**New challenges for telecommunications standardization as a result of a changing environment**

Discussion note submitted in November 2004 to the ETSI community by the Dutch ETSI members (NELO). Compiled by Rudi Bekkers, Dialogic *innovation and interaction*, Utrecht, The Netherlands.

> *There are certain ideas about uniformity which can sometimes impress great minds (as was the case with Charles the Great), but which invariably have an alluring effect on the poor in spirit. These people find in it a kind of perfection which they recognize as such because it is impossible not to discover it: the same weights and measures in trade, the same laws in the state, the same religion in all parts of the country. But is uniformity always and without exception desirable?*
>
> *Charles de Secondat, Baron de Montesquieu, Esprit de lois*[1]

For decades we have known that standardization is an important but also challenging task. Important because of the great advantages that can be associated with harmonized solutions, and challenging because it always involves a large number of awkward dilemmas. These dilemmas include: (1) homogeneity vs. diversity, (2) wide adoption vs. (regional) differences of interest and (3) the dynamics of innovation *within* a standard vs. the dynamics of innovation *between* standards. To differing degrees these interests have in the past been successfully brought into balance with each other, with widespread standardization as the result. Particularly in industries such as railways, electricity distribution and broadcasting, this worked successfully in certain cases and not in others. The telecommunications industry – a network industry par excellence – is very keen on standardization.

The European Telecommunications Standards Institute (ETSI), founded in 1988, is an important and successful exponent of standardization in this field. Although no one would deny the importance of standardization in the telecommunications industry, this world has been subject to major changes, certainly in recent years. This note discusses a number of exogenous (external) factors which are expected to be highly important for the future operation and success of standardization bodies. These factors are discussed in eight propositions (see Box 1 for a list). Although we are concerned with general developments, which will also have repercussions on other standardization institutes in this field, we will concentrate on developments which are of particular importance to ETSI.

By means of this discussion note the Dutch ETSI members hope to contribute towards the strategic reform which is currently taking place in ETSI.[2] In order not to be at cross-

[1] Charles de Secondat, Baron de Montesquieu, Esprit de lois, [1750], in *Oeuvres complètes* (Paris: Garnier, 1875), 5, pp. 412-413.

purposes with initiatives in that field, we will, as stated, concentrate wholly on external effects and not concern ourselves with internal matters. In this way we will try to outline a picture that may be helpful for the creation of strategy, without wishing to put forward strategic choices ourselves. We are convinced that the developments referred to in this document are such that they will influence standardization in this field in a radical and irreversible way within a relatively short time.

*Box 1: List of the propositions in this study*

**1. Overturning of the value chain relating to traditional telecommunications services**
*The imminent vertical separation of transport and services combined with the development of alternative infrastructures has far-reaching implications for the traditional, vertically oriented business models.*

**2. Distorted representation of interested parties and the prevailing standardization culture**
*As a result of the dominance of the more traditional parties, standardization bodies risk becoming a tool of anticompetitive behaviour. This can also hinder new, innovative developments.*

**3. Shifts in the industrial column**
*In the industrial column the importance of far-reaching integrated components (chips) is growing constantly, at the expense of the more typical telecommunications functions which are precisely those on which the standardization bodies focus. The application layers (including middleware and operating systems) pose a similar threat.*

**4. The absence of a broadly supported future-proof methodology for standardization which concerns more than one region**
*There seems to be waning enthusiasm for partnerships (such as 3GPP) for arriving at worldwide standards. In addition, a number important developing regions such as China are taking an increasingly independent attitude. This makes it difficult to achieve effective international harmonization.*

**5. Increasing diversity in the demand for standardization and other processes for the coordination of technology**
*The end of single system standards has been ushered in. Increasingly, (combinations of) market players are opting, on an ad-hoc basis, for a type of process that matches specific requirements.*

**6. Problems in providing a framework for safeguarding public interests**
*The increasing complexity of technology, the interdependence of building blocks and market trends are making it increasingly difficult to provide the desired framework for promoting public interests such as emergency calls, legal telephone interception and fighting crime.*

[2] The discussion note here presented is endorsed as such by the Dutch ETSI community, it should be noted that not all the individual members endorse all the propositions discussed. A number of experts have proved willing to share their ideas with us frankly on this topic. To them our thanks are due.

