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Universal service and disabled people

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ABSTRACT

The EU regulatory framework enacted 25 May 2011 has the objective to provide functionally equal access to telecommunication services for disabled persons. What are the rules, who are the target groups, and what obstacles do they face when using various telecommunication services? And what arrangements do exist in a selected group of six EU Member States to remove these obstacles? Recommendations include the introduction of a more market-oriented approach, independent of specific networks.

1. Introduction

The revised European Framework for the Communications Sector enacted 25 May 2011 shows a substantial shift in the thinking about universal service obligations. The framework requires Member States to take specific measures for disabled end-users, which is a substantial break with the past where regulation was not mandatory but mainly indicative ('Member States can regulate…'). Also, Member States are now obliged to give national regulatory authorities the power to regulate issues that relate to disabled people. The biggest drive behind improvement of the regulatory framework for disabled people is the principle of equality. Disabled end-users should have access to communications infrastructure and services as any other users and they should be able to make use of services in a non-discriminatory way (aiming at full inclusion).[1] The new provisions impose obligations on service providers regarding access, information needs and the availability of adequate terminal equipment. Examples are the provision of relay services, functional internet access and special tariff schemes.

Very little research has been done in this field although the impact of the new framework may be substantial. Both a delineation of disabled end-users and an assessment of the services they should have access to are lacking. Nevertheless it concerns a substantial and growing group in (the information) society. Figures presented in this paper suggest that, depending on the criteria used, this group constitutes 5–15% of the entire population.

This contribution aims at filling this gap. It sets out by reviewing and analysing the European Framework concerning universal service regulation, focussing on the position of disabled end-users. Subsequently, the specific obstacles faced by end-users with specific disabilities are analysed. After that, an overview is presented on specific regulation and services that are currently in place in six EU Member States to remove these obstacles. Finally, some conclusions and recommendations are presented.

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[1] These principles and arguments can be found in paragraphs 8, 9, 12, 13, 36 and 41 of the Preamble of the Citizens' Rights Directive (2009).

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2. Universal service regulation

2.1. Introduction

Universal service obligations are a known concept in the telecommunication industry (Bohlin & Teppayayon, 2009). Before the liberalisation and privatisation of the existing monopolies, universal service regulation had already gained ground as a result of new technological developments. At the end of this stage, universal service regulation in several European countries also comprised the provision of mobile telephony, which was at the time offered in the form of a monopoly. Gradually, liberalisation of the telecommunication markets reduced the extent of universal service regulation. An important reason for this was the fear that too broad a universal service would benefit incumbents and that the impediments for entrants would be too big if they were either subjected to service obligations or were obliged to make overly high (financial) contributions to universal service obligations.

The essence of classical universal service regulation still consists of voice telephony. This must be offered to everyone on a non-discriminatory basis, at an affordable price and at a certain level of quality. Following on from this, facilities such as subscriber information services, (electronic) telephone directories and the existence of public payphones are also covered by universal service obligations. So far, the main orientation of universal service obligations in telecommunications has been financial and geographical: they guaranteed accessibility of services at an affordable price in any region of a country to avoid that only high density areas are covered.[2] Provisions for special groups – such as disabled persons who are the subject of this study – are in general only discussed marginally.

Universal service regulation is mainly framed within a European context by European directives. That is why in the following paragraphs it is first defined how the position of disabled persons was regulated within the rules before 25 May 2011, in particular in the previous versions of the *Framework Directive* and the *Universal Service Directive* of 2002.[3] Next a description is given on the relevant provisions that have been introduced in the adapted regulatory framework for the telecommunication industry, which had to be implemented by the EU Member States by 25 May 2011.[4]

2.2. European framework

2.2.1. Framework Directive

In the original *Framework Directive* several general principles have been laid down with respect to the position of disabled persons. They can be found specifically in Article 8 of the Directive, which sets out the objectives for national regulatory authorities. They have to promote inter alia within the framework of competition that disabled users derive maximum benefit in terms of choice, price and quality. In the preamble it is further specified that network operators and producers of terminal equipment should be incited to facilitate access to electronic communication services for disabled users by means of cooperation. Further paragraph 4 of Article 8 comprises a general recommendation for national regulatory authorities to address the needs of specific social groups, in particular disabled users.

