de jure/de facto standards or formal/informal. The organizations are called either formal standardization bodies or fora/consortia. In literature and on the Internet they are sometimes referred to as authorized/unauthorized or official/unofficial organizations.

[13] Information Technology Standardization

3 STANDARDS

"I keep six honest serving men
They taught me all I know;
Their names are What and Why and When
And How and Where and Who"[14]

3.1 What is a Standard?

A standard is a voluntary agreement made in consensus by experts from manufacturers, authorities and other interested parties. Though the standard agreement in itself is voluntary, the authorities can use it as a reference in legislation, which makes the requirements in the standard mandatory. This is the case for standards on the European level concerning health, safety and environmental issues.[15] The UN/ECE agreement as found in ECE/STAND/17/REV.3 stipulates that legislation should preferably use international standards. This can be interpreted as: If an international standard is available and it suits the needs of the parties it shall be used.[16]

Formal standards are those developed within a recognized standards body. A standards body can be recognized either by self-declaration according to WTA article 6 and the Code of good practice[17] as defined in annex 3. In Europe a political institution such as the EU Commission can also recognize it.[18]

De facto standards are developed within industrial fora or consortia. The number has increased substantially over the last few years due to their ability to speed up the standardization process and respond to the market need of direct participation from the industry.

Proprietary standards arise spontaneously when a particular technical solution has made its way into the market to a certain degree. Bo Viklund of ITS considers them a separate third kind of standards. In COM (92) 445 the European Commission is of the opinion that they are another kind of de facto standards. Literally speaking, the Commission has a point, of course, but Bo Viklund is right in the sense that the proprietary standards are not the result of a consensus agreement in a fora or consortium.
From a company standpoint, it doesn´t matter whether the standard is formal or de facto. The important thing is to get the rules set, so that the

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[14] Kipling, Rudyard, The Just So Stories (1902) "The Elephant`s child"; quoted from Baskin, E, Krechmer, K, and Sherif, M. H. "The six dimensions of standards: Contribution towards a theory of Standardization" page 1, published in "Management of Technology, Sustainable Development and Eco-efficiency", Elsevier Press, Amsterdam, 1998 http://www.csrstds.com/theory.html
[15] SIS, Standards the common European language
[16] Viklund, Bo, PM, ITS
[17] The GATT/WTO Agreement relating to Technical Barriers To Trade including the Code of Good Practice For The Preparation, Adoption And Application of Standards
[18] EU Directive 98/34.

companies can take action in their segment of business.[19]The recognition or success of a standard depends on to what extent it is being used. There is a risk, however, if a standard is too successful. Then it may prevent other manufacturers and researchers from developing alternative solutions and thus block progress and cause technical stagnation.[20]

There are some famous examples of standards that have worked well in many parts of the world and failed completely in some countries. The best one is probably the total lack of recognition of the metric system in England, where it took decades before people reluctantly started to use it, though it was adopted many years ago.

3.2 Why standards?

In the ICT-sector the advantages of standards are numerous and obvious. Without standards there would be no communication at all or it would at least be much slower and more complicated.[21] Standards make it possible for a large number of manufacturers to adopt identical solutions.[22]

Standardization should lead to simplification for customers when it comes to compatibility of products. It also ensures safety by responding to regulations and specifications and makes it possible for the product to be type-approved.

For the industry it promotes and facilitates profitable production and trade.[23] It minimizes options, in a positive sense of these words, and it guarantees interoperability.[24] Reaching an agreement to limit the options regarding the number of dimensions for a certain product, coordinates manufacturing processes, reduces costs and therefore makes it possible to keep consumer prices lower.

Standards improve the possibilities of trading between different parts of the world. A trading-company in one country can rely on a standard and order goods from a distant counterpart.

3.3 When is the timing right?

The standardization process
In the last few years the key issue of standardization has been that of timing.

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[19] Jansson, Håkan, Ericsson, SIS Standardiseringen igår, idag och imorgon
[20] Karlsson, Sören, SIS, Standards, The common European language
[21] Viklund, Bo, ITS
[22] COM (92) 445
[23] SIS, Standards the common European language
[24] Viklund, Bo, ITS

Everyone agrees that the standardization process frequently takes too long. The reason for this is partly the aim to reach consensus, partly the tendency of standards to become too complicated and wide.[25] The process is also prolonged because the proposed standards are sent out to all interested parties for comments. According to WTA/TBT Agreement 6, Annex 3, section L, the time for the submission of comments should be at least 60 days.

Sometimes it can take as long as five to seven years to develop a formal standard. If the products have a life cycle of maybe two years, as they often do in the ICT sector, you will end up having the standard approved long after the product is taken out of business.

ISO has made a statement saying, ”in the fast-changing technology sectors, it may be more important to reach and publish a technical agreement quickly than to go through the various checks and balances needed to win the status of a full International Standard”.[26] This shows that timing is a crucial factor, which must be paid serious attention to.

Timing is one of the reasons why the industry has formed its own fora, where the process can be speeded up.

Timing on a product level

On the product level standards are needed at an early stage, before the ”mass-market” begins to use a supplier-specific standard. Standards should be developed at a pre-commercial stage, along with the development of the product.

On the other hand, if a standard comes too early, it impedes development. Obviously the trick is to find the right balance.[27]

3.4 How is the development carried out?

A standard is adopted according to the different rules in each recognized body.[28] However, there are some similarities in the working procedure of all standardization bodies.

A technical committee (TC) is set up for each project. It consists of appointed members from the national organizations involved. They are experts in their respective field, and they represent the national body at the TC level and will represent their own expert capacity in the working group where a work item is developed. Normally all costs are paid by the company, authority or institution where they are employed.

The actual work consists of technical investigations, compromising on viewpoints and issuing of proposals for a standard.[29] When a proposal is ready for a Swedish, European or international standard it is sent out for

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[25] Ibid.
[26] Serving ISO´s Stakeholders, ISO Annual Report 1998 http://www.iso.ch/presse/anrep98e.htm
[27] Akzell, Bengt, SIS Standards, the common European language
[28] Viklund, Bo, PM, ITS
[29] SIS Standards, the common European language

comment to companies, organizations, authorities etc., which may be affected by the proposal.[30]

All recognized bodies announce the public enquiry periods in different magazines, letter systems and sometimes on the Internet.[31] This way all interested parties will have a chance to express their opinion.[32]

After the comments have been gathered, they are processed, and if consensus is reached, the draft can go out for a final vote before the standard is approved. There is always uncertainty about the outcome of the negotiations. The consensus procedure might cause problems. There will be more on this in chapter 8.

The standardization process must add value to the parties involved, and the work can only be done if someone finds it worthwhile to pay for the process.The cost of participating in a working group is paid for by the employers of the experts, at least that is the case in Sweden. Other countries have realized the importance of supporting their nations' participation on an international level by subsidizing their representatives.

3.5 Where? At what level?

There are three levels of formal standardization; national, regional and international.

According to ISO/IEC the definitions of these levels are as follows:

National standardization takes place at the level of one specific country.[33]

Regional standardization means that participation is open to relevant bodies from countries from one geographical, political or economic area of the world,[34] and international standardization takes place when attendance is open to relevant bodies in all countries.[35]

An international standard has, naturally, a greater recognition and a higher status than a lower level standard. How far a standard can reach depends on how much work the interested parties are prepared to put in. There is also the question of finding it worthwhile to support the process financially. It all depends on the prognosis of the value of the future standard. An estimation of the life cycle of the standard is necessary.

The de facto standardization bodies are all global, and open to whoever wants to participate. If they were closed organizations, they would be breaching the anti-trust regulations in the various competition laws.

3.6 Who needs standards?

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[30] Ibid.
[31] Viklund, Bo, PM, ITS
[32] SIS Standards, the common european language
[33] ISO/IEC Guide 2:1996, definition 1.6.3, Bo Viklund, ITS
[34] Ibid, definition 1.6.2.
[35] Ibid, definition 1.6.1.

On a company level, standardization involves and affects all departments of the company, from the research and development division, through the product planning and design, to project design, marketing and information.

Companies need standards to reach a critical mass faster in production. They can more easily get access to the foreign market.The products or services linked to standards will be given higher confidence and this will lead to higher sales. It is easier to attract consumers with flexible and inter-operable products.[36]

The new technology requires new fields of standardization. The standards are categorized in different ways depending on what area they cover. In the software industry there are three classifications.

The first one is depending on what process is in focus. The different kinds of processes that can be identified are acquisition, requirements definition, design, code and test, integration, maintenance and operation, configuration management, documentation, project management, quality assurance, verification and validation.

The second classification is the type of technique or tools to which the standard applies, such as languages & notations, metrics, privacy, process improvement, reliability, safety, security, software reuse, vocabulary and ”other”.

The third category refers to sector applicability. It is divided into ”all sectors”, defense, financial, medical, nuclear, process control, scientific, shrink-wrap and transportation.[37] These categories are examples of why the interest in standards has increased in recent years.

Consumers need standards to use the products because standards mean extra choice and lower costs. If standards are used to facilitate access to more than one system, they can mean tougher competition between manufacturers and service providers.[38] National states need standards to increase their competitiveness on the international arena.

