National Technical Guidelines on E-Accessibility for the Arab Region

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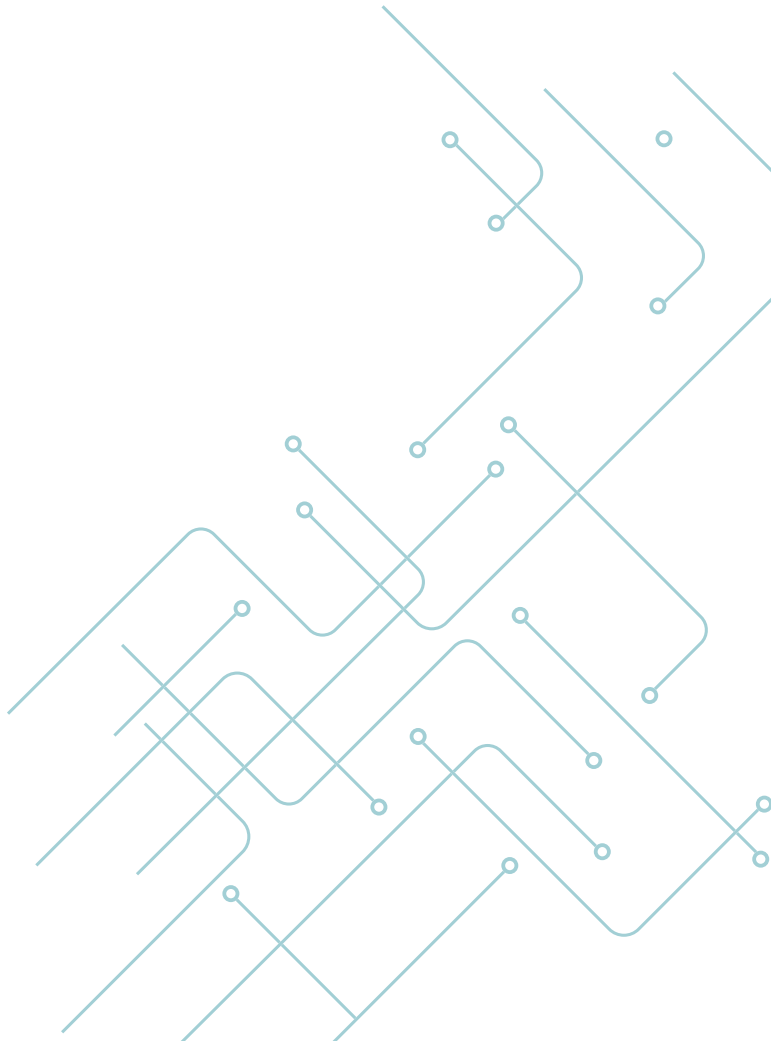
Economic and Social Commission for Western Asia

National Technical Guidelines on E-Accessibility for the Arab Region



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Key Messages

Arab policymakers

are encouraged to **adopt technical guidelines** for digital accessibility to allow all individuals to access ICT tools, services and applications efficiently.

Templates for digital accessibility

were suggested to cover **web accessibility**, **mobile accessibility** and **ICT procurement** of accessible devices.

A template for **basic digital accessibility**

is suggested **to** provide to countries the **minimum requirements** when developing **web sites**, **ICT services** and **apps**.

Executive summary

International programmes for the inclusion of persons with disabilities have resulted in significant achievements under the 2030 Agenda for Sustainable Development, the Convention on the Rights of Persons with Disabilities (CRPD), and the Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled. This momentum is driven by advancements in information and communications technology (ICT), which is taking a leading role in finding creative solutions to integrate marginalized groups and provide fair access to information for persons with disabilities. However, social and economic inequalities in many parts of the world, including the Arab region, are adversely impacting the inclusion of persons with disabilities, despite technological advancements in many of these countries. In addition, political unrest and armed conflict in some Arab countries, including Iraq, Libya, the Syrian Arab Republic, and Yemen, and economic challenged in countries such as Egypt, Jordan and Lebanon, negatively affect the circumstances of people with disabilities.

To address shortfalls in including persons with disabilities in the Arab region, the present report was developed as part of the Arab Digital Inclusion Platform (ADIP) of the Economic and Social Commission for Western Asia (ESCWA) to support policymakers in developing or improving national technical guidelines on e-accessibility. Based on sound and practical international standards, the present report proposes a wide range of guidelines to improve the lives of persons with disabilities.