2.2.2. Universal Service Directive

The provisions of the original *Universal Service Directive* in general cover all end-users including disabled persons. In this section the provisions that specifically regard disabled users are discussed. Thus Article 6(1) provides that it should be possible to impose measures concerning access to public pay telephones for disabled persons. Article 7(1) provides that the Member States – where necessary – take special measures for disabled end-users. These measures should aim at giving disabled persons affordable access to public telephone services, including emergency and directory enquiry services and telephone directories. Access should be equivalent to the access of other end-users. In the second paragraph of Article 7 it is stated that Member States may, in the light of national conditions, take measures to ensure that disabled end-users can choose between the various service providers, which are available to the majority of end-users.

In the preamble of the Directive (recital 13) it is further specified how Article 7 should be read. The special measures that Member States have to take in order to guarantee access at an affordable price to speech telephony, emergency services, directory enquiry services and telephone directories for disabled persons are described indicatively. They may concern "making available accessible public telephones, public text telephones or equivalent measures for deaf or speech-impaired people, providing services such as directory enquiry services or equivalent measures free of charge for blind or partially sighted people, and providing itemised bills in alternative format on request for blind or partially sighted people. Specific measures may also need to be taken to enable disabled users and users with special social needs to access emergency services (112) and to give them a similar possibility to choose between different operators or service providers as other consumers (recital 13)". The preamble next states that there are no standards for the quality of universal service for disabled persons (contrary to general standards that do exist). These standards should be developed; specifically, the preamble states that "[p]erformance standards and relevant parameters should be developed for disabled users and are

[2] See Poort, Groot, Kok, de Graaf, and Hof (2005) for a theoretical framework on different types of accessibility.
[3] Framework Directive (2002) and Universal Service Directive (2002).
[4] For further background info: BEREC (2011) and Ofcom (2011).

provided for in Article 11 of this Directive (recital 13)". Article 11 of the Directive indeed gives a special ground for regulating standards/quality criteria, but leaves it up to the Member States to decide whether they do so or not, and subjects this to the question whether relevant parameters have been developed, or not ("National regulatory authorities may specify, inter alia, additional quality of service standards, where relevant parameters have been developed, to assess the performance of undertakings in the provision of services to disabled end-users and disabled consumers" (Article 11, para 2)) National regulatory authorities should be enabled to require that data regarding the level at which the quality of the service is met are published if and as soon as such standards and parameters have been developed. Further the preamble states that the universal service provider is not allowed to take measures, which prevent users from benefiting fully from services that are provided by various operators or providers of services, in combination with its own services that are offered as part of universal service.

As to the option stated in the second paragraph of Article 7 to take measures in respect of freedom of choice no further clarification is given in recital 13 of the preamble.

Finally, Annex 4 of the Directive lays down that elements can be included in the calculation of costs associated with providing the universal service, which can only be provided at a loss or under conditions that fall outside normal commercial standards. The provision of specific services or equipment for disabled persons is specifically listed as such an element.

2.2.3. Evaluation universal service obligation

The previous version of the *Universal Service Directive* has undergone two evaluations, the results of which can be found in two communications of the European Commission of 2006 and 2008.[5] In the communication of 2006 the position of the representatives of disabled persons is mentioned. They alleged that extension of universal service to mobile communication would be required because many disabled persons experience serious problems accessing and using mobile services. These representatives also stressed the need for further harmonisation of measures, but there were also organisations that saw the risk of overregulation and therefore preferred other initiatives like designing services for consumers, which are also suitable for users with special needs. All in all, the European Commission did not see any reasons to impose stricter universal service obligations. This is also the conclusion of the evaluation of 2008, in which the European Commission states inter alia that there is no longer the need to bring mobile communication under the universal service obligation, because it has meanwhile become generally accessible and affordable. The costs of mobile telephony for a small user are even lower than the cost of a landline connection. As to broadband the European Commission finds that this is not open to a universal service qualification because the majority of the population does not yet have such a connection. However, the European Commission expects such a majority to exist in the near future. The communication rather widely discusses what is called 'universal service in a changed environment' and illustrates some future perspectives. This involves inter alia broadband availability for everyone and equality in access. Regarding disabled people, the question is raised how to guarantee access and user-friendliness of electronic communication services for vulnerable persons (such as disabled and elderly persons) to allow them to use such services like the majority of users do.

