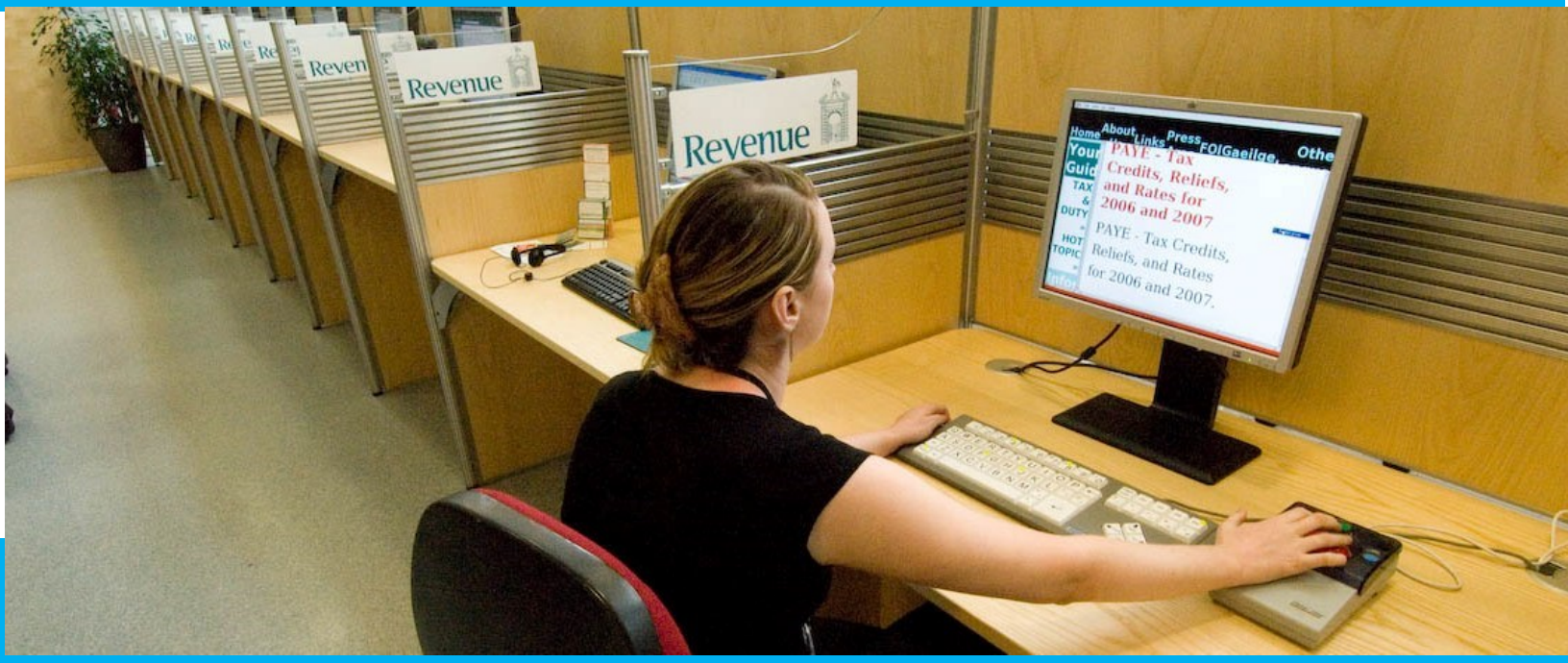
NDA

Údarás Náisiúnta Míchumais
National Disability Authority

Measures to Improve Accessibility of Public Websites in Europe



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Authors of this report

This report was compiled and edited by Susanna Laurin (Funka Nu), Andreas Cederbom (Funka Nu), Jose Martinez-Usero (Funka Nu), Lutz Kubitschke (empirica), Richard Wynne (WRC), and Kevin Cullen (WRC).

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Executive summary

This report presents the outcomes of a study conducted for the Centre for Excellence in Universal Design at the National Disability Authority, and the Department of Communications, Energy and Natural Resources in Ireland focusing on the accessibility of key public services for citizens in the EU Member States. The research was commissioned as an initiative under the Irish Presidency of the EU and as an action under Ireland's National Digital Strategy[1].

This study aims is to make a new contribution to the existing evidence base on Web accessibility in order to support the current dialogues in the European Parliament and Council of Ministers around the European Commission's recent proposal for a Directive in this area[2]. The proposal defines web accessibility as the principles and techniques to be observed when constructing websites, in order to render the content of these websites accessible to all users.[3] It aims to harmonise the measures which Member States use to make the content of public sector websites accessible. It includes a description of the scope, required level of accessibility with the relevant standard (Web Content Accessibility Guidelines 2.0) and timelines to be contained in the Directive.[4]

The study applies a new perspective by looking at accessibility issues both from the 'outside' (through direct examination of the accessibility features in the public services listed in the Directive) and from the 'inside' (through interviews with web managers of these public services to gain insight into their activities, experiences and the challenges they may be facing).

In all, 37 web services in 7 different countries were evaluated, and a total of 327 individual tests were conducted. In addition, in-depth interviews involving 19 people from 13 public sector organisations were conducted in three countries (Germany, Ireland and Sweden).

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[1] Ireland's National Digital Strategy. http://www.dcenr.gov.ie/Communications/NDS/

[2] European Commission. Proposal for a Directive of the European Parliament and of the Council on the accessibility of public sector bodies' websites.http://ec.europa.eu/digital-agenda/en/news/proposal-directive-european-parliament-and-council-accessibility-public-sector-bodies-websites

http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2012/0340%28COD%29&l=en

[3] Ibid, page 2

[4] Web Content Accessibility Guidelines 2.0, http://www.w3.org/TR/WCAG20/

Themes examined in the study were:

- Current levels of web accessibility among the selected Member States
- The types and levels of efforts potentially required by Member States to ensure their online public websites comply with the levels of accessibility listed within the proposed Directive.
- Web accessibility perceptions among web managers in public services

Based on these findings the report discusses implications for web accessibility policies at national and EU levels.

Summary of headline findings and recommendations

The following are the key findings and recommendations drawn from the web accessibility assessment and interviews conducted.

Implications for web accessibility policies at EU level

- EU-level web accessibility monitoring efforts should consider how operationally useful feedback can be provided to website managers and their organisations. Many of the websites examined were found to contain few, relatively minor errors that could have been uncovered if regular monitoring of the website's accessibility was in place.
- A prioritised and phased approach to implementing accessibility is practical.

Implications for web accessibility policies and practices at national level

- National web accessibility policies tend to be in place but there are significant variances in the level of practical supports and tools provided. The centralised supports and tools for web development and management available within the public sector in Germany, for example, would seem to have a positive impact on levels of accessibility.
- Public procurement remains an underutilised tool in ensuring public website development and maintenance results in a high level of accessibility.

Key findings from the web accessibility assessments

- Current levels of web accessibility remain low. None of the 37 public service websites that were assessed across the 7 countries currently comply fully with the WCAG 2.0 AA requirements. However many of the errors detected were of a relatively minor nature.
- The efforts required by the public services to fully comply with WCAG 2.0 vary depending on technical as well as operational factors within the public sector organisation.

- The most striking accessibility barriers relate to documents, forms and multimedia.
- Web teams that manage public sector website need to have specific skills and knowledge related to accessibility. More generally, training and capacity building is necessary for all staff that have a role in producing or commissioning content and documents published to the website

General web accessibility perceptions among web managers

- The focus on achieving accessibility remains more on a technical level than as a core aspect of how the service delivered to all citizens. According to one web manager interviewed, "Frequently accessibility is only associated with requirements that blind people have."
- Organisational web policies and processes often do not consider accessibility as a ongoing issue but rather as a once off activity.

Cost and benefits of web accessibility

- The potential costs and efforts required by the public services to fully comply with WCAG 2.0 vary. Key factors include the age of the website and technology used. The frequency with which accessibility is checked has a significant impact on managing compliance with accessibility standards over time. The routine publication of inaccessible content and documents to public sector websites seriously degrades their level of accessibility.
- Costs related to achieving accessibility to date are not perceived by the public sector organisations to be onerous or problematic. Many of the efforts required to improve accessibility relate to capacity building and training of internal staff, both technical and non-technical.

Implications for web accessibility policies at EU level

From the results obtained, there would appear to be a strong rationale for reinforcing the EU policy approach to web accessibility in order to encourage a more harmonised approach to accessibility by public sector bodies and a better end user experience by citizens in Member States.

- Approaches towards national or EU-level monitoring should consider providing operationally useful feedback to website managers and their organisations

Regular and systematic monitoring of the levels of accessibility of public websites, either internally or by external parties was not commonly reported by the web managers in the three countries. The lack of systematic monitoring and remediation results in many, relatively minor accessibility issues prevailing on many of the websites assessed in the study.

Expectations by the public sector web managers vary quite a lot on the impacts that might be achieved from national and EU monitoring activities related to the Directive. While many of the interviewees did not have considered views on the issues involved, they could generally see that monitoring could be a useful tool for promoting web accessibility. While some believe that impacts would primarily be indirect in nature (e.g. in terms of increased awareness) if at all, others would expect to be able to directly use the feedback received. There were also fears that a monitoring regime might ultimately become a bureaucratic exercise with low value for the web managers' day-to-day operations and high requirements being placed on the web management teams.

Therefore monitoring activities should provide information on the performance of a website against WCAG 2.0 that can be easily interpreted and used by these teams. Providing comparable scores for all or certain categories could be a useful motivational and awareness raising tool. In addition, providing the detailed results of the monitoring exercise of a website performance against WCAG 2.0 would be of operational use to web management teams in precisely identifying and improving the level of accessibility over time.

A prioritised and phased approach in implementing accessibility is practical

The results of the web accessibility assessments in this and other studies shows that much work needs to be undertaken within Member States before the public sector websites listed in the annex of the proposed Directive meet the requirements of WCAG 2.0 level AA. There remains a myriad of websites and public services at national, regional and municipal level that are of key interest for people with disabilities. The Directive proposes that the set of websites covered are likely to have a knock-on effect and help foster best practices in accessibility of websites across the wider public sector. Nevertheless, from the perspective of the end user, it is important that EU initiatives cover all public websites at different administrative levels, even websites in public-private partnerships, websites developed with public funding and even commercial websites of public interest. The list of 12 online services can be a starting point to develop good practices in the field, but global accessibility of most European public online services remains key for end users.

The Web Accessibility Assessment portion of the study showed that the large amount of information contained in documents on some public sector websites is a substantial barrier to improving the site's level of accessibility. This issue in particular may require a prioritised and phased approach to gradually realising the desired level of accessibility. Policy approaches should therefore differentiate between existing websites and documents and new website developments and

documents. At European level, it may be prudent to provide incremental and feasible deadlines for public websites to meet the requirements of WCAG 2.0 level AA.

Implications for web accessibility policies at national level

No public service website was found to be fully compliant with WCAG 2.0 guidelines in any of the countries examined in the web accessibility assessment. While some countries and/or services show better results than others, all countries would benefit from reinforcing their policy approaches to web accessibility.

National web accessibility policies need to be backed up with practical support

Table: Summary of policies and approaches

	Policy scope – all public sector websites	Support measure / resources	Monitoring	Public procurement
Sweden	Regulation	Guidelines and advisory documents	Self-declaration by public bodies	Provisions in legislation, not systematically monitored
Ireland	Disability act and code of practice	Guidelines and advisory documents	Self-declaration by public bodies	Provisions in legislation, not systematically monitored
Germany	Equality legislation	Guidelines supported by development and monitoring tools	Methodology defined for monitoring compliance	Provisions in legislation, not systematically monitored

The table above shows that Ireland, Sweden and Germany all have policies in place that address website accessibility, including provisions in public procurement. Support measures and approaches to monitoring differ, with Germany taking a more systematic approach backed-up by the provision of web development tools. The availability of a centralised, national-level support/competence structure within the public sector as available in Germany would appear to be effective in achieving a consistent approach to accessibility,

even if some smaller issues were still found to persist. All countries could consider the development of centralised support structures and processes, including skills development and the provision of guidance materials, evaluation procedures and development tools to support the development and ongoing maintenance of accessible websites.

A first step for all Member States to undertake is to assess these websites current levels of conformance with WCAG 2.0. Based on this assessment, a prioritised action plan will need to consider the best national approach to improving these levels, assuming that the same variance in the level of accessibility in the 7 countries examined in this study exists in other Member States. Section 4.2 on "Indicative costs and benefits to web accessibility" provides some guidance on identifying the likely extent of the effort required to improve the accessibility of public sector websites.

Based on the web accessibility assessments and the interviews with website managers, it would appear that accessibility problems often arise not because of a lack of effort, but because of structural barriers that constrain public sector organisations in taking a more systematic approach to web accessibility in their day-to-day operations. For example, in organisations where multiple members of staff have the capability to publish to the web, clear and easy to follow accessibility protocols need to be in place so that new content published to the site does not degrade the level of accessibility of the website as a whole over time. This phenomenon of accessibility "churn", whereby the level of accessibility degrades over time due to updates and changes to the content and services, was identified as a major contributing factor to the persistence of accessibility errors in the content of some of the websites assessed that otherwise exhibited a high level of accessibility.

Public procurement remains under utilised as a means of achieving higher levels of accessibility

Accessibility policies are not always formal and this may lead to accessibility efforts becoming once-off activities related to specific events such as the development of new websites. Most web managers reported that their procurement policies included requirements on the accessibility of websites. The level of specificity of these requirements varied somewhat, but most referred to WCAG standards. Procurement policies do not tend to include provisions in relation to systematically monitoring or controlling whether accessibility requirements have actually been met at the end of the procurement process. In addition there appears to be little in-house competence available to monitor whether accessibility requirements have been met. In fact, there was little evidence of accessibility testing being undertaken on a regular basis.

To ensure a higher level of accessibility, website managers need to specify clear requirements when procuring related services such as content management systems, web applications and desktop publishing and to check that these requirements are met in the procured product or service. Some of these systems have automatic features that need to be specified in terms of the level of accessibility they deliver. For more general web development, procurements procedures need to contain accessibility requirements and the means to confirm whether these requirements have been met.

Public organisations should ensure that publicly procured web services and applications are fully accessible.

During the stages of procurement of web applications and services, public sector organisations should ensure that:

- Accessibility is a defined as a criterion in the Call for Tender
- appropriate standards are specified
- accessibility requirements specified in the Call for Tender are verified in suppliers' tenders
- accessibility is dealt with in contract clauses and contract management.

Web services and applications include content management systems (CMS) and web applications, as well as services such as web design and desktop publishing.

Discussion on key findings from the web accessibility assessments

Current levels of web accessibility remain low

The results of the web accessibility assessments are consistent with previous studies showing that there is still much progress needed across the Member States to ensure they meet the level of accessibility stated in the proposed Directive, namely conformance rating AA with the Web Content Accessibility Guidelines (WCAG) 2.0, from the W3C[5]. None of the 37 public service websites that were assessed across the 7 countries currently comply fully with the WCAG 2.0 AA requirements. (see Table 1 below for summary of scores per Success Criterion)

[5] W3C. Web Content Accessibility Guidelines 2.0. http://www.w3.org/TR/WCAG20/

Table: Summary of test scores per Success Criterion

TESTS	TEST SCORES (N = 327)		
	Pass	**Marginal Fail**	**Fail**
Total Number of scores:	151 (46%)	44 (13%)	132 (41%)
Navigation:			
Test 1, Multiple ways to locate a web page. N=37	34 (93%)	2 (5%)	1 (2%)
Test 2,Keyboard control. N=37	3 (8%)	16 (43%)	18 (49%)
Accessibility of documents: *Note: In 2 cases Word documents were evaluated instead of PDF document, as no PDF were available.*			
Test 3, The PDF document has correct headings. N=37	6 (16%)	0	31 (84%)
Test 4,Images are not used to present text in PDF documents. N=37	28 (76%)	1 (2%)	8 (22%)
Accessibility of forms: *Note: In five cases any forms with mandatory fields was found and therefore test 5 was completed on 32 websites only.*			
Test 5, Error messages in connection to mandatory fields. N=32	10 (31%)	14 (44%)	8 (25%)
Test 6,Using correct labels in forms. N=32	17 (53%)	2 (6%)	18 (56%)
Construction quality:			
Test 7, Using HTML/XHTML according to specification. N=37	5 (14%)	1 (3%)	31 (84%)
Test 8, Separating information and structure from presentation. N=37	30 (81%)	3 (8%)	4 (11%)
Multimedia:			

TESTS	TEST SCORES (N = 327)		
Note: Twenty of the 37 websites tested contained multimedia, but in 4 cases the multimedia did not contain any audio information.			
Test 9, Captioning of media. N=16	3 (19%)	4 (25%)	9 (56%)
Test 10, Keyboard control in the video player. N=20	15 (75%)	1 (5%)	4 (20%)

The efforts required by the public services to fully comply with WCAG 2.0 vary

In many cases, no evidence was found of systematic problems with the website. Instead, specific mistakes and isolated errors were uncovered that could have been fixed – or at least discovered - if sufficient accessibility checks had been conducted during the development and subsequent maintenance of the website.

Approximately 10-15 % of the online services tested appear to have been developed using older technologies and approaches to accessibility. These types of services generally have more fundamental accessibility problems that would likely require an entire website redesign and rebuild, rather than simply retrofitting a number of isolated fixes.

An example of such an issue is where online forms cannot be submitted online by the citizen, but must be downloaded, completed and posted to the relevant agency. These largely manual form submission processes contains significant accessibility barriers for very many people using Assistive Technology and may need to be upgraded in order to achieve the relevant level of conformance with the standards set out in the proposed Directive.

It is noteworthy that manual form submission processes are also much less efficient for the organisation than fully online services. Considerations by public bodies on moving to an online service should take into account the Return on Investment in terms of efficiency gains to be achieved. In general public sector bodies need to consider any investment required to ensure compliance with the accessibility standard in the context of other efficiency gains that potentially can be achieved.

The most striking accessibility barriers relate to documents, forms and multimedia

A large disconnect was identified between the level of accessibility of the HTML pages of the websites and the stand-alone documents in formats such as MS

Word and PDF contained in these pages. PDFs in particular are widely used in public sector websites but in many of the PDFs examined they were found not be have developed with accessibility in mind. In many cases they contain detailed information or instructions about a particular public service or scheme. In addition, many application forms in PDF were found to be not web-enabled, but intended instead to be printed off, filled in and returned by mail to the public service organisation. This practice has serious implications for the levels of accessibility required by some groups of users, in particular users of Assistive Technology, as well as having implications for the efficiencies that can be achieved by public services in processing applications online.

A striking and emerging accessibility barrier was identified on those sites that provide audiovisual material such as videos online. While videos have an important role in assisting end users to understand a piece of complex information or to use an online service, the videos assessed were found to lack critical accessibility features such as subtitling. In addition, video content was often found to be presented in isolation on a page, without any reference to other pages containing related information.

General web accessibility perceptions among web managers

The focus on achieving accessibility remains more on a technical than a human level

The majority of organisations interviewed referred to the WCAG guidelines as being the basis of their web accessibility policy. The focus of accessibility efforts thus seems to be on technically complying with the standards or guidelines referenced in relevant policies and legislation at a specific point in the development of a website rather than on optimising and continually improving the user experience as a whole. This indicates a need to promote a more user-centric delivery of services online through the adoption of a Universal Design approach.

Organisational policies and processes often do not consider accessibility as a ongoing issue

Organisational accessibility policies are not always documented and/or formally implemented and this may lead to accessibility efforts becoming once-off activities related to specific events such as the development of a new website. Many of the accessibility errors observed in the web accessibility assessment would have been avoided if proper maintenance and quality checking procedures were in place.

A number of structural and management barriers constrain public sector organizations from taking a more strategic and structured approach towards web accessibility in their day to day operations. These include:

- resource restrictions and the need to balance accessibility requirements with other organisational requirements;
- deficits in keeping awareness or knowledge within teams at required levels over time;
- non-availability of tools that support staff in achieving or maintaining accessible websites/content on an ongoing basis;
- decentralized/ad-hoc generation and publication to the website of inaccessible content by internal staff, and;
- management of external content providers in producing accessible content.

Insights into cost and benefits of web accessibility

Potential costs vary for public services to fully comply with WCAG 2.0

The effort required to achieve full compliance across the 37 websites tested varies considerably due to the extent and mix of accessibility issues identified. Three categories of websites have been generally identified in this respect, varying in degree of the severity of issues identified and extent of efforts likely to be incurred in fixing these.

- The first grouping of websites could achieve full compliance with relatively minor efforts. Most websites assess come under this grouping.
- In the second grouping, some accessibility efforts have already been made and further improvements could be achieved if moderate efforts were made.
- The third category can be typified by websites where retrofitting of accessibility into the existing website is not recommended. For these website the amount of accessibility errors and/or the baseline technology used may make it either technically impossible or inordinately costly to achieve a satisfactory level of compliance. For this category rebuilding the website from scratch may be required.

In all cases, the ongoing and systematic review of the level of accessibility by the public sector organisation will likely reduce the need for future development work resulting directly from a degrading in the level of accessibility on the website over time.

Costs related to achieving accessibility to date are not perceived to be problematic

The results from the interviews with web managers are in line with other studies, which have found that public sector web services do not identify or try to track specific costs that might be attributed solely to making or keeping the website accessible. Therefore, as in other studies, no specific accessibility costs could be identified and collated. Some specific one-off costs that were identified related to conducting user testing or commissioning accessibility audits. From those views expressed in interviews, any costs related to accessibility were not typically identified as being especially large. Therefore, the cost to achieving accessibility was not considered to represent a major barrier by the web managers. Addressing accessibility from the beginning was seen as helping to keep costs to a minimum. The availability of nationally developed and deployed support tools and accessibility evaluation procedures, as found to be in place in Germany, was also reported to help keep costs to a relatively low level.

1. Introduction

To mark the 25th anniversary of the World Wide Web Sir Tim Berners, its inventor and Director of the W3C reiterated "By design, the Web is universal, royalty-free, open and decentralised.... This is for everyone"[6]. Over the past 25 years the Web has become an essential means of delivering and accessing information and services. It facilitates a global conversation. It enables people to communicate with relatives, shop online and deal with government and public services. In the context of the Web, accessibility means that everyone, regardless of their age, ability or disability, can perceive, understand, navigate, and interact with its content and services.[7]

This study was conducted for the Centre for Excellence in Universal Design at the National Disability Authority and the Department of Communications, Energy and Natural Resources in Ireland. The data gathering and auditing component of the research was carried out from April to October 2013. It was commissioned as an initiative under the Irish Presidency of the EU[8] and as an action under Ireland's National Digital Strategy[9].

The focus of the study was on the accessibility of key public websites for citizens in the EU Member States. It aimed to make a new contribution to the existing evidence base on this topic in order to support the current dialogues around the European Commission's recent proposal for a Directive in this area[10]. These are

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[6] http://www.webat25.org/news/tbl-web25-welcome

[7] http://www.w3.org/WAI/intro/accessibility.php

[8]The Presidency made progress on a range of issues to boost the Digital Single Market and to deliver long-term benefits that will help both consumers and business. These issues included a progress report on web accessibility. "Results of the Irish Presidency of the Council of the European Union, January-June 2013: for stability, youth and growth", p 23. http://www.eu2013.ie/media/eupresidency/content/documents/Irish-EU-Presidency-achievements-report-English.pdf

[9] Ireland's National Digital Strategy. http://www.dcenr.gov.ie/Communications/NDS/

[10]Proposal for a Directive of the European Parliament and of the Council on the accessibility of public sector bodies' websites. http://ec.europa.eu/digital-agenda/en/news/proposal-directive-european-parliament-and-council-accessibility-public-sector-bodies-websites

At the time of writing this report, the EC proposal has been considered by the Internal Market and Consumer Protection Committee (IMCO) of the European Parliament, who approved the resolution by 30 votes to 3 in November 2013. http://www.europarl.europa.eu/news/en/news-room/content/20131128IPR28091/html/Online-public-services-must-be-accessible-to-everyone-MEPs-insist

The proposal is now awaiting 1st reading by the Parliament.

services that are important in everyday life for citizens, and they have been given specific attention in regard to their online provision across the Member States in the context of the EU eGovernment initiatives.

The benefits of web accessibility to citizens and the public service alike from making websites accessible are well documented. According to the EC proposal, accessible websites result in a better user experience for all users, including older persons and persons with disabilities. Also, according to the proposed Directive, harmonising the rules by which websites are made accessible also makes business sense for the web development industry in Ireland and Europe.

A starting point for commissioning the study came from previous research evidence that most countries in Europe, including Ireland, have adopted some kind of legislative or other regulations in relation to the accessibility of their public sector websites, often based on the same guidelines (the Web Content Accessibility Guidelines 2.0). However these are interpreted very differently across the EU and are often only implemented in part.

The aim of the research is to provide evidence to support meaningful enhancements to the accessibility of public sector websites for people with disabilities, older people and other stakeholders to whom such accessibility is important. It is also envisaged that the research would contribute to the efforts to be undertaken by the Commission to establish an agreed monitoring and reporting process as stated for in Article 7 of the current draft of the Directive[11].

The core methodology involves both the assessment of accessibility-related aspects of public sector websites in a number of Member States and field work with web managers of such websites in order to gain a better understanding of their approaches and experiences in relation to the issue. The work also involved preparing a summary of previous European efforts in this field to provide a contextual background for the study.

The outcomes of this research are presented in the remainder of this report. This starts with outlining the main issues arising from previous research, policy and practice that set the context for the study (Chapter 2). Next the conceptual and methodological approach adopted for the purposes of this study are described (Chapter 3). Following this, the outcomes from the research are reported in Chapter 4. Finally, key results and policy implications from the

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[11] "Presumption of conformity" will be monitored by Member states and reported to the Commission. However the methodology is not detailed further in the Article but shall be developed through a series of 'implementing acts' to be published to the OJEU. These will most likely be developed by a Committee appointed by the Commission (Art 9).

evidence generated in relation to both technical and non-technical aspects are presented in Chapter 5.

1.1 Overview of methodological approach

A multi-method approach was adopted, comprising an audit of selected websites by a team of experienced accessibility experts and in-depth interviews with representatives of relevant public sector organisations.