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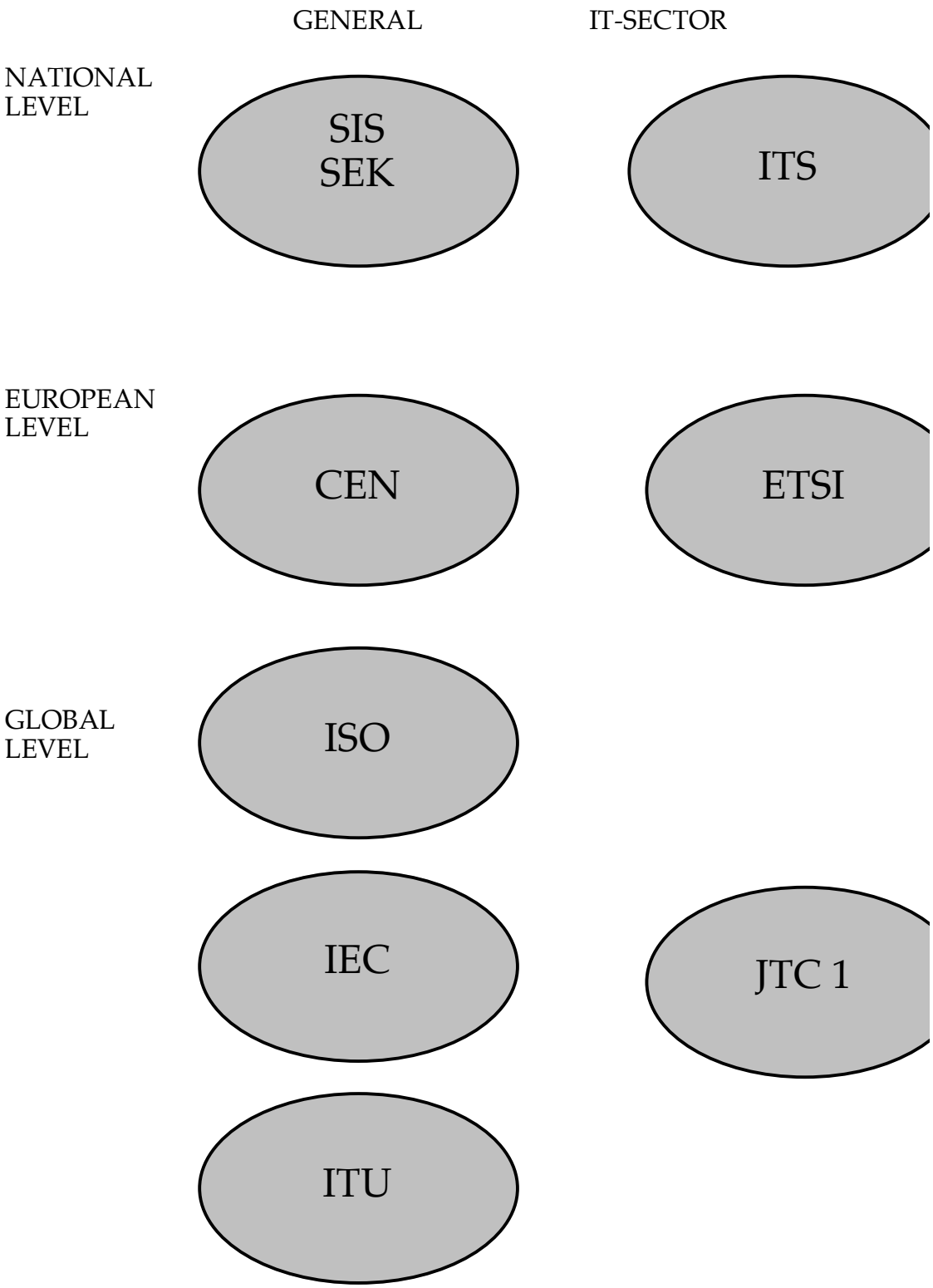
[36] CEN/ISSS, ICT Standardization in Europe; Standards for a New Age
[37] Magee, Tripp, Guide to Software Engineering, Standards and Specifications 1997 page x
[37] CEN/ISSS, ICT Standardization in Europe: Standards for a New Age

4 STANDARDIZATION BODIES
FORMAL STANDARDS



4.1 Official Standardization Bodies

4.1.1 National level

Swedish Standards Council, (Sveriges Standardiseringsråd) SSR, is the main body for standardization in Sweden. The standardization is carried out in national standards bodies with responsabilities in line with the international and European standards bodies. The members of SSR are the Swedish Government, Landstingsförbundet, Svenska Kommunförbundet, Sveriges Industriförbund, Svensk Handel and Svenska Bankföreningen. SSR was established 2000-06-27. The new structure was in place by 2001-01-01.

As national standards bodies SSR has recognized:

ITS Informationstekniska standardiseringen

SEK Svenska Elektriska Kommissionen

SIS Swedish Standards Institute

All three bodies are private, independent and impartial non-profit organizations and also recognized as European standardization bodies according to EU directive 98/34. SSR has set up a regime, where the three bodies on delegation can adopt national standards as long as they are fully in line with corresponding European standards.

SIS

The Swedish Standards Institute, is the Swedish member body of CEN and ISO. SIS is responsible for all areas not covered by SEK and ITS.

SEK

Svenska Elektriska Kommissionen, SEK, is the SwedishNational committee of CENELEC and IEC. SEK deals with all electrotechnical standardization. These areas do include areas such as electrical safety, EMC, electrical components and subsystems, household electrical equipments.

ITS

Information Technology Standardization, ITS, is one of the standards bodies in Sweden.

ITS deals with standardization in the ICT sector, which is information technologies and telecommunications. This field is of particular

importance because the technology is spread worldwide and it concerns companies and people everywhere.[39]

There are about 40 committees developing standards under the supervision of ITS, which supplies administrative leadership.[40]

On behalf of SIS and SEK, ITS represents Sweden in ISO/IEC JTC 1 and on behalf of SIS, someISO and CEN committees. ITS is also a member of ETSI, where the task is to put forward and coordinate a Swedish standpoint, according to ETSIs directives.

ITS is responsible for some of the national coordination of the standardization within the ITU, in line with a contract with the Swedish telecommunication agency.[41]

ITS is a flat organization, where the voting is delegated. The interested parties are organized in a general assembly, a board and or at committee level.[42]

The ITS interested parties experts are developing standards in many areas of the IT-field such as bar coding and related products, system engineering, identification cards and security.

4.1.2 European level

CEN

CEN is the European Committe for Standardization. It consists of 19 national standardization organizations plus EU, EFTA and the Czech republic. SIS is the Swedish member.

CENs system for the development of European standards (ENs) is based on the national members. This means that national delegations are sent to the European committees to put forward national standpoints when there is voting. They also carry out nationally binding rules for the implementation of ENs and the withdrawal of contradictory national standards.[43]

There are about 8 800 standardization projects now in progress within CEN in 270 technical committees.

In 1985 CEN and CENELEC got a considerably greater importance through EU´s ”new approach” program for harmonization of technical regulations and standards for the elimination of technical barriers to trade.[44] This so called new approach is not new anymore. Its purpose is

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[39] ITS Informationstekniska standardiseringen
[40] Ibid
[41] Ibid
[42] Viklund, Bo, ITS
[43] Sköld, Anders, SIS Globalization
[44] Standardkalendern 1999

that European standards should be the foundation for other standardization in the fields of health, environment and safety. It has not gained acceptance in the IT-sector, where very few standards have been approved.[45]

CEN have taken measures to adapt to the market demands for faster processes in the development of ENs, the so called CEN optimization. It will take an estimated 8-9 years before all ongoing standardization projects have been concluded. This is not acceptable. Therefore CEN has decided to simplify the working-process. Thus there are now three levels of decision-making in CEN.[46]

CEN has also established what is called CWA, CEN Workshop Agreement, where the interested parties can participate directly and make decisions quicker.

The members of the working-groups are experts. The CWAs are global and financed directly by the participants. A CEN member has the right to veto, but ITS is of the opinion that the right of veto is unjustified in this case, and it may have caused the IT industry to resent it. So far The CWAs have not been a success.[47]

CEN has approved approximately 3 500 ENs up till now. During 1998 about 1 000 new ENs were issued.

CENELEC

CENELEC, European Committee for Electrotechnical Standardization consists of the national standardization committees of the IEC that are members of the EU and EFTA countries and the Czech republic.

Its purpose is to develop and approve standards in the electrotechnical field. Mostly it uses results from the IEC to ensure a harmonized Western-European application.

CEN and CENELEC transpose ISO and IEC standards, with or without changes, into ENs. All ENs are transposed into national standards, and are only available as national standards. [48]

CEN has decided that there is no added value in transposing standards from the ISO/IEC JTC1 into ENs. CEN has even decided to withdraw a large number of these earlier transposed standards.

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[45] Viklund, Bo, ITS
[46] Sköld, Anders, SIS Globalisering
[47] Viklund, Bo, ITS
[48] Ibid

ETSI

ETSI, European Telecommunications Standards Institute is built up in a different way from CEN and CENELEC. It is open for participation not only to national standardization organizations, but also to telecommunication administrations, manufacturers, users, net-operators, research institutions and others.