2.2.4. Analysis: no specific obligations

Summarizing, it can be concluded that before the revision the European framework did not have any strict obligations. Only where necessary should Member States take special measures in order to ensure equal access for disabled end-users. This implies broad discretionary powers of the Member State, despite the fact that the preamble uses a more binding phrasing ('Member States should take suitable measures….').

2.3. Revised European framework

2.3.1. Introduction

As regards universal service, in the route that resulted in the review of the existing framework, suggestions were made for amendments to the provisions relating to the position of disabled persons. Several of them are in line with the outcome of a study of the implementation of the *Universal Service Directive* concerning disabled people. All this is described in a working paper of the European Commission.[6] It appears from this document that the implementation of the provisions concerning disabled people presents a high degree of variety. Specifically the report recommends to impose stricter rules concerning disabled people within the context of the review of the regulatory framework.

2.3.2. Main lines of the review

The amendments, laid down in two directives,[7] show that there is more focus on the specific position of disabled persons. Furthermore there is a distinct shift in emphasis. To illustrate this, the elements of the revised European Framework can be classified into three categories. First, there are measures that Member States have to take in order to

[5] Communication Universal Service (2006) and Communication Universal Service (2008).

[6] Inclusive Communications Group (2006).

[7] Better Regulation Directive (2009) and Citizens' Rights Directive (2009). Commission of the European Union (2010) contains consolidated versions of the new Framework and Universal Service Directives.

make services accessible and affordable for disabled end-users. These binding obligations form the core of the revised regulatory framework. Second, the framework contains provisions that commit Member States to create a legal basis for the provision of rules on several specific topics. Third, there are provisions that give Member States the option to take certain specified measures.

The problems encountered by disabled persons are discussed with more emphasis on the revised directives, as can be seen from the fact that both the *Framework Directive* and the *Universal Service Directive* specifically refer to disabled persons in the initiatory articles.

2.3.3. Binding obligations

Article 7 of the *Universal Service Directive* falls within the first category. This article has been made stricter, because in the first paragraph the words '*where necessary*' have been deleted from the sentence concerning the measures to be taken by the Member States for disabled end-users. Thus, Member States are obliged to take special measures in order to ensure that disabled persons have affordable access to fixed telephone services, including emergency services, directory enquiry services and directories. Access should be equal to the services for other end-users, which is expressed in the first full sentence of Article 7(1). Member States should also ensure that disabled end-users are able to call emergency services (Article 26).

2.3.4. Obligations to make additional regulation possible

Member States should empower the national regulatory authorities (NRAs) to take certain measures when needed. This goes inter alia for providing information. Article 21 creates the basis for imposing obligations to inform disabled subscribers regularly and in detail about products and services intended for them. Furthermore, Article 22(1) provides that providers can be required to communicate similar, adequate and current information for the sake of end-users about the quality of their services, including equal access for disabled end-users.

Under a new Article 23bis, national regulatory authorities shall have powers to impose rules on providers to ensure that disabled end-users get access and choices similar to the majority of end-users. It should also be possible to take specific measures to promote accessibility of terminal equipment with services and functions necessary for disabled end-users.

Finally, Article 33 can be mentioned in which Member States are ordered to ensure that national regulatory authorities take due account of the views of end-users including also disabled end-users. To that end a consulting mechanism should be set up.

2.3.5. Options

Within the revised framework several topics are mentioned, which Member States can regulate concerning disabled persons.

In Article 7(1) it is laid down that national regulatory authorities can be obliged by the Member States to assess inter alia the extent and form of specific measures for disabled end-users.