**7. The eternal problem of intellectual property rights**
*Particularly in the case of the large, formal standardization bodies, intellectual property rights remain a serious hindrance to expeditious production and the diffusion of standards.*

**8. Changes in the demand for telecommunications standardization**
*This discussion note does not endorse the claim which is sometimes heard that demand for standards in this area is beginning to be saturated.*

## 1. Overturning of the value chain relating to traditional telecommunications services

*The imminent vertical separation of transport and services combined with the development of alternative infrastructures has far-reaching implications for the traditional, vertically oriented business models.*

No one will deny that the last two decades have seen many changes in the telecommunications market. To a great extent, however, the major service providers (network operators) continue to build on a traditional, vertically oriented market model in which all the providers have an extensive, underlying infrastructure for transport and access. Competition creates a number of vertical compartments which provide interconnection to enable each other's customers to communicate with each other. Turnover is generated mainly by the income from circuit-switched speech telephony; a frequently heard statement is therefore that, by volume, the present telecommunications networks carry twice as much data traffic as speech traffic, but turnover for speech traffic is seven times as high as that for data. So far, new entrants such as carrier select and carrier preselect telephony providers and also (A)DSL providers, who can obtain access to the incumbent operators' networks on the basis of European legislation, have not been a great threat to the traditional business model (leaving aside one or two submarkets).

Serious indicators point to a large-scale overturning of the business case, with the dominant vertical business model giving way to a horizontal model in which the parties concentrate on a particular role in the value chain, such as access provider or service provider. Precisely because speech traffic generates much more income 'per bit' than data traffic, however, many traditional operators are holding on grimly to the integrated, vertical business model. You could say that incumbents are indulging – out of necessity – in a form of cross-financing. Abandoning this model not only results in a heavy fall in income; technologies such as VoIP (see below) also have major implications for the size of the workforce required; in many countries staff cutbacks at the (former) state enterprises are a thorny political issue.

Telephony services based on the internet protocol Voice over IP (VoIP) are the big catalyst in the – in our opinion inevitable – shift to horizontal models. This form of speech traffic could cause the regular income flows of many traditional

telecommunications providers to dry up and as such it has far-reaching implications for them, their suppliers and also for standardization. New entrants can roll out VoIP services cost-effectively by using regulated access to the telephony network (ADSL, ADSL2), or by using alternative infrastructures (cable television, WiFi/WiMAX access networks, Fibre-to-the-Home (FttH) networks and so on). The availability of alternative infrastructures seems to be increasing rapidly; in the Netherlands, for example, the three largest municipalities have plans to install FttH networks with urban coverage, while local wireless networks are increasingly being provided as a free facility in conference centres, hotels and restaurants.

VoIP services can involve completely new companies, but also, for example, mobile operators who can also supply fixed-line speech services using VoIP. Once a certain critical mass has been reached – and it now seems that this will happen –, growth will be accelerated by network effects[3]. In other words, if alternative providers manage to achieve a certain penetration, whether or not via alternative networks, their growth can gain momentum and undermine the incumbents' business case.

A characteristic feature of all this is the shift in intelligence from the core of the network to the periphery. This intelligence – and hence added value – then becomes located with another market player which does not itself does not have a carrier or access network. Because their IP-based networks can be structured very cost-effectively and they do not have to indulge in cross-financing, they can deeply undercut the incumbents' tariffs. In an even more extreme case the added value/intelligence can even migrate away from commercial market players and end-users can provide their own content. The Skype peer-to-peer telephony service is an example. With this service, the end-users' PCs in fact form the telephone exchanges, a concept that is fully consonant with the internet way of thinking. This telephony service is also free of charge (in so far as no interconnection to non-Skype telephones is needed; a commercial service for the latter has in fact recently become available). Skype also offers additional facilities: for example, during a telephone conversation users can also exchange files and a user can set up – free of charge – a conference call with five other users. Most users now phone using a headset; in partnership with Skype, Siemens has now launched a product which enables the end-user to use a wireless DECT telephone. According to Siemens, this is the first product in a series in what it calls its 'Cordless Product VoIP Integration Roadmap'. The introduction of Skype indicates that future developments could extend further than shifting the business case to other parties; parts of the commercial business case could evaporate. Skype could herald a much larger series of such developments.

The development outlined above, incidentally, seems to be taking place on a more substantial scale in Japan and other parts of Asia, and in the US, than in Europe. The faster development of broadband networks (including FttH) in a number of non-European countries could be an explanation of this. For example, VoIP is said to have already won over 50% of the market for long-distance telephony traffic in Japan. In the US an explanation can be found in the sizable market position of cable TV networks and the strong role of IT players. Conversely, the slower developments in Europe can be

[3] Generally referred to by economists as positive network externalities.

explained by the regulations regarding access in various European countries: the tariffs for fully unbundled access to telephone lines are much higher than those for shared access. These tariff differences make it difficult for a broadband provider, for example, to also supply telephony services cost-effectively. The fact that this development is taking place later in Europe could, to some extent paradoxically, work to the detriment of European standardization institutes: regional members remain more conservative and are not looking to the future as much as players in other parts of the world.