A key feature of this approach is the focus on developing and applying a perspective that assesses web accessibility in a meaningful manner. This involves moving beyond the typically quantitative pass-fail type of benchmarking approaches that have so far predominated in this field. This study explores in-depth 5 key themes: navigation, documents, forms, technical construction and multimedia and what the accessibility of these mean for different stakeholders. Findings from the web accessibility assessment informed the interview portion of the study.

Throughout the report a large amount of advisory commentary is also provided. This aims to provide practical assistance to public sector website managers and developers in identifying and strategically addressing accessibility issues as found to exist on public sector websites. Though not a core part of the study, this content can be used to assist public sector bodies in:

- Developing or updating an organisational web accessibility policy
- Considering web accessibility in the procurement of new web services
- Identifying priority problem areas to address
- Strategies for ongoing internal monitoring and maintenance of web accessibility

2 The study background

This Chapter outlines some of the main issues arising from previous research, policy and practice that set the context for the study. It starts with an overview of the European policy context for web accessibility, touching on the various communications, policy initiatives and relevant Directives, including those in the domain of public procurement. A description of the proposal for a Directive on the accessibility of public sector websites is provided. Finally, an overview of the policy context in each of the three countries in which interviews were conducted is provided (Ireland, Germany, Sweden). This overview covers themes such as public procurement, monitoring and support initiatives.

2.1 The European policy context for web accessibility

eAccessibility in general, and web accessibility in particular, has come to hold an important place in EU disability, ageing, equality, internal market and eGovernment policy. This section attempts to summarise the way relevant EU-level policies have emerged, and which policy instruments have been utilised in this context.

Since the mid-1990s, the European Union has developed a more proactive and ambitious disability policy, focusing on non-discrimination and the prevention of disabling barriers to participation, especially after the adoption of Article 13 of the Amsterdam Treaty (now Art.19 of the Treaty on the Functioning of the European Union (TFEU))[12]prohibiting discrimination on the grounds of disability, and the adoption of the non-binding declaration on the needs of persons with disabilities in the internal market attached to Article 95 EC (now Art. 114 TFEU)[13].

Also, the EU's Employment Framework Directive prohibits discrimination in employment and occupation on grounds of disability, and includes a legal obligation for reasonable adjustments to be made for employees with

[12]With the Treaty of Amsterdam, which entered into force on May 1, 1999, the European Union and Community sought to accord greater expression and substance both to a rights-based conception of Union citizenship and a concern to combat discrimination. In this regard, a notable feature of the Treaty establishing the European Community, as amended by the Treaty of Amsterdam, is the inclusion, under Article 13, of new anti-discrimination provisions.

[13]Article 95 (ex Article 100a) of the EC Treaty, which concerns the approximation of legislation relating to the single market.

disabilities[14]. References to eAccessibility have appeared in the domain of radio and telecommunication terminal equipment[15], electronic communications networks and services[16], and audiovisual media services[17]. Other, more horizontal and cross-sectoral legislation (not ICT specific legislation), has incorporated references to eAccessibility and the needs and rights of persons with disabilities in relation to copyright[18], public procurement[19] and structural funds[20].

In 2005, the European Commission adopted a Communication[21] on eAccessibility. This communication encouraged Member States to step up their promotion of initiatives to give improved access to information and communication technologies, particularly for people with disabilities and older people. It also emphasised the need to take stock of and monitor the progress of eAccessibility in Europe (on both the market and policy sides) in order to support decision-making on possible needs for EU level legislative or other actions. Following from

[14] Directive 2000/78/EC establishing a general framework for equal treatment in employment and occupation.

[15] Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

[16] Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services; Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services. Directive 2009/136/EC of 25 November 2009amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services etc.

[17] Directive 2007/65/EC amending Council Directive 89/552/EEC on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities.

[18] Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society

[19] Directive 2004/17/EC coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors; Directive 2004/18/EC on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts. In the case of the Proposal for a Directive on procurement COM/2011/0895 final, it includes several references to accessibility for people with disabilities and design for all.

[20]Council Regulation 1083/2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999

[21]COM(2005) 229 final. "i2010 – A European Information Society for growth and employment".

this a monitoring study, the Measuring Progress of eAccessibility in Europe (MEAC I) study[22], was commissioned and reported in 2007 and 2008.

Also in 2005, the Commission mandated European Standardisation Organisations (ESOs) to develop eAccessibility standards to support the use of public procurement practices to remove barriers to participation in information society by persons with disabilities and elderly people (Mandate 376)[23]. The Commission later continued its support for the continuation of this standardisation work to ensure that the ESOs deliver the actual standards and related conformity assessment schemes. In January 2011 Mandate M 376 Phase 2 started. This phase of the work, co-funded by the European Commission (EC), is managed by a Joint Working Group (JWG) of CEN, CENELEC and ETSI, collectively know as the European Standardisation Organisations, with AENOR, the Spanish national standards body, as the Secretariat. In February 2014 a European Standard, "EN 301 549 - Accessibility requirements for public procurement of ICT products and services in Europe" was published. This standard is intended to assist public procurement bodies when acquiring accessible ICT products and services[24].

In 2008, the Riga Ministerial Declaration was published. This included a commitment to ensure accessibility of all public websites by 2010, which increased the importance of monitoring web accessibility as part of EU activity in this field.

A further Communication adopted in 2008 stated that the Commission will monitor and publish progress in web accessibility and eAccessibility in order to speed up progress. The Communication referenced the results of the MEACI study [Measuring Progress of eAccessibility in Europe, 2007] and gave commitments to continue to monitor progress on eAccessibility, with special attention to be given to web accessibility. The possibility of follow-up legislation was also noted. After publication of the Communication, a follow-up study, the 'MeAC II' study, was commissioned as well as a study on progress towards the implementation of WCAG 2.0 web accessibility guidelines in the Member States (hereafter WCAG 2.0 study).

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[22] MEAC I. Measuring Progress of eAccessibility in Europe. Assessment of the Status of eAccessibility in Europe. Main Report. October 2007

[23]Standardisation mandate to CEN, CENELEC AND ETSI in support of European Accessibility Requirements for Public Procurement of Products and Services in the ICT domain, Mandate 376, European Commission, DG Enterprise and Industry, Brussels, 7. December 2005

[24] Mandate 376. http://www.mandate376.eu/

The 'MeAC II' study[25] on Monitoring eAccessibility in Europe (2009-2010) extended the scope of the policy and status indicators used in MEAC I to include a number of emerging although less mature eAccessibility themes. These were applied and tested in a subset of 12 EU Member States plus the US, Canada, and Australia, and an online Balanced Score Card approach to benchmarking and results presentation was developed. The web accessibility monitoring/assessment approach was again mainly quantitative, but included both WCAG 2.0 and WCAG 1.0 indicators.

The WCAG2.0 study[26] focused specifically on progress towards and issues arising in relation to the move towards WCAG 2.0 standards in Europe. It also assessed web accessibility as well as examining policy and practical issues around the transition process in a subset of Member States.

In December 2010, by ratifying the United Nations Convention on the Rights of Persons with Disabilities ('the UN Convention'), the majority of the Member States and the European Union have committed themselves "to ensure to persons with disabilities access, on equal basis with others, to inter alia information and communication technologies" and "to take appropriate measures [...] to promote access for persons with disabilities to new information and communications technologies and systems, including the Internet." The European Disability Strategy[27] 2010-2020 builds on the UN Convention and contains actions in several priority areas, including web accessibility, with the objective "to ensure accessibility to goods and services including public services and assistive devices for people with disabilities."

In November 2013, the so called 'MeAC III' study on Assessing and promoting eAccessibility conducted during 2012-2013 was published by the European Commission[28]. The main aims of the study were to take stock of the extent of e-accessibility across the EU27 countries and some third countries, as well as the policy efforts that have emerged in this area. The focus was on e-accessibility in three key domains – web, telecommunication such as mobile and landline phones, and TV.

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[25]MEAC II (2010). Monitoring eAccessibility in Europe. http://www.eaccessibility-monitoring.eu/

[26]Empirica, WRC and eWorx (2009). Web accessibility in European countries: level of compliance with latest international accessibility specifications, notably WCAG 2.0, and approaches or plans to implement those specifications.

[27]COM(2010) 636 final

[28]Kubitschke L., Cullen K., Dolphin C., Laurin S. and Cederbom A. (2013): Study on Assessing and Promoting e-accessibility, Final report.
http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=3163

2.2 Proposal for a Directive

On the 3rd December of 2012 the European Commission adopted a proposal for a Directive on the accessibility of public sector bodies' websites[29]. The draft directive aims at the harmonisation of the laws, regulations and administrative provisions of the Member States on the accessibility of websites of public sector bodies. As stated in the draft text:

> "The proposal lays down the technical provisions whereby Member States shall make accessible the content of certain types of websites of public sector bodies".

The scope of the proposed Directive is reduced to public sector bodies' websites offering 12 types of public services[30] that are essential for citizens' participation in the economy and society.

Regarding monitoring, Member States are requested to monitor the public sector bodies websites concerned, using the methodology established by the Commission in accordance with the procedure laid down in the Directive. The methodology will use procedures and technical assessment approaches from the harmonised standard, if available and adequate, and will be published in the Official Journal of the European Union. Moreover, Member States shall annually report on the results of such monitoring.

At the time of writing this proposal has been considered by the European Parliament, who approved a 1st Reading Opinion on the proposal. [31]. The proposal is now awaiting 1st reading by the Parliament[32].

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[29] European Commission. Proposal for a Directive of the European Parliament and of the Council on the accessibility of public sector bodies' websites.http://ec.europa.eu/digital-agenda/en/news/proposal-directive-european-parliament-and-council-accessibility-public-sector-bodies-websites

[30]The list is provided in the Annex and is drawn from the 2001 E-government benchmarking exercise. Member States may decide to extend this list of types of web sites. In essence, therefore, the proposed Directive would apply at a minimum to 12 specified public services in all Member States, with the requirement of being accessible at WCAG Level AA. (See section 3.1 for detailed info).

[31] European Parliament News, 28.11.2013. Online public services must be accessible to everyone, MEPs insisthttp://www.europarl.europa.eu/news/en/news-room/content/20131128IPR28091/html/Online-public-services-must-be-accessible-to-everyone-MEPs-insist

2.3 The current evidence base on web accessibility

As outlined in the previous section, the European Commission had commissioned a number of studies on web accessibility. These vary considerably in conceptual and methodological approaches. This section summarises the main outcomes according to the key themes emerging from this research, i.e. levels of accessibility actually achieved by public sector organisations and quantitative information about the costs and benefits involved.

2.3.1 Levels of web accessibility achieved

Key results of early research in this field characterised the eAccessibility legislative landscape across the different technological domains as containing either:

- an 'deficit' (insufficient availability of achievable eAccessibility provisions),
- a 'gap' (the general situation in Europe was not as well developed as comparison countries, especially the US), or
- a 'patchwork' (a wide variation across the Member States and also across technology domains in relation to eAccessibility progress)[33].

Subsequent research showed that progress across the Member States against the WCAG guidelines was still slow, although again some Member States performed better than others[34].

However, these and other studies also suggested that progress may be achieved that is not being captured when compliance (i.e. passing both automatic and manual tests) is considered from a 'pass/fail' point of view[35].It was highlighted that there may be hidden progress towards accessibility, especially in the case of government websites. Beyond this, a noticeable 'churn' rate could be observed over time - a substantial proportion of websites that have achieved a certain level of accessibility in one year seem not to have been able to sustain this in

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[32]Procedure file: 2012/0340(COD). http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2012/0340%28COD%29&l=en

[33] Empirica and WRC: MeAC- Measuring Progress of eAccessibility in Europe. Assessment of the Status of eAccessibility in Europe. Main Report (2007) and eAccessibility status follow-up (2008).

[34] Technosite et. al. (2010). Monitoring eAccessibility in Europe. (http://www.eaccessibility-monitoring.eu/)

[35]Empirica, WRC and eWorx (2009). Web accessibility in European countries: level of compliance with latest international accessibility specifications, notably WCAG 2.0, and approaches or plans to implement those specifications.

subsequent years.

The latest cross national benchmarking study[36] conducted in this field generally confirms the finding of earlier research[37]. The study on assessing and promoting eAccessibility (2013) shows that there has been some progress in recent years, with nearly all Member States now having some type of obligation or policy in place for accessibility of public websites and some having strengthened or further developed their existing approaches. Despite this, there remains much room for improvement in the actual levels of web accessibility that are so far being achieved across Europe; for the EU27 as a whole, the levels of web accessibility (for the types of websites covered in this study and according to the set of accessibility indicators used) are lower than the comparison countries (USA, Canada, Australia and Norway).However, considerable variation has been observed across the Member States in the levels of web accessibility being achieved. In many countries, the levels of accessibility achieved by public websites tend to be higher than by commercial websites, which is consistent with the fact that national policies and regulations often address government websites or those supported by public funds.

Recent studies show that the situation is not improving as it should in relation to the experience of people with disabilities using public websites. The "Study of Disabled World" in 2013 confirmed that people with disabilities use the Internet and other types of technologies at levels that are below those of the rest of the population. The main reason is not due to a lack of interest or education, but because the Internet itself remains inaccessible to people who experience various forms of disabilities. Recent studies of accessibility of US government websites discovered that at least 90% of them have major barriers to access, even though legal requirements mandating their accessibility have been in place for almost 10 years. The levels of accessibility in educational and commercial settings are worse.

A 2012 study by the National Disability Authority investigated the "lived experience" of people in Ireland accessing using public sector websites.[38] Based

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[36]Kubitschke L., Cullen K., Dolphin C., Laurin S. and Cederbom A. (2013): Study on Assessing and Promoting e-accessibility, Final report.

[37]Measuring Progress of eAccessibility in Europe. Assessment of the Status of eAccessibility in Europe. Main Report. October 2007 and MEAC II (2010). Monitoring eAccessibility in Europe. http://www.eaccessibility-monitoring.eu

[38]AMAS (2012). The Lived Experience of People in Ireland using Online Public Services: Universal Design research and design guidance for public sector websites. http://www.universaldesign.ie/web

on data from the National Disability Authority's 2011 "National Survey of Public Attitudes to Disability In Ireland" the study showed that people with a disability were significantly less likely to use public sector websites (33% vs. 55%) compared with people without a disability. In addition, this group of people with a disability who reported not using a website was approximately three times more likely to say the reason for not doing so was because they find them difficult to use (13% vs. 4%).[39] Based on interviews with older persons' representative bodies and user testing with a small number of older people, the study concluded that for older people "the design of website is particularly an issue for this cohort and need to be considered as a priority in facilitating access to public services."

2.3.2 Costs and benefits of web accessibility

Remarkably little information is available in the public domain on the cost of developing websites for public sector services, let alone on the additional costs of making these websites fully accessible. The Commission i2010 policy framework[40] called for an inclusive Information Society and the 2007 Communication on eInclusion[41] gave attention to the need to document the tangible and quantifiable costs and benefits associated with efforts to address eInclusion and related themes such as eAccessibility.

The 2012 research study to support the European Commission's impact assessment for its proposal for a Directive relies on a quantitative modelling of costs and benefits assuming different scenarios, with a view to analysing the benefits and costs of improved web accessibility for web managers and for society as a whole[42]. This research made estimations of the monetised value of benefits for users (the measure of aggregate social gain) across the EU27 under full implementation of web accessibility and coordination with other social policies. According to this analysis, the scale of such benefits may be of the order of €400 billion or more. The aggregate EU27 costs of introducing web accessibility for both the private and public sector were estimated to be over €2 billion (initial costs and first year maintenance). These potential costs were

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[39] National Disability Authority, (2012). National Survey of Public Attitudes to Disability In Ireland. http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/90F8D23334D786A880257987004FCF51?OpenDocument

[40] COM(2005) 229 final. "i2010 – A European Information Society for growth and employment".

[41] COM(2007) 694 final. European i2010 initiative on e-Inclusion "To be part of the information society".

[42] Technosite et al (2012). Study on economic assessment for improving eAccessibility services and products. http://www.eaccessibility-impacts.eu/researchResults.aspx

partially counterbalanced by economic returns from increased online sales and from efficiency gains. These potential costs were also shown to be relatively very small in relation to the overall societal gains achievable by full implementation of web accessibility.

Apart from this aggregate level of analysis, the study also looked at cost-benefit issues at the individual organisation level. A sample of organisations was surveyed through a questionnaire and some in-depth case studies were conducted. In general, the picture emerging was that organisations reported overall satisfaction with their efforts to introduce web accessibility, with little evidence of significant complexities and difficulties, and costs were deemed to be affordable.

2.4 National policies on web accessibility

The first comprehensive benchmarking exercise on web accessibility related policies in Member States was published in 2007[43]. Since then there has been some general progress, with nearly all Member States now having some type of obligation or policy in place for the accessibility of public websites and some having strengthened or further developed their existing approaches[44]. However, the available evidence base shows that there is considerable variation when it comes to the policy context for web accessibility related obligations. Also, there are differences when it comes to the types of websites that are included within their scope, the accessibility standards/guidelines that are applied, whether there is official monitoring of compliance/achievements, and how web accessibility policies have been evolving in recent years.

Against this background, the policy context prevailing in the three countries covered by the current study, Germany, Ireland and Sweden is summarised in the following subsections on:

- Policy scope
- Timeframe for implementation
- Scope of coverage of WCAG 2.0
- Supporting measures
- Monitoring
- Public procurement

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[43]Cullen, K. and Kubitschke, L. (2007) Assessment of the Status of eAccessibility in Europe.

[44]Kubitschke L., Cullen K., Dolphin C., Laurin S. and Cederbom A. (2013): Study on Assessing and Promoting e-accessibility, Final report

2.4.1 Germany

2.4.1.1 Policy scope:

General equality legislation – the "Behindertengleichstellungsgesetz" (BGG) - enacted in 2002 is the legal basis for imposing accessibility related obligations on public websites in Germany[45]. In particular, section 4 of the BGG stipulates that structural and other facilities, means of transport, basic technical commodities and systems used for the purpose of information processing must be free of access barriers[46] in a way that they can be used by people with disabilities in accordance with general usage, without aggravation and without assistance by a third party. Furthermore, section 11 of the BBG stipulates two key requirements on public websites in particular:

- Bodies of the Federal administration and bodies of the Regional administration implementing Federal law must ensure that their internet offerings can generally be used by people with disabilities
- the Federal government shall work towards achieving that commercial web offerings become accessible to people with disabilities by means of 'target agreements'

The following types of online offerings maintained by the parties concerned fall under the ambit of this regulation:

- All internet offerings directed towards the general public
- All intranet offerings directed towards the general public
- All other types of graphical software interfaces directed towards the public

In relation to public websites, the general obligation imposed by BGG has been further substantiated by subsequent Federal Ordinance. The Ministry of the Interior in agreement with the Ministry for Labour and Social Affairs has stipulated detailed implementation requirements by means of the so called "Barrier-free Information Technology Ordinance" (BITV) enacted in July 2002. A revised version of BITV – the so called BITV 2.0 – was enacted in Sept 2011. As

[45] For the following c.f.: Behindertengleichstellungsgesetz (BGG) of 2002 as amended on 19th Dec 2007: http://www.gesetze-im-internet.de/bgg/BJNR146800002.html; and BITV of 2002: http://www.einfach-fuer-alle.de/artikel/bitv/; and BITV 2.0 of 2011: http://www.gesetze-im-internet.de/bitv_2_0/; and Overview of Equality legislation enacted at the regional governance level: http://www.di-ji.de/index.php?option=com_content&view=category&layout=blog&id=76&Itemid=57&lang=de

[46] The term "barrier-free" is commonly used in Germany as a synonym for accessibility.

this revision did not concern the basic law itself but only the subsequent Federal ordinance, no involvement of parliament was required. In this context, the existing list of 14 accessibility requirements was aligned with WCAG 2.0. Again a staged implementation approach was adopted:

- All websites particularly directed towards people with disabilities had to comply by March 2012
- All other existing websites have to comply by September 2012.

Beyond the alignment of previously existing requirements with WCAG 2.0, new requirements were added. All websites falling under the ambit of BITV must provide basic information to the users in **German sign language** and **simple language** on their home pages by March 2014 at the latest. This includes a general explanation what the website is about, information on how to navigate it and an explicit indication of any further items that may be available in sign language and/or simple language further down in the website structure.

The administrative landscape which equality legislation in general and web accessibility in particular attempts to legislate in general in Germany is complex. There are approximately 11,250 municipalities, cities (Städte)and autonomous cities (kreisfreie Städte) in Germany which normally enjoy local self-government[47].Under the provisions of related actions, provisions contained in the law of the Federation or the Länder (states) on the accessibility of information technology normally do not apply here. The Federal parliament has no powers to regulate web accessibility at regional level. The 16 regional parliaments exist in Germany have all adopted their own equality laws. These include similar obligations on the accessibility of websites when compared with the Federal law (BGG). A working group had been established following the adoption of BGG in 2002 made up of representatives of the Federal government and all regional governments. Agreement was reached that any equality law to be adopted by a regional parliament should seek to follow the same basic principles as laid down in BGG, thereby taking account of the sovereignty of the regional parliaments.

It is therefore difficult to obtain a definitive picture across all German regions of the extent to which online offerings at the municipal governance level are governed by web accessibility related obligations. A legal obligation for web accessibility does not *per se* extend to services of public interest that are provided by commercial organisations, e.g. public transport.

[47] http://de.wikipedia.org/wiki/Gemeinde_(Deutschland)

When it comes to commercial organisations, a noteworthy and innovative legally defined process has been established in the framework of general anti-discrimination legislation. The process of 'structured negotiations' aims to negotiate contractual agreements, so called "target agreements", about how accessibility of products, services and venues should be achieved on a case by case basis, as well in what time frame. Accredited disability organisations have the right to demand the initiation of contract negotiations with individual enterprises or umbrella organisations representing the private sector at any time using a formalised procedure[48].

2.4.1.2 Time frame:

Web accessibility was to be implemented on a phased basis from 2002 to 2005 for public websites covered by legal obligations in Germany[49]. Any existing websites falling under the ambit of the law and which were particularly directed towards people with disabilities had to comply by 31st December 2003 at the latest. All other existing websites had to comply by 31st December 2005. Websites which were to be newly established from 2002 onwards had to comply immediately.

Overall, all websites owned by bodies of the public administration at the Federal level had to comply by September 2012 with a common set of requirements based on WCAG 2.0. Beyond this they have to make basic information available

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[48] Federal Law on Equality of People with Disabilities (Behindertengleichstellungsgesetz - BGG) enacted in 2002 empowers accredited disability organisations to force commercial enterprises or their umbrella organisations into a structured negotiation process about making their products, service and/or venues accessibility to people with disabilities. The law enables enforcement of a bilateral and consensus based negotiation process which is ultimately directed towards contractually agreeing a so called "target agreement". It is up to the negotiating parties to agree specific accessibility requirements that are to be met, a schedule for implementing these and any sanctions that might apply where a target agreement is implemented as contractually agreed. A disability organisation demanding negotiations for a target agreement must indicate this at a central register, stating the parties involved in the negotiation process. Other disability organisations have the right to join the negotiation process within four weeks of publication in the central register. As soon as joint negotiating committee has been established by the disability organisations involved the negotiation process has to be started following weeks. Successfully concluded "target agreements" must be published in central register. See http://www.bmas.de/DE/Themen/Teilhabe-behinderter-Menschen/Zielvereinbarungen/Zielvereinbarungsregister/inhalt.html

[49] See Federal Law on Equality of People with Disabilities (Behindertengleichstellungsgesetz - BGG) enacted in 2002 and subsequent Federal Ordinance Barrier-free Information Technology Ordinance (Barrierefreie Informationstechnik - BITV) of 2002. See also the revision (BITV 2.0) of 2011.

in sign language and clear language by March 2014 at the latest. When it comes to the regional level a mixed picture emerges. All regional parliaments have adopted some kind of regulation in relation to web accessibility within the framework of generic equality legislation - some refer to the Federal Ordinance BITV and some don't. The detailed accessibility requirements that have to be met vary such that no common standard is applied below the Federal level.

2.4.1.3 WCAG 2.0 coverage:

In Germany, a national standard was adopted based on WCAG1.0, in terms of a listing of detailed requirements annexed to a Federal ordinance (BITV) detailing the general requirements for web accessibility included in general equality legislation. Following the adoption of WCAG 2.0, the national standard was aligned by means of a further ordinance (BITV 2.0). The success criteria of WCAG 2.0 have been adopted for the purpose of BITV 2.0, with slight deviations[50].

2.4.1.4 Supporting measures:

Since the enactment of national web accessibility legislation in 2002 a number of supportive measures have been put in place. One example is The ABI project (Actions for Barrier-free Communication), which was funded by the Ministry of Labour and Social Affairs until 2010.[51]This initiative was jointly conducted by associations for people with disabilities and different centres of excellence in the field of web accessibility, with a view to supporting website managers to comply with accessibility requirements.

A more comprehensive support measure is the BIK project (Informing and Communicating without Barriers), which was funded by the Ministry of Labour and Social Affairs until 2012[52].The project developed a voluntary certification scheme, the so called BITV-Test. The test was first published in 2004 and has been continually updated since. Today onsite workshops and different types of tests are offered[53].

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[50] This concerns success criteria no. 3.1.5 where the theme "Leseniveau" has been substituted by "leichte Sprache" and no. 2.4.8 which has been assigned "Priority I" although this is a priority level AAA condition. See: http://webkrauts.de/artikel/2011/bitv-20-kraft

[51] The ABI project (Aktionsbündnis für barrierefreie Informationstechnik) finished in 2010. For details see: http://www.abi-projekt.de/

[52] For details see: http://www.bikonline.info/bik/index.php

[53] Beyond onsite-workshops, tests on offer include:

"BITV self-assessment": Free for everyone after registration, the self-assessment is a web-based online accessibility checking procedure for one evaluator allowing checkpoint ratings and

Also, consultancy services and supportive tools are available from the Information Technology Unit (BIT) at the Federal Office of Administration[54]. The unit acts as a central service provider for all federal government bodies such as federal Ministries and the federal labour administration. Utilisation of services offered by BIT is however not mandatory to public website managers. One strategic aim for setting-up the unit was to avoid growth of "island IT solutions" across the federal administration. When it comes to websites in particular, the Unit has developed a tool - the "Government Site Builder". Based on a commercially available content management system (CMS), Site Builder goes beyond supporting content management tasks in the narrow sense[55]. Modules include layout templates, navigation concepts but also newsletters and search functionalities. The tool has also been designed to support accessibility. Moreover, a free of charge testing tool has been developed to support website owners in assessing compliance with national accessibility regulation (BITV 2.0).