The second paragraph of Article 7 seems unaltered, but is quite not so: Member States can take measures – in the light of national conditions – to ensure that disabled end-users can also benefit from the choice between undertakings and providers of services, which are available to the majority of end-users. The new phrasing '*take advantage of*' instead of the old '*choose*' stresses the equalisation of disabled and other end-users.

As to emergency services, measures can be taken, which aim at guaranteeing that relevant technical standards and specifications are respected (Article 26(4)). To ensure effective implementation of 112 services – including access for disabled end-users who travel in other Member States – the European Commission may take enforcement measures (Article 26(7)).

Finally the *Authorisation Directive*[8] can be mentioned, which empowers national regulatory authorities to attach specific conditions to general authorizations to ensure that the spectrum is also accessible to disabled users.

3. Analysis of target groups and obstacles

The revised European Framework obliges Member States to take measures to guarantee disabled end-users functionally equivalent and affordable access to fixed telephone services, including emergency services, directory enquiry services and directories. However, neither a definition of disabled end-users is provided, nor of the necessary arrangements to meet their needs to guarantee equal access.

This section first distinguishes the major groups of disabled end-users that face obstacles accessing telecommunication services. Next, the obstacles they experience accessing telecommunication services are analysed. Although this assessment is largely based on Dutch figures and a series of interviews with Dutch representatives of these groups, the problems experienced stem from general disabilities in combination with international telecommunications technology. Hence, the outcomes of this assessment are believed to be internationally valid.

[8] Authorisation Directive (2002). This directive has been modified by the Better Regulation Directive (2009). Relevant article in Annex, point A8.

Table 1
Percentage of Dutch population with disabilities.

	% of population	% of those severely disabled
Visual	3	20
Auditory	2	44
Motor	9	30
Cognitive	1	52

3.1. End-user groups

In an official communication on eAccessibility, the European Commission estimated people with disabilities to constitute about 15% of the EU population (Commission of the European Communities, 2005). However, this figure does not differentiate between different kinds of disability or severity.

For the purpose of this paper, four main types of disabilities are distinguished in line with general literature on disabilities (e.g., Klerk, 2007): visual, auditory, cognitive and motor. Estimates of the size of these groups in relation to the general population differ substantially, depending on the severity of the disability included. Klerk (2007) provides estimates for the Netherlands as listed in Table 1. These figures are based on people who do not live in institutions and exclude people whose disability is characterised as light.

For visual, auditory and motor disabilities, there is a strong correlation with age, which is also one of the main drivers of overlap between (light or moderate) disabilities. Thus the elderly turn out to be a specific target group for accessibility measures, as a combination of often light disabilities is prevalent in a large proportion of this group. Overlap between severe disabilities is less common, in particular outside institutions.[9] All in all, the proportion of the population that is believed to be affected by the revised European Framework can be expected to exceed 10%. If only severely disabled end-users are counted, this would amount to about 5% of the population.[10]

3.2. Obstacles vis-à-vis telecommunications services

Based on interviews with representatives of stakeholders as well as document study, an assessment was made of the obstacles that these groups encounter when using the ordinary telephony services, and the adaptations or additional services required. In this assessment, the following services that are covered by the general universal service obligations are taken as a starting point: fixed telephony, emergency services, directory enquiry services and directories. In addition, mobile telephony and Internet access are considered, as the introduction of a universal service obligation for these is presently being considered in several countries.

In this assessment, it is critical to distinguish the accessibility of the service itself from the content or information provided by this service. Content does not fall under the revised European Framework. A second distinction that needs to be made is between physical and financial accessibility. Physical inaccessibility refers to a situation when a disabled person cannot use a certain telecommunication service without adaptations. Financial inaccessibility may arise when disabled persons face substantially higher costs for the use of a telecommunication service. This may be a consequence of the fact that disabled users need more time to use a service. Obstacles may also arise from a combination of physical and financial inaccessibility, when specific equipment or services that are used have substatially higher costs.