Incidentally, the above development is an extension of the struggle in the 1980s between the so-called Netheads and Bellheads, terms which refer to the advocates of the internet and of telecommunications respectively. The internet has also been described as 'the big equaliser', an appropriate metaphor in the context of the discussion here of the overturning of the traditional telecommunications business case.

## 2. Distorted representation of interested parties and the prevailing standardization culture

*As a result of the dominance of the more traditional parties, standardization bodies risk of becoming a tool of anticompetitive behaviour. This can also hinder new, innovative developments.*

The strength of a standardization body lies to a great extent in its membership. Whereas forums and consortia strive for a selective membership, formal standardization bodies are generally have an open membership structure as a starting point. These organizations' procedures concerning membership and the decision-making structure are chosen in such a way that interested parties of all kinds have a fair chance of being able to take part in the standardization process.

It is precisely such formal standardization bodies which run the risk of being used as a tool of – groups of – market players in order to achieve specific goals. In the case of ETSI, for example, the European incumbent network operators could rely on a strong position. Not only do these companies have a substantial number of votes themselves; their most important suppliers will also guard against any position being taken up which deviates strongly from their most important customers. This creates the risk that powerful groups of parties will use the standardization process as a tool for anti-competitive behaviour. They could start to regard standardization bodies as single control points, which they can substantially influence. In this way they create a rigidly formalized and structured market with many standards and rules, thereby erecting all kinds of access barriers to new players, technologies and initiatives. It is precisely an organization like ETSI, which also strives to champion certain public interests, operates in the specific European context and accepts assignments from the European Commission, which can find it is doing the splits.

Here is an example. ETSI has been instructed to draw up a list of standards for Article 17 of the framework telecommunications directive. National regulators can use these

standards to impose specific duties on parties with significant market power. Incumbents can exploit their position in ETSI to influence the contents of that list and thereby exercise influence on what standards can be imposed on them in future. They can also deliberately avoid standards and technologies which newer market players could benefit from if they were on the list.

The strong position of certain (groups of) market players can also lead to a status quo in which new, innovative developments stand little chance. It is precisely entrants to the market who can become victims of this. An example is the standardization of New Generation Networks (NGN). Incumbent operators will – perfectly legitimately – prefer to structure these networks so that as far as possible they match their present networks and their interests. This means, inter alia, that existing circuit-switched infrastructures can continue to be the core of the network. Interfaces on the 'edges' of the core network then define the form of NGN. By retaining all the intelligence in the network, the present traditional business case can continue to be applied: the design of services and hence the added value remain in the domain of the network, however. In other words: NGN with an IP core, but complete retention of the services integration model. Incumbents can derive market power from their *de facto* monopoly of interconnection (with, incidentally, the regulators being able to impose limits on the behaviour of parties with considerable market power). This is at odds with the content which new entrants want to give to NGN, and the preferred content from the internet world from which the most important protocols are being taken over. For this world is embracing the principle that the transport network is given a task which is as tightly described as possible, whilst the desired form of services and added value can be created in the periphery, whether or not by end-users themselves. The Skype internet telephony service is an illustration of this.

It must be immediately noted here that not all incumbents adopt the same approach. Whilst on the one hand quite a number of incumbents behave as described, a large number, on the other hand, take a progressive and future-oriented approach. The group to which an incumbent belongs depends on, among other things, (1) the size of its home market, (2) the degree of competition in the home market and – related to that – how strict the national regulator is, and (3) the extent to which the incumbent also carries on activities in other countries.

In addition, the internal culture which prevails is reflected in how a standardization body operates. This culture is a valuable given and can contribute to an organization's productivity and effectiveness. If, however, this culture is no longer consonant with the outside world, this can also result in isolation and deteriorating performance. Most standardization bodies in the telecommunications field have a strong internal culture, consisting of shared standards and values, views, routines and procedures. Over recent decades the outside world has seen great changes, however: the importance of IT has grown enormously, the market is now based on liberalization and competition, telecommunications services have become part of a larger whole. This has increased the size of the gap I have referred to: certainly the formal standardization bodies in this field are characterized by the dominance of 'older' players, senior members of staff, suppliers whose interests lie mainly in the continued existence of the 'older' players, and by a

rigid, formalized approach and culture. They are relatively monolithic environments, characterized by a monoculture. That picture contrasts starkly with the heterogeneous, dynamic world beyond.