There are more than twenty Swedish members from the industrial sector. ITS is one of these.

Altogether ETSI has 750 members located within 35 European countries and including some 150 from 15 non-European countries.

When voting on the approval of European standards and on other issues where national voting is required ITS has the vote for Sweden.

There are approximately 200 experts from various companies and organisations in Sweden participating in the three different kinds of ETSI committees. These are ETSI Projects, Technical committees and ETSI Partnership Projects.

Apart from Reports and Guides, ETSI approves deliverables on three levels:

ETSI Technical Specifications, TS, contain normative provisions, approved for publication by a Technical Body.

ETSI Standards, ES, consist of normative provisions approved for publication by application of the Membership Approval Procedure.

European Standards (telecommunication series), EN, are ETSI deliverables containing normative provisions, approved for publication in a process involving the National Standards Organizations and/or ETSI National Delegations. They have implications concerning standstill and national conflicting standards.[49] This means that when an EN is developed no national work can be carried out and when the EN is adopted all national conflicting standards shall be withdrawn and the EN shall betransposed into a national standard.[50]

To show the complexity and the amount of work of standardization on the European level follows a description of the ETSI European standards voting cycle:

ETSI Technical Committee, TC, approval

Public enquiry

[49] Viklund, Bo, PM, ITS and Standardkalendern 1999
[50] ECE/STAND/17/Rev.3 Article 6.4, Viklund, Bo, ITS

National circulation, ITS coordination, national experts

ETSI TC evaluation

Formal voting

National Circulation and voting, national experts

ETSI adoption

National adoption[51]

This process takes a lot of time and effort, and is consequently very costly. Therefore the interested parties really have to believe in the project, before they are willing to start the process.

When voting on an ETSI TS or a TR (Technical Report) each member has one vote. When voting on an ETSI ES, EG (ETSI Guide) or EN, European Standard (telecom series) a system of weighted voting is used, where each member or country has a voting strength according to its relative importance.[52]

ETSI has a large number of agreements of cooperation with non-official standardization organizations, consortia and fora.

It also acts in a new open forum for collaboration between official and non-official organizations called The ICT standards board, ICTSB. Apparently it hasn´t been successful so far, mainly because it is dominated by the European organisations CEN, CENELEC and ETSI. The global fora do not accept this.[53]

On a global level ETSI cooperates with the ITU and regional and national organizations in other parts of the world.[54]

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[51] Viklund, Bo, ITS
[52] Viklund, Bo, ITS
[53] Viklund, Bo ITS
[54] Standardiseringskalendern 1999

4.1.3 International level

ISO

The International Organization for Standardization, ISO comprises 120 national standardization organizations. It has a broad focus on all kinds of standardization in all fields except the electrotechnical sector, telecommunications and some special areas concerning provisions.[55]

Like the other traditional organizations ISOs system is based on national members. Consensus is a key word, which means that the basis of standardization is that you get together voluntarily, and develop standards that are adoptable for those who wish to do so. The views of all interested parties such as manufacturers, vendors, users, consumer groups, testing laboratories, governments, engineering professionals and research organizations are taken into account.

There are some 7 500 ongoing projects within the ISO. About 11 000 ISO standards have been adopted so far.[56]

The development of international standards, IS, is carried out in Technical Committees, TCs, Sub Committees, SCs and Working groups, WGs.[57]

The work is decentralized so that the responsibility for the secretariats of the technical committees is on the national organizations.

There are 500 international organizations in liaison with ISO.

The ISO standards are revised every five years.

IEC

The International Electrotechnical Commission works for standards in the electrotechnical field. IEC collaborates closely with ISO in this matter.

ISO and IEC have common rules for the technical work of standardization and for the development of international standard.

Together ISO and IEC have formed a Joint Technical Committee, JTC 1, for standardization in the area of information technology, ISO/IEC JTC 1.

JTC 1 has over 100 subcommittees and working groups.[58]

Due to the market situation in the ICT field JTC 1 acknowledges PAS, Public Available Specifications, which are de facto standards. They could be specifications from ECMA, OMG or Wapforum. The non-official standardization organizations recognized in this way are called Recognized PAS Submitters.

A PAS submitter can after recognition send in its specifications for voting to become international standards.[59]

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[55] Ibid
[56] Sköld, Anders, SIS Globalization
[57] Standardiseringskalendern 1999
[58] Standardiseringskalendern 1999

ITU

The International Telecommunications Union is a United Nations Organization which handles standardization in two fields, ITU-T for telecommunications and ITU-R for radiocommunications.

The recommendations developed in the ITU are not binding, but it is essential to follow them to make communications between countries possible.

The members are tele-authorities, net-operators and manufacturers of systems for telecommunications.

ITS is administrating the work in Sweden for both sectors.[60]

CONSORTIA
DE FACTO STANDARDS

GLOBAL LEVEL

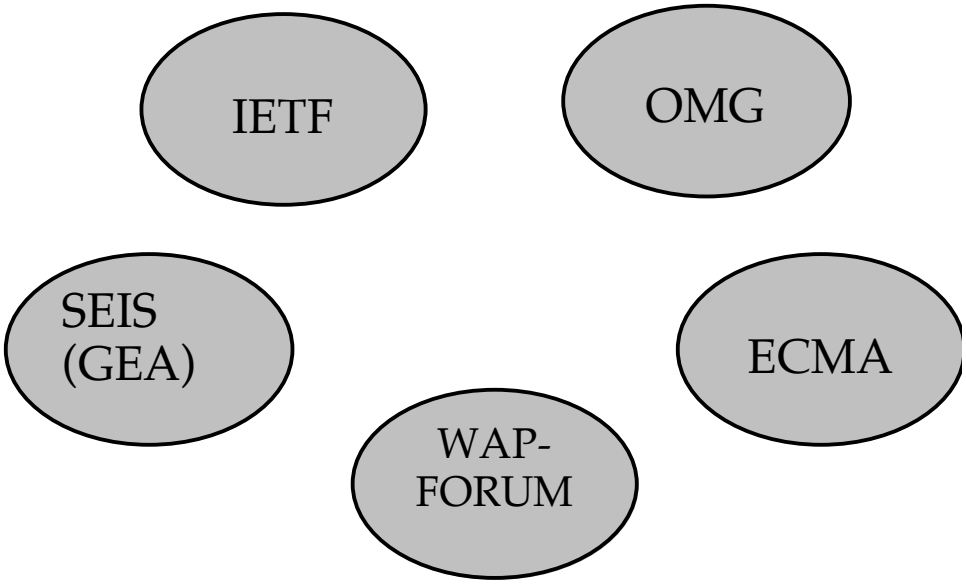

Figure 4.2

4.2 Fora and consortia

[59] Viklund, Bo, ITS
[60] Standardiseringskalendern 1999

Global level

The fora or consortia have emerged in considerable numbers along with the development of the IT sector. The traditional standards organizations have not been able to respond to the market demands for faster processes and direct industrial participation Membership in associations of this kind is one way of creating strategic alliances with the competitors.

The fora are characterized by being market run, with common goals. The participants are very enthusiastic, since they have a vested interest in the success of the technology.

The consortia are global in the sense that they are open to all who want to join them. The cost may be high, but apparently the industry finds it worth the investment.

The work is concentrated on a specific technology or product. This means that, unlike the situation in the traditional standardization organizations, you do not have to drag along members who are opposed to the development of the solution.

There are some doubts about the value and the amount of testing that goes on in some of the forums. But on the other hand, there is a greater risk of failure without serious testing. The companies involved have everything to gain by taking testing seriously and thereby having a greater chance of turning the technology into a success.

The lead times for de facto standards are often considerably shorter than in traditional standardization organizations.[61]

The number of fora is almost innumerable; there is practically one forum per technology. In this paper only a few of the most important ones will be described.

ECMA

ECMA is a body that is Standardizing Information and Communication Systems. It is one of the oldest and most respected forums. It deals with developing standards in the information and communication systems.

There are three categories of members in ECMA, ordinary, associate and SME.[62]

Ordinary members are companies in the IT-field, which develop, produce and market hardware or software products or services. These technologies are used for processing digital information for business, science, control, communication or other similar purposes.[63]

The associated member is a company, which has an interest and experience in matters related to one or more of the technical committees, but doesn´t qualify as an ordinary member.[64]

SME membership is open to companies with an annual turnover of less than 100 000 000 Swiss Francs.[65]

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[61] Viklund, Bo, ITS
[62] Small and Medium sized Enterprises
[63] ECMA, www.ecma.ch/memento/members.htm
[64] Ibid

Special technical committees are established for a specific task, and are disbanded when the task is completed.

The result of ECMA's work is two kinds of de facto standards, ECMA standards and ECMA Technical Reports. It is possible to transpose an ECMA standard into an international standard.[66]

ECMA is a Recognized PAS Submitter, and is invited as a forum to CEN/ISSS. ECMA is also an observer of ETSI and is responsible for one of ETSIs committees.[67]

OMG

The Object Management Group is a non-profit corporation which develops specifications that are technically advanced, commercially viable and vendor independent for the software industry. It now has over 800 members.[68]

Object management is software development that models the real world through representation of objects. "A key benefit of an object-oriented system is its ability to expand in functionality by extending existing components and adding new objects to the system. The result is faster application development, easier maintenance, enormous scalability and reusable software."[69]

The focus of OMG is not on the underlying technology but on integration and interoperability.