The issue of financial inaccessibility is aggrevated by the fact that people with disabilities have lower average incomes, as their disabilities also negatively affect their earning capabilities. In 2003, the average gross annual income of people with a physical disability in the Netherlands was almost 40% lower than that of people with no disabilities (Klerk, 2007, p. 98).

3.2.1. Visually disabled

People with a visual disability traditionally had little problems using fixed telefony. Modern handsets, however, tend to have more complex menu structures and displays. The continued existence of simple handsets is important for this group.

Mobile telephony is more problematic for this group: navigating menus and operating touchscreens without speech software is highly problematic. Such software is only supported by relatively expensive handsets, thus creating a potential *financial* accessibility problem.

The same holds for directory enquiry services. People with a visual disability have trouble using printed directories; they have to rely on directory enquiry services, which are generally paid for services.

[9] In total deaf–blind people in the Netherlands amount to about 0.2% of the population.

[10] Fragmented data from other contries show similar figures. For example, recent material of the French Telecommunications regulator mentions that 5.5 million people have problems with mobile telephony due to a handicap (ARCEP, 2010). This amounts to approximately 8.5% of the entire population. Likewise, the number of users of Swedish video relay services relative to the population (0.03%) is equal to the share of the Dutch population for whom sign language is the first language (Akker & Poort, 2009).

Table 2
Main adaptations required for disabled end-users using telecommunication services.

	Visual	Auditory	Motor	Cognitive
Fixed telephony	Simple handsets required	Text telephony, text relay or video relay services	Simple handsets required, additional equipment	Simple handsets required
Mobile telephony	Simple handsets or spoken menus	Text telephony, text relay or video relay services	Simple handsets required, additional equipment	No specific issues
Emergency services	No specific issues	Accessible by text telephone, fax, sms, or relay service	Simple handsets required, additional equipment	No specific issues
Directory enquiry services and directories	Dependence on (expensive) directory enquiry services	No specific issues	Dependence on (expensive) directory enquiry services	Dependence on (expensive) directory enquiry services
Internet	Speech software	No specific issues	Additional equipment and/or interfaces	No specific issues

Accessing the Internet is considered to be a growing problem for the visually disabled. Although speech software can in theory be used to navigate the Internet, Internet sites increasingly use plugins and formats that thwart the use of such software.

Accessing emergency services (112) presents no obstacles.

3.2.2. Auditorily disabled

The use of fixed telephony has traditionally been problematic both for hearing impaired and for speech impaired people. However, text telehony and text relay services have been developed in several countries to counter this problem. More recently, video relay services have been introduced in some countries (see Section 4.2). Also, text telephony and relay services can be offered on mobile phones.

Furthermore, the accessibility of emergency services may pose problems. Emergency services need to be accessible either by relay service or by other means of communications such as text telephony, fax or sms.

No specific accessibility problems exist vis-à-vis the Internet and directory services (printed and online).

3.2.3. Motor disabled

People with moderate or severe motor disabilities tend to have problems operating modern handsets for fixed and mobile telephony. The continued existence of easy-to-operate handsets is important for this group.

For people with very severe motor disabilities, speech operated telecommunication facilities can be required. Also, these people may benefit from personal equipment to alert emergency services directly (e.g. by pressing a single button).

In addition, the motor disabled tends to have difficulties using printed telephony directories, thus increasing their use of directory enquiry services (as with people with a visual disability). This may raise the costs involved and thus cause financial accessibility issues.

3.2.4. Cognitively disabled

As for motor and visually disabled people, the existence of easy-to-operate mobile and fixed handsets is important for people with cognitive disabilities. Also the use of directories, directory enquiry services and particularly the Internet may pose problems for this group. The use of intermediaries can improve this.

The main adaptations in equipment and services that according to the present research are required by these groups are summarised in Table 2.