2.4.1.5 Monitoring:

No mandatory monitoring scheme is in place in Germany to check compliance with legal obligations. As outlined above, several indirect measures aiming to support web managers in fulfilling their web accessibility related obligations have been funded by the Government. Amongst other measures, a voluntary third party compliance assessment scheme has been put in place, the so called BITV-Test. The test is based on the Federal Ordinance (BITV) and includes 50 detailed

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comments. The self-assessment has no page sample: it applies the checkpoints to the entire site. Alternatively, users may limit self-assessment tests to a single page and aggregate results on their own.

The so called "BITV design support test": This test is used for evaluating websites during development. The results help address accessibility problems detected. The design support test often conducted prior to a final BITV-Test. Evaluators can target the page sample to pages in response to clients' needs. The result is for internal use by the client, i.e., it cannot be made public and cannot be used as statement of conformance.

The so called "BITV final test": The final BITV-Test checks conformance to BITV 2.0. It involves two evaluators conducting the test independently based on the same page sample. These tandem tests are followed by an arbitration phase. Here, both evaluators run through all the checkpoints they have rated differently and agree on the final consensual rating. The arbitration phase not only helps detect oversights and corrects both too lenient and too strict ratings. When a site achieves a score of 90 or more points (out of 100), it is considered accessible. The site can now carry a 90plus-seal that links to the detailed time-stamped test report.

For details see: http://www.bitvtest.eu/bitv_test/intro/overview.html

[54] For details see: http://www.bva.bund.de/EN/Home/home_node.html;jsessionid=E173FBF1067776AE8878C42CCF1B384D.1_cid370

[55] For details see: http://www.bva.bund.de/DE/Organisation/Abteilungen/Abteilung_BIT/Leistungen/IT_Produkte/GSB/Produktinfos/Barrierefreiheit/inhalt.html

test steps for assessing whether information-oriented websites are accessible for users with disabilities. An overall assessment is provided according to a 100 point scale, whereby a website achieving a result of 90 to 94 points is considered as "fairly accessible". A website achieving a result of 95 points and more is considered as "very accessible"[56].

2.4.1.6 Public procurement:

In Germany, the only directly relevant regulation for public procurement is the Federal Ordinance on Barrier-free Information Technology (BITV 2.0). Although this is not explicitly stated, this regulation contains a requirement catalogue that is in principle to be considered by public procurers covered by this regulation when a service contract is awarded for web design.

2.4.2 Ireland

2.4.2.1 Policy scope:

The Disability Act 2005 and the accompanying "Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies" prepared by the National Disability Authority are the most directly relevant measures[57]. Section 28 (2) of Disability Act 2005:

> "Where a public body communicates in electronic form with one or more persons, the head of the body shall ensure that, as far as practicable, the contents of the communication are accessible to persons with a visual impairment to whom adaptive technology is available."

Public sector web managers are supported in meeting the requirements of the Act through the National Disability Authority's Code of Practice and guidelines and available from the National Disability Authority and its Centre for Excellence in Universal Design.

This disability legislation addresses most public sector bodies. The public bodies defined in section 2 of the relevant Act cover for instance Government bodies, e.g. a Department of State, the Office of the President, and the Office of the Attorney General as well as local authorities, the Health Service Executive and any person, body or organisation (other than the Defence Forces) established by or under any enactment. The latter would include, for example, the Broadcasting

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[56]The BITV-Test is intended to serve as a comprehensive accessibility evaluation instrument. For more information, see: http://www.bitvtest.eu/

[57] For the following c.f.:http://www.oireachtas.ie/viewdoc.asp?DocID=4338; and http://www.nda.ie/Good-practice/Codes-of-Practice/Irish-Code-of-Practice-on-Accessibility-of-Public-Services-and-Information-Provided-by-Public-Bodies-/

Commission of Ireland, the Central Statistics Office and the National Disability Authority, the Courts Service, the Legal Aid Board as well as Dublin Bus, Bus Éireann and Iarnród Éireann. When it comes to the private sector, an obligation could be inferred under the Equality Act. However to date no cases have been taken under the Equality Act related to the accessibility of private sector websites.

The public service reform agenda in Ireland which is managed by the Department of Public Expenditure and Reform focuses on the delivery of "improved outcomes for service users".[58] The Office of the Government Chief Information Officer (OGCIO) is responsible for developing and implementing an ICT Strategy for the Irish Government. It is implementing the current Irish eGovernment strategy.[59] This strategy again emphasizes online public services should "ensure a strong focus on the customer and that better and more innovative use is made of technology to improve the customer experience."[60]

2.4.2.2 Time frame:

No timeframe for the adoption of WCAG 2.0 has been specified in Ireland yet, although implementation the Disability Act did have a date when it came into effect – 1st Jan 2006.

2.4.2.3 WCAG 2.0 coverage:

On request by the Minister for Justice, a statutory Code of Practice was prepared by the National Disability Authority setting out how a public body can improve accessibility by:

1. establishing what is entailed in making electronic communications accessible and understanding the needs of those using adaptive technology;
2. reviewing existing practices for electronic communications in terms of accessibility against relevant guidelines and standards, e.g.: NDA IT Accessibility Guidelines for all computers, information kiosks, interactive services with an ICT front end; e-mail and other application software, and other Public Access Terminals used by the public; Double A level conformance with the Web Accessibility Initiative's (WAI) Web Content Accessibility Guidelines (WCAG);

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[58] http://reformplan.per.gov.ie/exec_summary/exec_summary.html

[59] http://www.per.gov.ie/minister-howlin-launches-new-office-of-the-government-chief-information-officer-ogcio/

[60] http://egovstrategy.gov.ie/wp-content/uploads/2012/04/eGovernment-2012-2015.pdf

3. planning to ensure that all such communications are produced, as far as practicable, in a format that is accessible to persons with visual impairment using adaptive technology such as, e.g. screen readers or speaking browsers, etc., as appropriate.

The Code of Practice states that compliance with the Code is considered to indicate compliance with the provisions of the Disability Act. Although the reference to WCAG contains no number, this is interpreted to mean the most recent version.

The obligations contained in the Disability Act 2005 and the accompanying Code of Practice cover all levels of administration within the public sector.

2.4.2.4 Supporting measures:

A number of supporting measures are available to website developers and managers to help them in improving the accessibility of their websites in Ireland in the form of comprehensive guidance materials. These are provided by the National Disability Authority and its Centre for Excellence in Universal Design which was established to promote the design of environments that can be accessed, understood and used regardless of age, size and ability[61]. These include:

- An Accessibility Toolkit for public sector staff, (http://www.accessibility.ie), which in turn refers to
- detailed "Universal Design guidance for online public services", (http://www.universaldesign.ie/web), covering both issues of usability and accessibility
- "Web accessibility techniques" for developers, designers and content editors, (http://www.universaldesign.ie/useandapply/ict/webaccessibilitytechniques)
- An "IT Procurement Toolkit" which provides guidance on including accessibility as a criterion in the procurement process, (http://www.universaldesign.ie/procurement)
- Guidance on "Web accessibility auditing", (http://www.universaldesign.ie/useandapply/ict/webaccessibilityauditing)

2.4.2.5 Monitoring:

The National Disability Authority has responsibility for monitoring compliance by the public sector with the Code of Practice concerning Part 3 of the Disability Act 2005 covering the accessibility of services. A self-declaration approach has

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[61] National Disability Authority http://www.nda.ie/ and the Centre for Excellence in Universal Design

http://www.universaldesign.ie

been adapted to monitoring efforts to date. Results from the 2008 survey show a relatively positive picture in terms of conformance with WCAG, with 49.5% of respondents reported having achieved conformance rating AA with WCAG. However a report commissioned by NDA in 2012 provides some commentary of the accuracy of a self-declaration approach to monitoring website accessibility. The report point to the gap between this self-declaration of levels of accessibility and the much lower levels of compliance (0% to 12%) found by other independent surveys based on actual auditing of Irish websites[62]. The authors postulate that "questionnaire type surveys about public sector websites and new technologies may be significantly affected by positive connotations and social desirability bias." It also goes onto recommend that "It would also seem desirable that at a national monitoring level that more, empirical type research be conducted to gauge actual levels of compliance with WCAG 2.0 rather than relying on responses to surveys by public sector organisations."

2.4.2.6 Public procurement:

In Ireland, central procurement policy is managed by the Office of Government Procurement (OGP). Launched in 2013, the OGP has responsibility for centralising public sector procurement arrangements for common goods and services, including ICT.[63]

Disability policy includes provisions relating to the procurement of accessible goods and services by public sector organisations. Section 27 of the Disability Act[64] (2005) states that 'where a service is provided to a public body, the head of the body shall ensure that the service is accessible to persons with disabilities'.

Based on a small sample of Calls for Tenders examined, public sector organisations tend to refer to WCAG 2.0 as a criterion in the procurement of web services for public sector websites[65].

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[62]Early studies include: McMullin,B. (2002) WARP: Web Accessibility Reporting Project Ireland 2002 Baseline Study. Trulock, V. (2005) *A Comparative Investigation of the* Accessibility Levels of Irish Websites. Napier University. Cabinet Office (2005), eAccessibility of Public Sector Services in the European Union.

[63] http://www.procurement.ie/about-us

[64]http://www.irishstatutebook.ie/2005/en/act/pub/0014/sec0027.html#sec27

[65] RfTs retrieved from http://etenders.gov.ie/. Analysis also based on research conducted by the authors for the development of a toolkit under Mandate 376. Reports published here: http://www.mandate376.eu

2.4.3 Sweden

2.4.3.1 Policy scope:

All authorities under the Swedish government are obliged to follow an Ordinance SFS 2001:525. This regulation states in section 2 that 'The authorities shall in particular work to ensure that their premises, operations and information are accessible for people with disabilities'[66]. It requires that external public sector websites ('det allmänna') must be accessible to people with disabilities. The Ordinance states that the authorities shall, when there is cause to do so, consult with the Swedish Agency for Disability Policy Coordination on the structuring of initiatives under this Ordinance.

The obligations contained in this Ordinance cover all administrative levels of the public sector (central Government, regional, local and municipal authorities).

Although not specified explicitly that the obligations in the Ordinance apply to publicly owned companies it appears that the Ordinance has had some 'spill-over' effect on influencing levels of accessibility in the private sector.

In order to support implementation of the Ordinance, the Swedish Agency for Disability Policy Coordination has drawn up guidelines 'Break the barriers'[67] which in the latest version refers to the e-Government Delegation [68]. The latter has published official guidelines for web development with the recommendation to follow WCAG 2.0 AA level.

There is also a specific law[69] on language in public sector, stating among other things that the language of authorities shall be simple and comprehensible and that the authorities have a special responsibility to protect and promote Swedish sign language. This law does not refer to WCAG.

2.4.3.2 Time frame:

No specific timeframes are set in the guidelines, but the Ordinance (2001) in principle requires accessibility to be achieved immediately.

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[66] For the following c.f.: A translation of the ordinance in page 7. http://www.handisam.se/Filer/English/Riv%20Hindren%20English_.pdf and http://www.webbriktlinjer.se/r/1-utga-fran-wcag-2-0-niva-aa/

[67] Handisam (2012). Riv hindren - Riktlinjer för tillgänglighet. http://www.handisam.se/Publikationer-och-press/Informationsmaterial/Om-Handisam1/Riv-hindren/

[68] Vägledning för webbutveckling http://www.webbriktlinjer.se/

[69] Svensk författningssamling 2009:600. http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Spraklag-2009600_sfs-2009-600/

2.4.4 WCAG 2.0 coverage:

The official recommendation published by the e-Government Delegation in relation to public sector websites is to follow WCAG 2.0 guidelines and to target AA level compliance. There are also recommendations regarding usability, trust, efficiency, technical independence and maintenance over time. The first recommendation on accessibility is to 'follow WCAG 2.0 level AA', but the recommendations also provides more than 40 specific recommendations on accessibility, including some at WCAG 2.0 level AAA and some which are not WCAG criteria but rather WCAG recommendations. Also some are recommendations on which of the WCAG techniques to use, and some do not relate to accessibility at all.

2.4.4.1 Supporting measures:

Web accessibility is supported by the national guidelines published by the e-Government Delegation.

Two commercially available automated monitoring tools that measure and support accessibility are commonly used within the public sector in Sweden[70].A small number of commercially available certification schemes are also used by Swedish public sector organisations. These act as both a means of quality assuring the accessibility work done to date and in supporting the public body in making progress towards achieving its accessibility goals.

2.4.4.2 Monitoring:

Up until 2008 automatic testing of government websites was performed on a quarterly basis by Verva, a pubic body. Since 2008, Handisam, the Swedish Agency for Disability Policy Co-ordination under the Ministry of Health and Social Affairs, has implemented a self-declaration approach, within the framework of a bi-annual survey of public sector organisations.[71]

2.4.4.3 Public procurement:

Swedish legislation covering public procurement requires that accessibility be used as a criterion in tenders by public sector organisations. In practice, most authorities make reference to accessibility when procuring, but there are strong divergences in the level of detail specified. In particular there appears to be little oversight that the level of accessibility specified in the tender is met in the final product.

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[70] From NetRelations http://inspector.netrelations.se/and Meridium http://www.meridium.se/sv/produkter/sitevalidator/oversikt/

[71] In 2014 Handisam was subsumed into The Swedish Agency for Participation: http://www.mfd.se/other-languages/english/

2.4.5 Summary and comparative analysis on national policies and approaches

Table: Summary of policies and approaches

	Policy scope – all public sector websites	Support measure / resources	Monitoring	Public procurement
Sweden	Regulation	Guidelines and advisory documents	Self-declaration by public bodies	Provisions in legislation, not systematically monitored
Ireland	Disability act and code of practice	Guidelines and advisory documents	Self-declaration by public bodies	Provisions in legislation, not systematically monitored
Germany	Equality legislation	Guidelines supported by development and monitoring tools	Methodology defined for monitoring compliance	Provisions in legislation, not systematically monitored

2.4.5.1 Policy scope:

All three countries covered by the current study have some form of obligation related to web accessibility. The legislative basis for the obligations varies across countries. Web accessibility related obligations have in general applied to public sector websites since middle of the last decade in all countries. Current obligations refer to WCAG 2.0, either in terms of referencing WCAG 2.0 in relevant guidance documents and codes of practice (SE, IE) or adapting national legislation (DE).

In terms of levels and types of public administrations covered, the obligations in Ireland and Sweden extend across the entire public sector and to apply to all levels of public administration. In Germany, the situation is more complex as it is a federation of states with responsibilities for competencies such as web accessibility devolved to the individual states. Web accessibility obligations at the federal level apply to websites owned by federal government bodies and regional government bodies, which implement federal law. However, the 16 regional parliaments in the country have adopted their own equality laws which may or may not include similar obligations in relation to the accessibility of websites. In

cases where any obligations have been imposed they tend to concern public administrations and related bodies at the regional and municipal governance levels.

2.4.5.2 Support measures/resources:

The extent to which obligations contained in legislation are followed up with supportive actions varies across the three countries included in this study. In Germany, a range of centralised, supportive resources have been made available to website managers by the national government, either through the Federal Office of Administration or in terms of publicly funded projects conducted by external parties. This has involved public investment in the development of practical tools, which support accessibility when in web development and for content management. The tools provide significant support to assisting in the development of new websites as well as checking, monitoring and reporting on the accessibility of existing websites.

In contrast, both Ireland and Sweden have adopted a lighter-touch approach typified by the development of publication of guidelines and advisory guidance documents.

2.4.5.3 Monitoring:

In both Ireland and Sweden a self-declaration approach has been adopted to monitoring in terms of a regular survey of public sector bodies. Swedish monitoring takes place more regularly (bi-annually) than in Ireland. In Sweden there is evidence of some commercially available validation tools and third party certification schemes in use by the public sector.

Although no evidence of explicit centralised monitoring activities in Germany, the BITV test could be interpreted to be a form of self-certification. In particular the so called "BITV final test" provides time-stamped reports that enable a public sector body to show it conformance with the BITV tests (essentially WCAG 2.0) at a certain point in time.

2.4.5.4 Public procurement:

In principle public policy includes provisions relating to accessibility of websites in all three countries covered by this study, albeit some variability can be observed in relation to scope and strength. For instance, Swedish public procurement legislation explicitly requires procurers to include accessibility in the tender specifications wherever possible. Disability specific legislation in Ireland contains an obligation that goods and services procured by public bodies are accessible to persons with disabilities. In Germany, general anti-discrimination legislations has been interpreted to implicitly require public bodies to ensure that any web related service they procure from external parties are accessible to persons with disabilities in accordance with subsequent regulation or guidelines. However, in

all three countries procurement policies do not include provisions in relation to systematically monitoring or controlling whether accessibility requirements have actually been met at the end of the procurement process.

3 The study approach & methods

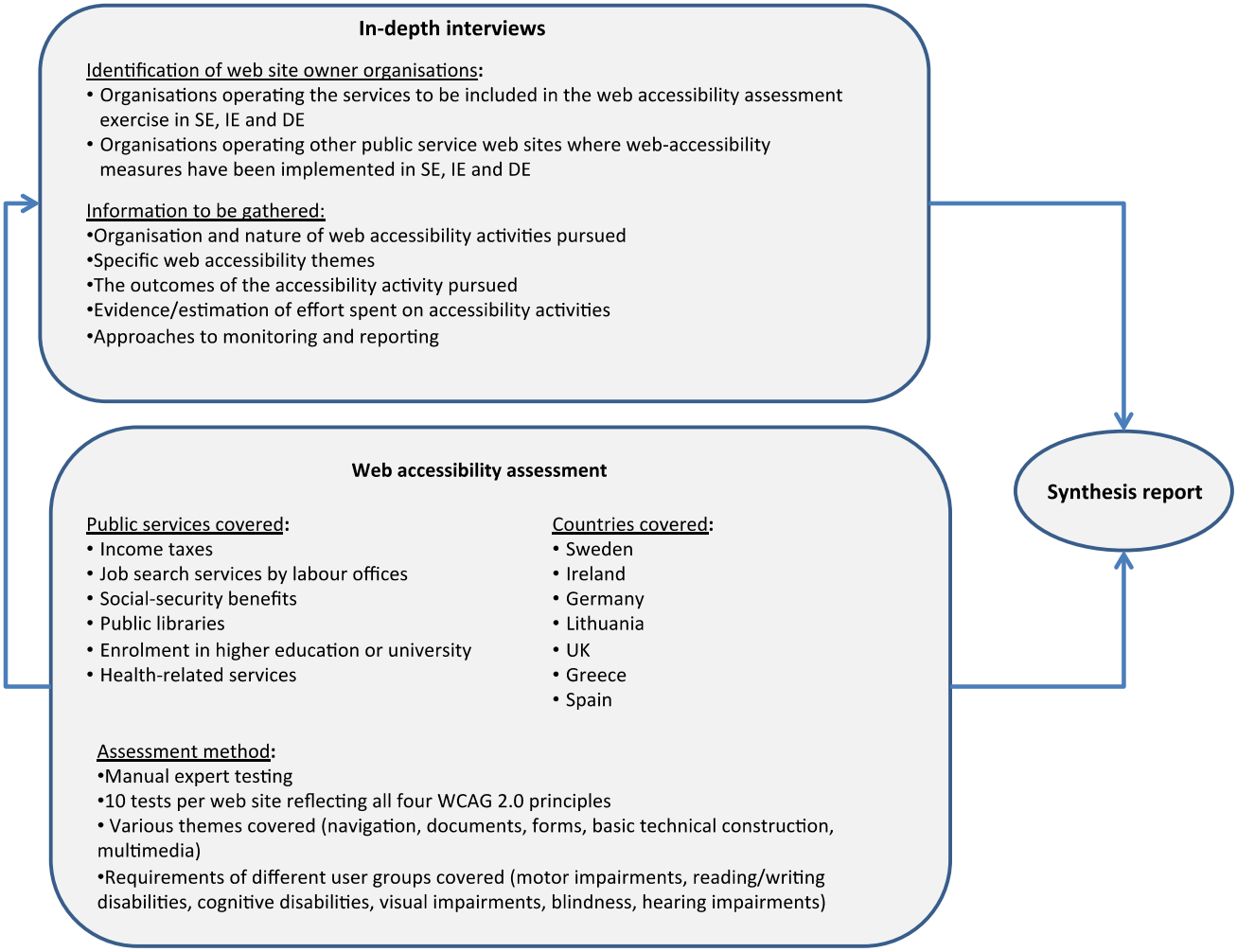
This study aims to make a contribution that will be helpful in the context of the current discussions on the proposed EU Directive as well as having a broader value for the various stakeholders and interested parties in this field. It builds on and takes forward the work and results of previous policy support studies mentioned in Chapter 2.

The study focuses specifically on the set of websites offering specific types of public services listed in the proposed EU Directive. These are services that are important in everyday life for citizens, and are the ones that have been given specific attention across the Member States in the context of the EU eGovernment initiatives.

In addressing these the study applies a new perspective by looking at the accessibility issues both from the 'outside' (through direct examination of the accessibility features, or lack of such features as may be the case, in the public services listed in the Directive) and from the 'inside' (through interviews with web managers for these public services to gain insight into their activities, experiences and challenges they may be facing). The overall methodological approach is summarised in

Figure 1 below and described in more detail in the subsequent sections.

Figure 1 – Summary of the overall methodological approach



Another key feature of the approach is the focus on developing and applying a perspective that assesses web accessibility in a meaningful manner. This involves moving beyond the typically quantitative, pass-fail type of benchmarking approaches that have tended to be applied in this field, and instead explores some key dimensions of accessibility in-depth and what it means for different user groups, if these are not adequately addressed in the public service websites.

Finally, the study, despite its relatively small scale, tries to provide some basic scaling of the 'typical' amounts of effort that might be needed by the public services across the Member States to bring their sites to the desired level of accessibility.

3.1 Public services and countries covered

In all, 37 web services in 7 different countries were chosen for the web accessibility assessment.

The website assessments were conducted on 37 websites in 7 countries. A total of 327 individual tests were conducted. (See annex 3 for more details).

- Sweden (6 sites)
- Ireland (6 sites)
- Germany (6 sites)
- Lithuania (5 sites)
- UK (5 sites)
- Greece (4 sites, there is no publicly financed support for higher education students)
- Spain (5 sites)

These countries have been chosen to cover Ireland and Lithuania (EU presidencies in 2013), Greece, (EU presidency in 2014) and to have a broad perspective when it comes to geographical distribution, population and ICT readiness.

In addition, in-depth interviews involving 19 people from 13 public sector organisations were conducted in a subset of three countries (Ireland, Germany, and Sweden). These countries were chosen to cover different types of government administrations and approaches to implementation.

The focus of the study is on the public sector websites offering 12 types of public services that are listed in the proposed Directive. In order to achieve a manageable scale within the resources and timeframe for the study, six of the services were selected for specific attention in the research (in bold and with an asterisk).

***(1) Income taxes: declaration, notification of assessment**

***(2) Job search services by labour offices**

***(3) Social-security benefits:** unemployment benefits, child allowances, medical costs (reimbursement or direct settlement), student grants.

(4) Personal documents: passports or driving license

(5) Car registration

(6) Application for building permission

(7) Declaration to police, e.g. in case of theft

***(8) Public libraries, e.g. catalogues and search tools**

(9) Request and delivery of birth or marriage certificates

***(10) Enrolment in higher education or university**

(11) Notification of change of residence

***(12) Health-related services**: interactive advice on the availability of services, online services for patients, appointments.

The six services chosen cover activities that a majority of citizens will carry out across all Member States and, for some of the services, quite frequently during any given year.

For web accessibility analysis, one URL was identified for each type of service in each country. Where this was more complex due to structural variations in how a given public service is organised in each country, sites that provide roughly the same type of service (or part of the service) were included. For instance, for the service that the proposed Directive calls "enrolment in higher education", the study team targeted sites that provide public financial supports rather than other aspects, which are organised in various ways in the different countries. In general, when selecting URLs, the portion of the service explicitly mentioned in the draft directive was specifically selected,(e.g. the job seeker support section of the bigger public employment service),

As per the experience in previous studies in this area, it was not possible in most cases to study the interactive element of the online service without access to the real names, numbers and/or passwords of real citizens. For one national income tax website, the study team were provided with a 'dummy' name and password. In other instances, the study team focused on those interactive parts of the service that did not require an identification or on informational parts of the website.

3.2 3.2. Approach to web accessibility assessment

The focus of the study is on assessing "meaningful accessibility" from the perspective of end users with disabilities. Therefore, the method chosen for the study is built on the following pillars:

- The indicators were chosen from all 4 principles of WCAG 2.0. (see below)

- To ensure traceability, accuracy and the possibility to repeat the tests, the defined techniques in WCAG 2.0 were used.
- The tests are based on the concept of Universal Design, so that as many target groups as possible are covered.
- Robustness, validity and reliability were ensured through a centralised group of experts doing the web accessibility testing manually in all countries studied.

To measure all the success criteria of WCAG 2.0 level AA is not feasible in this type of study. The study team chose indicators that make up a cluster-sampling of success criteria for WCAG 2.0. Tests that cover all four principles of WCAG 2.0 have been chosen, which means different perspectives on accessibility are covered. The four principles of WCAG 2.0 covered are:

- Perceivable ("users must be able to perceive the information being presented")
- Operable ("users must be able to operate the interface")
- Understandable ("users must be able to understand the content and interface")
- Robust ("user must be able to continue to access the content as technologies and user agents evolve")

Since the focus of the study is on "meaningful accessibility" rather than just numerical indicator scores, important aspects of accessibility according to 5 themes (navigation, documents, forms, construction and multimedia) have been selected, connecting them to relevant WCAG 2.0 techniques. The tests related to each the themes are described in detail in Annex 2.