The present report provides an overview of the status of e-accessibility at the global level in view of CRPD and the 2030 Agenda, and assesses the work of various countries in promoting e-accessibility and digital inclusion of persons with disabilities. It also provides country rankings in terms of their commitment to international agreements on involving people with disability in public life without discrimination, and harnessing technology to integrate them in society. In addition, it reviews the achievements made by the European Union at the legislative level, and the implementation of international principles and guidelines.

The 2019 European Accessibility Act is a major achievement in making Europe an accessible place for persons with disabilities by enforcing the implementation of e-accessibility requirements in all e-services and digital platforms. With a focus on government websites, e-books and e-commerce websites, the requirements cover a range of products, including regular general-purpose computers and popular technologies such as smartphones, smart televisions, IP televisions, and e-readers. For example, by 2021, all mobile applications in European Union countries must comply with the Web Content Accessibility Guidelines (WCAG) 2.0. The present report also identifies the main international technical standards and guidelines for enhancing access by persons with disabilities to ICT devices, services, websites, and tools.

The present report then examines the commitment and current status of digital accessibility in the

Arab region, and efforts by member States to include persons with disabilities. Although all Arab countries are signatories to CRPD, some countries have not ratified the convention or the optional protocol. However, all Arab countries have a responsible governmental organization that oversees the progress of issues related to persons with disabilities, either through social development ministries or independent councils. Overall, Arab countries have similar challenges and opportunities for e-accessibility, with minor differences at the local level. However, absence of reliable data and accurate statistics on disability make it difficult to objectively evaluate disability, and hinder many opportunities for assistance from international, non-governmental and local institutions. Nevertheless, the legislative commitment of Arab Governments to the overall issue of disability is seen by many as an enabler to promote digital accessibility. Other positive indicators, such as high Internet penetration rates and smartphone use among young people, who are often educated and passionate about technology, promote the role of ICT in e-accessibility.

The present report concludes with technical guideline templates on e-accessibility adoption in the Arab region. The templates cover web accessibility, mobile accessibility and public service terminals accessibility. All templates are based on the latest international standards and guidelines. In addition, a minimal requirement template is provided for countries or organizations that prefer to not adopt the implementation and compliance process.

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Abbreviations and Acronyms

ADIP	Arab Digital Inclusion Platform
AI	Artificial intelligence
ATAG	Authoring Tool Accessibility Guidelines
ATM	Automated teller machine
CEUD	Centre for Excellence in Universal Design
CRPD	Convention on the Rights of Persons with Disabilities
ESCWA	Economic and Social Commission for Western Asia
G3ict	Global Initiative for Inclusive ICTs
GCC	Gulf Cooperation Council
GUI	Graphical User Interface
HTML	HyperText Markup Language
ICT	Information and Communications Technology
IDI	ICT Development Index
IEC	International Electrotechnical Commission
IO	Input/Output
IOS	iPhone Operation System
IP	Internet Protocol
ISO	International Organization for Standardization
IT	Information Technology
ITU	International Telecommunication Union
MENA	Middle East and North Africa
PDF	Portable Document Format
POUR	Perceivability, Operability, Understandability, and Robustness
SDG	Sustainable Development Goal
UAAG	User Agent Accessibility Guidelines
W3C	World Wide Web Consortium
WAI	Web Accessibility Initiative
WCAG	Web Content Accessibility Guidelines
WIPO	World Intellectual Property Organization

Introduction

Arab countries were among the first to sign and ratify the Convention on the Rights of Persons with Disabilities (CRPD). The implementation of these rights as part of a sustainable transformative disability inclusion is supported by the United Nations Disability Inclusion Strategy, which aims to achieve the Sustainable Development Goals (SDGs). According to the World Health Organization,[1] 1 billion people live with some form of disability, with almost 60 million in Arab countries. Consequently, the United Nations has launched many initiatives to promote the inclusion of persons with disabilities through information and communications technology (ICT).