## 3. Shifts in the industrial column

*In the industrial column the importance of far-reaching integrated components (chips) is growing constantly, at the expense of the more typical telecommunications functions which are precisely those on which the standardization bodies focus. The application layers (including middleware and operating systems) pose a similar threat.*

In the 1980s and '90s it was taken for granted that overall standards (whose development was then pivotal) should include various elements at all kinds of different layers. For example, the GSM standard comprises specifications for authentication, for the number plans used, and for the application layer (even including parts of the man-machine interface). In addition, standards could be drawn up in relative isolation: the authentication referred to above, for example, could be put in place without any real need to take account of other systems. Today's functional chain is much more 'decomposed', however; elements are becoming separated and the typical telecommunications functions are increasingly having to give way to the integrated components (chips) and the application layers.

Chips are gaining in importance in the value column of telecommunications systems. The development of computing and memory capacity has for many years shown a steep, more or less predictable, trend which is also known as Moore's Law. Every 18 months computing and memory capacity increase by a factor of approximately two. As a result, suppliers' activities in the telecommunications industry are moving away from designing and producing hardware building blocks and more and more towards software development. The makers and designers of these chips – companies such as Intel, AMD, TI and ARM – are claiming an increasingly important role for themselves.[4] In particular, interfaces are increasingly becoming the domain of these silicon players. One of the ways in which this can readily be seen is in the development of Wireless-LAN chip sets. The chip makers, however, are largely outside the world of telecommunications standardization. The situation I have outlined has major implications for the standardization process, and these are expressed, inter alia, in the intensity with which telecommunications suppliers participate in standardization processes. In the 1980s the development of ISDN is estimated to have drawn a further 1000 to 1500 people into the standardization environment. A development such as TISPAN, which is comparable in terms of ambition, is currently drawing in around 100 to 150 of those involved.

A similar development can be observed at the 'top end' in telecommunications systems. As the market has matured, the added value of the operating systems, application layers

[4] Present developments prompt comparison with the development of the original IBM PC in the early 1980s; that period too turned out to be a watershed after which the added value of system designers and integrators began to shift towards the chip suppliers.

and content has grown faster than that of the transport. One thinks here of areas including middleware: for identification and authentication (including PKI infrastructures), security, presentation, platforms such as the Multimedia Home Platform (MHP), Digital Right Management systems (DRM) and electronic payment schemes.

In the recent past telecommunications suppliers have taken certain initiatives in order to enter these higher layers. For example, Symbian Epoc was an attempt to play a role in the area of operating systems. More generic systems such as Windows CE and Java platforms seem to offer big opportunities, however. DRM systems, which have a much broader scope than telecommunications systems alone, are also an important key in this industry but fall outside the traditional telecommunications standardization. They are markets where trial and error, market selection and (a striving for) market dominance are pivotal. The trend I have outlined above is shown diagrammatically in Figure 1.

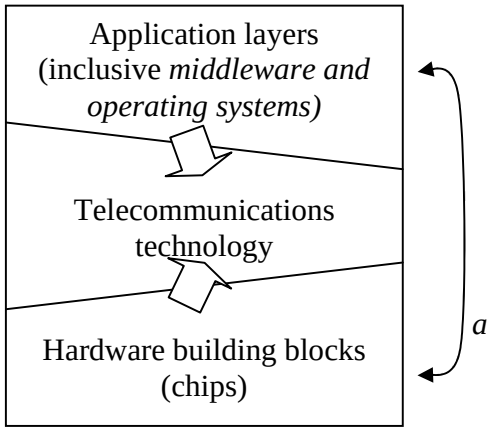


**Figure 1: Outline of the shifts in the value chain in telecommunications systems**

It is also worth noting that applications software is increasingly often being implemented directly in hardware without the telecommunications layer having anything to do with it (arrow *a*). For example, we are seeing authentication protocols and DRM solutions being integrated directly into chipsets.

## 4. The absence of a broadly supported future-proof methodology for standardization which concerns more than one region

*There seems to be waning enthusiasm for partnerships (such as 3GPP) for arriving at worldwide standards. In addition, a number important developing regions such as China are taking an increasingly independent attitude. This makes it difficult to achieve effective international harmonization.*

Technical standards have strong political dimensions. This is expressed particularly in geographical conflicts of interest, formerly mainly between (smaller and larger)

countries, but now more between world regions. Large regional industrial interests play a part here, as does access (or conversely barriers to access) to regional markets. The tension between world regions as regards standards shows a wave-like motion: sometimes standards (or rather: how they are managed) result in trade conflicts or interregional conflicts between market players, whilst at other times the various interests are successfully brought together by means of agreements and cooperation.