- **Navigation.** The ability to navigate easily is a key factor for all users
- **Documents**. The accessibility of documents has received little attention in study.
- **Forms.** Forms are the core of most e-services. Problems with forms can result in being unable to complete the task.
- **Basic technical construction**. This is essential for assistive technology and cross browser compatibility; problems here can result in the user being unable to use the interface.
- **Multimedia.** More and more information is being provided with multimedia and this is in many ways positive, but at the same time it can mean also more accessibility problems for several groups of users.

To ensure a broad range of user groups were included in the analysis, the research team tried to make sure that the experiences of at least 6 defined users groups were covered. These were people with:

- Motor difficulties
- Reading- and writing difficulties
- Cognitive difficulties
- Visual difficulties
- Blindness
- Hearing difficulties.

The tests were performed by several of Funka Nu's experts and quality controlled through comparisons across services and tests respectively. See Annex 2 for details of tests conducted. One assessor was responsible for the test of each service. After that, another assessor compared the services test by test, and a third assessor compared country by country. In this way, each assessment was conducted by two or three assessors. Since all manual tests are based on human judgement this is an important part of the methodology. The use of manual testing is essential in itself, since accessibility is not only about technology; it has to do with human interaction and user experience.

A sample of pages to test was drawn from each site. This sampling included (if found):

- The start page (this does not always mean the start page of the whole website. In some cases it's a subpage that constitutes the start page for a particular department or service).
- A subpage with instructions or similar.
- A page with multimedia.
- Three documents in alternative formats (preferable PDF, but in a couple of cases Word documents were selected)
- The actual service as far as it can be tested without identification of the user. When this has not been possible, a page with the largest form that we could find relating to the service.

See Annex 3 for a list of all webpages and sites tested.

The scoring scheme for all tests is as follows:

- **A score of 2** (**pass**) means that the service complies with this specific success criteria (SC) from WCAG 2.0.

- **A score of 1** (**marginal fail**) indicates the presence of some relatively minor level of failure with the specific WCAG 2.0 success criteria that were tested. While technically a fail, these are instances where some level of the content or functionality is still accessible to the user.
- **A score 0** (**fail**) means that the service do not comply with the specific WCAG 2.0 success criteria that were tested.

It is important to note that many WCAG 2.0 success criteria are open to interpretation. This is partly deliberate from the W3C, because exact implementations can vary over time, techniques can be modified, the support in browsers and assistive technology change, and cultural differences make specific solutions stronger in some countries than others. **Standardise globally but implement locally is the suggested approach.** This does however leave room for interpretations of exactly where the limit is for meeting a specific requirement, just like any measurement of quality.

3.3 Public service web manager interviews

Earlier research has pointed out that even though accessibility related obligations have been put in place in many countries, the establishment of intra-organisational processes to maintain accessibility in the longer run seems to have received less attention so far[72]. At the operational level, barriers to implementation include low levels of awareness of the importance of web accessibility and a lack of expertise and knowledge on how to implement existing guidelines and standards.

The main **objectives** of this part of the research were:

- To characterise the **perspectives and opinions** of web managers on the key accessibility issues under study,
- To identify the main **driving factors, barriers and processes** involved in addressing web accessibility for the websites under the responsibility of the interviewee,
- To try to characterise the **costs and benefits** of addressing web accessibility,
- To characterise web managers **views on the proposed Directive.**

[72] For example, empirica, WRC and eWorx (2009) Web accessibility in European countries: level of compliance with latest international accessibility specifications, notably WCAG 2.0, and approaches or plans to implement those specifications.

The **themes** addressed in the interviews covered:

- **Organisational policies** in relation to web accessibility, if any, and main reasons why such a policy is in place,
- **Approach** taken to address web accessibility (what types of activities, whether done in-house and/or using externally contracted services), any issues/challenges that may have been experienced,
- Whether and how the **specific accessibility themes** examined in the web accessibility assessment have been addressed in their approach and any issues/challenges experienced in these areas,
- **Outcomes** of the accessibility activities including accessibility related benefits for users with disabilities as well as any wider/other benefits),
- Perspectives and/or available information on **effort/costs** of activities to address web accessibility,
- Current activities in relation to **monitoring** web accessibility, as well as perspectives on monitoring and its value (including proposed EU approach from the Directive).

The interviewees targeted were from the same types of public service organisations whose websites were tested for accessibility, making a total of 18 interviewees sought. The main criterion for selecting interviewees was that they had a web management or web development role within the team and enough knowledge of the website to be able to comment meaningfully on accessibility activities that have been undertaken.

In total, in-depth interviews involving 19 people from 13 public service public sector organisations were conducted in three countries (Germany, Ireland and Sweden)[73].

The aim was wherever possible to conduct interviews with the personnel dealing with the types of public service websites that were covered in the accessibility assessments, although it should be noted that there is not always a one-to-one correspondence between the websites that were tested for accessibility and the websites that were the subject of the interviews[74]. In some cases it was not possible to obtain interviewees from those responsible for the websites that

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[73]The numbers of interviewees varied between 1 and 4 per web site. In Ireland, 10 people contributed to the interviewees on 5 web sites, in Germany 4 people were interviewed in relation to 4 web sites, while in Sweden, 5 people were interviewed in relation to 4 web sites.

[74]All of the organisations from which the interviewees came had been involved in addressing accessibility issues in relation to the web sites that they were responsible for.

were tested, while in others, interviewees sometimes had responsibilities for larger websites than those which were tested. In this latter case, the interviews took place with reference to the broad responsibilities of the interviewee, as this gave the opportunity to obtain information based on a wider set of experiences of addressing accessibility. Many of the interviewees had technical competence, while others operated at a more managerial or policy related level, and both perspectives are of interest and importance.

In addition to these interviews with website managers, it was intended to hold a further set of interviews with selected **policy makers** in the core countries(IE, SE, DE) to provide a national level perspective on web accessibility. These were to focus especially on issues relating to methods of monitoring compliance with regulations. However, it was only possible to arrange one such interview in Sweden[75]. For the others, it did not prove possible to arrange such interviews, at least in part because of sensitivities around ongoing consultations with the Commission in relation to these issues.

Following the identification of the URLs in each country, initial contact with the web managers was made in order to identify suitable interviewees[76].

When these were identified the interview was arranged. The methodology used varied according to the requirements of the interviewee; some were interviewed face to face, while others were interviewed via the telephone.

Finally, the content and structure of the interview guides were informed by both the results of the web accessibility assessments and the background research into the policy context in each of the three countries. It was felt to be inappropriate to present the results of the web accessibility assessments to interviewees prior to interview them, as this approach would have informed their responses. In addition, most interviewees have responsibility for a larger portion of the website than the ones on which the accessibility tests were conducted. Decoupling the accessibility test results from the interviews had the benefit of allowing for discrepancies to emerge between the two information sources.

[75]This is not reported upon because it cannot provide a representative view.

[76]The process of finding the relevant person to talk to in a given organisation was quite challenging, so a pragmatic approach was taken in terms of how much effort was spent on first finding and then chasing people to respond.

4 Study outcomes

This Chapter presents the main findings of the study. It presents both the findings from the web accessibility assessmentsas well as those from the interviews that were carried out in the three countries. The first part of the results looks at the barriers to developing accessible online services and this material is illustrated with findings from the interviews where relevant. This is followed by an analysis of the generic cost and benefits of web accessibility. Finally, other results from the interviews, which focus on broader issues surrounding the organisational efforts to improve accessibility are introduced.

4.1 Results from the web accessibility assessments

This section presents and discusses the web accessibility results separately for each of the five targeted accessibility dimensions - **navigation, documents, forms, technical construction**, and **multimedia.** It also integrates results from the part of the web manager interviews that focused specifically on these themes. An overall profile of the results across all the accessibility dimensions is then provided.

4.1.1 Introduction to the analysis

A total 37 web services in 7 different countries were evaluated. For each service between 7 and 10 tests were completed, depending on what kind of content the service contained. The most common reason for not completing all 10 tests was lack of multimedia.

A total of 327 individual tests were conducted and the results were distributed as follows, where 2 = pass, 1 = marginal fail, 0 = fail.

Table 0. Number of scores per test

Test scores:	**2**	**1**	**0**
Number of scores:	151	44	132

The scoring scheme for all tests is as follows:

- **A score of 2** (**pass**) means that the service complies with this specific success criteria (SC) from WCAG 2.0.
- **A score of 1** (**marginal fail**) indicates the presence of some relatively minor level of failure with the specific WCAG 2.0 success criteria that were tested.

While technically a fail, these are instances where some level of the content or functionality is still accessible to the user

- **A score 0** (**fail**) means that the service do not comply with the specific WCAG 2.0 success criteria that were tested.

The web accessibility assessment uses a cluster-sample of 10 tests based on 10 success criteria out of the total 38 possible tests. Therefore, the results should be viewed as being indicative rather than definitive. Many tests are needed to verify an individual success criterion, so the potential number of tests needed to fully ensure fulfilment of WCAG 2.0 level AA is much larger.

The tests related to each the themes are described in detail in Annex 2.

- **Navigation.** The ability to navigate easily is a key factor for all users.
- **Documents**. Documents contain lots of information and they are very common in public sector websites.
- **Forms.** Forms are the core of most e-services. Problems with forms can result in being unable to complete the task.
- **Basic technical construction**. This is essential for assistive technology and cross browser compatibility; problems here can result in the user being unable to use the interface.
- **Multimedia.** More and more information is being provided with multimedia and this is in many ways positive, but at the same time it can mean also more accessibility problems for several groups of users.

4.1.2 Navigation

It is essential for all users to be able to navigate and find the right information and services on a website. Navigation that is difficult is more problematic for users with cognitive or motor difficulties, blind users or indeed for any user who is unsure of or unfamiliar with the website.

Two tests were used to evaluate the navigation on each website. First, sites were assessed for a **clearly visible search function** in line with the requirements in WCAG 2.0 Success Criterion [SC] 2.4.5[77]. Then, keyboard navigation was tested to see that all functions can be managed, including menuing systems, via the **keyboard** and that the user always has a clear and visible **focus**. This helps to

[77]More than one way is available to locate a Web page within a set of Web pages except where the Web Page is the result of, or a step in, a process. (Level AA)

determine if the website meets the requirements in **WCAG 2.0 SC 2.1.1**[78] and **WCAG 2.0 SC 2.4.7**[79].

Table 1. Test scores for navigation

Scores:	2	1	0
Test 1, Multiple ways to locate a web page	34	2	1
Test 2, Keyboard control	3	16	18

4.1.2.1 Test 1: Multiple ways to locate a web page

Almost all sites (98%) provide a **clearly visible search function** as a navigation aid. The few exceptions include a site where the search function was hidden behind a link, a site where it was placed to the left instead of the right in the web page, and one case of a quite small website that did not have any search function at all.

Overall the set of websites tested **scored 95% on the test for having a clearly visible search function** as an alternative to the menu.

This high score may indicate that some accessibility issues are well known, although it is also possible the website managers and developers may view providing a search function as being more fundamental to usability rather than accessibility[80]. It also shows that there is a common understanding or *convention* that the most important navigation alternative to the menu is a search function.

4.1.2.2 Test 2: Keyboard control

The results from the keyboard navigation test were less positive.

Only 3 out of 37 websites *passed* while 16 out of 37 websites achieved a *marginal fail* because of a lack of a clearly visible tab **focus**. Many websites rely on the browser to highlight what link or object has got focus, but this is rarely sufficient

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[78] All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints. (Level A)

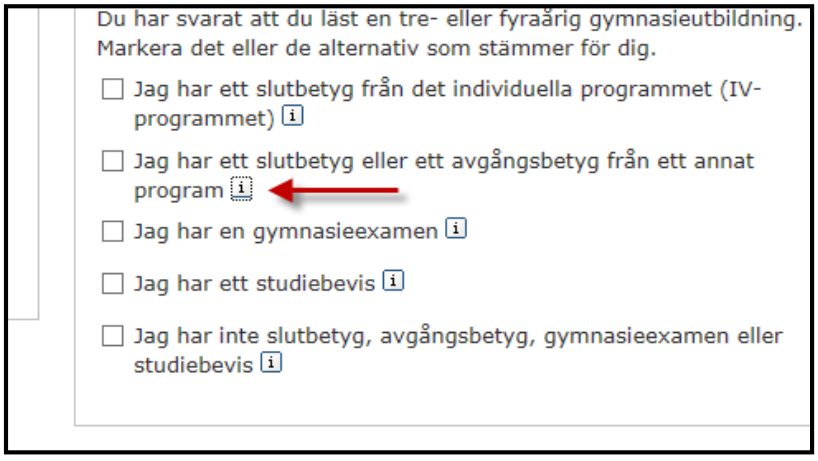
[79] Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible. (Level AA)

[80] WCAG 2.0 does not specify that there must be a search function, only that there should be multiple ways of finding a page on the site.

to visually alert the user which object the focus is on. It may work for a standard text link in the middle of a page with a white background but often there are problems with the visibility of the tab focus for linked images or items in a navigation menu. Most of the sites achieving a *marginal fail* could be navigated via a keyboard by a blind user with a screen reader, (since the screen reader reads which link has got focus). However, the focus was so visually vague that it would present significant difficulties to many sighted users.

Figure 2 is an example[81] where the focus is on the second "i" icon but it almost impossible to see. The issue of a clearly visible focus was first addressed in WCAG 2.0, which means that websites developed prior to the publication of WCAG 2.0 in 2008 would probably not have incorporated this features even if accessibility had been considered during the websites development. However since most of the websites in the study would otherwise appear to have been developed post 2008, the low scores on this test perhaps indicate that accessibility efforts have to date, lacked an attention to detail in this regard.

Figure 2. Example of non clear tab focus

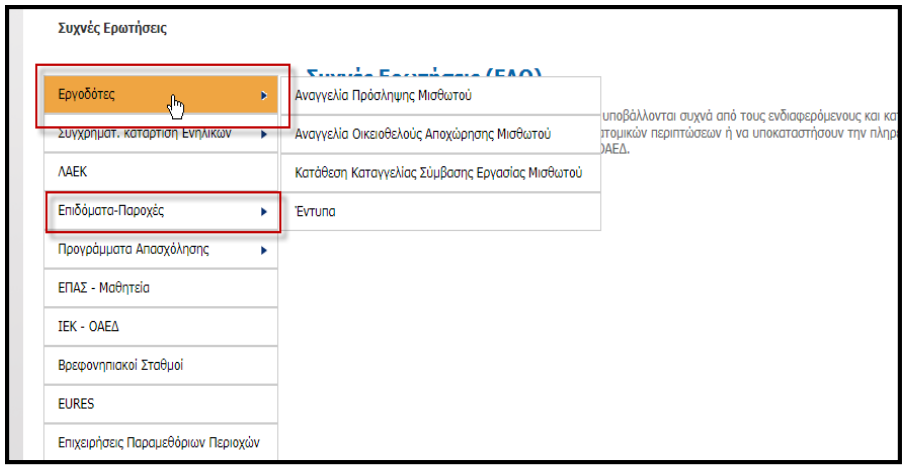


About half of the sites (49%) *failed* this test. Most of the sites scoring 0 could in part be navigated via the keyboard, but there were some functionalities that could not be reached. For example, while most of the menu items on some websites could be reached and activated with a keyboard, this was possible for only some of the submenus.

[81] The examples used are not to show a web site that is particularly good or bad, but only to highlight a typical problem.

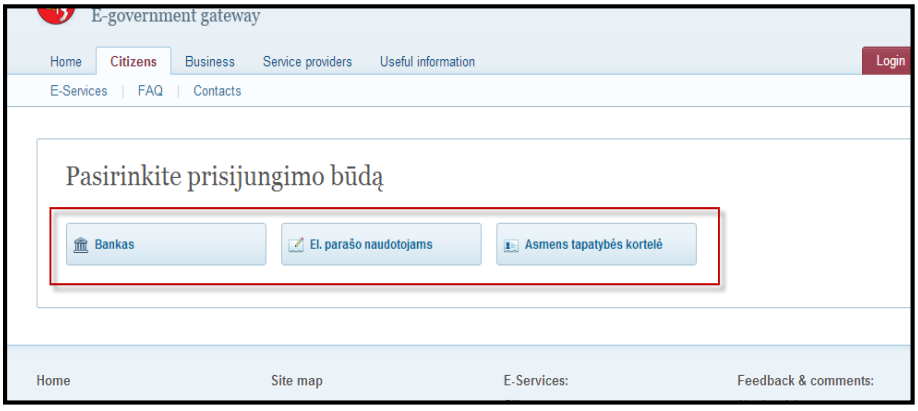
Figure 3 illustrates some of the complexity in ensuring correct keyboard control in navigational menus. In this example a keyboard only user could not progress to the pages contained under the two menus highlighted. The two items highlighted in red in the main menu (on the left) can only be expanded and used with a mouse, restricting a keyboard-only user from being able to activate the links contained in the submenu (which appears on the right). In contrast, two more items in the main menu contain submenus, which can be reached by activating the menu item itself and then getting to the submenu items via a landing page (a page that contains the links from the submenu). However, the two highlighted menu items did not have landing pages and the submenu could not be displayed.

Figure 3. Example of incorrect keyboard control



In the next example below (Figure 4), the user needs to click to select what kind of security solution they want to use to log in. None of the three different choices could be reached using the keyboard alone.

Figure 4. Example of a barrier to selecting options with keyboard control



In many cases it would appear that the website has largely been created with keyboard navigation in mind. However, the subsystems and functions were not generally developed with the same focus on accessibility, e.g. a help function that presents help information in parallel with the e-service (in a new window). These subsystems are equally important for the user, but in many cases had a very different accessibility level from the main service.

This type of inconsistency is more prevalent in services where forms or functions are incorporated from other systems and are not part of the main website. In Sweden, for example, there is increasing usage of modern techniques such as AJAX (*Asynchronous JavaScript and XML*), which is used to enhance functionality making it possible for the web page to send and retrieve data without reloading, and making it possible to create interfaces that are more similar to applications rather than web pages. It is often used so that all users benefit, but when accessibility requirements are not met when using these new techniques in different situations, important elements such as help texts are not readable by users with assistive technology.

4.1.2.3 Web managers experiences of navigation

Generally, the interviews with web managers supported the findings emerging from the website audit. There was a **clear awareness** of the importance of accessible navigation for users with disabilities on the part of most interviewees, although the many different aspects to implementing an accessible and usable navigation systems are not always have been fully addressed in practice.

All but two organisations reported that they had addressed the issue of navigation in terms of accessibility at some point. Often, doing so was as much due to usability considerations as accessibility issues. In some instances, interviewees mentioned **legacy issues** concerning navigation systems. More generally, it was recognised that not all accessibility issues have been resolved and in many cases work is ongoing in this area. **User input** was pointed by some interviewees as being especially helpful in resolving navigation issues.

Box 1: Selected interview statements on navigation

This is one requirement of the German BITV 2.0 and WCAG as well. We need to consider this, e.g. in relation to tabulators and so on. This is usually straightforward. (Germany)

We recognise the importance of navigation as a tool in enhancing accessibility. User testing as well as our own analysis has led us to address navigational issues for accessibility (Ireland).

4.1.2.4 Efforts and actions required for compliance

While the vast majority of sites already have a clearly visible search function in place to complement the website's navigation, the issue of keyboard navigation and non clear tab focus will require attention on most sites.

In most cases sites that scored 0 on "Test 2: Keyboard Control" did so because a function or detail in the interface is missing. In most cases a relatively low level of effort to correct these problems consistently is required. For example, implementing a change to a Cascading Style Sheet (CSS) file for clearer tab focus should in the majority of instances take very little effort and can most likely be achieved by in-house developers.

Depending on the age and complexity of some of the websites, implementing changes to the navigation system may, in some instances require further efforts. Key factors here include the flexibility of the content management system and other back-end system to support keyboard access to all controls, links and menus. In cases where these systems cannot support such accessibiltiy features it will be necessary to update or upgrade these systems. While this is a potentially large scale undertaking, it is likley that such systems also fail to support other accessibiltiy features. However, as in the case illustrated in Figure 3, the current CMS would appear to support keyboard accessible menus, but this has not been implemented consistently. This is a case where more regular monitoring of accessibility on the site would catch such inconsistencies.

4.1.3 Documents

Documents are an important element in providing information on websites. Often only brief information is available on the web page itself but a PDF or Word document must be opened to obtain detailed information. WCAG 2.0 covers all web content, even if it is provided in a PDF or Word document. The accessibility of documents is important to all users, but especially for users with motor impairments, users with reading and writing difficulties, and users with vision difficulties.

On each of the 18 websites tested, 3 PDF documents related to the service were identified and evaluated. Two tests were conducted on each of these documents, the first examined how visual **headings** are created so that they can be perceived as headings by assistive technology - this addresses parts of the

requirements in **WCAG 2.0 SC 1.3.1**[82]. The test also involved checking the text in the documents to ensure that what looks like text is fact text, and **not just an image of the text** as is the case with scanned documents. This addresses the requirements in **WCAG 2.0 SC 1.4.5**[83].

Table 2. Scores for the tests concerning accessibility of documents

Scores:	2	1	0
Test 3, The PDF document has correct headings	6	0	31
Test 4, Images are not used to present text in PDF documents	28	1	8

Note: In 2 cases Word documents were evaluated instead of PDF document, as no PDF were available.

4.1.3.1 Test 3: PDF headings

Only 6 out of 37 websites *passed* this test. This low score result suggests that document accessibility receives less attention than the accessibility of the website. This also suggests that in many organisations the quality control of documents is not as well developed as the quality control of content published in HTML. The most significant trend noted was that Germany performed considerably better than other countries, with a score of 63% compared to 20% in Lithuania and Spain, and scores of 0 in the other four countries.

4.1.3.2 Test 4: Images in PDF documents

In "Test 4: Images are not used to present text in PDF documents",28 out of 37 sites *passed* this test. However a *fail* in this test often has serious consequences for people with reading difficulties and users with visual difficulties. Many users in these groups have limited or no possibility of getting information transformed to a form that is perceivable and understandable. Spain, UK, Germany, Sweden and Greece scored highest, with somewhat lower scores achieved for Ireland and Lithuania.

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[82]Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text. (Level A)

[83]If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text. (Level AA)

4.1.3.3 Web managers experiences of making PDF documents accessible

Here again, the qualitative interviews conducted with website managers support the findings of the website audit. Although most organisations were well aware of the importance of having accessible PDFs, many admitted that their sites contained PDFs, which were not compliant with the accessibility guidelines. The main reasons provided for this relate to both capacity and organisational issues. At a technical level, some sites do not have the requisite **guidelines in place** to ensure the creation of accessible PDFs. Even is cases where guidelines are in place, they may have not been communicated to all content providers who are responsible for producing or commissioning the source document which is then converted to PDF. In many more organisations, the main problem is related to **resources**, especially where content providers are not adequately trained or where material is centrally uploaded to the website. In some cases, there is not sufficient staff available to produce accessible PDFs.

Another reason relates to difficulties in **enforcing the policy** of producing accessible PDFs, in some cases, those responsible for producing the website did not have the authority to ensure that all PDFs published to the site are accessible. In others, this difficulty is compounded by a scarcity of personnel who can produce accessible documents in specific languages. These difficulties in part hinge on whether the uploading function is centralised or decentralised. In one example, capacity problems in a centralised system lead to a failure to ensure that all PDFs are accessible, while in another with a decentralised system, 400 trained content providers and up to 4000 untrained ones means that compliance is equally difficult to ensure.

Box 2: Selected interview statements

The skills required are often not available on the part of the staff responsible for creating content. Often, working documents are created by diverse staff and they tend to lack the skills to ensure accessibility right from the beginning. To make existing documents accessible afterwards requires more resources and thus the lack of resources sometimes becomes an issue. (Germany)

We have thousands of content providers within the organisation, and even though many have been trained in the production of accessible PDFs, not all of them are compliant. Resources prevent us from ensuring that all are compliant. (Ireland)

Our PDF forms do not have good accessibility for users with visual difficulties. We are working on this and are currently in the process of buying a screen reader, which is necessary to validate the improvements we make. (Sweden)

Information material in Swedish or English is made fully accessible. Documents in other languages are not accessible, since we don't have the language skills required internally. (Sweden)

4.1.3.4 Effort and actions required for compliance

The effort and actions required for creating accessible documents in most cases may require an overall organisational effort. Documents are commonly created by a mix of content creators within the organisation, external companies, or are automatically produced by a software system. Making all new documents accessible requires some or all of the following conditions to be satisfied:

- Knowledge on how to create **well structured, accessible source documents** (e.g. MS Word) among both staff who create and staff who publish documents.
- Accessibility included a **requirement in procurement** when commissioning the writing of reports, and desk top publishing services.
- Appropriate people have access to the appropriate **software** to convert, check or modify documents for accessibility.
- Time dedicated to checking accessibility in the **workflow process** for documents published to the website.

Therefore, in order to meet requirements, staff need to be trained and have the time to create accessible documents, third party systems or internal systems that deliver PDFs automatically may need to be re-developed and there may also be a need for some type of testing. The costs can therefore differ widely depending on the organisational context and how the PDFs are generated in the first instance. Based on the PDFs examined three likely cost scenarios emerge.

1. Where PDFs are created internally, **training and mentoring of internal staff** in creating accessible documents may be required. This in many instances can be incorporated into staff training on writing skills, writing for the web, using MS Word, etc. Not all staff need to know everything about PDF accessibility. However, at a minimum staff need to know how to structure source documents, such as those provided in MS Word correctly. This will reduce the effort required to convert these source documents in accessible PDFs prior to publishing in the website.
2. Where PDFs are generated by **external companies and contractors**, the public procurement of reports or print design services should incorporate accessibility, so that any resultant PDFs are fully accessible. This is likely to incur a modest cost, especially where contractors already have the accessibility pre-requisite.

3. Where PDFs are **produced automatically** by a software application as part of a workflow process more significant resources may be required to modify or even replace the software application. Considerations here again relate the age and complexity of the back-end system and where or not these costs can be absorbed into other upgrade works that need to be carried out.

Finally, it may in many cases be more appropriate to consider publishing some contents in PDFs as HTML pages, especially considering the potentially better user experience that HTML can deliver on mobile devices.