There are three major bodies within the OMG, the Platform Technology Committee, the Domain Technology Committee and the Architecture Board.[70]

There are mainly three ways to influence the OMG process, apart from general review, commentary and open discussion.

Firstly there is the possibility to vote on work issues in the so-called Task Forces.

These issues will ultimately be reviewed and voted on at the technology committee level. Secondly, there are two technology committee levels and you can vote on the work items at one or both of these. The third way of doing it is to actually submit technology for adoption at one or both of the two technology committee levels. The membership fees are varied for different levels of influence. The fee is more expensive at the higher level.[71]

OMG used to be wrongfully seen as the group up against Microsoft. The fact is that Microsoft is a member of OMG.[72]

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[65] Ibid
[66] Viklund, Bo, ITS
[67] Ibid
[68] OMG, www.omg.org/omg/background.html
[69] Ibid
[70] Ibid
[71] Ibid
[72] Ibid

IETF

The Internet Engineering Task Force is a large open international community of network designers, operators, vendors and researchers concerned with the evaluation of the internet architecture and the smooth operation of the Internet. It is open to any interested individual or organization.[73]

The actual work is done in working groups organized by topic in several areas such as routing, transport and security. Much of the work is handled via mailing lists.

The IETF is the principal body engaged in the development of new Internet standard specifications. It´s not a traditional standards organization, although many of the produced specifications become standards.

There is no membership in IETF. Anyone may register for and attend any meeting.

The IETF is a four-group-structure; the ISOC and its board of trustees, the IAB, the IESG and the IETF itself.

The Internet society, ISOC, is a professional society that is concerned with the growth and evolution of the worldwide Internet, with the way in which the Internet is used, and with the social, political and technical issues arising as a result.[74]

The IAB is a technical advisory group of the ISOC, which provides survey of the infrastructure of the Internet and its protocols, and serves, in the context of the Internet standards process, as a body to which the decisions of the IESG may be appealed.[75]

The Internet Engineering Steering Group, IESG, is responsible for technical management of IETF activities and the Internet standards process.[76]

The IETF is divided into eight functional areas, which have several working groups each.

The working groups are not permanent, and once the goal is achieved, the working group is disbanded. As in the IETF, there is no official membership for a working group. A member is someone who is on the mailing list of that working group. However, anyone may attend a working group meeting.

Areas may also have Birds of Feathers (BOF) sessions. They have the same goals as working groups, but they have no charter and only meet once or twice. BOFs are often held to determine if there is enough interest to form a working group.[77]

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[73] IETF , http://www.ietf.org/overview.html
[74] Ibid, http:ietf.org/tao.html
[75] Ibid
[76] Ibid
[77] Ibid

Internet-drafts are working documents of the IETF. Any group or individual may submit a document for distribution as an Internet-Draft. These documents are valid for six months, and may be updated, replaced or withdrawn because they are declared obsolete at any time. Guidelines require that an expiration date appear on every page of an Internet-Draft. The Internet Drafts are not to be used as reference material, nor are they to be cited from, other than as ”Working-drafts” or ”work in progress”[78]

Unrevised documents placed in the Internet-Drafts Directories have a maximum life span of six months. After that they must be updated, or they will be deleted. After a document becomes a Request For Comment, RFC, it will be replaced in the Internet-Drafts Directories with an announcement to that effect.[79]

There are three standard levels in The IETF, Proposed standards, Draft Standards and Standards. The requirements of a proposed standard are that it should be a complete, credible specification with demonstrated utility. It has a lifetime of at least six months but no longer than two years. After that it should be elevated, abolished or recycled.

A Draft standard should be independent and have interoperable implementations. It should work well even with limited operational experience. After between four months and two years it should be elevated to a Standard, abolished, recycled or returned to being a Proposed Standard.

A Standard should demonstrate operational stability. It can last forever or be sent off to the Historic department, which means that new versions must start from the beginning.[80]

Wapforum

Wapforum is a consortium designed to promote the Wireless Application Protocol.

It was formed by the industry to provide technology necessary to develop and support applications for users of wireless devices. The number of Wap-users is expected to exceed 100 million worldwide by the end of the year 2000.

A WAP specification is a global open standard. Membership in WAP is open to all industry participants.[81]

The specifications are available on the Internet for all to comment on.

The WAP specification leverages and extends existing Internet standards, and thus enables application developers to create their contents to the special needs of wireless users.

It is still not certain whether or not Wap will be a commercial success. It will really depend on whether the contents will be interesting enough to be of practical use.

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[78] http://www.ietf.org/ID.html
[79] http://www.ietf.org/tao.html.
[80] http://www.ietf.org/rfc/rfc2026.txt
[81] WAPforum, www.wapforum.org/faqs/index.htm

SEIS

The Secured Electronic Information in Society was an open forum that works in three fields, Cards[82], Interfaces and Regulations.

The overall goal was to form a complete set of norms that are to create an infrastructure as a foundation for security in the electronic field of society.[83]

About fifty major companies and authorities were members. SEIS met the demands for collaboration between the private industry and the public sector of society.[84]

An example of a standard developed by SEIS is the Electronic Identification Card. It has been adopted as a national Swedish Standard, and the work is now continuing on an international level as will be shown in the next chapter.

SEIS is now found as an integral part of GEA (Gemenskapen för elektroniska affärer).

5 THE EID-STANDARD[85]

5.1 Background

A unique cooperation between the public sector and the business community in Sweden has resulted in the approval of a national standard for an Electronic Identification card[86]. The process has taken place within the forum SEIS, Secured Electronic Information in Society.[87]

This standard is an example of a consortium creating technical specifications, in other words de facto standards, and then adding value and status to the technical solution by turning to a formal standards body, in this case ITS, for further development. The technical solution is also based on ISO standard[88] and stipulations for application from the IETF.

The international prospects for this technology are very good, and the standard has created a lot of interest in many parts of the world. Because of this the strategy is to apply for an international standard via JTC 1. Now it is being scrutinized in one of their technical committees as a New Proposal under the name of Cryptographic Token Information

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[82] more on cards in chapter 5
[83] SEIS, www.seis.se www.gea.nu and SEIS Användning av elektroniska ID-kort EID
[84] Ibid
[85] Electronic Identification
[86] SS 614330, SS 614331, SS 614332
[87] SEIS, www.seis.se
[88] ISO/IEC 7816

Application. SEIS has decided to face JTC 1, the international standard body, directly, instead of first transposing the technology at the European level.[89]

IPR[90]
There are several IP-rights involved in the EID standard[91], but specific details on what kind of IPR or who the holders are is not openly accessible. Documents produced in working-groups are not available to the general public.

5.2 The technical contents

The EID-card is supposed to be used for security functions of all persons using digital networks. It is an active card, a smart card with a chip. In the chip there is a small computer, designed to perform advanced cryptographic functions using the RSA-algorithm[92]. The chip also contains a memory for storing for instance a digital signature.
This makes it possible to

- positively confirm identification, i.e. authentication
- store information in a digital envelope, or lock it in a digital way with an electronic key. That is to secure confidentiality
- use a digital signature to confirm a commitment, to achieve unrejectability, and to lock its contents; i.e. integrity [93]

5.3 The PKI infrastructure

The EID card is a component in a Public Key Infrastructure, PKI. It is a method for safe computer-communication between two or more parties. The PKI is built on an asymetric cryptographic technology. This is to say that it requires two keys for the technology to work, a private, secret key and a public, open one. The private key is stored in the chip, and the use of it is protected by a PIN-code.[94] In the future this might be replaced by a biometric code of some sort, such as fingerprints, to ensure that nobody but the holder can use the card with the private key.
The public key is protected by a certificate and published in a catalogue.