In the present telecommunications market one can simultaneously observe a trend towards globalization and a trend towards regionalization. It goes without saying that over the past few decades the telecommunications market has become more and more global. Increasingly, operators and their suppliers are active throughout the world. Standards such as GSM are also being used worldwide. At the same time, however, there is increasing regionalism as regards the development of standards. Major industry interests (sales, ownership rights) induce world regions to follow an independent course. The most suitable standardization model has not yet been found.

Recently the tensions I have referred to seem to be increasing considerably, and one can point to two factors here: (1) the interregional cooperation in the form of 3GPP, adopted in the recent past, is no longer regarded everywhere as a future-proof way of achieving international coordination, and (2) growth regions such as China are beginning explicitly to follow a course of their own. These two developments are discussed in more detail below.

3GPP was set up in late-1998 as a form of cooperation between all the important standardization institutes, the aim being to set up a worldwide standard for third-generation mobile telephony. Various regional standardization institutes take part in 3GPP. Meanwhile, however, the ‘3GPP model’ has led to substantial friction. The interests of the regions concerned are sometimes far apart from each other. Related to this are reproaches that ETSI, as the host of the 3GPP organization, can exercise disproportionate influence over the content of this standard. There are also questions about the way in which companies manage to obtain additional voting rights through their membership of different regional standardization organizations. The tension which has arisen between the world regions recently led to an eruption: at GSC#9 (Global Standards Collaboration) in Seoul, Korea, in May 2004, the United States and Japan expressed strong objections to a major role for ETSI in developing the NGN standards, which are regarded as very important. They would now prefer this development to be placed under the auspices of the ITU.

The rise of China as an increasingly important player demands special attention. In terms of size the Chinese market has no equal; because of the country’s large population, the rising level of prosperity and the limited penetration of current infrastructures, the prospects for new (mobile) networks there are very favourable. In this regard the Chinese government is pursuing powerful industrial politics by means of which it wants to avoid becoming completely dependent on foreign suppliers and network managers. It also fears becoming too dependent on foreign ownership rights. In other words: China does not want to remain a consumer of standards or IPR but wants to expand its increasingly

strong position in manufacturing to become an IPR and standards producer. From the Chinese point of view these are legitimate interests, even if they are often regarded by Western countries and organizations as unreasonable and disruptive.

The politics of Chinese industry is expressed in various ways. Firstly foreign entrants must negotiate with the Chinese government regarding entry conditions; in these negotiations considerable concessions are often expected with respect to IPR payments. Secondly China is becoming increasingly active as far as standardization is concerned, concentrating on technologies which have been developed in the country itself. Chinese companies prefer to hold the ownership rights to these technologies, or that they should be free from rights. This is illustrated by China's WAPI protocol to safeguard WLAN connections. China recently announced that it would not permit the WEP protocol, used elsewhere in the world, and was making its own WAPI protocol obligatory. WAPI is subject to patents which are held by Chinese companies.[5]

Besides China, a number of other developing countries will probably also start to assume a more independent role; examples are Brazil (which recently announced that it would follow its own course in the area of HDTV) and India.

All in all, a future-proof picture of how to structure the development of standards in a global context is lacking.

## 5. Increasing diversity in the demand for standardization and other processes for the coordination of technology

*The end of single system standards has been ushered in. Increasingly, (combinations of) market players are opting, on an ad-hoc basis, for a type of process that matches specific requirements.*

One aim of the European New Regulatory Framework is to promote competition, not only in the area of service provides but also in that of technology. In other words, there will be competition not only between markets but also between technologies and where applicable also between standards.

Technology competition is increasingly seen as a necessity for a flourishing European telecommunications market. This competition ought to lead to more innovation (with references to 'innovation-friendly' regulation), increasing room for choice and better access to markets. These principles of the new regulatory framework fit within a more general trend which diverges from the conviction that 'one technology fits all' and in which diversity and selection mechanisms are pivotal features of the market. It is being recognized more and more clearly that the development and acceptance of technology are characterized by a large measure of unpredictability, and that demand is seldom

[5] Incidentally, the American companies Intel and Broadcom have objected to this decision, and under pressure from the American government China has postponed making WAPI obligatory for an indefinite period.

homogeneous. It is an illusion to assume that market demand, acceptance and the state of the technology can be predicted many years ahead.