4.1.4 Forms

Forms are a key aspect of online services. For persons with disabilities, problems with forms can result in the person being unable to complete the task. Groups that are particularly sensitive to these problems include users with cognitive, visual or motor difficulties.

Two tests were conducted to assess the forms across the websites. First, **error messages** were checked when users fail to complete all mandatory fields. All errors that can be identified by the system should be reported to the user. It is important that users find all error messages at the top of the form and that each place where an error occur is highlighted. This test is designed to see if the website meets the requirements in **WCAG 2.0 SC 3.3.3**[84].

The second test is designed to see if the visual information such as **labels** that are provided for **form controls**, such as text boxes, are **correctly associated** with each other. This is necessary for assistive technology to provide the user with sufficient information to complete the task. This test is designed to see if the website meets the requirements in **WCAG 2.0 SC 3.3.2**[85].

Table 3. Scores for the tests concerning accessibility of forms

Scores:	2	1	0
Test 5, Error messages in connection to mandatory fields	10	14	8

[84]If an input error is automatically detected and suggestions for correction are known, then the suggestions are provided to the user, unless it would jeopardize the security or purpose of the content. (Level AA)

[85]Labels or instructions are provided when content requires user input. (Level A)

Test 6, Using correct labels in forms	17	2	18

Note: In five cases any forms with mandatory fields was found and therefore test 5 was completed on 32 websites only.

4.1.4.1 Test 5: Error messages

As form design is a key usability feature and tracking failures by the end users to complete forms is relatively easy to achieve, it is likely that this issue is being addressed by most transitional website teams. Therefore while a majority of sites tested (75%) scored a 1 (*marginal fail)* or 2 (*pass)*, this result should be considered to be relatively low considering the efforts that form design and maintenance is likely to achieved within the web team.

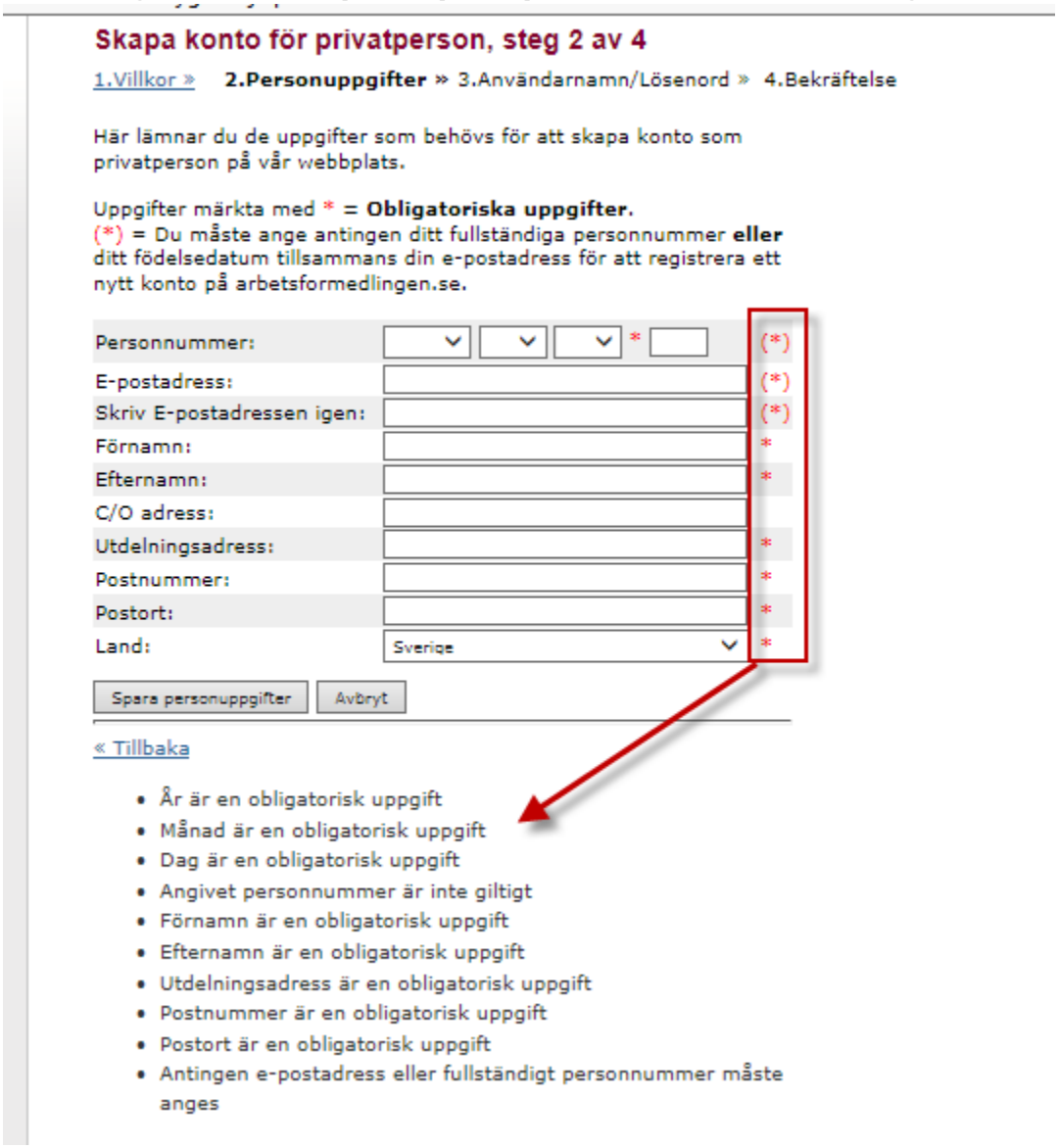
The difference between sites scoring 1 (*marginal fail) (44%)* and 2 (*pass) (31%)* on this test may well illustrate differences between what are usually viewed as usability requirements and what can be considered accessibility. To achieve a score of 1, errors messages need only to be presented to the user. To achieve a score of 2, an overall error message needs to **appear at the top of the form** as well as an **indication of the location of every error** throughout the form. In this way, users with low confidence levels when using technology, users with cognitive, concentration or memory difficulties, users with assistive technology, visually impaired users and users with reading and writing difficulties can more easily locate the error message in both the standard location, and also find each error that needs to be corrected.

Figure 5 is an example of a form where the user is provided with clear feedback when errors are detected (this form scores 2 on this test). The existence of error messages in indicated at the top of the page and each error is identified thereafter. The existence of errors and the error messages themselves are signified with both visual and textual warning.

Figure 5. Example of good practice on error messages

However, as is the case of figure 6, the more usual approach found during the assessment was that errors do not provide relevant information about the error, but rather just identifies the location of the error. Moreover, in this example the information about the errors is placed below the form.

Figure 6. Example of poor practice on error messages



For a user with assistive technology zooming the interface up to 32 times, it is very difficult to identify where the errors are when they are only indicated with an asterisk to the right of the field. This form scores 1. It could be argued that this meets the criteria of WCAG 2.0 SC 3.3.3[86], but the solution still leads to accessibility problems for some user groups.

[86]If an input error is automatically detected and suggestions for correction are known, then the suggestions are provided to the user, unless it would jeopardize the security or purpose of the content. (Level AA)

4.1.4.2 Test 6: Correct labels

The results from this test show an almost even number of sites totally passing (40%) and marginally failing (42%) on "Test 6: Correct Labels". However, even a *partial fail* on "Test 6: Correct Labels" can lead to severe problems for blind users. In the absence of form controls and their labels being explicitly associated with one another, assistive technologies may attempt to predict what text on the page describes a particular form control. This results in unpredictable outcomes with the probability that the user will become confused or lost within the form. In these situations users can't know what information to fill in where, and this quickly results in a situation where users can't complete the task at all.

In many on the websites assessed, some of the form controls are implemented correctly, but a large number of mistakes still persist, resulting in a score of 0 (*fail).* This level of inconsistency implies that developers would appear to know what to do, but that a lack of awareness of the significance of this issue for some users and a lack ongoing monitoring/checking results in a large number of errors.

4.1.4.3 Web managers experiences of forms

Interactive forms represent a standard feature of many public sector websites and this was to some extent reflected during the interviews with website managers. In some cases, it was reported that forms are currently made available in terms of **downloadable paper versions** to be completed off-line (e.g. in PDF format). In many such instances online forms constitute only a part of an overall service. For example, a user can search for a job online, but to apply for the job, they need to manually print out, fill in and return the forms by post.

All interviewees showed **awareness** of the importance of ensuring that forms are accessible, but relatively little effort seems to have been expended on this issue. In some cases, it was apparent that **the expertise to produce accessible forms was lacking** in some organisations. Beyond this, obstacles to inter- and/or intra-organisational workflow processes were mentioned as well. There were cases where forms are provided by another part of the organisation, and such distributed responsibility for functionality has led to a disjointed approach to the issue of forms accessibility.

Another point of note was that the presence of fully interactive forms on websites may also require a change in work processes to support the interactive experience – this may act as a barrier to the use of forms in some cases. Moving from a paper based to an online form system brings improvements for accessibility, but is also linked to efficiencies in back-office procedures.

On the other hand, instances were found where accessibility of online forms has been addressed by means of external consultancy and content management tools being made available to website managers through a central government agency. In one instance the accessibility of forms, *inter alia*, is addressed by a dedicated competence centre established internal to the public sector organisation. In this case the forms overall were found to have a good level of accessibility.

Box 3: Selected interview statements

This aspect is again addressed by our 'Government Site Builder'. Forms are for instance machine readable. (Germany)

Forms are looked at as well, and they are also tested by our competence centre before they go online. When it comes to screen reader users we provide so called quick info that is read out. (Germany)

We have worked to ensure our forms are keyboard accessible. (Sweden)

We host some forms that are produced by other parts of the Public Sector. We cannot ensure their accessibility as we don't have the authority to do so. (Ireland)

Having completely interactive forms available on site changes how we process business. For example, in the old face-to-face process, clients had to produce paper evidence of certain documents. Now they self-declare that they have these documents and the service is now competed in minutes. This is good for the client, but it has led to a work system with significant changes. (Ireland)

4.1.4.4 Effort required for compliance

As with other issues identified so far, the effort required to improve the accessibility of online forms from across the public sector is likely to fluctuate and is dependent on number of factors. Therefore, a number of scenarios are discussed.

1. In cases where **some mistakes in the HTML** are present, the amount of effort required to improve accessibility and ensure compliance with WCAG 2.0 is likely to be minimal.
2. In other cases identified during the assessment, the **entire form and error handling** needs to be redone at the back-end. Dependencies on the amount of effort required include the age and ability of the system to support accessibility as well as the capacity within the organisation to carry out this work internally.
3. In cases where online **forms are provided in PDFs** that must be printed off and filled in manually, there is significant effort likely to be required to implement a fully accessible online solution. Mitigating factors to the amount

of effort in these cases are the benefits that can be achieved in moving from a solely paper-based process to a fully electronic process, as appropriate. Such efficiencies should be considered strategically in the context of improving overall organisational efficiencies and an improved user experience for all users.

4.1.5 Construction

Web standards provide for web developers, and browser and assistive technology manufacturers to have a common source of requirements that ensure web content is presented optimally for the end user. If these standards are not followed, end users are at risk of having problems accessing content and using functionality. If the problems become too large, there is a risk of preventing usage for some groups of users, especially users depending on assistive technology.

It is important to use the right techniques and technologies for the right purpose. Information and functions should use HTML/XHTML while presentation should use CSS. This makes it possible for people with, for example reading and writing difficulties to use assistive technology and/or preferences within the browser to change the presentation so that content is easier to perceive and operate.

Two tests were undertaken to check the quality of the code. First HTML/XHTML code was checked to use if was used according to specification, as per **WCAG 2.0 SC 4.1.1**[87]. The second test checked that content is presented and styled using CSS. This relates to the requirements in **WCAG 2.0 SC 1.4.5**[88].

Table 4. Scores for the tests concerning accessibility of structure

Scores:	2	1	0
Test 7, Using HTML/XHTML according to specification	5	1	31
Test 8, Separating information and structure from presentation	30	3	4

[87] In content implemented using markup languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features. (Level A)

[88] If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text except for the following: (Level AA)

4.1.5.1 Test 7: HTML

This test can be viewed as a key indicator on how much focus has been placed on accessibility. Traditionally many developers have used code that works with the common browsers of that time, instead of ensuring that code is used in line with standards. The goal for the developer should be to use code that is 100% correct, and WCAG points to some specific errors that are not allowed. This test focused only on these types of errors.

Thirty one out of 37 websites tested had errors that do not meet WCAG requirements on at least one out of five pages. Almost all of the 31 websites had these kinds of errors on 2 or more of the 5 pages checked.

This test shows, for many websites, inconsistencies between the quality of code used on informational pages and that used on interactive elements of the websites. In some cases informational pages use code correctly, but online service pages or other functions do not. This is indicative of different CMSs or other back-end systems being used for different partsof the website. This in turn presents the organisational challenge of ensuring a consistent quality of code across different systems, potentially provided by different suppliers. When a new website is procured, requirements on accessibility are often in place, but when a new function, service or modification is implemented, accessibility may not receive the same priority as in the original development.

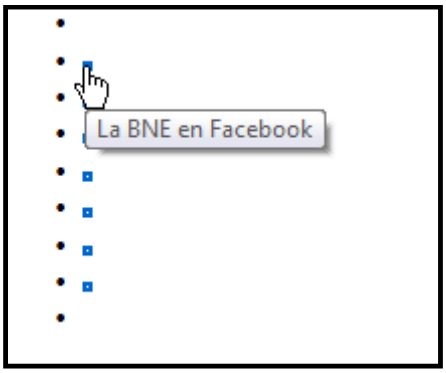
4.1.5.2 Test 8: Cascading Style Sheets (CSS)

Thirty out of the 37 websites tested received a *pass* on this test. It is now common practice by the web development community as well as in content authoring tools to use CSS to manage presentation and HTML for content, rather than the older practice of using HTML for everything.

Ironically, one emerging cause for concern identified during the web accessibility assessment is that this older and undesirable practice of using HTML only to manage both content and presentation is becoming prevalent on newer web pages that incorporate social media plugins. For example, Twitter was used on the start page of one website to show "News and announcements" (which is the main feature on this website's homepage). When viewed with CSS turned off in the browser, this Twitter listing was reduced in size so that it was barely possible to see one tweet instead of all News and Announcements. In the example shown in the Figure 7, the icons for social media are reduced to a type of bullet point when CSS is turned off.

This practice makes it difficult and in some cases impossible, for example for people with some forms of mild learning or vision difficulties using assistive technology and/or preferences within the browser, to change the presentation so that content is easier to perceive and operate.

Figure 7. Example of bad practice using CSS



4.1.5.3 Web managers experiences of web construction

Here again, the results of the qualitative interviews suggest a high level of awareness of the importance of web content being adequately presented to the user, in terms of correct coding and separation of content from design. All 13 of the interviewees stated that their organisations had addressed these issues. However, there was some evidence of problems experienced by website managers in spite of this. In some cases the use of older technology to manage the website has contributed to these problems. In two cases, problems were inbuilt because of the CMS used. In contrast, the interviews identified cases where centrally provided web design and content management tools have helped to address accessibility issues in relation to the technical construction of the website in question.

Another issue highlighted in one case where a large number of websites are maintained by a single organisation is that a strategic decision had been taken to adopt a conservative website design. In this instance, websites are produced with a view to avoiding rather than addressing or overcoming some technical accessibility challenges, such as those highlighted in relation to social media plugins. This potentially leads to a reduced, less interactive experience for users.

Box 4: Selected interview statements

We believe in the principle of separating content from design. However, we are constrained by using an old CMS. This contains a tag that is not compliant and it cannot be altered or corrected. (Ireland)

We have internal documents describing test procedures, including validation of code, testing in different browsers, using Web Developer Toolbar to make sure the code structure is correct... We also have internal checklists for WCAG level

AA. However, it varies from project to project to what extent these resources are used. (Sweden)

Yes this is something we address as well. We have deliberately decided to go for a rather conservative website, I mean HTML and PDF, to keep the effort required to handle everything at large scale at an oversee-able level. The more technologies you apply the more complex the task becomes of ensuring accessibility across the board. Of course, there are solutions to accessibility for many things; but you have to put resources, I mean staff time, into this (Germany)

4.1.5.4 Effort required for compliance

The cost of correcting all errors in the HTML code and ensuring that all information and functionality is decoupled from style will vary. Again, a number of scenarios is presented.

1. In the case where only a **small number of errors** exist due to an oversight, the effort required to fixing these code errors is likely to be trivial.
2. In cases case the problems occur because of **a third-party solution**, either open source or proprietary, there might be a need for more in depth technical modification to be made to CMS or web application. The extent of the problems that exists will need to be carefully considered and offset against the likely efforts and costs to upgrading or replacing the current CMS of other web applications. It is particularly important in this instance that web managers ensure that suppliers' claims of accessibility support in their web applications are accurate and correct.
3. Where **social media plugins** are used, care should be taken to ensure that the code used in the plugin is also accessible. The effort required here will include careful selection and testing of the plugin. While not likely to take a large amount of time, it is a specialist task and may require a strong level of experience with accessibility.

4.1.6 Multimedia

The use of video can be a very efficient way of providing information, especially to users with mild learning difficulties, cognitive difficulties or for non-native language speakers. Through the web generally, multimedia is becoming increasingly a popular communication tool, but the public sector is still somewhat behind on this trend.

For people with hearing difficulties, it is essential that audio information contained in the video is available in another format. This can be done by captioning the

video or by providing the same information by text in close proximity to the original video content.

The checks carried out included ascertaining if the multimedia content contains captions or if a text equivalent is available and easy to find. This relates to the requirements of **WCAG 2.0 SC 1.2.2**[89].

For users with motor difficulties and visual difficulties the challenge often lies in being able to use the video player controls via the keyboard. The second multimedia test was to see if the video player could be controlled with the keyboard. This is to verify that the website meets the requirements of **WCAG 2.0 SC 2.1.1**[90] and **WCAG 2.0 SC 2.4.7**[91].

Table 5. Scores for the tests concerning accessibility of multimedia

Scores:	2	1	0
Test 9, Captioning of media	3	4	9
Test 10, Keyboard control in the video player	15	1	4

Note: Twenty of the 37 websites tested contained multimedia, but in 4 cases the multimedia did not contain any audio information.

4.1.6.1 Test 9: Captioning

Only 3 of the videos identified were properly captioned. Some had automatic captioning that was inaccurate to the point of being unusable in practice. The most common situation was that videos were presented on their own on a page without any reference to other pages with information about the same topic, and without captioning. In such a situation users that can't see the video for some reason, e.g. low connection speed or a device that can't handle video, and users

[89] Captions are provided for all pre-recorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labelled as such. (Level A)

[90] All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints. (Level A)

[91] Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible. (Level AA)

that can't hear what is said in the video would find it difficult to find information on the same topic.

4.1.6.2 Test 10: Keyboard control

Most websites used YouTube to show multimedia. In these cases the websites passed "Test 10: Keyboard controls", since most functions in the YouTube video player can currently be handled with a keyboard. However, for some countries where English is not the main language this solution is not optimal since YouTube buttons are described in English only. This can make it hard to use for some users, especially users with a visual difficulty where first language is not English.

The total score for all sites providing multimedia was 78% for"Test 10: Keyboard control". It was notable that even though all Swedish sites had multimedia, Sweden scored only 58%, meaning that users with motor disabilities and blind users that navigate by keyboard will be more likely to experience problems.

4.1.6.3 Web managers experiences of multimedia accessibility

On the basis of the outcomes of the website testing, the qualitative interviews revealed only limited experience of multimedia content on the part of the website managers. In all, only five web managers reported having any experience of using multimedia, with four having only limited experience and four having none. As a result, levels of awareness of what is involved in ensuring that multimedia is accessible (in all cases interviewees were most concerned with video) were limited. It was also notable that most organisations did not see a large role for video on their websites – it appeared to carry a low priority for them. Of those that had more extensive experience, some noted that captioning is a time consuming process. They also noted that much of the video content would be produced by external contractors and that this arrangement carries with it the problems inherent in managing accessibility externally.

Box 5: Selected interview statements

As mentioned earlier, we currently do not use multimedia. We are now producing signed content. But in terms of volumes this will be quite small when compared with the overall volume of content we have to manage. (Germany)

We are aware that our website is quite static, but we do not have the resources to engage with something as resource intensive as video. Also, it is not clear that we need to engage with video very much, considering the nature of what we do. (Ireland)

We have used links to some YouTube clips on our website – we cannot control these from the point of view of accessibility. (Ireland)

We want to try new ways of getting the information across, for example showing a video clip. (Sweden)

4.1.6.4 Effort required for compliance

The issue of accessible multimedia is complex and covers the provision of captions, audio description, and live and pre-recorded video. Since captioning of live audio is also required according to WCAG 2.0 AA, the cost of complying could potentially be very high. However this is likely only to affect specialised public services such as state broadcasters and sites that stream live content, for example parliamentary meetings.

In practice, most videos found in public sector websites and services are not live. In this case it is sufficient to provide the same content in a text adjacent to the video and still meet the requirements. This is usually not costly at all, since there is usually a script available on which the video was based and this can be used as the basis of the captions to be provided.

While the provision of captions was identified in the interviews as a potentially costly activity, in practice the largest cost relates to retrofitting captions to the video. Captions can be produced in-house and attached to the video with little effort. For commissioned videos, all modern video companies have the capacity to add captions when required to do so.

Finally, pre-recorded video also needs audio description for compliance, which needs to be done manually. This can be more costly and needs to be considered at the earliest stage of the video development.[92]

4.1.7 Summary of main findings

Overall the 37 services tested passed just over half the tests conducted, achieving an overall score of 53%. All of the 37 individual servicesfailed at least one test.

These results provide a snapshot of the state of accessibility in relation to conformance with a selection of Success Criteria from WCAG 2.0. It is important to counterpoint these results with other findings and analysis from the web accessibility assessment and the interviews. Many of test fails were the result of a lack of attention to detail or quality assurance to pick up individual errors and were not indicative of systemic problems with the technology being

[92]It is notable that Norway for example, has chosen to omit WCAG 2.0 SC 1.2.3 , SC 1.2.4 and SC 1.2.5 in their anti-discrimination legislation. This means that there is no requirement on pre-recorded multimedia to have an audio description and there is no requirement to provide captioning to live audio content.

used or the overall approach to developing the website. In the case of documents and multimedia the many of errors identified results from issues at a wider organisational level or with how external consultancy work such as report writing or developing video is commissioned. In a small number of cases it is likely that significant effort will be required to upgrade existing systems in order them to even be potentially capable for reaching conformance rating AA with WCAG 2.0.

The main findings can be summarised as follows:

Results are overall low considering policy commitments. The sum of all scores on all tests conducted equals 53%. No single website avoided falling one or more tests (a score of zero).These results could be said to be disappointing in light of the commitments made by Member states and at European level to improve levels of accessibility.

Low level of implementation. No website in this study can be said to currently fully comply with WCAG 2.0 level AA. Often, there are not systematic problems with websites, but rather mistakes and isolated errors that could have been fixed – or at least discovered - if an accessibility audit or ongoing checks had been carried out during website development, or at regular intervals thereafter.

Basic knowledge on web accessibility. In some cases the informational portion of the website has a high level of accessibility, but problems occurred with the online service. There seems to be general awareness among public sector organisations of accessibility themes addressed by common standards such as WCAG 2.0 (e.g. navigation, documents, forms, and so on). However, it seems less well understood how to address these in operational terms with a view to enabling a satisfactory user experience in relation to the entire services offered online.

Usage of old techniques. Based on findings from the web accessibility assessments and on the expert opinion of the researchers, approximately 10-15% of the services tested have been developed with older techniques (standards, code libraries and functionality) and these in general exhibited more errors than newer websites. These websites are more likely to need a complete rebuild in order to reach conformance rating AA with WCAG 2.0, as per the proposed Directive.

Multimedia is not often used. When used it often lacks subtitling, audio description and other aspects of accessibility. The use of multimedia has such a strong accessibility potential that the lack of multimedia as such is significant.

Documents are often less accessible than the HTML-site. This is problematic in many ways, not least because PDFs are widely used in public sector websites. The content contained in the PDFs were converted from a variety of sources such as automated systems, word processing documents and print design files. This presents a significant challenge to ensuring a consistent level of accessibility across all PDFs provided on public sector websites.

Problems with forms. When forms are not accessible, the online service becomes less efficient. The forms tested are not complex or difficult to make accessible, and should not require a large amount of effort to comply with requirements.

Procurement of external accessible resources. To ensure a higher level of accessibility, the website managers need to make clear requirements when procuring content management systems and third party functionality, like systems that manage forms and documents. Some of these systems have automatic features that need to be specified in terms of the level of accessibility they deliver.

Costs and efforts estimation. It is beyond the scope of the current study to determine the exact costs potentially involved in making the websites included in the audit fully compliant with WCAG 2.0 AA. However, from the information gathered, some estimates can be made of the order of magnitude of effort that would need to be spent if this was to be achieved. These are elaborated in the next section.

4.2 Indicative costs and benefits of achieving web accessibility

This section provides information about the costs and benefits of web accessibility. As per previous studies in this area, the interviews carried out confirmed that public sector bodies do not attempt to track accessibility as a separate cost centre to the general costs associated with the design, development and maintenance of a website. However it was possible to ascertain the public sector web managers perceptions of the cost and benefits of web accessibility. Some qualitative and practical information based in a wide range of experiences was collected. These perceptions and experiences provide an indication of how willing or otherwise web managers are to allocate resources and effort to accessibility.

4.2.1 Perceived costs of web accessibility activities

The interviews generally confirmed earlier research, which has found it difficult for web manager to quantify the cost of accessibility efforts undertaken. No quantitative information was available from the interviewees in that respect, and dedicated budgets for web accessibility are not typical. It even turned out to be

difficult for interviewees to estimate the monetary costs relating to accessibility activities in comparison to the costs spent on web development and overall maintenance. Generally, however, the perception of the level of costs and staff effort required are perceived to be low across public sector organisations. Illustrative examples from the interviews are presented in Box 6 (emphasis added).