4. Situation in selected Member States

4.1. Introduction

In order to establish the impact of regulation on universal service and disabled people, a comparative study was made of the situation prior to the implementation of the revised European Framework in six EU Member States: Belgium, Germany, France, United Kingdom, Sweden and the Netherlands.[11] In line with the preceding sections, the comparison includes the services that are currently part of the universal service regulation in the EU or are considered to be so in the future: fixed telephony, emergency services, other services (mobile telephony, directory enquiry services and internet access), financial accessibility and obligations that can be dealt with by the regulatory authorities (information to the public, promotion of adequate terminal equipment and freedom of choice).

[11] These countries were chosen because they are neighbouring countries (Belgium, Germany, United Kingdom) or countries with an interesting situation as far as the topic is concerned (France, Sweden). Information was gathered from April to July 2009, using document and Internet research, as well as e-mail and telephone communication with regulators, government departments and service providers in these countries. Where relevant, this information has been updated using BEREC (2011).

Table 3
Relay services in selected countries.

Countries	Text	Video	Initiation by hearing person	Cost for users
Belgium	10 h.d.	No	No	Free
Germany	15 h.d.	15 h.d.	Yes	€ 0.14 and € 0.28[a]
France[b]	24 h.d.	24 h.d.	Yes	Free
United Kingdom	24 h.d., Direct Call	No	Yes	Free
Sweden	24 h.d.	12 h.d.	Yes	Free
Netherlands	24 h.d.	No	Yes	€ 0.10 and € 0.50[c]

[a] The user pays €0.14 per minute for text mediation services and €0.28 for video mediation services.
[b] By July 2009, the services were not yet available on a national scale in France. Data are based on the intended availability.
[c] Use of the Teleplus service costs €0.10 a minute from the landline and €0.50 a minute from mobile text phone

Table 4
Financing of relay services in selected countries.

Countries	Financing of development	Financing of use
Belgium	Government	Government
Germany	Telecom provider DTAG	Combination of government grants, contributions by the industry and user charges.
France	Providers, users, private parties	Not yet known
United Kingdom	Service was developed in the 1980s by RNID[a] and is currently operated by BT	BT
Sweden	Government	Government
Netherlands	KPN	KPN

[a] RNID is UK's largest charity supporting deaf people, currently known as Action on Hearing Loss (Ofcom, 2011).

4.2. Fixed telephony

In five out of six studied countries relay services were provided for hearing-impaired and speech-impaired persons on a national scale. In France, relay services were being developed. Three different relay services are offered: text telephony, video telephony and a help service. A help service for speech-impaired persons and cognitive disabled persons is only provided in Sweden. Users can make arrangements with the operator about the support they need, e.g. taking notes during the conversation, which are sent to the user after the call, or giving reminders during the conversation.

Table 3 lists the availability in hours a day (h.d.) of relay services. Including France, four out of six countries provide text mediation service 24/7. However, this high service level should be considered in light of the fact that in the first three of these countries text relay services also mediate in calls from hearing-impaired persons to emergency services. In Belgium and Germany, where the service is not available the entire day, as well is in the Netherlands, the emergency services can be reached by fax or SMS (see Section 4.3).

With the exception of France, a text relay service was available in all countries in this benchmark group prior to the implementation of the New Framework. In Belgium, the service is only accessible through the Internet. In the other countries the service can also be used with a landline or mobile text phone. In countries where video telephony is presently provided, this service is only accessible through the Internet. In the United Kingdom, the text relay service operates through direct connections: the user himself calls the desired number whereat the relay service is switched on afterwards. This increases the speed by which hearing- and speech-impaired persons can reach a desired number. Sweden is presently experimenting with direct connections.

4.2.1. Restrictions on use of the service

Belgium is the only country with a restriction on use of the relay services. The service is only intended to arrange practical and social matters. Calls with commercial purposes can be refused or terminated. In the other countries the services are also explicitly aimed at facilitating equal access to telecommunication in the workplace.[12]

4.2.2. Financing of the services

There are several ways of financing the services. This applies to both the development of services and the use of services. Table 4 lists how this is arranged in the countries studied.

[12] In Germany, workplace use of video relay is available only on weekdays from 8 am to 5 pm; charges for workplace users are different from private users (Ofcom, 2011).