The unstoppable rise of competing, overlapping standards is a definitive break with the past. The GSM standard as the only and more or less compulsory standard in the EU is no longer reproducible in the present international context, both European and international. Whereas the enormous success of GSM can be attributed to the favourable and simultaneous concurrence of all kinds of market, institutional, political and technical factors, one cannot now automatically rely on a situation of that kind.[6]

Demand is now concentrated increasingly on specific standards which provide a framework for subareas. Those concerned increasingly choose, on an ad-hoc basis, a process and environment which best match their specific requirements at that moment (sometimes referred to as an opportunity coalition. There is a wide range of formal standardization bodies, forums and consortia which concentrate on specific topics. At the same time topics increasingly overlap; organisations such as the IETF and IETF have nowadays managed to secure important positions in the field of public telecommunications.

Sometimes companies opt for a forum or consortium in order to arrive at technical specifications quickly and effectively, within an environment which consists only of like-minded parties. In other cases, though, it is no longer the goal of the companies concerned to arrive at public specifications; instead, they liaise bilaterally or multilaterally. When choosing a standardization modus, one of the things market players ask themselves is how they can best capitalize on first-mover advantages and network effects. A series of other factors is also at work.[7] The time when a single standardization body could meet all the different requirements seems to be past.

Standardization methods in the internet world, which have a greater degree of interaction with the market than the more traditional telecommunications standardization, enjoy a substantial measure of success. The IETF's approach illustrates this. Broadly speaking it proceeds as follows: an internet draft, created in a low-threshold form, is converted into a proposed standard, which can exist for two to four years. After the market has produced a minimum of two independent implementations a draft standard can be drawn up. Once this has subsequently been implemented a minimum of four times, a final standard appears. The fact that several of these sequences partly or even wholly overlap is not seen

[6] Incidentally, one cannot exclude the possibility that in future opportunities will again occur for a single, global standard. Sometimes network effects and the more generic benefits of scale are such that a single, global standard for each area of application is strongly preferred or is even the only feasible solution. We are talking here, however, about very specific cases, which arise particularly if there is a vacuum (and elaborating existing systems further proves unsatisfactory). The question also arises of how a single standard of this kind then comes into being. Extreme situations in this context are an industry standard dominated by a single player (cf. MS Windows), an industry standard which is supported by a particular group of companies and ultimately wins the day over alternatives (cf. VHS videotape), and the formal form adopted ex ante which is drawn up by a standardization body recognized as such.

[7] For more information on differences in standardization modi see *Future organization and positioning of ETSI*, Discussion document submitted by the Dutch members and observers of ETSI, October 2003.

as a problem. This approach has a number of benefits compared to the more linear sequence which formal standardization bodies aim for. For example, decision-making procedures are less problematical and market players are far less able to allow themselves to adopt an uncooperative attitude where intellectual property rights are concerned – for no licence means no (independent) implementation; no implementation means no standard; and no standard means little prospect of successfully exploiting the ownership right. The example of IETF discussed here is not the only instance; organizations such as IEEE also show that they successfully apply alternative and more market-driven standardization methods.

## 6. Problems in providing a framework for safeguarding public interests

*Governments do their best to safeguard certain public interests. One way in which they do this is by drawing up rules for emergency calls, legal telephone tapping and facilitating fighting crime. The increasing complexity of technology, the interdependence of building blocks and market trends are making it increasingly difficult to provide the desired framework for promoting public interests such as emergency calls, legal telephone interception and fighting crime.*

In fulfilling their role as guardians of the general interest governments impose a number of requirements on telecommunications networks. These include functions such as emergency calls (112, whether or not supplemented with location identification), legal interception, data retention, and facilities for certain vulnerable groups in society. Certainly security is becoming increasingly important; for example, under a recent convention the European Union acquired greater powers in that area which could have an impact on the requirements imposed on telecommunications. There are also more general requirements concerning (spectrum) efficiency, network integrity, interference (EMC) and electrical safety (Low Voltage Directive). Finally there are also important environmental aspects, examples of which are the regulations on Waste Electrical and Electronic Equipment (WEEE), Restrictions on the use of Hazardous Substances (RoHS) and the proposed 'ecodesign' rules for Energy Using Products (EuP). The European and national regulatory bodies use various tools to safeguard these and other public interests.[8] This public interest is one of the mainsprings of the European Commission and of national member states as regards their involvement in standardization. And questions which arise in this field include whether the universal service description must also be carried out in relation to IP telephony and in precisely what form, or should a telephone service to a closed group of end-users also support 112 calls?