Box 6: Selected interview statements on costs of accessibility

The contract concluded with the external web developer company **did not specify any particular budget for accessibility-related services**. Achieving accessibility was just one requirement in the overall requirements catalogue, and I **don't believe that it consumed any major extra costs**. (Germany)

The effort that was put into the support tool now enables us to keep the effort required for building up new accessible websites at a comparatively **low level** (Germany).

It is sometimes possible to quantify accessibility related actions, but only in relation to actions such as user surveys costs. However, these only relate to one off costs and the **ongoing efforts to produce accessible content are impossible to quantify** – we don't have the systems to estimate that. (Ireland)

The costs of producing accessible content are impossible to estimate due to the fact that **the templates used oblige the production of accessible content**. Producing content means producing accessible content. (Ireland)

Staff is the biggest cost. We have one internal resource who puts about a third of his working hours on accessibility. And the members of the web content group put some time into ensuring plain language and correct mark-up. **But the costs are very low in general.** (Sweden)

Even though quantitative information could not be provided, a number of stages within a typical development cycle where effort on accessibility is often spent were identified by the interviewees. in this respect. These include once-off activities such as initial development/design work and testing as well as activities required on an ongoing basis, such as content generation and maintenance work. Staff training was also mentioned as an activity requiring resources, although the scope and volume of training provided varied widely across organisations.

Examples in relation to the elements of the developmental lifecycle are presented in Box 7 (emphasis added).

Box 7: Selected interview statements on accessibility activities

Generally, accessibility efforts concern the **entire development cycle** and later on **maintenance processes**. Again, I am unable to say how much is spent on individual steps. (Germany)

There are also some costs incurring for the generation of **accessible PDF files**, because this is done by an **external service provider**. (Germany)

As mentioned earlier, content generation is another area which should be carefully budgeted, e.g. when it comes to **sign language description**, **videos** and accessibility of **downloadable documents**. (Germany)

The **early stages of the web design cycle** involve the highest proportions of time spent on accessibility – ensuring that the construction of the site and the forms and templates used are accessible requires effort. (Ireland)

Where specific activities such as **user consultations or training** are undertaken as part of the development process, they may have an **identifiable cost**. (Ireland)

Staff, **external contractors** and **software license** for a screen reader are some of the costs… But it's hard to separate accessibility from general costs of improving the website. (Sweden)

There are some costs for **external accessibility consultants**. And of course the time it has taken to establish the **accessibility checklists**. (Sweden)

4.2.2 Perceived benefits from web accessibility

As will be discussed in more detail later in section 4.3, the primary perspective of interviewees in the majority of cases is to perceive web accessibility as a legal obligation or as a general public duty. Expectations of wider benefits for the organisation that might result from accessibility-related measures did not seem to be given very much attention or importance in most cases. In some instances, however, web accessibility was perceived as an intrinsic feature of high quality service provision more generally.

Against this background, it is not surprising that any benefits flowing from accessibility efforts have usually not been tracked in a systematic manner. In general, identifying specific benefits proved difficult for the majority of interviewees. Formal evaluations are not usually carried out and regular management systems are not geared to provide information on web accessibility benefits. In some instances, interviewees reported that benefits did indeed

accrue, such as increased usability and fewer complaints about services. It was also felt by one interviewee that a strategic view on accessibility was lacking whereby the benefits to one group of users was not considered in the context of the benefits to other users from easy to understand language.

Attitudes towards monitoring benefits are exemplarily presented in Box 8 (emphasis added).

Box 8: Selected interview statements on monitoring

We don't monitor any potential benefits. We simply have to **comply with the law**; and that's what we do, as it is documented by the BITV test. Of course you always want to get better. (Germany)

I am not that sure about other benefits such as easier maintenance of websites and updating of content. Usually, public organisations tend to consider accessibility measures as an additional effort requiring additional resources. **In my view a kind of strategic perspective is lacking**, considering that for instance **easy language can facilitate usage of the online service by many groups**, not just reading impaired people. The same holds true for other aspects such as easy to understand structure of the web presence. In practice accessibility and usability often go hand in hand. (Germany)

We have no means of tracking specific benefits of web accessibility actions, especially in quantitative terms. However, as it is part of our mission to promote accessibility, **these actions help us to fulfil our commitments**. (Ireland)

We very seldom get complaints from users for the parts of the website where we have worked a lot with accessibility. **The parts we know to be less accessible generate more questions and complaints**. (Sweden)

4.2.3 Indicative efforts required to reach conformance with WCAG 2.0 AA

The cohort of websites analysed in the Web Accessibility Assessment vary in the amount and types of efforts required for each to reach conformance rating AA with WCAG 2.0. Based on the Success Criteria used in the assessment, this section identifies which areas need most attention and which of these will require the most effort. Three scenarios are dealt with: website that contain a high, medium and low number of errors. Website managers can use these to estimate the scale of the effort required to reach conformance rating AA with WCAG 2.0

AA. Of course, website managers should conduct their own accessibility audits to gain a more fulsome picture of their website conformance level.[93]

- The efforts described below which are required to make a website conformant with WCAG 2.0 level AA are dependent on a number of factors, such as:
- Knowledge of the extent of the work to be carried out (awareness).
- Organisational willingness to address accessibility (attitude).
- Skills sets of staff within the website team (capability).
- Resources available to carry out remediation work internally or provide training (human resources).
- Financial resources require to procure upgrades to or replacements for existing software, procedures or documents (financial resources).

4.2.3.1 Websites requiring significant effort to ensure compliance

A large number of accessibility errors on a given website is indicative of deficiencies with the technologies used to develop and manage the website. As identified in the Web Accessibility Assessment section, Content Management Systems and other systems used to manage content and functionality, such as online forms, documents and multimedia must all be capable of supporting accessibility. Similarly, procedures and processes need to be in place to ensure that accessibility is checked on an ongoing basis and new content and features published to the website are fully accessible.

From the data available from the assessments and the interviews, very few of the websites examined in the study could be said to fall into this category.

Depending on the organisational structure and the technical skill level within the organisation in general, and within the website team in particular, the work to remediate an extensive level of failures with the WCAG 2.0 Success Criteria may require a mix of internal and external resources. The following are a listing of the types of efforts required to improve websites with a low level of accessibility.

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[93] For guidance on conducting a website accessibility audit see: http://universaldesign.ie/useandapply/ict/webaccessibilityauditing

Key issues that may need to be addressed on website with a low level of accessibility:

- A website's CMS cannot support all required accessibility features. This results in inaccessible content being routinely published.
- For a transactional service, the online forms are inaccessible, or are provided in PDF only, for printing off and filling out manually.
- Website content is published in an inaccessible format such as a scanned PDF, or as an unstructured document.
- Multimedia content is not available with accessibility features and/or the media player used does not support accessibility
- No internal processes in place to ensure accessibility during website development or during ongoing quality assurance as part of managing the live website

A website with a low level of accessibility will require some or all of the following types of actions to remediate these issues:

- A preliminary review of the website to assess its exact conformance with WCAG 2.0 AA.
- Procurement of CMS or other backed software used in publishing content and handling front-end transitional functionality
- Procurement of software for creating accessible documents.
- Training of technical staff in using new software, in particular its accessibility features.
- Training technical staff to develop check and maintain accessible content and functionality.
- Training and supporting non-technical staff in writing accessible content for the website and where appropriate, in using any new software for converting and publishing the content to the website.
- Developing and implementing content creation and web development processes that ensure that accessibility is considered and supported during all stages of the websites lifecycle.

4.2.3.2 Websites requiring medium effort to ensure compliance

In this case, a considerable number of accessibility errors may be indicative that accessibility has received sporadic attention during the development and maintenance of the website, but this has not been sufficient to resolve all problems. As identified in the Web Accessibility Assessment section, different services on the same website have large differences and show a lack of consistency, which can confuse the user. Often this may be because of a lack of

overall responsibility and a clearly determined internal process for the end user requirements. For this group of services to comply with WCAG some redevelopment work is needed, but does not require an entire redesign.

From the data available from the web accessibility assessment and the interviews, an important percentage of the websites examined in the study could be said to fall into this category.

Depending on the organisational structure and the technical skill level within the organisation in general, and within website team in particular, the work to remediate a medium level of failures with the WCAG 2.0 success criteria may require a mix of internal and external resources. The following are a listing of the types of efforts required to improve the accessibility of websites that have a medium level of accessibility. Website managers can use these to estimate the scale of the effort required to reach conformance rating AA with WCAG 2.0.

Key issues to be addressed:

- HTML is not correct and CSS has not been used coherently across the website.
- A website's CMS does not fulfil all required accessibility features.
- Documents are published in an inaccessible format, such as a scanned PDF, unstructured Word documents, etc.
- Multimedia content is not available with accessibility features.
- No internal processes in place to ensure accessibility during website development or during ongoing quality assurance as part of managing the live website.
- No periodic accessibility inspections and reports in place to detect main errors and establish contingency measures.
- No internal knowledge on how to maintain accessibility levels of transactional services with more sophisticated accessibility requirements.

A website with a medium level of accessibility will require some or all of the following types of actions to remediate these issues:

- A preliminary review of the website to assess its exact conformance with WCAG 2.0 AA.
- Process for adapting the website CMS and other web development software to be fully compliant with WCAG 2.0 AA.
- Procurement of accessible documents and multimedia contents.

- Training technical staff to develop, check and maintain accessible content and functionality.
- Training and supporting non-technical staff in writing accessible content for the website.
- Developing and implementing procedures to ensure that web accessibility remains invariable during all stages of the website lifecycle.

4.2.3.3 Websites requiring low effort to ensure compliance

A small number of accessibility errors on a given website is indicative of high quality development and no deficiencies with the technologies and procedures used to develop and manage the website. As identified in the Web Accessibility Assessment section, largely accessible websites would require better internal monitoring and a small number of corrections to comply with WCAG 2.0 AA.

From the data available from the audits and the interviews, a considerable proportion of the websites examined in the study could be said to fall into this category.

In this case, the organisational structure, the technical skills level within the organisation and/or the procurement of external services or contents are extensively aligned with WCAG 2.0 AA success criteria. The following are a listing of the types of efforts required to improve the accessibility of websites that have a high level of accessibility. Website managers can use these to estimate the scale of the effort required to reach conformance rating AA with WCAG 2.0.

Key issues to be addressed:

- Website content is published including some minor accessibility errors.
- For a transactional service, the online forms are not fully accessible or can be improved to increase user satisfaction.
- Multimedia content is available with accessibility features, but some amendments are needed to ensure full conformance with WCAG 2.0 AA.
- Ongoing accessibility assurance is not part of managing the live website.

A website with a low level of accessibility will require some or all of the following types of actions to remediate these issues:

- A preliminary review of the website to assess its exact conformance with WCAG 2.0 AA.

- Training technical staff to develop check and maintain accessible content and functionality.
- Training and supporting non-technical staff in writing accessible content for the website.
- Plan to carry out corrections of all error detected during accessibility assessments.
- Procedures to maintain accessibility level invariable during all stages of the website lifecycle.

4.3 Organisational approaches and perceptions in relation to web accessibility

In the previous sections technical barriers to accessible public online services and cost consideration have been discussed. This section focuses on experiences reported by public sector organisations on implementing web accessibility as part of their daily operations. Interviews[94] were conducted with public sector web managers in Ireland, Sweden and Germany.

In total, in-depth interviews involving 19 people from 13 public service public sector organisations were conducted in three countries (Germany, Ireland and Sweden).The main themes covered were:

- Organisational policies on web accessibility,
- Approach taken to address web accessibility,
- Issues/challenges experienced in addressing specific accessibility themes examined in the web accessibility assessment,
- Outcomes of the accessibility activities undertaken,
- Perspectives and/or available information on effort/costs of activities,
- Monitoring web accessibility, as well as perspectives on monitoring and its value (including proposed EU approach from the Directive).

4.3.1 Organisational web accessibility policies remain largely informal

All of the public sector organisations consulted reported having some kind of intra-organisational web accessibility policy in place, although the level of formalisation of these policies varied. Generally, national legislation or policies represent an important driver for organisational web accessibility policies, though

[94]See section 3 for details of the interview approach and methodology.

these are augmented by intra organisational policies of various kinds also. This is illustrated by the statements presented in Box 9 (emphasis added).

Box 9: Selected interview statements

As already mentioned, we have to comply with Federal law, and this required complying with BITV web accessibility requirements. Accessibility represents an integral aspect of our policy towards **quality of service.** But there is **no dedicated policy on web accessibility**, apart perhaps from a general policy to comply with legislation. (Germany)

Part of our mission is to serve the general public as well as possible. Accessibility in all its forms (e.g. employment, physical access) is important to us and we view web accessibility as part of this overall drive to promote the accessibility of our services and their **overall quality**. (Ireland)

It's never really been an issue – it is **only natural that we should address accessibility**, since we have many older users and users with disabilities. (Sweden)

Accessibility represents a **standard requirement** on the organisation's general web policy for several years. The main reason for becoming involved in undertaking web accessibility measures was **a legal requirement imposed by the regional parliament** (Germany).

Also, occasional feedback by users with disabilities was mentioned as an incentive to address specific accessibility issues, although only by a limited number of interviewees. (Box 10 emphasis added)

Box 10: Selected interview statements

Sometimes we get **a report from users with disabilities** that this or that does not work properly. We then try to fix these problems. But it shows to us that they generally can use our websites. (Germany)

The majority of organisations interviewed (11 of the 13) referred to WCAG guidelines as being the basis of their accessibility policy. Both WCAG 1.0 and WCAG 2.0 were referred to, but it was not clear whether this was with reference to the complete guidelines package or to specific elements. In some of the countries, national standards or guidelines from relevant legislation or other policy instruments are a common basis for web accessibility in the countries concerned.

Box 11: Selected interview statements

*Our general policy is to enable and support compliance of Federal government bodies with the **German web accessibility regulation**, notably BITV 2.0. The BITV standard has been aligned with WCAG 2.0 recently (Germany)*

*Our **tendering specifications** specifically call for tenders to be WCAG 2.0 compliant (Ireland)*

*We require that all of our **content providers** are WCAG compliant (Ireland).*

Our goal is to follow WCAG and the e-Government Delegation's guidelines for the public sector (Sweden).

Most web managers seem to be working towards the WCAG guidelines in one way or another. However, the results of the web accessibility assessment work on how the five specific accessibility areas (navigation, documents, forms, technical construction and multimedia) as well as the discussions with the web managers on how they were addressing these areas show that there is considerable variability in approach. This variability is notable in terms of the aspects of web accessibility that are given emphasis and how they are actually addressed in practice.

4.3.2 Diverse parties and activities are involved at organisational level

All interviewees indicated that accessibility was being addressed as a development and design activity within their organisation. The majority (12 of 13) of organisations utilised services delivered by **external contractors** for these purposes at least to some degree. Where services tended to be procured from external parties a requirement for accessibility was often included, amongst other requirements, in more general procurement specifications or framework contracts. In most cases it was reported that external services tended to be procured from mainstream web developer companies, albeit some examples were reported where accessibility-related specialist consultancy services were procured, e.g. in relation to user testing and staff training (see Box 12). However, a systematic examination of compliance with accessibility requirements seems to represent an exception. In part this is because there is not the in-house competence to monitor whether accessibility requirements have been met in sufficient detail, but is also because there was little evidence of accessibility testing being undertaken on a regular basis.

The most common type of accessibility activity relates to web design or development work (9 organisations mentioned this activity). 5 of the 13

interviewees mentioned that accessibility audits had been carried out at some time, while smaller numbers (2 or 3 interviewees) mentioned training of staff, involvement of end users and generation of content as being accessibility related activities. Only in one case was all web development carried out by **in-house staff** (Box 12).

Box 12: Selected interview statements on web accessibility activities

Our web presence was developed and designed by an external service provider. Such an approach was also adopted when a **major re-launch** became necessary a few years ago. On this occasion, accessibility for people with disabilities was included as a **core requirement in the procurement process.** The procurement process was not directed to procuring specific accessibility related services from any specialist supplier. As expected, all accessibility related requirements were ultimately met by a mainstream web developer company as **part of the overall service contract**. (Germany)

We work with mainstream external web developer companies who have a **proven track record in accessibility,** amongst other criteria. They usually do web development and design work for us and we conclude framework contracts, and again accessibility is one contractual requirement. (Germany)

We use external consultants for much of our development work and we place accessibility requirements on all developments that take place. External contractors are expected to produce **systems that are compliant and that aid compliance**, i.e. templates must 'force' compliance and there should be testing routines for all content placed on the site. (Ireland)

Some IT solutions are developed in-house, others externally. WCAG compliance is always part of the requirements. (Sweden)

We have **internal competence** when it comes **to user experience**, **interaction design** and **language**, all of which are closely related to accessibility as we see it. But we do use external competence for **user testing** on real costumers. We have also used external help for more in-depth analysis of accessibility and for training (Sweden).

Procurement of dedicated software enabling accessibility to be enhanced was reported by eight of interviewees. In some cases this focused on the needs of specific user types, (e.g. screen reader users), while in other cases it focused on content developers (e.g. CMS's) that enabled some testing for accessibility prior to content being uploaded. Six organisations also reported dedicated activities for making content accessible to people with disabilities. In one case, an in-house dedicated competence centre is maintained to ensure compliance with intra-

organisational quality requirements, including accessibility-related ones (see Box 13).

Box 13: Selected interview statements on accessibility competencies and supports

Everything that goes online is first going to be pre-tested by our **internal competence centre**. For instance, we had to put 22 new application forms online earlier this year. This concerns accessibility requirements as well as other requirements. For instance, two of our staff spent about eight months designing these and getting them through the testing procedure, where accessibility requirements are just one aspect that had to be taken into account. When it comes to accessibility in particular, staff at the competence centre use for instance screen reader software to try out whether content is read out properly, whether the reader jumps in the correct order, whether appropriate alternative text is provided and so on. (Germany)

We do everything in-house. But we have **purchased tools that support our work**. We use for instance the Government Site Builder that is offered by the Federal Office of Administration. In essence this is a content management system, but it offers even more functionalities that support you in building your own websites, including templates and so on. It has many built in functionalities that are directed towards supporting you in achieving accessibility. (Germany)

In a few cases the production of accessible content was contracted out. Of those which did such contracting out, problems were sometimes mentioned, such as producing Irish language material (Box 14).

Box 14: Selected interview statements

Some of the material that is translated into Irish by external organisations was not compliant – we had to take steps to ensure that they fully understood compliance requirements for the future. (Ireland)

A mixed picture emerges from the interviews in relation to current practices on intra-organisational capacity building for web accessibility. About half of the interviewees (6 out of 13) reported that staff has received **web accessibility-related training**. In three cases, such training was conducted by external parties. In other cases, accessibility related in-house expertise seems to have been built up more informally and concerned only limited numbers of staff. When it comes to training contents, the interviews revealed different aspects that were paid regard to. These include specialist expertise within dedicated web teams as

well as more general knowledge required within the public sector organisation at a broader scale, e.g. when it comes to generating accessible web content (see Box 15).

Box 15: Selected interview statements intra-organisational capacity building

Also, **all staff receive training** with a view to ensuring that all documents we offer over the web are accessible. We have decided to generally offer **PDF documents** for downloading. This requires those who create the content being able to **first generate an accessible word document** which is then transferred into PDF format. Secondly the PDF document needs to be **checked against certain requirements.** This requires some time, and the training as well. (Germany)

Also, the call for tender included a request for providing **advice to internal staff** concerning web accessibility. (Germany)

In the beginning I spent some of my working time to bring myself up to speed in this respect. But it's part of my job anyhow to keep myself up-to-date in relation to any new developments in the web field, and the issue was really about becoming aware that **accessibility represents one aspect of web development rather than a dedicated field**. (Germany)

Only the staff from the web team are trained in web accessibility procedures – these are responsible for ensuring that content is compliant. (Ireland)

We have **trained some hundreds of content providers** to produce compliant material. This is basic training, but it helps to ensure that more content is compliant compared to the past. (Ireland)

All staff involved in web development must have a **basic understanding** of accessibility. Also, someone of each area (design, code, publishing, etc.) must have **expert knowledge**. (Sweden)

Formally, we don't have a specific person responsible for web accessibility, but we do have a web designer who has taken on the role of accessibility expert. He is always involved in new projects to some extent to make sure we develop accessible services. (Sweden)

Dedicated monitoring/auditing procedures were reported in less than half of the cases (five). Involving end users in general consultation, usability testing or accessibility testing in relation to their website was also reported in five cases. At least some of the reason provided by those who didn't report any monitoring or testing procedures was lack of resources due to the economic downturn, rather

than a failure to recognise the importance of monitoring and/or user input. The general recognition of this importance is borne out in reports that the results of such consultations were used to improve site accessibility.

Box 16: Selected interview statements on monitoring/auditing procedures

Our website has undergone the so-called "BITV test". Although the Federal legislation only applies to Federal government organisations, it was felt that the "BITV test" was a good means to demonstrate that our website complies with legislation adopted by the regional parliament of Berlin as well. Also, it was felt that the test would provide a useful benchmark for assessing the outcomes of our accessibility related effort internally to our own organisation (Germany)

We obtained very useful results from **user testing** of our website with regard to improving accessibility and usability, but this was tied to the implementation of new website design and is not an ongoing process. (Ireland)

An **accessibility audit** was performed by **external experts** in 2010. The audit included requirements from WCAG 2.0 as well as usability, design and language aspects of accessibility. (Sweden)

4.3.3 Diverse barriers to achieving web accessibility and some solutions adopted

A number of structural barriers to complying with existing web accessibility related policies/ requirements were mentioned during the interviews. The need for prioritising available resources was a recurring theme, though this does not necessarily concern only accessibility-related efforts. In fact, **resource restrictions** were sometimes felt to represent a challenge to generally maintaining websites at a high level of quality and also in relation to further development of the sites. Austerity policies, which have been pursued within the public sector in recent times, contribute to this development. The ways in which resource issues impacted included are presented in Box 17 (emphasis added).

Box 17: Selected interview statements on resource challenges

The key challenge we face is a **lack of resources**. Public administration is under extreme pressure at the moment to save resources, and ensuring accessibility all

the time in relation to such a large number of websites simply requires staff; the lack of resources does not represent a challenge when it comes to ensuring accessibility in particular but further developing and maintaining the web presence overall. So the pressure that comes from **general austerity policies** in the public **sector concerns our web presence overall, and not accessibility efforts in particular**. We have for instance plans to use video material and films. But this is an issue that has to wait, it's something for the future. If I had more staff available, I would do much more. (Germany)

Changes in organisational structure as well as reduced resources have meant that there have been difficulties in maintaining the accessibility of the website. We have now moved as a result of organisational restructuring to having only one person managing the website. (Ireland)

New website developments provide the opportunity for upgrading accessibility, but the opportunity for such developments has been restricted since the economic downturn. (Ireland)

We recognise the importance of accessibility and for involving users in its assessment, but this is only possible when new developments are undertaken and these are constrained by the current economic situation. (Ireland)

Beyond the need to prioritise efforts in an environment of constrained resources, further challenges related to the levels of awareness and knowledge of accessibility issues within the public sector organisations. Here, two somewhat different elements were apparent. On the one hand, insufficient levels of awareness of what exactly web accessibility is about and why it is an important issue for particular user groups has been highlighted as a challenge by some interviewees. It was also suggested that it is challenging to maintain the required levels of awareness and knowledge within the public sector organisations in the long run, particularly in cases where organisational knowledge on web accessibility is maintained by one member of staff acting as an advisor, be it formally or informally. On the one hand, this concerns more general accessibility related awareness and knowledge among content creators, who may be scattered across different units within a given public sector organisation. On the other hand, it concerns specialist expertise within dedicated technical web teams. (Box 18, emphasis added).

Box 18: Selected interview statements on awareness and knowledge

Very often awareness is very low, and frequently accessibility is only associated with requirements that blind people have. Problems other population groups have such as hearing impaired people or those who have difficulties to read text, such as reading impaired and sign language users are usually not on the radar of staff doing the day-to-day work, perhaps a bit more at the upper management levels.(Germany)

Sometimes a staff member who has developed awareness of web accessibility and a good understanding of the practical issues involved leaves the organisation and accessibility issues are not systematically considered anymore. For instance a **good level of accessibility may have been achieved when the website was set up but, after staff has left, this level is not maintained anymore**. Ultimately **accessibility-related capacity** building cannot keep pace with **staff turnover**. (Germany)

Even though there is a policy commitment to promoting website accessibility, in practice there are relatively few people with the knowledge to implement it. We are **organised centrally**, so that the **web team review content for accessibility**. However, the levels of knowledge of **content producers** is low. (Ireland)

Many of the content producers have been trained in producing accessible material, but these represent only a small percentage of the total number. It is difficult to ensure that there is sufficient knowledge of accessibility issues amongst a large and constantly changing number of content producers. (Ireland).

A number of different solutions to some of these challenges were mentioned. One organisation maintaining a large number of websites has responded to this challenge by setting up an internal competence centre**,** which addresses issues around accessibility amongst other issues. Another approach identified in Germany includes the centralised provision of web accessibility related consultancy to relevant government bodies through a public body operating as a national competence centre. The latter approach also included investing in developing supportive tools and making these available to public sector organisations through the national competence centre. The core tool is based on a commercially available content management system, but goes beyond supporting content management tasks in the narrow sense. Modules include, for example, layout templates, navigation concepts but also newsletters and search functionalities. When it comes to accessibility in particular, the features include for instance:

- accessible, entirely CSS-based layout in standard solutions,

- support of diverse editorial tasks,
- an automatic tool facilitates compliance with the national web accessibility standard,
- glossary interlinking,
- distinction of accessible and non-accessible download documents.

Beyond this, the editorial responsibility remains with the website manager. Public bodies can decide whether they want to rely on the service offered by the competence centre, e.g. partly or entirely, or whether they prefer to contract commercial web developer companies to do the work. Sometimes, commercial web developer companies are subcontracted to develop parts of their web presence or particular solutions. Thus, in practice the mix of players involved can become quite complex.