In the Netherlands and the United Kingdon, the relay services are funded and operated by the former incumbent, KPN and BT, respectively. However, proposed new regulation for the Netherlands aims at financing by providers of telecommunication networks according to their turnover.

4.3. Emergency services

Emergency services can be used by hearing- and speech-impaired persons in the studied countries through relay services by SMS and fax. Table 5 lists the options in the six countries. Use of a mediation service can only be fully effective, if the service is available 24/7. Use of direct connections increases the speed by which emergency services can be reached.

In several countries studied, the use of SMS for reaching the emergency services is possible locally, but nowhere has it been set up nationally. Supply reliability is still an impediment in all the countries. Fax is used in three of the studied countries to reach the emergency services. In Germany and France standard forms are used for this.

4.4. Other services

In Table 6 a list is given of the measures relating to other services. In three of the six studied countries visually impaired persons have free access to directory services. In Belgium the service provider is of the opinion that visually impaired persons are already compensated by the overall social tariff (see Section 4.5). Only in France, measures are taken in addition to the relay services to render mobile telephony more accessible to impaired persons. Upon the government's initiative, telecom providers in France consult interest groups in order to develop suitable mobile phones. In Sweden an accessible Internet forum is offered to deaf–blind persons (Table 7).

Table 5
Accessibility of emergency services in selected countries.

Countries	Text	Video	SMS	Fax
Belgium	10 h.d.	No	Locally	Yes
Germany	No	No	Pilot projects	Some 'Länder'
France	Future	Future	Locally	Yes
United Kingdom	Direct Call 24/7	No	Regions	No
Sweden	experiments with Direct Call 24/7	Yes+experiments with Direct Call	Experiments	No
Netherlands	Direct access with text phone	No	No	No

Table 6
Regulation of directory services, mobile telephony and Internet for disabled users in selected countries.

Countries	Directory services visual impairment	Directory services hearing impairment	Mobile telephony	Internet
Belgium	€1.12 per minute	€1.12 per minute+mediation service	No regulation	No regulation
Germany	No regulation	Mediation service	No regulation	No regulation
France	Free access	No regulation	Consultation target-group	No regulation
United Kingdom	Free access	Mediation service	No regulation	No regulation
Sweden	Free access	Mediation service	No regulation	Internet service deaf-blind persons
Netherlands	Directory service: number information service at low rate	Mediation service	Compensation aids in social security insurance for hearing handicap	Compensation aids in social security insurance for visual and motor impairment

Table 7
Financial regulation of subscriptions and calls for disabled end-users in selected countries.

Countries	Social tariff	Relay service discount	Social tariff/discount arranged by law
Belgium	Nominal discounts, financed by industry	No	Yes
Germany	Yes	No, additional costs	No
France	Yes	No	Yes
United Kingdom	No	Yes	Yes
Sweden	No	No	n.a.
The Netherlands	No	No	No

4.5. Financial accessibility

Financial accessibility of telecommunication for disabled people is implemented in two different ways. First, there is the option of providing a social tariff. Thus the costs of subscription and/or calls for disabled users are reduced. In the United Kingdom another way of financial compensation has been chosen. Since calls through the relay services take longer, the telecom providers are obliged to give a discount of 60% on the costs of calls. This discount is also given if a hearing person initiates the call. In addition to the costs of subscription and the costs of using services, countries often provide specific equipment through social security or health insurance arrangements. Such arrangements fall outside the direct reach of telecommunication regulation and hence fall outside the scope of the present paper.

4.6. Obligations to make additional regulation possible

4.6.1. Information

In France, telecom providers are obliged to send invoices, which are understandable for the target-group. This means that visually impaired users must be informed in Braille if they request so. Telecom providers are also required to report annually about the progress made in the accessibility of telephony for disabled persons. In Belgium, an annual evaluation is held with the users of the text relay service. In the other countries studied, no specific measures were found with respect to an obligation to inform disabled persons.

4.6.2. Terminal equipment

No specific measures were found in most of the countries studied with respect to the availability of terminal equipment. Only in France, providers are required to consult the users for the development of suitable phone sets.