Standardized interfaces are needed between all the components in the computer-system and so called API, Application Program Interfaces. These interfaces are used for the authenticity, digital signature and writing in cipher.[95]

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[89] Björkander , Susanne and Viklund, Bo ITS
[90] Intellectual Property Rights
[91] Björkander, Susanne, ITS
[92] Rivest, Shamir and Adleman
[93] SEIS Användning av EID page 7
[94] Personal Identification Number
[95] SEIS, Användning av EID, Stockholm 1998, page 12

5.4 The advantages of the EID card

Compared to a regular physical identification card, which verifies the holder by a comparison between the physical appearance and the ability to write his/her own signature, the EID identifies the holder by her or his possession of the two keys. The public key exists only on the card itself. A certificate technically does the assurance that the public key really belongs to the right person.
The certificates are created and signed by a part called a CA, which is a certification authority[96]
It is possible to combine the EID with a traditional ID card. The surface of the card would then be used as a regular card for identification in a bank, for instance, and the card would carry the qualities of the EID in addition.[97]

5.5 Applicability

The EID card can be used in many different fields and has created great interest internationally.
The postal organizations in Sweden and abroad have joined or are considering joining in applying the EID standard. On a national level the Swedish postal company today has the platform for issuing EID cards and the appropriate digital certificate.[98]
The banks and financial institutes are continually working on improving the security in transaction systems. Companies in the tele-communication sector, like Telia and Ericsson, have made substantial contributions to the development of the technology for the EID-standard, in order to offer solutions improving the possibilities for trade over the internet.
In the health care area, as well as in other parts of the public sector, there is a need for solutions improving security and personal integrity. In many parts of the country, the principals of the health care sectors (i.e. the county councils) have shown an interest in using active cards for their staff.[99]

A lot of work is being done in many standard organizations and fora to try to transpose the EID card as a standard on as high a level as possible. The success of a standard depends on whether it is being used and implemented or not. The competition is fierce.
No one knows what the outcome will be, but the prospects look good so far.[100]

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[96] Ibid page 17
[97] Ibid page 9
[98] Ibid page 27
[99] Ibid page 27
[100] The EID-standard ## SS614330, SS614331 and SS614332, in three parts, can be found at this website http://www.its.se/ITS/svenska_standarder/svenska-std.htm

6 INTELLECTUAL PROPERTY RIGHTS AND COMPETITION LAW

6.1 IPR and Standards, A conflict of interests

Standard development is at the center of the fundamental conflict between the unique and the uniform. Patents are one way to value the unique; standards are the means to define the uniform.[101] IPRs are tools to create a market while standards are used for creating the marketplace. The conflict is due to the different nature and origin of these tools. Standardization organizations have traditionally been opposed to including IPR in standards. In the ICT-sector this view began to change in the 1970s and 1980s,[102] and since then there has been an ongoing debate.

The expansion of applicability of patents and the increased possibility to defend patent rights in the United States are the main reasons for addressing the issue.[103]

The Europe-based organizations realized that they had to follow the development, otherwise the industry would simply move their business elsewhere.

The companies and organizations supporting standard development, must balance the ”cost” with the ”benefit”. Naturally the owners of IPRs are interested in economic gain from their investment, but there is also the aspect of quickly achieving state-of-the-art standards.

Today many organizations, both creating formal and de facto standards have implemented policies on how to handle IPRs in the development of standards.

Currently, consensus-based standards organizations use a doctrine requiring that patent holders offer to license their inventions on ”reasonable, fair and non-discriminatory terms”.[104] This signifies that the invention will be available to multiple developers.[105]

For the owners of such rights, who are commercializing their products, it is vital to gain market acceptance and get a profit from their investment in research and development.

In the software sector computer programs are very easily copied and circulated to others. Since there is no deterioration in the quality of the

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[101] Krechmer, Ken, Communication Standards and Patent Rights: Conflict or Coordination? page 1, http://www.csrstds.com/star.html

[102] Viklund, Bo, ITS

[103] Krechmer,Ken, Ibid page 2

[104] ETSI Directives Annex 6.6.1

[105] Krechmer, Ken, Ibid page 5

copy compared to the original, the importance of IPR protection in the IT-industry has increased.[106]

6.2. IPR

Intellectual Property Rights are private rights that enable the owner to get an income from these rights. There are three ways of obtaining them. She can either apply the protected material herself or license the IPR in the protected material to others, exclusively or non-exclusively. She can also assign the rights to others.[107]
When it comes to standardization the most important IPRs are Patents, Copyrights, Trademarks and, in some countries, Trade Secrets.[108]

6.2.1 Patents

Patentability
The criteria for an invention to be patentable are

- novelty
- inclusion of an inventive step
- capability of industrial application
- technical character, technical effect and technical problem
- reproducibility[109]
- usefulness (USA)

Possible protection
Patents are used to allow inventors to add value to their technology, but yet open it to multiple developers.[110]
Any invention that meets the above requirements may be protected.
In the computer industry there have been no problems with hardware or firmware, which includes new or improved features.[111]
The possibility to protect software[112] technology has changed however, first in the USA, and therefore later in the rest of the industrialized world.
In the legislation it is stated that computer programs are not inventions and therefore not patentable. It is still not possible to protect a computer program per se, unless it meets the requirement of including an inventive step. Some key-programmed computer inventions have been considered patentable. Today, there is an ongoing debate on this issue. The situation is not clear. The demands of the market might lead to an adjustment of the patent institute. In the future, there is a possibility of the development of a special kind of short-term patent. The criteria would be adjusted to the new technology.[113]

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[106] Baker McKenzie, Guide to Intellectual Property in the IT Industry, page 6
[107] Baker and McKenzie, , page 5
[108] Ibid page 147, ”although this is subject to both academic and judicial dispute, it is argued by some that confidential information is a form of property right and may be protected as such.”
[109] Swedish Patent Act 1:1-2, Koktvedgaard pp 196
[110] Krechmer, Ken, Technical Communication Standards: New Directions in Innovation page 1
[111] Baker McKenzie, page 117

[112] A definition of software is ” the instructions given to a computer to enable it to perform a specific task”, Baker McKenzie, p xv
[113] Discussion on this matter can be found for example here:

The fact that a patent has been granted on a certain computer program is not a guarantee. It can be declared invalid.[114] The view on the patentability of software is also very varied in different countries, so the situation is complicated.
The programs that are not patentable are still protected by copyright for their literary qualities.[115] The copyright-protection does not prevent competitors from using the program.
A mere idea or concept is still not possible to protect with a patent or a copyright.[116]

6.2.2 A company strategy

It is important that the management of a company creates a patent policy early on. The following issues should be considered.
Is using the patent system worthwhile? The cost is high, the application becomes public, and reversed engineering makes it possible for anyone to reproduce the invention and maybe develop it further.
The patent protects the invention for 20 years.[117] That might be unnecessarily long in the IT–sector because of the fast development and short life cycles of new technology.
If the patent isn´t going to be strong enough, it might be better not to apply.
The geographical markets will have to be defined, too. The company might, even though it is small, be acting on the world-market. The cost for filing patents in many countries may be too high.[118]
Nota Bene! Before engaging in a standard body, the technology will have to be protected, preferably by means of a patent application. Otherwise someone else could take advantage of the situation and all efforts will be lost.

Policy of secrecy
If possible this is the best way to handle the issue. It will give the company exclusive rights to the invention without a patent. The invention will be a trade secret. There is, however a high probability that someone will find out and make use of the invention, sooner or later.[119]

Public domain
This is a defensive strategy. The advantage of turning the invention into public domain is that nobody else can apply for a patent. This is done by

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http://www.theregister.co.uk/000331-000021.html, Aharonian, Gregory, Internet Patent News Service 20000330, www.bustpatents.com/ipns.htm and on http://www.amazon.com/exec/obidos/subst/misc/patents.html/102-8423768-1588056

[114] Swedish Patent Act 1:1:2, Swedish Copyright Act 1:1:1, Kogtvedgaard pp 58, 82-83
[115] Swedish Patent Act 52§
[116] Koktvedgaard p 85
[117] Sw Pat. Act 40§, Koktvedgaard p 255
[118] Koktvedgaard p 189
[119] Ibid p 193

publishing an article in some obscure newspaper halfway across the world. Thereby the requirement of novelty is broken.[120]

6.3 IPR policies of the Standards Bodies

Today the standard bodies deal with IPR issues in two different ways. The first is through the well-established position of ETSI and the majority of organizations where such rights are recognized. Secondly there is the IETF, which has woken up recently, and realized that these issues will have to be taken care of.

6.3.1 ETSI

The ETSI policy on IPR is an elucidation of the policies of the major standardization bodies, both formal, like ISO, IEC and ITU and fora such as OMG, ECMA and Wapforum.[121] Therefore the ETSI policy is accounted for here. Developing this policy has been very difficult due to the different structures and cultures of industry in the various countries.[122]

The basis of the policy is that IPRs should be recognized. When IPRs are implemented in standards the owners should be ”adequately and fairly rewarded”[123]

In the ETSI policy IPR means all IPRs conferred by statute law and their applications with the exception of trademarks. Confidential information and trade secrets are also excluded.[124] That is to say that patents and copyrights are given recognition.

The key issue is to determine whether or not a particular standard or proposed standard includes ”Essential IPRs.” For an IPR to be considered essential it is required that it is ”not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to make, sell or otherwise dispose of, repair, use or operate equipment or methods which comply with a standard, without infringing that IPR.” [125]

A license agreement with a member of ETSI should include the right to manufacture, to sell, lease or otherwise dispose of what has been manufactured, and the right to repair, use or operate equipment.[126]

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[120] Sw Pat. Act 2:2, Koktvedgaard pp 192-193
[121] Viklund, Bo, ITS
[122] Ibid
[123] ETSI Directives, Annex 6:3:3
[124] ETSI Directives, Annex 6:15:7
[125] Ibid 15:6
[126] ETSI Directives Annex 6.6.1

A standard should represent the state of the art of a technology. If it contains unavailable essential IPRs, the investment in the preparation, adoption and application might be wasted. ETSI seeks a balance between the need of standardization for public use and the right of the owners of IPRs.[127]

Members of ETSI have an obligation to inform ETSI of essential IPRs they become aware of, but they do not have to conduct IPR searches.[128]

If members refuse to grant licenses on their IPRs, ETSI should search for an alternative technology that is not blocked by IPRs.[129] If the search fails work on the standard should cease and the member will be given a period of three months to explain the reason for the refusal.
If a non-member refuses to grant licenses on essential IPRs, the working-committe should try to modify the technology so that the IPR is no longer essential.[130] If this fails, members should be asked to use their influence and good offices to find a solution.[131] A failure at this point leads to non-recognition of the standard.