In general, the **availability of adequate tools** for supporting public sector organisations in designing and maintaining accessible websites and content (e.g. content management systems and testing tools) was seen as a critical issue by a number of interviewees. Aspects uncovered in the interviews included a perceived non-availability of suitable tools on the mainstream market as well as positive impacts of investments made by the government in order to make such tools centrally available to public bodies. Examples of this issue are presented in Box 19:

Box 19: Selected interview statements

Another challenge concerns the tools that we have available. I could imagine that there would be many more tools available with capabilities to support accessibility if commercial websites were obliged to comply with the web accessibility law as well. (Germany)

We do everything in-house. But we have acquired tools that support our work. We use for instance the so called Government Site Builder that is offered by the Federal Office of Administration. In essence it is a content management system, but it offers even more functionalities that support you in building your own websites, including templates and so on. It has many built-in functionalities that are directed towards supporting you in achieving accessibility. (Germany)

Our (commercially available) content management system is old and is not capable of fully complying with accessibility requirements. (Ireland)

Challenges were also reported by some interviewees in relation to **dealing with legacy content**, in particular where large volumes are involved. This also

related to the need for prioritising efforts in the context of limited resources. Examples of this issue are presented in Box 20.

Box 20: Selected interview statements on legacy content

We are obliged to maintain on the website a large volume of material such as statutory instruments, legislation and related material. This is updated every year with considerable volumes of new material. The older material is relevant only to a small specialist audience, and we do not have the resources to make this material fully accessible. (Ireland)

When we first became concerned with accessibility issues during the major upgrade of the website in 2008, we had to migrate a large amount of content to the new site and to try to ensure that this was accessible. It did not prove to be possible to make all documents and content fully accessible because of resource limitations. (Ireland)

4.3.4 Monitoring of accessibility achievements

In general, none of the countries covered by the current study has implemented a mandatory monitoring scheme when it comes to levels of accessibility actually achieved by public online services. As described earlier in this report (Chapter3), a voluntary certification scheme has been put in place in Germany while self-declaration approaches have been adopted in Ireland and Sweden. From the interviews conducted in the framework of this study, it emerges that evidence of the extent to which accessibility has actually been achieved is not usually collated on a regular basis by the public sector organisations (Box 21). In most cases, occasional accessibility and/or user testing provides systematic but irregular monitoring. Only one organisation reported monitoring the outcomes of each individual accessibility project. However, some organisations considered their accessibility efforts to be an ongoing process of achieving gradual improvements.

Box 21: Selected interview statements

As mentioned earlier, we have used a **voluntary certification scheme,** the so-called "BITV Test". (Germany)

As we have learned, web accessibility is about optimising your website. You are never there entirely. There are always constellations of user requirements you don't fully meet. (Germany)

We have **no formal or regular monitoring procedures**. We have in the past (when there are major website developments) undertaken user testing, part

of which is concerned with accessibility testing. It would be useful to do this on a regular basis, but we don't have the resources. (Ireland)

Sometimes it's hard to fulfil all accessibility requirements before a service is launched, but then we have **a structured backlog of issues that we continue to work on**. (Sweden)

It's important to have a **good dialogue with the disability organisations**, which we do. But it could always get better. (Sweden)

The interviews aimed also to investigate perceptions on the usefulness of regular web accessibility monitoring and also, to get some feedback in relation to the proposal for a common EU-wide monitoring approach as suggested in the proposed EU Directive.

Overall, a mixed picture emerges in this respect (Box 22). While some interviewees seem to be well disposed to having a monitoring system in place to help improve their website, sanctioning in the case of underperformance was felt to be inadequate or even counterproductive. Generally, a "carrot" approach seems to be deemed more effective than a "stick" approach. Also, a mixed picture emerges when it comes to tangible impacts that are deemed to be achievable through regular monitoring. While some expected that impacts would be primarily indirect, e.g. in terms of raising current levels of awareness at the strategic management level in relation to the relevance of web accessibility, others felt that regular monitoring might provide operationally useful information that could be fed back into their day-to-day activities

Box 22: Selected interview statements on perceptions of regular monitoring

In general, monitoring can be a useful tool for learning, with view to improving your web presence. For instance, we found the feedback received from the BITV test useful. (Germany)

Not sure about this. In any case, I would find it problematic if any sanctions would be imposed on websites that don't achieve a certain level of accessibility. Actually, the issue is more about awareness-raising rather than sanctioning. (Germany)

We would do what we would be required to do as we are a public sector body, but we would be concerned if it led to more work for us. (Ireland)

At present, there are no strict policies, so the accessibility is dependent on the goodwill of the people working with a website. Regular monitoring would

probably make it easier for many organisations to follow standards, and avoid getting stuck with inaccessible solutions. (Sweden)

Regular external monitoring would put more focus on accessibility when prioritizing between different issues. (Sweden)

A number of issues were mentioned that shed some light on the requirements web managers would have on a suitable monitoring approach (Box 23). To begin with, some interviewees highlighted that a suitable monitoring approach should be capable of adequately considering realities on the ground in a fair manner with a view to comparing like with like, e.g. when it comes to different types and volumes of services offered through the web. Others expressed a preference that any monitoring activity should emphasise the most practically relevant aspects of an accessible user experience, e.g. accessible coding and documents. There was a perceived risk that country-wide or even EU-wide monitoring might turn out to be a bureaucratic rather than an operationally useful exercise.

User testing – beyond mere automatic testing - was also mentioned by some respondents as a potentially suitable means for receiving operationally useful feedback (see also Box 23). On the other hand, practical feasibility and costs were highlighted as an aspect deserving particular attention. Potential restrictions where emphasised with regard to the depth that was realistically achievable if monitoring was to be done frequently. Generally it was felt that regular monitoring should not represent too much of an additional burden to the public sector organisation.

Based on the interviewer feedback it appears that the website managers perception of monitoring falls into two types; remote monitoring done by a centralised entity, and self-declaration.

Box 23: Selected interview statements on types of monitoring

In the case of an **EU wide monitoring,** I would wonder **how the outcomes would be used**. For instance would there be a **ranking** or even **sanctions**? One should not forget that it is never useful to compare apples with pears. If I look at - let's say – in a regional water authority they may have a rather small web presence, and rather confined amounts of traffic and user interaction. Compared with our web presence which includes more than 120.000 websites you may require much less staff and managed processes to ensure accessibility all the time. (Germany)

If regular monitoring is to be introduced, care should be taken to focus on all the different issues that have relevance in relation to accessibility, even assumed "small issues" such as correct usage of HTML and so on. (Germany)

Documents should be assessed in relation to accessibility as well. (Germany)

If monitoring was to be introduced, **it should not be burdensome** in terms of workload for us. We don't have the resources to devote to this activity. (Ireland)

It's important that the monitoring is performed by a non-commercial actor. (Sweden)

Some major concerns about the impacts potentially achievable through regular monitoring also came to the fore during the interviews as well, and it was suggested that available resources might be better spent on other issues such as capacity building. Also, some interviewees questioned the utility of regular monitoring as they felt that there was always a subjective element to it if it is done in sufficient depth, i.e. not only in terms of automatic testing. Pertinent concerns here are presented in Box 24.

Box 24: Selected interview statements on impacts of monitoring

I don't believe that monitoring is the holy grail of web accessibility. What may practically happen is that website managers would try to comply with the specific requirements imposed at the point when the monitoring is carried out, let's say every two years or so. Presumably they would even subcontract work to ensure compliance at a certain point in time. But then the issues would not be further followed up until the next monitoring round is looming. Rather I would think that ongoing awareness-raising and capacity building would have a more sustainable effect when it comes to achieving accessibility for people with disabilities. (Germany)

If monitoring is to take place, it should contain **some element of user testing** – automated testing does not always reflect user experience. (Ireland)

It is generally a good thing to have accessibility requirements, but at the same time we have limited resources. So it's hard to fulfil all the requirements with the resources we have. (Sweden)

4.3.5 Summary of main findings

The in-depth interviews conducted with representatives of public sector organisations shed light on a number of aspects, which deserve attention if current accessibility deficits are to be overcome in a sustainable manner. The main findings can be summarised as follows:

Formalisation of organisational accessibility policies. National legislation or policies tend to be perceived by public sector organisations as a major driver towards achieving accessible online services. However, organisational policies and processes directed towards web accessibility seem to have largely remained non-formalised. Often, accessibility related activities tend to be pursued in an *ad hoc* manner rather than according to systematically specified workflow processes, management procedures or documented policies.

Intra-organisational awareness and knowledge. In reality, a wide variety of parties are typically involved in setting up and maintaining public online services, including technical and non-technical staff (e.g. procurement experts and web developers) as well as external contractors. Also a variety of activities may need to be effectively coordinated if accessibility related efforts are to yield sustainable outcomes (e.g. conceptual work, development work, content generation, validation/ quality control and capacity building). Low levels of awareness of the relevance of accessibility in relation to these activities and related knowledge among the various parties involved tends to act as a barrier to achieving fully online services. This concerns more general knowledge within the overall organisation, e.g. among content creators, and specialist expertise within dedicated technical web teams and procurement units.

Variability of accessibility aspects emphasised. Although most web managers seem to be working towards WCAG guidelines in one way or another, there is considerable variability in terms of aspects that seem to be given emphasis and how they are usually being addressed in practice.

Service procurement from external parties. Often, public website managers rely on procurement of web related services from mainstream web developer companies rather than consultancies specialised in web accessibility. In such cases, a requirement for accessibility is often included, amongst other requirements, in more general procurement specifications or framework contracts. Including accessibility requirements in procurement policies is a positive step, but for it to be truly effective, compliance with accessibility standards needs to be systematically controlled. In general, there appears to be little in-house competence available to monitor whether accessibility requirements have been met. In fact, there was little evidence of accessibility testing being undertaken on a regular basis.

Supra-organisational support. Another approach identified in Germany includes the centralised provision of web accessibility related consultancy to public sector web managers through a public body operating as a national competence centre. This approach also includes investing in developing supportive design and content management tools and making these available to public sector organisations through this channel.

Non-strategic perception of web accessibility. Resource restrictions, particularly in view of austerity policies which have been pursued in the public sector during recent times, often require prioritisation of organisational efforts, where accessibility is usually competing with other organisational priorities. Accessibility is rarely considered as a strategic perspective, but rather as a technical tick-box issue. In fact, such measures tend to be primarily perceived as an effort rather than a potential source of benefits.

Benefits for a wide range of users. The body of evidence on web accessibility shows clear benefits for a wide demographic of users in being able to access, understand and use a website or service. This includes people with disability, older people and increasingly people access the website on different devices and in different contents of use. However the interviews in particular illustrate that web accessibility is still, at an organisational level perceived to be mainly an matter of compliance, rather than a means of improving the customer experience.

Systematic tracking of achievements, efforts and impacts at organisational level. The tracking of the effectiveness of accessibility related efforts tends to happen only sporadically, if at all. Benefits potentially flowing from accessibility related activities or costs involved are not systematically tracked by public sector organisations. In addition, the costs incurred for accessibility related activities pursued are usually not quantified by public sector organisations.

Accessibility monitoring at supra-organisational level. In general, none of the countries covered by the current study has implemented a mandatory monitoring scheme. While some interviewees seem to be well disposed to having a monitoring system in place to help improve their website, sanctioning in the case of underperformance was felt to be counterproductive. A number of requirements on a preferred monitoring approach were mentioned. These include ensuring a fair comparison of "like with like" in terms of types of services and volumes of content actually provided and taking into account those aspects that are indeed practically relevant for an accessible user experience. There was a perceived risk that country-wide or EU-wide benchmarking might turn out to be a bureaucratic rather than an operationally useful exercise. Also, practical

feasibility and costs were highlighted as an aspect deserving attention. Generally it was felt that regular monitoring should not represent too much of an additional burden to the web manager organisation.

5 Key results and overall implications

Having in mind the contents from previous chapters and trying to point out the results obtained in the field study, this Chapter presents the key results and its implications. All of the results introduced are based on the findings of the study or inferences taken from the study findings. The chapter structures the results regarding web accessibility of public website from a technical and organisational perspective. This is followed by a systematization of the implications for web accessibility policies at national and European level.

5.1 Implications for web accessibility policies

5.1.1 National level approaches

Public service websites are not fully compliant with WCAG 2.0 guidelines in any of the countries covered, even if some countries and/or services show better results than others. All countries would benefit from reinforcing their policy approaches to web accessibility.

Public web managers typically make at least some efforts in this area, some more than others. However, levels of attention and approaches to web accessibility vary considerably, and there are many challenges experienced by web managers in optimally addressing and achieving accessibility.

The availability of national level support/competence structures seems to be very helpful (e.g. as in the case of Germany); all countries could consider developing support structures and processes, such as skills development as well as specific tools to support development of accessible websites.

Most web managers reported that their procurement policies included requirements on the accessibility of websites. The level of specificity of these requirements varied somewhat, but most referred to WCAG standards. If public procurers incorporate accessibility requirements when procuring for related services (web applications, CMS, external functionalities, forms, documents, etc.), higher levels of accessibility can be achieved.

Based on the web audits and the interviews with web managers, it seems that often accessibility problems arise not because accessibility is not given any attention, but because of structural barriers that constrain web manager organizations in taking a more structured approach to web accessibility in their day-to-day operations. These include resource restrictions and the need to balance accessibility requirements with other organisational requirements, deficits in keeping awareness/knowledge at required levels over time, a lack of tools to support staff in achieving/maintaining accessibility on an ongoing basis, decentralised or *ad hoc* generation of content, limited ability to 'enforce'

accessibility standards by web managers, and management of the production of content by external content providers.

5.1.2 EU level approaches

Public service websites are not fully compliant with WCAG 2.0 guidelines in any of the countries covered, even if some countries and/or services show better results than others. There are also differences across countries in the aspects of web accessibility being addressed. There is therefore a strong rationale for reinforcing the EU policy approach to web accessibility in order to encourage more harmonised accessibility experiences for public service users across the Member States.

The accessibility analysis of a set of public sector websites across Europe shows that much work has to be done before the websites covered in the proposed Directive meet the requirements of WCAG 2.0 level AA. The list of public website analysed is relatively short (12 key services), but there are a wide range of public services at national, regional and municipal level that are under the umbrella of public websites of key interest for people with disabilities and older people. Therefore, these 12 key services can be a way to foster best practices in accessibility among public websites at large. It is important that EU initiatives involve all public websites regardless of administrative level, even websites in public-private partnerships, websites developed with public funding and commercial websites of public interest.

The importance of public web content makes especially relevant the debate regarding the accessibility of new content (for example, ensuring the production of accessible contents generated by the corporative CMS) and the retrofitting of existing content (for example retrofitting huge volumes of existing PDF documents). At European level, it is also relevant to provide indicative and feasible deadlines for the public website to meet the requirement of WCAG 2.0 level AA, these should probably differentiate between existing content and new content.

The costs for public service web managers to substantially improve accessibility of websites seems unlikely to be a major issue in most cases. Public web managers generally consider web accessibility to be part of their public duty and do not give much attention to tracking any costs associated with this. However, economic constraints have put pressures on web development resources in most organisations with implications also for accessibility work. There were also some concerns about potential costs in some areas, such as where large volumes of legacy documents might be required to be made fully accessible.

The availability at national level of support/competence structures seems to be very helpful. Consideration could be given to the development of EU level supports and/or shared approaches across the Member States in this area.

Based on the sample of public service web managers covered in this study, there appears to be a reasonable level of openness to a common EU wide monitoring of the accessibility of public websites. Nevertheless, there were some concerns that a monitoring regime might ultimately become a bureaucratic exercise with low value for the web managers' day-to-day operations and high requirements being placed on the web managers. Various issues around the scope and content of a common monitoring approach were also mentioned. If monitoring was to be used for comparative purposes, then care would be needed to ensure that comparisons took into account the wide differences that exist in the complexity and scale across public service websites. In general there was a positive attitude to monitoring. In particular is was perceived to be desirable that the monitoring should provide operationally useful feedback to the web managers as opposed to being intended to be used in a negative manner (e.g. as a basis for imposing sanctions).

5.2 Some key results regarding web accessibility of public websites in Europe

5.2.1 Characteristics of the study

Limited testing: The results of the present study should be seen as being indicative rather than definitive. The study used cluster-sampling of 10 tests from 10 different WCAG success criteria out of 38 possible tests. Many tests are required to fully verify a success criterion, so the potential amount of tests needed to ensure fulfilment of WCAG 2.0 level AA is very large.

Divergences among national public websites. There is an important difference in how complex the same type of service is in different countries. In some, countries a particular service is an interactive web form, but in another country it might be a PDF form, and in a third country it can be a transactional e-service. Therefore, it is not meaningful to compare individual services between countries, since the characteristics of the services vary so much, and it is essential to take into consideration that when a larger part of a complex service is assessed, it is more likely to find errors and mistakes. As a consequence, it is difficult to talk about a "level of accessibility" that allows valid comparisons to be made.

5.2.1.1 Web accessibility implementation

Low levels of compliance. The results of the web accessibility assessments are consistent with previous studies showing that there is still much progress needed across the Member States to ensure the levels of accessibility in accordance with the WCAG guidelines. None of the 37 public service websites that were audited across the 7 countries currently complies fully with WCAG 2.0 AA requirements.

5.2.1.2 The extent and range of the accessibility problems found

Most frequent accessibility problems. In most of the websites assessed no evidence of systematic problems were found. Instead specific, repeated mistakes and isolated errors were identified. These errors in most instances could have been fixed – or at least discovered - if an accessibility test had been conducted during website development or subsequent to the website being developed.

In some cases, the informational part of the website has a high level of accessibility, but problems occur in relation to online services (mainly transactional services).

Older development techniques cause problems. About 10-15 % of the tested services seem to be developed using older techniques and they also generally have more problems. These are services that would need to be rebuilt entirely for a cost-efficient solution.

Complexity of language and instructions. Although not specifically within the scope of the web accessibility assessment portion of the study, a large number of the websites reviewed were observed to contain overly bureaucratic language and complex sets of instructions. These issues may in many cases result from the complexity of the service itself. However in most cases it may be possible to make the language and processes easier to understand.

Multimedia related problems. Videos have an important role in assisting end users to understand a piece of complex information or to use an online service. The videos assessed were found to lack critical accessibility features such as subtitling. Video content was also often found to be presented in isolation on a page, without any reference to other pages containing related information.

Documents related problems. Documents are often less accessible than the HTML sites. This is problematic in many ways, not least because PDFs are widely used in public sector websites. Website managers should require the same level of accessibility in documents as in HTML.

5.2.2 Key results at organisational level

5.2.2.1 General web accessibility perception

WCAG 2.0 as a standard. The majority of organisations interviewed referred to WCAG guidelines as being the basis of their accessibility policy.

Accessibility is seen as a legal requirement. In many cases, organisational web accessibility policies seem to be driven by a perceived duty to comply with relevant policies or laws rather than a more strategic perspective towards providing meaningful web accessibility for users. The focus of accessibility efforts thus seems to be on technically complying with standards and guidelines referenced in relevant policies or legislation rather than on optimising and improving user experience. This indicates a need for raising awareness of the importance of accessibility for users with disabilities and older people and universal design related concepts.

Main barriers. A number of structural and management barriers constrain web managers from taking a more strategic and structured approach towards web accessibility in their day- to-day operations. These include **resource restrictions** and the need to balance accessibility requirements with other organisational requirements, deficits in keeping awareness and knowledge at the required levels over time, the lack of tools to support staff in achieving and maintaining accessible websites on an ongoing basis, decentralised or ad-hoc generation of content, and management of the production of content by external content providers.

5.2.2.2 Management and monitoring of web accessibility

Strategic approach. There is considerable variability in terms of the accessibility elements that are emphasised and how they are usually addressed in practice, although the current tendency for most website managers is to work towards WCAG guidelines in one way or another. Accessibility is rarely considered under a strategic perspective, e.g. considering that accessibility measures can also improve usability or overall quality of a given online service for wider user groups.

Resources. Resource restrictions, particularly in view of austerity policies, which have been pursued in recent times, require prioritisation of organisational efforts, with the result that accessibility is in competition with other organisational priorities. In addition, concerns were sometimes mentioned in relation to specific aspects of accessibility, such as when large volumes of legacy content (e.g. PDF documents) are required to be made fully accessible.

Control measures. The lack of systematic monitoring, third party testing or other ways of controlling and supervising accessibility degrades the level of accessibility of a website over time. Some awareness is in place, but clear

requirements, testing procedures and consistent monitoring have not received sufficient focus to date.

Actual monitoring. Regular and systematic monitoring of the levels of accessibility of public websites, either internally or by external parties, was not commonly reported by the web managers in the three countries where interviews were performed.

5.2.2.3 Public procurement of accessible resources

Specification of accessibility requirements. Most web managers reported that their procurement policies included requirements on the accessibility of websites. The level of specificity of these requirements varied somewhat, but most referred to WCAG standards. Procurement policies do not tend to include provisions in relation to systematically monitoring or controlling whether accessibility requirements have actually been met at the end of the procurement process. In addition there appears to be little in-house competence available to monitor whether accessibility requirements have been met. In fact, there was little evidence of accessibility testing being undertaken on a regular basis.

5.2.2.4 Knowledge and competence aspects

Lack of competence. Sufficient competency to ensuring meaningful accessibility for users beyond fulfilling a set of technical specifications is very important, both to website managers of public services and also to external suppliers of web contents and applications.

The need for accessibility procedures. Usually, accessibility related activities are pursued in a relatively unstructured manner rather than according to systematically specified workflow processes or management procedures. In reality, a variety of parties are typically involved in setting up and maintaining public online services. These include technical and non-technical staff (e.g. procurement experts and web developers) as well as external contractors. Also, a variety of activities may need to be effectively coordinated if accessibility related efforts are to yield sustainable outcomes (e.g. conceptual work, development work, content generation, validation/quality control and capacity building).

5.2.2.5 Cost and benefits of web accessibility

Degree of effort needed. The extent and mix of accessibility problems across the websites and therefore the effort that might be required for achieving full compliance varies considerably. Three categories of websites can be identified in this respect. These include a group of online services where retrofitting of accessibility into the existing web presence is not recommended, form submission processes are not accessible and rebuilding the website from scratch would be required. There is another group where some accessibility efforts have already been made and further improvements could be achieved if moderate

efforts were made. Finally, there is a group of websites that could achieve full compliance with relatively minor efforts.

It is noteworthy that manual form submission processes are much less efficient for the organisation than fully online services. Considerations by public bodies on moving to an online service should take into account the Return on Investment in terms of efficiency gains to be achieved. In general public sector bodies need to consider any investment required to ensure compliance with the accessibility standard in the context of other efficiency gains that potentially can be achieved.

Accessibility costs are not perceived as a barrier. The results from the interviews with web managers are in line with other studies, which have found that public sector web services are not especially cost conscious in relation to their accessibility activities. They typically consider that addressing web accessibility is part of their public duty and tend not to identify or try to track specific costs that might be attributed to accessibility-related work. Costs were not typically identified as being especially large or large enough to constitute a major barrier. Addressing accessibility from the beginning was seen as helping to keep costs to a minimum. The availability of nationally developed support tools (in Germany) was also reported to help keep costs to a relatively low level.

6 Annex 1: Methodology for testing services

This section describes how we have chosen the relevant service in each country.

6.1 Income taxes

6.1.1 Rationale

High percentage of citizens pay taxes

6.1.2 Identification of website

If the service is available at the national level, this website was chosen
If the service is not available at the national level but on the regional level, this websitewas not chosen of the largest region in the country measured in terms of inhabitants.
If the service is neither available on the national level nor on the regional level but on the municipal level, this website was chosen of the largest municipality in the country measured in terms of inhabitants.

6.1.3 Identification of the starting URL

The URL was selected the 1st web page where the personal income tax theme is addressed from the perspective of the citizen (not other parties such as tax consultants) on the website (or portal) managed by authority/body providing the service.

6.2 Job search services by labour offices

We have selected the job seeker support services provided by public employment service

6.2.1 Rationale

People with disabilities, unemployed to a greater extent than the overall population.

6.2.2 Identification of website

If the service is available at the national level, the websitewas chosen through which it can be accessed nation-wide
If the service is not available at the national level but on the regional level, the websitewas not chosen through which it can be accessed by the citizens of the largest region in the country measured in terms of inhabitants.
If the service is neither available on the national level nor on the regional level but on the municipal level, the websitewas chosen through which it can be

accessed by the citizens of the largest municipality in the country measured in terms of inhabitants.

6.2.3 Identification of the starting URL

The URL was selected the 1st web page where the job seeker support theme is addressed from the perspective of the job seeker (not an enterprise searching for staff) on the website (or portal) managed by authority/body providing the service.

6.3 Social-security benefits

Support of citizens regarding publicly paid unemployment benefits was selected.

Rationale

For the same reason as job seeking service above, this is important from a disability perspective.

6.3.1 Identification of website

If the service is available at the national level,the website through which it can be accessed nation-wide was chosen

If the service is not available at the national level but on the regional level, the website through which it can be accessed by the citizens of the largest region in the country measured in terms of inhabitants was chosen.

If the service is neither available on the national level nor on the regional level but on the municipal level, the website through which it can be accessed by the citizens of the largest municipality in the country measured in terms of inhabitants was chosen.

6.3.2 Identification of the starting URL

The URL of the 1st web page was selected where the unemployment benefits theme is addressed from the perspective of the unemployed person / employee (not the employer) on the website (or portal) managed by authority/body providing the service.

6.4 Public libraries, e.g. catalogues and search tools

6.4.1 Rationale

Usually, studies of accessibility are about assistive technology, funding, benefits and things like this. These themes are of course of great importance, but from a disability perspective, rights to culture is as important a democratic right as paying taxes.

6.4.2 Identification of website

The website of the public library within the largest population area in each country (if applicable the largest municipality measured in terms of inhabitants) was chosen.

6.4.3 Identification of the starting URL

The URL of the website was chosen.

6.5 Enrolment in higher education or university

Publicly financed support for higher education students was selected, since enrolment works so differently in different countries.

6.5.1 Rationale

In many countries, it is still difficult for persons with disabilities to study at the university. Since assistive technology have made higher education increasingly possible for many groups, the percentage of students with disabilities has risen significantly. Also, higher education is often a way to get employment. Therefore, this is important from a disability perspective.

6.5.2 Identification of website

If the service is available at the national level, the website was chosen
If the service is not available at the national level but on the regional level, the website was chosen of the largest region in the country measured in terms of inhabitants.
If the service is neither available on the national level nor on the regional level but on the municipal level the website of the largest municipality in the country measured in terms of inhabitants was chosen.