4.6.3. Freedom of choice

In all studied countries the service is separate from phone subscriptions, and freedom of choice of users is not restricted either. However, in none of the countries a choice can be made among several providers of relay services. In several countries, the service is provided by the former monopolist.

5. Conclusions and recommendations

The revised EU regulatory framework has the objective to provide functionally equal access to telecommunication services for disabled persons. The proportion of the population affected by it is expected to exceed 10%, but the actual use of arrangements for disabled people will strongly depend on their attractiveness in terms of user charges, availability and user friendliness. The previous section shows that prior to the implementation of the revised framework, most of the studied Member States were already addressing the needs of disabled persons in several ways. Here, conclusions are drawn and recommendations are made for policymaking and regulation.

Bottlenecks in accessibility of telecommunication services, which are considered substantial to such an extent that they impede functionally equal access for groups of disabled persons, should be further remedied. A condition to this is that there should not be enough reason to trust that the bottleneck will be solved by the market without any regulation. Market failure can be a reason for this, as well as the relatively small market for services and equipment tailored to the needs of disabled end-users. The smaller the number of end-users in need of a specific service, the less likely it is that the fixed costs of setting up or operating the service can be recovered from commercial user charges without creating financial inaccessibility. Substantial additional costs that disabled persons have to bear to be able to communicate in a functionally equal manner, should also be remedied.

Terminal equiment can often be obtained from the global market, in particular if international standards such as the Internet Protocol (IP) or ITU-standards are complied with. Economies of scale in relay services, however, are limited to language areas and/or national borders. This implies that the social costs of providing such services will be relatively higher in smaller Member States. Only the most populous EU Member States may be able to achieve competition between providers of relay services, as is the case in the United States.

Nevertheless there is a degree of subjectivity in the above: when is a bottleneck substantial to such an extent that it should be remedied? What additional costs are so high that an arrangement should be made? And for what combination of restrictions can equal access reasonably be imposed? Inter alia the country comparison, but also user surveys provide holds for this.

Next to the question of what should be regulated, there is the question of how to realise it: who should provide a service? In what manner? How should the service be financed? Upon answering these questions, solutions should be looked for which are *market-conform* as much as possible and enhance *competition* and *innovation*.

Freedom of choice, both for terminal equipment and service providers is a key-notion in this and it is recommended that more emphasis is given to this aspect. Freedom of choice of users incites providers to compete and thus aspire to innovation and cost reduction. This implies that freedom of choice for terminal equipment is to be guaranteed where it is possible to make sure that global economies of scale are benefitted. Moreover, phone sets are developed on the global market, which are not specifically intended for disabled persons, but are nevertheless suitable for them. Thus freedom of

choice helps disabled persons benefit from innovation and competition on the world market and participate in general telecommunications wherever possible.

If – given the extent of the market for a service or product – competition *on* the market is not feasible, competition *for* the market by means of tenders is often second best. Furthermore it is important that when a service is a natural monopoly for lack of market volume or scale benefits, it is separated as much as possible from services or products where there is competition. This prevents users from needlessly loosing their freedom of choice for services and products that are offered competitively and thus also missing out on the advantages of competition. For the monopolistic part of the service there should be supervision to prevent abuse of the dominant position.

Adapted services and terminal equipment should function *independently of networks*. Relay services should for instance be accessible (dialable) from any network under equal conditions. This may also imply that use of these services should be charged directly through the party, which provides the relay service and not through the network operator to prevent the latter from acquiring an undesirable dominant position.

Finally, upon implementation a distinction should be made between bottlenecks, which are specific to the studied telecommunication services on one hand, and accessibility problems, which also apply to other markets, on the other hand. Think for instance of readability of invoices of telecom providers and accessibility of their sites: although all this can be arranged through specific telecommunication regulation, it concerns problems, which are in fact of a general nature and ask for more general solutions. On this point the European framework is not sufficiently distinctive and the amended directive includes elements, which can be characterised as generic rather than sector specific.

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