6.3.2 The Internet

IETF have previously not allowed the inclusion of patented technology in their deliverables. Instead the IETF have developed standards using a version of the technology without patents.[132]
The growing importance of IPRs has resulted in the development of a Best Current Practice including an IPR policy.[133]

The fact that most of the work in the IETF and their associated organizations and working groups takes place online make these policies somewhat different from those of the other standardization bodies. Regarding Copyrights all participants, by submitting a contribution to the standardization process, are obliged to grant an unlimited, perpetual, non-exclusive, royalty-free, world-wide right and license to the ISOC and the IETF.[134] The participant also has to allow the ISOC to freely disclose any information in the contribution. No part of the contents is confidential.[135]

The contributor is obliged to reveal any information on proprietary or IP-rights that are personally known to that person. He or she cannot be expected to give information about all IPRs owned or claimed by the organization they represent, or about those owned by third parties.[136]

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[127] ETSI Directives, Rules of Procedure, Annex 6:3
[128] Ibid 4
[129] ETSI Directives Annex 6.8
[130] Ibid 8.2.iii
[131] Ibid 8.2.iv
[132] SEIS, Användning av EID, page 30
[133] IETF, RFC 2026, page 27 fwd, http://www.ietf.org/rfc/rfc2026.txt
[134] Ibid 10:3:1
[135] Ibid 10:3:1:5
[136] Ibid 10:3:1:6

In the standard track documents, the existence of all IPR, including patents and patent applications, should be included in a note in the documents by the IESG.[137]
A difference, when compared to the IPR policies of other standard bodies, is that the IESG does not estimate the validity or scope of any IPRs that are included in any specifications in the standards track.[138] The IETF will make no effort to identify any such rights.[139]
Neither does the IETF take up any position regarding to what extent any license under such rights might or might not be available.
The terms for licensing should be reasonable and non-discriminatory. If an agreement on a standard has been reached, the IESG assumes that the terms must have been reasonable and non-discriminatory. [140]

It is not possible to read out of the policy documents to what extent licensers are rewarded, nor can you find out whether licenses for other IPRs than copyright are also given free of royalty. Patent-licence agreements granting licenses on the basis of reciprocity can be found on the internet.[141]

6.4 Competition law and Standards

Standards
Agreements on standards, along with license agreements on IPR can interfere with competition law. They can lead to a reduction of competition between companies, a limitation of the number of different products on the market and therefore reduce the opportunities for the consumers to make a choice.[142] On the other hand, they can also promote competition by setting the rules for a product-market. The Swedish Competition Authority takes the standpoint that standards can work both ways. Common standards can promote competition if they allow foreign companies access to a market. They can also reduce competition if they are designated to favor national producers. The authority prefers standards based on function rather than de facto standards based on a certain product. The reason for this is its consumer-perspective.[143]

There are as yet no specific rules of competition law laid down for standards in the IT-sector. This is due to the competition-promoting function of standards and, for the same reason, the tools of competition law have not been applied against the standardization bodies.

Standards can be seen as technical barriers to trade. Bureaucrats can devise laws and regulations in favor of local producers rather than

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[137] Ibid 10:3:2
[138] Ibid 10:3:2
[139] Ibid 10:4
[140] Ibid 10:3:3
[141] www. Ietf.org/ietf/IPR/ERICSSON/ROCCO
[142] Carlsson, Schuer, Söderlind, Konkurrenslagen, page 218
[143] Widegren, Monica, Swedish Competition Authority

foreign companies. National markets can depend upon standards controlled by the local industries and governments can issue procurement specifications that favor individual suppliers. The WTA/WTO Agreement on Technical Barriers to Trade[144] is an international attempt to remove such unfairly discriminatory standards as a factor in free trade. The goal of the TBT is to promote trade through international agreements for how the market should work.[145] Annex 3 of the TBT contains the Code of good practice for the preparation, adoption and application of standards. Section E states that the standardizing bodies are to ensure that standards are not prepared, adopted or applied with a view to, or with the effect of, creating unnecessary obstacles to international trade.

The Standardization Bodies

An *association* between companies like a standardization body offers a sort of legal body to its participants. Concerted practices between member-companies are regulated in order to ensure the functions of the market economy. If agreements are made under the umbrella of an organization, the authorities look upon them as if they were made between the companies themselves.[146]

According to the rules associations can, for instance, promote the line of industry in question, edit magazines or organize training. They can also collect and publish information about the industry, provided that the identity of any single member company is not revealed.

It is prohibited for associations to deal with pricing agreements, lists of recommended prices, to divide the market or to set limits for production. It is also forbidden to hand out information between the members on pricing, discounts or conditions on client-relationships if it can be traced back to an individual member company.[147]

Horizontal agreements made by *companies* at the same level, such as producers or manufacturers, are considered to be more of a threat to competition, than vertical ones, made between a producer and a retailer. Horizontal agreements that divide the market, for example geographically, are forbidden.[148]

If the intention with or the appreciable effect of an agreement is to restrain competition, they are forbidden and should be declared invalid.[149] In the Swedish legislation it must have a negative effect on the national market to be prohibited.[150] The EU has the same rules except that the effect has to be on trade between member countries.

Examples of prohibited agreements are price cartels, where the price of a product or other conditions is fixed.[151] Another kind of forbidden

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[144] hereafter referred to as the TBT

[145] Willingmyre, George T., Standards…..An Essential Component of Corporate Business Strategy, http://www.gtwassociates.com/answers/wsdpap.html

[146] Carlsson, Schuer, Söderlind p202, Swedish Competition Act 6§

[147] 6§ Sw. Competition Act, Article 81 (85) EC Treaty, Carlsson, Schuer, Söderlind p 201 fwd

[148] Ibid. P 169

[149] Ibid p 212, Swedish Competition Act 7§

[150] Swedish Competition Act 6§

[151] Carlsson, p 153

cooperation is rigged bidding. The bidders are supposed to compete in giving the best offer, and not decide in advance who is to give the lowest bid.[152] Agreements on retail price maintenance where producers set gross prices for the retailers are also not allowed.[153]
Setting quotas for production with negative effect on competition is not permitted. This is a kind of quota cartel. Another way to restrict competition is to set standards to prevent access to the market for external companies.[154] If the agreements have a positive effect on the market, like some R&D cooperation or license agreements, they can be allowed by means of an exemption.[155]
Tying clauses are not permitted, unless they are justified for technical reasons. If there is a connection between the main and the attached product or service for natural reasons or due to commercial practice, tying clauses are allowed. They are common in license agreements.[156]

For the market economy to function well, *monopolies* have to be prevented. Companies that dominate their market in an abusive way may restrain competition.[157] An important factor is to define what the relevant market is. The domination can be either on the production market or on the geographical market. The market share also has relevance, along with the potential for competition in that market.
Unreasonable clauses in contracts, setting limitations for the market, discriminatory conditions and tying clauses are prohibited.
Being in a dominant position is not forbidden, or trying to achieve domination. It all depends on how the company handles the situation once domination has been reached.[158]
Owning IPRs is an advantage and can mean domination in relation to competitors, but because law regulates these rights, the mere possession does not imply a prohibited dominant situation. In the EU the existence of IPRs is protected,[159] but the exercise of IP rights can come into conflict with legislation.

In the United States, organizations like the NCITS[160] are well aware of the strict regulations on antitrust matters in their country. In order to prevent its members from violating antitrust legislation, the NCITS has developed detailed guidelines, which are mandatory.
The following topics are never to be discussed at any NCITS or NCITS subgroup meeting:

- prices or pricing policies of any specific company,
- research and development, sales, marketing plans
- confidential products of any company

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[152] Ibid. P 155
[153] Ibid. P 157
[154] Ibid. P 159 fwd
[155] Ibid. Pp 161, 169
[156] Carlsson. Schuer, Söderlind p 174
[157] EC Treaty Article 82(86), Sw Competition Act 19§
[158] Sw Competition Act 19§, EC Treaty Article 82 (86), Carlsson, Schuer, Söderlind p 333 fwd
[159] Ibid article 30(36)
[160] National Committee For Information Technoloy Standards, www.ncits.org

- whether certain suppliers or customers will be served
- prices paid to input sources
- complaints about individual firms or other actions that might restrict a competitor in any market

These topics can only be discussed upon the advice of NCITS counsel.

By taking this action, the NCITS is trying to anticipate and avoid its members´ getting involved in antitrust lawsuits, which are very costly and lengthy.

7 STANDARD STRATEGIES

7.1 Background

Standardization is a strategic business issue that has a direct impact on the development of new products and new markets. Taking active part in standardization means leadership in technology.[161] In the ICT sector, a successful company must be active in creating standards promptly for the interfaces with the technical environment to avoid failure with isolated solutions.[162]

The purpose of developing a standard is to gain market acceptance and to make the proprietary technology a commercial success.In order to achieve this a company will have to make some important strategic decisions that need serious consideration. The standardization policy will have to be coordinated with other policies on management and IPR.