6.5.3 Identification of the starting URL

The URL was selected the 1st web page where publicly financed benefits for higher education students are addressed on the website (or portal) managed by authority/body providing the service.

6.6 Health-related services

This is the most complicated service to identify because it is organised very differently in each country. For individual services like appointment booking, the user needs to identify herself. Therefore we suggest the type of service that does exist in the countries we are studying and that does not require identification, namely a service including information and support in health related questions.

Rationale
Contact with health services is important for everyone, but since many persons with disabilities have a larger than average need for contact with health services, this is important from a disability perspective.

6.6.1 Identification of website
If the service is available at the national level, this website was chosen.
If the service is not available at the national level but on the regional level, this website was chosen of the largest region in the country measured in terms of inhabitants.
If the service is neither available on the national level nor on the regional level but on the municipal level, the websitewas chosen the largest municipality in the country measured in terms of inhabitants.

6.6.2 Identification of the starting URL
The URL was selected the 1st web page where health services are addressed on the website (or portal) managed by authority/body providing the service.

7 Annex 2: Tests performed

7.1 Navigation

Test 1: Multiple ways to locate a web page

WCAG 2.0 Success Criteria 2.4.5:

G161: Providing a search function to help users find content

The website should provide a search function that is clearly visible to the user. WCAG specifies that there should be multiple ways to locate a web page, and the two most important ways for users today is a menu and a search function.

Results:

2 points = Pass = If a search function is clearly visible on all pages. Except inside an e-service that is clearly outside the ordinary website (i.e. the ordinary menu is replaced or not displayed on the pages).
1 point = Marginal fail = If the search function itself is not visible, but there is a link to the search page on all other pages.
0 points = Fail = If one of the 4 pages we've checked doesn't seem to have either a search form or a link to a search form.

Test 2: Keyboard control

WCAG 2.0 Success Criteria 2.1.1 and Success Criteria 2.4.7:

G202: Ensuring keyboard control for all functionality
(F54: Failure of Success Criterion 2.1.1 due to using only pointing-device-specific event handlers (including gesture) for a function)
AND:
C15: Using CSS to change the presentation of a user interface component when it receives focus
(F78: Failure of Success Criterion 2.4.7 due to styling element outlines and borders in a way that removes or renders non-visible the visual focus indicator)
Because users with assistive technology do not use the mouse for input, it must be possible to reach all links and to control all functionality with a keyboard. It also needs to be visible clear where the focus is on the page.

Results:

2 points = Pass = If all links and objects can be reached with the tab key on the keyboard and it is visibly clear where the focus is on objects that are receiving focus. This do not includes any audio, video or synchronized media player on the pages. See test 10 for multimedia.
1 point = Marginal fail = If all objects can be reached except for level 2 in menus and lists that fold out/expands. If a user with the mouse can expand a menu without loading a new page, but a user navigating with a keyboard needs to load a new page to access level 2 of the menu this would be considered a marginal fail. **OR** if all objects can be reached but it in some cases is hard to see what object got focus.
0 points = Fail = If not all objects can be reached by keyboard control. **OR** if level 2 of a menu is different when expanded with a mouse or by a keyboard. For example, if a menu allows a user to expand level 2 by mouse over, and those links are different from, or presented in a different order, than the links shown on level 2 in the menu for a user that has loaded a new page by selecting the menu item on level 1. **OR** if it's very hard to see where the foucs is on several objects on the pages.

7.2 Documents

Test 3: The PDF document has correct headings

WCAG 2.0 Success Criteria 1.3.1:

PDF9: Providing headings by marking content with heading tags in PDF documents

Headings needs to be created correctly for assistive technology to be able to present the structure of the document to the user.

We try to find 3 different files to evaluate.

Results:

2 points = Pass = In at least 2 out of 3 different files: All visual headings on the first five pages containing visual headings, are created as correct headings in the document. That is, each visual heading should have a tag that has the role of heading (H1, H2, H3 and so on). Only 2 exceptions are allowed.
1 point = Marginal fail = In at least 2 out of 3 different files. At least 75 % of all visual headings on the first five pages containing visual headings are created as correct headings in the document.
0 points = Fail = Less than 75 % of all visual headings on the first five pages containing visual headings are created as correct headings in the document.

Test 4: Images are not used to present text in PDF documents

WCAG 2.0 Success Criteria 1.4.5:

G140: Separating information and structure from presentation to enable different presentations and
PDF7: Performing OCR on a scanned PDF document to provide actual text

For assistive technology to be able to present the information to the user in a way that the user can perceive it is important that the text is pure text, not an image displaying text. Assistive technology cannot guess what text the image is trying to display.

Results:

2 points = Pass = If all text in the documents except for text in images where the text together with an illustration makes up the information (for example a chart or a logotype) is text that could be highlighted with the mouse.
1 point = Marginal fail = If most text in the documents except for text in images where the text together with an illustration makes up the information (for example a chart or a logotype) is text that could be highlighted with the mouse. If a document contains short texts that are images of text but that have alternative texts (for example a heading is an image but it includes an alternative text giving the same text as the image contains) it would be considered a marginal fail.
0 points = Fail = if the documents contains images of text without an alternative text that gives the same information.

7.3 Forms

Test 5: Error messages in connection to mandatory fields

WCAG 2.0 Success Criteria 3.3.3:
Situation A: If a mandatory field contains no information:

G83: Providing text descriptions to identify required fields that were not completed

A form with mandatory fields should give the user feedback if the user tries to post it without providing data in the mandatory field. This must render an error message that refers to the mandatory field that was not completed.

Results:

2 points= Pass = If the form contains at least one mandatory field and we receive an error message at the top of the form, identifying the form field by its

label and the form field itself is visually highlighted.
1 point= Marginal fail = If the form contains at least one mandatory field and we get a text error placed adjacent to the form field, but not at the top of the form or at the top of the form but not at each field.
0 points= Fail = if only a visual indicator shows what form field is not completed and no text information is given, **OR** if only one error at a time is presented to the user, **OR** if the form is submitted to the next step without any error messages.

Test 6: Using correct labels in forms

WCAG 2.0 Success Criteria 3.3.2:

H44: Using label elements to associate text labels with form controls and
H65: Using the title attribute to identify form controls when the label element cannot be used

Every form control needs a text explaining its function to the user. This needs to be done in a way that assistive technology can understand.

Results:

2 points= Pass = All form control except for buttons have a label correctly connected to the form object or there is a title-text on the form control.
1 point= Marginal fail = If most of the form controls except for buttons have a label correctly connected to the form object or there is a title-text on the form control, but there are 1-2 occurrences of form controls that doesn't have a label or a title-text but they got place holding texts.
0 points= Fail = If form controls lack both label and title-texts and there are no place holding texts, or there are more than 2 places where place holding texts are used instead of labels or title-texts.

7.4 Construction

Test 7: Using HTML/XHTML according to specification

WCAG 2.0 Success Criteria 4.1.1:

G134: Validating Web pages

The HTML/XHTML code should validate to the chosen standard. To assess this we use W3C Markup Validation Service (http://validator.w3.org/).

5 random pages are selected and evaluated.

Results:

2 points= Pass = The number of errors are not higher than 10 on any specific page and none of the errors below are occurring:

Wrong start- and end tags
Wrong nestling/order of elements
Double usage of same attribute within an element
Repeating same ID on any specific page

1 point= Marginal fail = One or more of the pages have more than 10 errors but no page has more than 50 errors and none of the specific errors mentioned above occur.
0 points= Fail = At least 1 page has more than 50 errors, or any one page has one of the following errors:

Wrong start- and end tags
Wrong nestling/order of elements
Double usage of same attribute within an element
Repeating same ID on any specific page

Test 8: Separating information and structure from presentation

WCAG 2.0 Success Criteria 1.4.5:

G140: Separating information and structure from presentation to enable different presentations

CSS should be used for layout and HTML should be used for content. This is checked by turning off style sheets and checking that layout and design disappears but information and structure remains.

Results:

2 points= Pass = If the layout and presentation disappears and all information can be accessed when the pages are viewed without style sheets.
1 point= Marginal fail = If all of the information can be accessed on the pages but some presentation elements occurs or some design images still remains when the pages are viewed without style sheets.
0 points= Fail = If some information can't be accessed or if the overall layout is still in place when the style sheets are turned off.

7.5 Multimedia

Test 9: Captioning of media

WCAG 2.0 Success Criteria 1.2.2:

G93: Providing open (always visible) captions and
G87: Providing closed captions
(F75: Failure of Success Criterion 1.2.2 by providing synchronized media without captions when the synchronized media presents more information than is presented on the page)

Synchronized media should have captions.

Results:

2 points= Pass = If the media got captioning.
1 point= Marginal fail = If the media doesn't have captions but the page with the media have a text link placed in direct adjacent to the media leading to a page with information on the same topic as the film, or the page itself contain a substantial text on the same topic.
0 points= Fail = If the media doesn't have caption and if the page clearly doesn't have enough text information to give the same meaning as the media and there is no text link in direct adjacent to the media.

Test 10: Keyboard control in the video player

WCAG 2.0 Success Criteria 2.1.1 and Success Criteria 2.4.7:

G202: Ensuring keyboard control for all functionality
(F54: Failure of Success Criterion 2.1.1 due to using only pointing-device-specific event handlers (including gesture) for a function)
AND:
C15: Using CSS to change the presentation of a user interface component when it receives focus
(F78: Failure of Success Criterion 2.4.7 due to styling element outlines and borders in a way that removes or renders non-visible the visual focus indicator)

It must be possible to reach all links and to control all functionality with a keyboard, including starting and stopping synchronized media. It also needs to be visible clear where the focus is on the page.

Results:

2 points = Pass = If it's possible to start, stop and reach most other functionality in the video player with the keyboard.
1 point = Marginal fail = If it's possible to start and stop the video but not to

reach any other functionality with the keyboard.
0 points = Fail = if it's not possible to start and stop the video.

8 Annex 3: List of tested pages by country

Country	Website	URL
Germany	Support of citizens re personal income tax	https://www.elster.de/index.php
Germany	Job seeker support services provided by public employment service	http://www.arbeitsagentur.de/nn_25266/Navigation/zentral/Buerger/Arbeit/Arbeitssuche/Arbeitssuche-Nav.html
Germany	Support of citizens re publicly paid unemployment benefits	http://www.arbeitsagentur.de/nn_25650/Navigation/zentral/Buerger/Arbeitslos/Alg/Alg-Nav.html
Germany	Public libraries	https://www.voebb.de/aDISWeb/app?service=direct/0/Home/$DirectLink&sp=Svb.srz.lit.verwalt-berlin.de%3A4103
Germany	Publicly financed support for higher education students	http://www.das-neue-bafoeg.de/de/372.php
Germany	Health-related services	http://www.informedhealthonline.org/informed-health-online.2.en.html
		-
Greece	Support of citizens re personal income tax	http://www.gsis.gr/
Greece	Job seeker support services provided by public employment service	http://www.oaed.gr/
Greece	Support of citizens re publicly paid unemployment benefits	http://www.oaed.gr/
Greece	Public libraries	www.nlg.gr/

Country	Website	URL
Greece	Publicly financed support for higher education students	N/A
		-
Ireland	Support of citizens re personal income tax	http://www.revenue.ie/en/personal/index.html
Ireland	Job seeker support services provided by public employment service	http://www.fas.ie/en/Job+Seeker/Home/default.htm
Ireland	Support of citizens re publicly paid unemployment benefits	http://www.welfare.ie/EN/Schemes/JobseekerSupports/JobseekersBenefit/Pages/jb.aspx
Ireland	Public libraries	http://www.dublincity.ie/RecreationandCulture/libraries/Pages/DublinCityLibrary.aspx
Ireland	Publicly financed support for higher education students	http://www.studentfinance.ie/
Ireland	Health-related services	http://www.hse.ie/eng/services/healthpromotion/
		-
Lithuania	Support of citizens re personal income tax	http://www.vmi.lt/lt/?itemId=20516
Lithuania	Job seeker support services provided by public employment service	http://www.ldb.lt/INFORMACIJA/PATARIMAIIESKANTIEMSDARBO/Puslapiai/nedarbo_ismoka.aspx
Lithuania	Support of citizens re publicly paid unemployment benefits	http://www.ldb.lt/Informacija/PaslaugosAsmenims/Puslapiai/default.aspx
Lithuania	Public libraries	http://www2.lnb.lt/lt/
Lithuania	Publicly financed support for higher	www.vsf.lt

Country	Website	URL
	education students	
		-
Spain	Support of citizens re personal income tax	http://www.agenciatributaria.es/AEAT.internet/Inicio.shtml
Spain	Job seeker support services provided by public employment service	http://www.sepe.es/
Spain	Support of citizens re publicly paid unemployment benefits	http://www.sepe.es/contenido/prestaciones/index.html
Spain	Public libraries	http://www.bne.es/es/Inicio/index.html
Spain	Publicly financed support for higher education students	http://www.educacion.gob.es/educacion/becas-y-ayudas.html
		-
Sweden	Support of citizens re personal income tax	http://www.skatteverket.se/privat/deklarera2013.4.2b543913a42158acf800013508.html
Sweden	Job seeker support services provided by public employment service	http://www.arbetsformedlingen.se/For-arbetssokande.html
Sweden	Support of citizens re publicly paid unemployment benefits	http://www.forsakringskassan.se/privatpers/arbetssokande
Sweden	Public libraries	https://biblioteket.stockholm.se/
Sweden	Publicly financed support for higher education students	http://www.csn.se/
Sweden	Health-related services	http://www.1177.se/
		-

Country	Website	URL
United Kingdom	Support of citizens re personal income tax	http://www.hmrc.gov.uk/
United Kingdom	Job seeker support services provided by public employment service	http://www.direct.gov.uk/en/Employment/index.htm
United Kingdom	Support of citizens re publicly paid unemployment benefits	http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/documents/digitalasset/dg_200090.html
United Kingdom	Public libraries	http://www.direct.gov.uk/en/homeandcommunity/yourlocalcouncilandcounciltax/yourcommunity/dg_4018790
United Kingdom	Publicly financed support for higher education students	http://www.direct.gov.uk/en/educationandlearning/adultlearning/financialhelpforadultlearners/dg_10033132

9 Annex 4: Accessibility study interview protocol

9.1 Section 1: Background information

In this section I would like to obtain some background about your organisation, your website and the work that you and your organisation do in relation to web accessibility.

Question	Instructions for interviewer
Organisation:	
Date of interview:	
Website address:	Clarify whether this is the same as the site that was tested by Funka Nu. It should be, but if the interviewee is referring to more than one website, or a larger site than the one tested, make a note of which sites they are talking about.
Name:	
What is your Job Title:	
We understand that your organisation has been involved in addressing accessibility issues of the website of your organisation - is that correct? What is your role with regard to this website?	Yes/No We aim here to confirm the involvement of the organisation in accessibility issues and to see what the role of the interviewee is in relation to efforts in the area.

9.2 Section 2: The organisation and nature of web accessibility activities

Here we would like to explore how your organisational web accessibility efforts and actions are organised in terms of who is involved, what are their roles and what policy elements you use to promote accessibility. Accessibility activities may have been going on for a long period – here we are interested only in actions that have taken place relatively recently, i.e. in the past 4 or 5 years.

Question	Instructions for interviewer
Does your organisation have a formal or informal policy on web accessibility?	If so, please describe it in terms of its nature (e.g. guidelines, legislation based), its scope, what elements of accessibility it refers to and so on. Does this involve applying WCAG guidelines? (If so, how/which ones) Does this policy relate to procurement?
Why has your organisation been involved in undertaking web accessibility measures? What are the **main reasons**	For example: Internal policy (what kinds of policy), Pressure from external groups Quality management principles, etc is it required by legislation ? is it felt to be a public duty more generally, albeit it may not necessarily be required by law? is it due to more strategic considerations, e.g. as part of a corporate social responsibility strategy.
What activities are undertaken by your organisation in relation to web accessibility?	We aim to obtain information on specific activities here that are carried out by own staff such as: Development/design work Generation of content Training of staff Involvement of end users in development / testing Conducting specific accessibility audits, tests or monitoring procedures (either on a regular basis or as once-off activities) Procurement of specific software or devices applying guidelines to website developments making website changes as a result of assessments/audits and so on. Other
Does your organisation use	If so, what kind of companies are they? For

external contractors in relation to accessibility?	example, general ICT or web developer companies, specialists in web accessibility, others. What are their specific roles? ? Are they for instance involved in the following activities: Development/design work Generation of content Training of staff Involvement of end users in development / testing Conduction of specific accessibility audits, tests or monitoring procedures (either on a regular basis or as once-off activities) Other .
Have you ever experienced any major problems in organising or conducting web accessibility activities	For example, lack of support/awareness internal to your organisation, budget/resource restrictions, unavailability of knowledge/expertise, other issues

9.3 Section 3: Specific web accessibility elements

As part of this study and other studies on website accessibility conducted for the EU, a picture has been emerging about the current situation overall as well as about the extent of variability across websites in terms of whether and/or how well specific accessibility themes are being given attention. There are some aspects of accessibility that seem to vary particularly widely in this regard, and sometimes are not addressed very much at all even if they are part of the WCAG guidelines. We are trying to get some better insight in why this might be the case, and would like to explore a little with you some of these specific themes. You may not be in a position to have some of the relevant information/insight into some of these issues, and, if so, if you could refer us to a colleague who may have the information, that would be very helpful

Question	**Instructions for interviewer**
Navigation (here we are thinking about such issues as alternative navigation (search functionality,	If you did address this issue: What was your experience of dealing with it? Was it straightforward or were

website index, A-Z listings or similar) and keyboard control of navigation: Have you addressed this theme in your accessibility efforts?	there any problems/ difficulties? If you did not address the issue: Why not? (e.g. had not thought about it, not included in the scope of your current accessibility targets, not a priority, don't have the skills to address this, too much cost/effort, etc.) **Additional back ground info for the interviewer:** Do they see search as accessibility/they spend a large amount on search/they do not know how their search works. Is it internal as part of CMS or bought as third party functionality? Keyboard navigation is interesting because it is mostly hidden, because of the assumption that accessibility is only about blind users. So while it can be possible to control navigation with a screen reader, it can also be difficult for everyone else that uses the keyboard or virtual keyboard or other input device to control the computer. Also, the sighted user groups are larger than the blind ones.
Document formats: Here we are thinking about such issues as ensuring that PDF documents are treated the same way as html, making it possible to zoom and navigate with AT for example: Have you addressed this theme in your accessibility efforts?	If you did address this issue: What was your experience of dealing with it? Was it straightforward or were there any problems/ difficulties? If you did not address the issue: Why not? (e.g. had not thought about it, not included in the scope of your current accessibility targets, not a priority, don't

	have the skills to address this, too much cost/effort, etc.) **Additional information for the interviewer:** Do they make PDFs themselves or get them from a system or a supplier? How do they ensure they are accessible? How is this addressed/specified in policy/law?
Forms: Here we are thinking about such issues as using correct labels in forms (e.g. so that AT users can use them) and having error messages in connection to mandatory fields - (important for all users, but especially people with cognitive, reading and writing problems, users that are not so confident and so on): Have you addressed this theme in your accessibility efforts?	If you did address this issue: What was your experience of dealing with it? Was it straightforward or were there any problems/ difficulties? If you did not address the issue: Why not? (e.g. had not thought about it, not included in the scope of your current accessibility targets, not a priority, don't have the skills to address this, too much cost/effort, etc.) **Additional information for the interviewer:** Do they make forms themselves (coding) or get them from the CMS or other system or procure them from a supplier? How do they ensure they are accessible? How is this addressed/specified in policy/law? Error messages can be both content (internal) and system (procured). Do they address error messages (might be a non-accessibility issue), do they have a process for creating them or do they leave it to the supplier to produce them? Do they test them? (internally or with real users)

Technical construction of the website: Here we are thinking about such issues as using HTML/XHTML according to their specifications and separating information from presentation. Have you addressed this theme in your accessibility efforts?	If you did address this issue: What was your experience of dealing with it? Was it straightforward or were there any problems/ difficulties? If you did not address the issue: Why not? (e.g. had not thought about it, not included in the scope of your current accessibility targets, not a priority, don't have the skills to address this, too much cost/effort, etc.) **Additional information for the interviewer:** Do they follow a HTML-standard at all and – if so - how do they ensure this is met.
Multimedia content: Here we are thinking about such issues as captioning of media and making media accessible to people who rely on keyboard access. Have you addressed this theme in your accessibility efforts?	If you did address this issue: What was your experience of dealing with it? Was it straightforward or were there any problems/ difficulties? If you did not address the issue: Why not? (e.g. had not thought about it, not included in the scope of your current accessibility targets, not a priority, don't have the skills to address this, too much cost/effort, etc.) **Additional information for the interviewer:** What is Interesting here is do they see multimedia as an accessibility issue (we think it is), and whether they think at all of making it accessible for people with hearing difficulties (we are not testing for audio description, only captioning). Be

	aware that video doesn't have to be captioned, if the content is provided in text somewhere close to the video. Of interest also is if they think or know that it is expensive to do captioning.

9.4 Section 4: The experiences and outcomes of the accessibility activity

We would like to explore with you what has happened as a result of addressing web accessibility. Here we are concerned not just with the website, but the entire service of which the website is a part. We are interested in both direct and/or indirect outcomes, positive and/or negative (whether intended or unintended)

Question	**Instructions for interviewer**
What have been the benefits in terms of accessibility associated benefits for people with disabilities as a result of your actions in the area?	The aim of this question is to identify the kinds of results that have occurred because of the efforts addressing accessibility. These may have been direct results, e.g. accessibility improvements, improvements in service usage by specific target groups and so on, or they may have been more indirect, for example, overall service quality may have improved. There may also have been negative results. Specific benefits might include: Improved usability for all users, not just users with disabilities better accessibility of the web presence by users of mobile devices such as smart phones lower effort required for maintaining the web presence and updating content better findability by search engines
Are the outcomes of your accessibility related efforts consistent with meeting your initial objectives ?	This question aims to identify what the objectives of accessibility actions have been as well as the extent to which they have been met. For instance policy objectives, taking advantage of available functionalities, meeting specific request from users/clients trying to address the accessibility of the website, mainly to improve the quality of the

	website
Have these outcomes been measured in any way?	We are interested in finding out how these outcomes were measured – is it a system that was specifically set up for the accessibility project, is it part of ongoing monitoring. We also want to know how the outcomes are measured.

9.5 Section 5: Effort estimations for accessibility activities

Here we would like to ask some questions that deal with the issue of how much resources are spent on web accessibility. Resources here can mean staff time and/or money.

Question	**Instructions for interviewer**
What do you think are the main areas of effort in relation to web accessibility activities?	The aim here is to define the main types of costs that may occur. Here we are interested in the efforts spent on web accessibility in particular rather than developing /maintaining the web presence more generally For example, areas where particular accessibility related efforts may occur could include: Hardware Software licenses External contractors Staff costs Training of staff The interviewee should also be asked about where the main efforts in relation to accessibility take place in relation to the development cycle: Conceptual planning of the web presence and development of an information structure Definition of particular functionalities such as search facilities, fold out menus, responsive design frameworks and the like

	Front end design / lay out Back-end development such as accessibility of back-end interfaces, supporting generation of accessible content and the like
Is it possible to quantify the efforts spent on web accessibility in particular, e.g. in terms of staff time that has been put into addressing web accessibility or any other costs associated with making the web presence accessible to users with disabilities in particular?	Here we are interested in quantifying the efforts spent on web accessibility in particular when compared with effort spent on developing /maintaining the web presence more generally. This could be expressed in terms of manpower effort, costs in monetary terms or perhaps a percentage of a project cost. Clarify the time frame, are these annual amounts of staff effort/costs etc.
Is there a web accessibility budget in your organisation?	Try to find out what percentage this budget is of the overall web budget
In addressing web accessibility issues, could you estimate (roughly) what level of effort was needed from the following people? Web manager/strategic planner Web developer Web designer Content providers Others	The aim here is to try to characterise the efforts of all parties involved and the likely type of work that these roles undertake. (Web managers refer to the role of policy and management of the website, rather than a technical role)

9.6 Section 6: Approaches to monitoring and reporting

We would like to obtain your opinion on the issue of monitoring and reporting of compliance with web accessibility standards. The EU Commission have made a proposal to introduce a Directive on the accessibility of public sector bodies' websites, including a possible common monitoring approach to be applied across the EU. In the context of this proposed Directive, we would particularly value your opinion on what might be appropriate methods of monitoring and reporting on web accessibility.

Question	Instructions for interviewer
In the context of the proposed Directive, how useful (or problematic) would a common EU-wide approach to monitoring of web accessibility to you in your work? What do you think would be appropriate methods of monitoring web accessibility for such a common EU-wide approach?	Proposed directive on the accessibility of public sector bodies' websites
From your perspective in your own organisation, how could monitoring of web accessibility be improved to make it more useful to you in your work?	

10 Annex 5: The public sector organisations interviewed

6 public sector organisations in each of Ireland, Sweden and Germany were approached to take part in the study. The target organisations were drawn from the following services and the numbers of interviews that were achieved can be seen in the following Table:

Service	Germany	Ireland	Sweden	Total
Health related services		X	X	2
Income taxes		X		1
Job search by labour offices	X	X		2
Social security benefits		X	X	2
Public libraries	X	X	X	3
Enrolment for Financial support for third level education			X	1
Railway	X			1
Multiple public services	X			1

The first 6 of these services related to the target services originally set out in the proposal. However the additional two services interviewed in Germany came from a Federal Agency with responsibility for accessibility in multiple areas of Government and so can be taken to cover multiple areas of interest, while the final service (Railways) was suggested by this Federal agency.

It should be noted there were 18 interviewees from the 13 website manager organisations. In Ireland there was a total of 10 interviewees from within the 5 participating organisations.

Údarás Náisiúnta Míchumais
National Disability Authority

Centre for Excellence in Universal Design
National Disability Authority
25 Clyde Road, Dublin 4
Telephone (01) 608 0400
Fax (01) 660 9935
www.nda.ie

Universal Design is the design of a building or place, products, services or information / communication technologies so that they can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.