An important concern is that technical and market developments are making it more and more difficult to safeguard these public interests. For example, the legal interception of

[8] One thinks in this context of the EMC and Low Voltage directives, the telecommunications directives relating to the New Approach and the obligations laid on a public telecommunications network provider in the context of the New Regulatory Framework. For environmental aspects reference can be made to the WEEE and RoHS directives of early 2003 and the draft Ecodesign for Energy Using Products (EuP) directive of July 2004.

speech services on an IP-based network is more complex than listening in to a regular circuit-switched telephone connection. The fact that large system standards are increasingly giving way to a combination of numerous specific standards, which are partly interdependent, makes matters more difficult. The value chain has also become more complex. The more parties in the chain, the more difficult it is to determine exactly on whom certain responsibilities can or should be imposed.[9] Parties must sometimes also exchange all kinds of additional information because the complete set is not present in a single network (an example is location data in mobile networks). Finally, we would draw attention to the problem of conflicting regulations; requirements concerning fire retardance, for example, collide with those relating to the use of durable materials which cause the minimum harm to the environment. Another example is that environmental rules prescribe that in the event of problems with the power supply networks should reduce their power consumption, which is at cross-purposes with other regulatory requirements concerning emergency calls, which one must always be able to make.

Incidentally, the way governments safeguard public interests in turn often leads to more complex technical systems and to obstacles and costs for market players. Areas where this is the case include obligations laid on internet service providers (ISPs) to store traffic data systematically, interception obligations which can result in specific problems particularly in relation to fibre-optic networks, and obligations to supply accurate location data relating to an emergency call (112).

Discussions are currently under way about how the European regulator can better respond to the public interests, for example in the form of common statements of essential requirements or elaborated minimum requirements. One of the concerns which the market (for which read: suppliers) has is that the requirements which are intended to protect certain public interests (such as legal interception, data retention, location-enhanced 112) have not been elaborated in enough detail, certainly given that at present they may have to be implemented in IP networks in addition to traditional telephony networks.

There is a possible role for standardization here, though it is not a simple one: it is often difficult to combine the regulator's desire for technology neutrality with a concrete, detailed working-out.

## 7. The eternal problem of intellectual property rights

*Particularly in the case of the large, formal standardization bodies, intellectual property rights remain a serious hindrance to expeditious production and the diffusion of standards.*

[9] The European Commission was also faced with questions of this kind when drawing up the e-Commerce Directive, where a distinction had to be made between mere conduit, caching (temporary storage) and hosting.

Ever since the perils surrounding essential patents for GSM technology, the subject of intellectual property rights (IPR) has been high on the agenda of standardization bodies in this field. Despite many attempts to arrive at a workable IPR policy acceptable to all parties, the fact is that property rights are still one of the stumbling blocks to standardization in this sector.

Property rights are an important tool for promoting innovation: if players invest in R&D, property rights enable them to reap the benefits. Without property rights, R&D investment would be jeopardized. The starting point is therefore that players are free to deal with their rights as they wish, whether to licence them or not, what fees and conditions are applied in relation to licences, and so on. The mere fact that a standardization body decides to include a particular patented technology as an essential element in a standard must not mean that the rights of the holder of the patent concerned are curtailed. Looked at from the point of view of standardization bodies, however, it is important that property rights which are essential to the standards they develop are readily accessible, for if they were not, the diffusion of the standards drawn up would be jeopardized. All this means that a balance must be struck between the commercial interests of the IPR holders on the one hand and the interests of standardization and standards users on the other.

Most standardization bodies have now adopted more or less similar IPR policies, which have two important and widely discussed aspects. The first is the required self-declaration that licences for essential patents will be made available on fair, reasonable and nondiscriminatory terms (FRAND). This declaration is of only limited significance, however, certainly for smaller players. Because licence terms normally remain confidential, it is virtually impossible to check whether the terms offered are nondiscriminatory. In addition, the concepts of ‘fair’ and ‘reasonable’ are mainly a matter of interpretation, depending on the points of view of the interested parties. What is a reasonable fee depends inter alia on the future prospects, and those prospects are uncertain and may be assessed differently by different parties. All in all the FRAND concept provides only limited certainty that the desired situation will be achieved. The second aspect involves the procedure used, which prescribes that the development of the standard will be halted if one or more of the (known) holders of essential patents is not prepared to issue the self-declaration referred to to issue FRAND licences. In practice this procedure offers few or no options for effective sanctions. A malicious IPR holder knows very well that a standardization body simply cannot allow the whole process to be halted. This can open the way to a patent owner imposing all kinds of conditions on the standardization body, behaviour that some would call blackmail. Besides these two major shortcomings there are various smaller problems, such as disputes about whether patients are or are not essential and the validity of patients, the problem of carrying out a watertight patent search (and the risk arising from this that, for example, a nonmember might invoke a patent after the standard has been introduced) and the problem of the cumulative licence fees.