The importance of knowledge of the company's IPR position cannot be emphasized enough. Unprotected IPRs should not be revealed in a standards working-group.[163]

7.2 Positioning

Forum

The choice between the formal bodies of standardization and the fora depends on factors such as the size of the company and the market share. Another matter to be considered is the nature of the market in which the company operates. If it is a fast growing new market, like in the IT sector, the company might consider joining an independent forum instead of a formal standards body. If there is a forum for the same technology as

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[161] Fisher, George, Business Week, october 16 1995, quoted from Willingmyre, G, Standards….An Essential Component of Corporate Business Strategy, http://www.gtwassociates.com/answers/wsdpap.html

[162] Vöhringer, K-D, Daimler-Chrysler, Ten theories on the subject of standardization, http://www.ifan-online.org/news/

[163] All of the strategies are suggested by Bo Viklund, ITS

that the company, joining is a way of keeping an eye on the competitors, as well as an opportunity to influence the path the technology is taking. This way you can secure that the company's research follows those lines.

The most important demand from companies today is direct participation in standardization. In a forum the company sends their own representative. To take part in the work of the formal standard bodies the company will have to settle for a national representative, who is sent out to express the consensus view of the organization. Naturally, the possibility to influence the process is much larger in the fora.

A choice will have to be made regarding what areas are to be given priority, e.g. a certain product or a certain technology.

7.3 Competition

What does competition look like in the business sector in which the company is situated? Is the market divided between a few large companies, or is there a multitude of actors of different sizes? Are there many small companies each with a small share of the market? Does one large manufacturer dominate the market?

What are the conditions of the product market?

Are there fora and standardization bodies? If so, how do they work? Have they been successful? Have competitors gained market shares by participating in standardization bodies?

7.4 Active/passive participation

The ability, possibility and willingness to contribute to the standard making process are to be considered when deciding whether the company should be a standard developer or merely a user.

Taking active part in creating standards requires a considerable amount of time and commitment from experts within the company. The representative will have to be a technical expert or an executive. If the company is small it will be very costly to spare people who might otherwise be needed to run the research department on a daily basis.

The other way to go is to buy standards and adapt the development to them. This way the company will benefit from a standard developed by others, but it will not be able to influence the future product development and the direction of the market.

The delegate sent out to represent the company in a standards body should have a well specified mandate for negotiations and a good knowledge of internal time and cost limits for the product development. He or she will have to be well aware of the company´s position on IPR issues and must have a good insight into the mechanisms of standardization. An ability to understand other delegates and their objectives is also required as well as a capability to convince other delegates. In other words, what is needed is good social competence.

7.5 Timing

If the development has reached a stage where it is ready for commercialization it might be too late to join a standards forum. There is a great risk that the products may be out of line or out of date. Companies should develop a standards strategy right from the beginning, even before the actual foundation of the company. It needs to be done at the same time as the product development. All researchers ought to keep themselves informed of the current situation in their line of technology even if the thought of starting a company never occurred to them.

7.6 Integration

Standardization should be integrated in the planning, development and information flow of the company. Standard issues should not only be delegated to internal experts within the company.[164] These issues have an effect on all parts of the business. The whole staff ought to be aware of the company´s position as to standards. Detailed technical knowledge is not necessary, but everyone should have a general idea of the current issues and topics.[165]

7.7 De facto/proprietary standards

An ideal strategy is of course if a company can make their proprietary technology a de facto standard without the participation in any forum. However, in most cases that is not possible. It requires that the product is unique, and therefore can dominate the market. That is to say the market will have to be to some extent controllable. The company must also have enough financial strength to make itself a commercial success with large investments in marketing. In order to achieve such a strong position on the market the company will have to be number one in every way and dominate. It will have to get the ”first mover advantage”.

There are successful examples though, like Microsoft´s Windows 95, which is almost impossible to avoid if you buy software.[166] In the long run, though, ruthless exploitation will not pay off and cannot be recommended. The authorities will react, and so will the competitors.

No approach to or strategy for standards fits all companies and all situations. Standards strategy evolves from management strategy, and there are many choices to be made. There are no golden rules that work for all. However, it is perfectly clear, that the market will punish those who take up the question of standardization too late. [167]

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[164] Ghilade, V, ISO Bulletin 12/99 http://www.ifan-online.org/news/
[165] Vöhringer, Daimler-Chrysler, Ten theories on the subject of standardization
[166] Willingmyre, Standards…an Essential Component of Corporate Business Strategy
[167] Vöhringer, Daimler-Chrysler, Ten theories on the subject of standardization

8 CRITICISM OF THE SYSTEM

There are many standards that function well to create new markets, and a lot of activity is going on to develop standards on all levels. However, there are some areas that cause concern and some problems that have yet to be solved.

8.1 A Standardization-IPR problem

The inventor of GPS, The Global Positioning System, Håkan Lans, was forced to give up his patent rights to get his invention adopted as a World Standard.[168] He received a phone call from IMO, The International Maritime Organization, a United Nations organization, telling him to give up his rights to the patent and the royalty, or the organization would deny him a world standard on the grounds that his technology was not good enough. Håkan Lans realized that he did not have a chance to fight the UN, so he did sign an agreement renouncing his rights.
Of course, he is disappointed that the patent system obviously cannot be used to protect technology when it comes into contact with the world of standardization.
This is a consequence of the consensus process. It is perfectly all right for a member to oppose a standard. In cases like this the directives say that the organization is supposed to look for another technology to replace the one connected with IP rights. Apparently, another technology has not been found. The holder of the IPR is then, if the IPR is essential, supposed to be offered to license the technology on fair and reasonable terms. This does not seem to have been the case here. The members are obliged to follow the directives, but since they have to reach a consensus agreement it might not be possible.
This case shows how difficult it can be to create a win-win situation. Clearly Håkan Lans, who put in eighteen years of work developing his technology, and his financiers, who put up something like 100 million Swedish Kronor, are not satisfied with the outcome.
Nobody knows what is going on behind the scene. Håkan Lans may be rewarded in some other way - he might have other rights.[169] Over the years Håkan Lans has been involved in many legal battles to save his IPRs. He may be temporarily down, but it is too soon to count him out. He might have something up his sleeve.[170]

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[168] Rosendahl, Johannes, Blåst på pengarna av FN,Dagens Industri 991202
[169]Viklund, Bo, ITS
[170] Lindstedt, Gunnar, Envis forskare navigerade från Meccano till världspatent, SvD 2000-05-10

Still, it is very serious having to give up IPRs that are expensive to obtain. It is perfectly all right to work for the good of mankind, but nobody should be expected to work for nothing.

8.2 IPR problems in the USA

In the telecommunications industry the number of patents involved in standards has increased substantially. This has caused problems because the cost of license fees for the product manufacturers and their customers is now close to exceeding the total profit.[171]
The American telecom industry has obvious problems with the multitude of IPRs involved in the standard processes. In a single communication standard there are multiple patent-holders claiming rights.
The costs of patents have risen in this segment of industry because the control of the worldwide communication networks has moved from public to private organizations. Private owners in a competitive market seek a return on their investment from as many sources as possible, also IPRs. The public networks, which were in a monopoly position sometimes saw their IPRs as public property. The companies control the communications technology via patents rather than via unique manufacturing, sales or distribution capabilities.[172]
The market for communication products has grown and is now on a world scale.The prices are low and will continue to decrease and the volumes are large and increasing.[173]

The task of the standards bodies to search for and validate IPRs[174] delays the process of developing standards. Negotiations over patent rights with the holders are in conflict with the intention of the standards bodies to speed up the process. The negotiations often end up being waiting games, and it is doubtful whether the standards bodies should get involved in these negotiations at all.[175]
The willingness to prolong negotiations has increased following a statement from the director of ITU-T. He asked if ”reasonable” license fees refer to individual fees or the total of all license fees required to implement an ITU recommendation.[176]
The development of standards is done by technicians who are not experts on legal matters involving IPR and should not have to spend time and effort dealing with these questions.[177]
However, the solution to the problem is not to refuse to integrate IPRs in the standards process. That will only lead to a decrease in the validation of the standard making bodies.

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[171] Ken Krechmer, Technical communication standards: New directions in innovation, page 2
[172] Ibid
[173] Ibid
[174] ETSI directives Annex 6:6:2
[175] Ken Krechmer, Tecnical communications standards; New directions in innovation, page 2
[176] Ibid,
[177] Ibid

8.3 First to file/First to invent

WIPO[178] has an enormous role to play in questions concerning harmonization between different national patent legislations. The fact that the principles for patent applications are different on the other side of the Atlantic can cause trouble.[179]
There have been cases where a person from across the ocean has been to a working-group meeting in a European standardization body where unprotected technology has been revealed and discussed. That person has then gone back home and filed for a patent, and the true inventor has ended up paying royalty for his own invention[180]. Enough details are not known to decide whether this situation could have been changed if the two different principles were harmonized, but it is obvious that things would be simplified if the rules were the same.The situation now is that an American person filing for a patent in the USA and other countries will come under the first-to-invent principle, which makes it very difficult for others to prove that they are the true inventors. Patent cases tend to become lengthy and expensive and are therefore not affordable for the little man.

Another question is the ”period of grace” in the first-to-invent principle, which gives the inventor the right to use the invention him-/herself. There have been discussions in WIPO whether or not this should be applied in countries using the first-to-file principle too, but nothing has been decided yet.[181]

8.4 Overlapping

The large number of organizations developing standards makes it very difficult to get a general view of the situation, even for initiated people. In the software engineering area there are about 55 different organisations involved, small ones of little significance and large ones with a major impact. They have produced over 300 standard documents of varied importance aiming at specific spheres and with different perspectives.
The basic elements of software engineering are the same as in other fields, for instance requirements definition, design, fabrication, installation, operation, maintenance and retirement.
Since the special conditions for producing and maintaining software are varied, these factors have caused duplication of standards data.[182]

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[178] World Intellectual Property Organization
[179] Koktvedgaard p 222
[180] Viklund, Bo, ITS
[181] Koktvedgaard, Immaterialrätt page 221-222
[182] Magee, Tripp, Guide to software engineering, Standards and Specifications, page vii

8.5 All interested parties

Everybody realizes the need to speed up the lead time for developing standards.
Today, everyone involved in the process of standardization has great opportunities to influence the outcome of the process.
Bo Viklund suggests that only the members who have actually done the basic work in the developing should have a final say when the standard is adopted. This could be described as a kind of limited consensus procedure.
There have been cases where a member who has not participated before, has come in at the end of the process, turning down the suggestion that other members have put a lot of effort into making. In other situations "anyone" has voted yes to a suggestion in a routine way without knowing or caring about the outcome, although the experts have discovered some major faults that ought to lead to the dismissal of the proposed standard.
Reducing the number of interested parties allowed to have an influence on the proposal is regarded as controversial and many members are opposed to it. A serious discussion on which the interested parties really ought to be seems to be needed for the moment.

8.6 Unnecessary transposition

About 95% of the standardization work in all areas consists of transposing and harmonizing international standards into Swedish standards. It has been suggested that some of this work is unnecessary and just causes loss of time. The standards used should be of the highest level. The transposition must add value. If no changes in the specifications were necessary, it would be in some cases enough only to translate the standard without publishing it as a national standard. Thus there would be only one standard without differences in adopted versions. Avoiding unnecessary transposition would reduce the bureaucracy within the system.
This would enable the national standardization bodies to concentrate their efforts on what is really needed: to support Swedish research and development and offer help to companies through the difficult process of standardization on the international arena[183].

8.7 Financing participation

The employers of representatives from Swedish companies pay for their participation in developing standards. For a small company it is bad enough to have to spare technicians or managers, who are vital for running the company. In other countries, like England, the government contributes to the delegates. With the new technology, more meetings might take place via the Internet and without traveling, but the costs are nevertheless high.

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[183] Viklund, Bo, ITS

The consequence is that many small enterprises have left the formal standardization bodies and are concentrating their efforts on the more specialized consortia. This is a disadvantage for companies from Sweden because they do not have the same terms as their foreign competitors.

8.8 Voting against yourself

When a delegate from a company is abroad negotiating standards on the European or international level she represents what has previously been agreed on as a national standpoint. The person does not necessarily represent the standpoint of her own employer.
It is vital that the representative has first been successful on the national level and has managed to convince the other people in the national standardization body that the position of their company is the best. Failing to do so means that she will have to act against her own company on the international level.[184] This situation is intolerable for small companies, and very tricky even for large ones.

9 CONCLUSIONS

The Federation of Swedish Industries suggested an overhaul of the structure of national standardization in SIS.[185] It was recognized that the industry and the government have a common responsibility for standardization and it looks upon standardization as a national resource. Information technology is here to stay, and so far Sweden has been quite successful in this field. The ITS is a very efficient organization which recognizes IPRs as being of great importance to industry.

The system with one nation one vote on the international level is very positive for small countries, and it must be taken advantage of. Major companies, like Ericsson and others, are participating in some 100 different standards bodies, both formal and de facto, and this is very expensive. They are taking their share of the responsibility for developing standards and creating markets.
Small companies have difficulties keeping up with this. The government would be wise to use taxpayers' money to increase investments in standardization.
Other countries, like the USA support their national standardization heavily, and Sweden must follow suit to be able to keep its position.
To meet the challenge from the USA big efforts will have to be made on the European level to improve harmonization, and to show a united front.

A small company with limited resources should enter a forum handling their specific technology, if there is one. After an agreement has been

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[184] Viklund, Bo, ITS
[185] UD, pressrelease 990416, www.regeringen.se

reached for a de facto standard, the opportunity to go on to a formal standard should be considered for greater recognition. The cooperation in the consortia will be of great advantage to a small company.

It is the technical development that leads the way for the standardization in the ICT area, not the other way round.
The significance of standards will continue to grow, no matter where they are developed. In the future there are many great challenges for standardization in the ICT-sector. The most interesting areas will be Multimedia Computing, High Capacity Storage Media, High Speed Telecommunications, Software Engineering, IT Security and Application Portability.[186]

In the near future education and training of specialists in standardization will be of vital importance and this is encouraged by ISO and IEC. They also want standardization to be introduced as a subject in the science and technology curricula of universities and other educational establishments.[187] There is no time to lose. The world is waiting!

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[186] ECMA, Preface, www.ecma.ch/memento/preface.htm
[187] ECE/STAND/17/Rev.3

SIS ITS Informationstekniska standardiseringen
SIS Swedish Institute for Standards
SIS Standardiseringen, igår, idag och imorgon
SIS Standardization in Sweden
SIS Standardkalendern 1999
SIS Standards, the Common European language I and II

CEN/ISSS Standards for a new age; ICT standardization in Europe, ICT Standards Board

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LIST OF ABBREVIATIONS

This list is written on a functional basis, not in afphabetical order. The abbreviations appear in the same order in the list as they do in the text of the essay when it is convenient. Those belonging to a certain organization are listed under that organization.

A THE OFFICIAL ORGANIZATIONS[188]

SIS Swedish Standards Insitute
www.sis.se

ITS Information Technology Standardization
www.its.se

SEK Swedish Electrotechnical Commission
www.sekom.se

CEN European Committee for Standardization
www.cenorm.be

CENELEC European Committee for Electrotechnical Standardization, www.cenelec.org

[188] All Abbreviations on the traditional organizations are from Standardiseringskalendern 1999

EN	European Standard developed by CEN, CENELEC or ETSI
CWA	CEN Workshop Agreement
ETSI	European Telecommunications Standards Institute, www.etsi.org
ETSI TS	ETSI Technical Specification
ETSI ES	ETSI Standard
EN	European Standard(telecommunication series)
EG	ETSI Guide
ICTSB	Information and Communication Technology Standards Board
ISO	International Organization for Standardization www.iso.ch
IS	International Standard
TC	Technical Committee
SC	Sub Committee
WG	Working group
IEC	International Electrotechnical Commission www.iec.ch
ISO/IEC JTC 1	Joint Technical Committee 1, Information Technology www.jtc1.org
PAS	Public Available Specifications PAS Submitters www.jtc1.org
ITU	International Telecommunications Union (UN) www.itu.ch
ITU-T	telecommunications
ITU-R	radiocommunications

B FORA / CONSORTIA

ECMA Formerly known as an abbreviation for European Computer Manufacturers Association, today it stands for a body that is Standardizing Information and Communication Systems www.ecma.ch

OMG Object Management Group

www.omg.org

IETF	Internet Engineering Task Force www.ietf.org
ISOC	Internet Society
IAB	The Internet Advisory Board
IESG	The Internet Engineering Steering Group
BOF	Birds of Feathers
RFC	Request for Comment
Wapforum	Wireless Application Protocol Forum www.wapforum.org
SEIS	Secured Electronic Information in Society[189] www.seis.se , currently found at www.gea.nu
EID	Electronic Identification Card
CTIA	Cryptographic Token Information Application, Possible future name for EID
RSA	Rivest, Shamir and Adleman algorithm
PKI	Public Key Infrastructure
PIN	Personal Identification Number
API	Application Program Interfaces
CA	Certification Authority

C MISCELLANEOUS

GATT/WTO	World Trade Organization, formerly General Agreement on Tariffs and Trade http://www.wto.org/
ICT	Information and Communication Technology
IFAN	International Federation of Standards Users http://www.ifan-online.org/index.html
TABD	Trans Atlantic Business Dialogue, http://www.tabd.com/
UN/ECE	United Nations Economic Commission for europe http://www.unece.org/
SME	Small and Medium Enterprises
NCITS	National Committee for Information Technology Standards (USA) http://www.ncits.org/

[189] All abbreviations under the title of SEIS are from Användning av Elektroniska ID-kort

GPS	Global Positioning System http://www.gpsworld.com/
IMO	The International Maritime Organization (UN) http://www.imo.org/
WIPO	World Intellectual Property Organization (UN) www.wipo.org
WSSN	World Standards Services Network **www.wssn.net**