Although standardization bodies do their best to handle IPR problems properly, the problems referred to above cannot be readily overcome. Many take the view that it would

also be completely undesirable if a standardization body were to have a more far-reaching role than it does now; patent holders' discretion would be affected unacceptably. If standardization bodies pursued the use of such weapons they would soon be caught up in a game in which it would be better if they played no role at all and in which they would no longer be able to guarantee their independence. An IPR policy that imposes further requirements on patent holders is therefore undesirable and in practice unattainable.[10]

There do, however, seem to be other ways of easing the IPR problem. By abandoning the credo that competition must in principle take place *within* a technology (standard) and displaying openness towards competition *between* technologies (standards), the market is provided with ways in which it can itself direct the IPR issues along proper paths. For in the case of competition within a standard only, market players can play a tough game. In an all-or-nothing situation they can allow themselves to pursue extreme, noncooperative IPR strategies. But the moment there is competition between standards, the parties will be less ready to pursue extreme strategies. Too high a stake can mean that an alternative technology manages to increase its chances and market share. Clever structuring of the standardization process can also lead to the wider availability of affordable licences. An inspiring example of this is the procedure relating to the IETF. In that process a proposed standard must have at least two independent implementations at a certain time, and at a later stage a further four additional independent implementations before it can be elevated to the status of a final standard. If a holder of an essential IPR imposes (licensing) requirements that are too high, these implementations will not come about, nor will the standard for which the IPRs are essential. This would greatly decrease the value of the ownership right. In fact, the implementation requirements are an effective test of whether the licences really can be regarded as FRAND and whether they are viable.

Some standardization bodies in the internet world even have a royalty-free IPR policy, including W3C. The ideas of the open-source world – where developers deliberately waive income from patents – are slowly beginning to become important to the telecommunications industry, for example by means of the development of carrier-grade Linux.

It is not the aim of the foregoing to suggest that these alternative approaches are completely problem-free, but they do illustrate that there may be ways of reducing the problems.

## 8. Changes in the demand for telecommunications standardization

*This discussion note does not endorse the claim which is sometimes heard that demand for standards in this area is beginning to be saturated.*

[10] This became clear from the responses to ETSI's original IPR Policy and Undertaking of 1993, which was revised a year later after serious objections from a number of members.

Sometimes one hears it claimed that the demand for telecommunications standards will decline. The industry is said to be moving into a phase of greater consolidation and the biggest demand for application areas, it is said, has now been met. At the same time other, newer areas such as nanotechnology and biotechnology are demanding more attention. However, this claim is contradicted by various insiders. They assume, on the contrary, that, after the present economic dip, demand for telecommunications standards will increase for various reasons:

- Telecommunications will be adopted in developing countries at a dramatically increasing pace. Owing to changed geographic, demographic and economic conditions, this increased pace of adoption will in turn alter the need for standards;
- The development of telecommunications systems in house and the area of domotica are still in their infancy;
- The integration of telecommunications and medical technology is also still in an early stage of development (for example telecoms on the body, non-intrusive techniques, in a ring or armband, which continually monitor a person's metabolism and can raise the alarm in good time if clinical features develop);
- The integration of systems from different backgrounds (telephony, television, PC) at diverse levels of service still demands all kinds of solutions;
- The development of many very diverse and complementary fixed, wireless and mobile networks creates a demand for all kinds of solutions, such as seamless inter-system video roaming;
- Safeguarding public interests can require elaborations in which standards may turn out to be indispensable (see proposition 6).

**Conclusion**

More than ever, telecommunications standardization is facing a number of challenges. The various institutes will therefore have to reconsider their roles and approaches.

We wish to emphasize, however, that these challenges should *not* lead to the conclusion that there is no longer a role for standardization and its institutes. We think that that role certainly still exists, but will have to take a new form that is thoroughly in line with the external developments here outlined. This goes both for ETSI and for other formal standardization organizations in this field.

What that other role will look like is a further step forward in our thinking, and the Dutch ETSI members therefore look forward with confidence and interest to the results of the High Level Review Group led by Jean-Pierre Henninot.