Article 9 of CRPD clearly requires countries to enable persons with disabilities to live independently and participate fully in all aspects of life. It stipulates that States parties should take appropriate measures to ensure access for persons with disabilities, on an equal basis with others, to the physical environment, to transport and ICT. Article 4 calls for the development of universally accepted standards and guidelines.

The present report offers templates for technical accessibility guidelines to assist Arab countries in providing equally accessible ICT services and applications for persons with disabilities, in accordance with international standards and best practices, to fulfil their commitments under CRPD.

This work complements a parallel project to develop a template for national policies on digital accessibility to enable policymakers to fulfil CRPD commitments. This would allow governmental and non-governmental organizations to work in a coherent and coordinated manner to accelerate the inclusion of persons with disabilities in society.

The first section of the present report reviews e-accessibility for persons with disabilities at the global level, and provides a number of international standards and guidelines and best practices adopted by various countries that have made significant efforts to include persons with disabilities using digital accessibility. The second part explores the status of e-accessibility in the Arab region, and highlights the challenges facing accessibility from the Arab point of view and opportunities to further advance the adoption of e-accessibility and the inclusion of persons with disabilities as a part of the digital transformation in the region. The report also showcases the status of e-accessibility in Oman and Qatar, which are ranked among the top countries worldwide in that regard.

The final section presents four e-accessibility guideline templates to help policymakers decide on the best level of compliance. The proposed templates offer gradual adoption options, beginning with the lowest acceptable recommendations. The templates are based on internationally approved and recognized standards and best practices. The standards are organized around four principles of e-content, known as POUR: perceivable, operable, understandable, and robust.

1.

E-accessibility at the global level

1. E-accessibility at the global level

Accessibility for persons with disabilities has received great attention worldwide, especially after the international adoption of CRPD. Many countries have introduced initiatives to spread awareness about the needs of this social group, to provide services and achieve the principles of inclusion, justice and equality. The diverse issues of digital accessibility have also received significant attention, driven by the technological revolution and the widespread use of the Internet. Advances in mobile communications and smartphones with a wide selection of programmes and applications have helped facilitate access to services and information. Some countries, such as the United States of America and the European Union, have played a leading role in consolidating many principles of equality and participation for persons with disabilities, at both the local and international levels. Other countries have taken concrete steps towards the adoption of e-accessibility and the inclusion of persons with disabilities as part of their digital transformation, while others are still lagging behind.

A. International initiatives

Digital accessibility is a priority in key global initiatives, such as the Disability Inclusion Strategy, CRPD, the 2030 Agenda and its SDGs, and the standards of the International Telecommunication Union (ITU). The 2030 Agenda includes disability issues in many of its Goals and targets, with a clear call for cooperative efforts in achieving the SDGs pertaining to persons with disabilities, in line with CRPD. The disability-related Goals are SDG1 on poverty, SDG2 on hunger, SDG4 on education, SDG5 on gender equality and the empowerment of women and girls with disabilities, SDG8 on decent work and economic growth and industry, and SDG9 on innovation and infrastructure, particularly access to ICT (target 9.c). The ITU Strategic Plan 2020-2023[2] calls upon all countries to create an accessible ICT environment for persons with disabilities by 2023. CRPD calls on all signatory countries and organizations to develop and implement laws and policies ensuring the rights of persons with disabilities. The fundamental issue of accessibility is clearly highlighted in article 9, stipulating the elimination of all barriers facing persons with disabilities, and equal and reasonable access to public facilities, services and ICT infrastructure.

General Assembly resolution 64/154[3] of 2009 requests the Secretary-General to continue the progressive implementation of standards and guidelines for the accessibility of facilities and services of the United Nations system. Since then, the Department of Global Communications has been promoting web accessibility within the United Nations system to ensure the inclusion of persons with disabilities. They dedicated a website[4] to guide designers in developing accessible webpages that are easy to navigate, with a simple layout. The site recommends simple and clear requirements based on Web Content Accessibility Guidelines (WCAG) regarding multilingual content, navigation, design, scripts, forms, and site validation.

B. Laws, guidelines, policies, and regulation

According to the 2016 CRPD ICT Accessibility Progress Report,[5] 93 per cent of participating countries do not involve organizations who work in the field of e-accessibility in the development of laws and policies. The report clearly shows a low average of general legal and regulatory compliance with CRPD ICT accessibility (42 per cent), a low average of implementation and impact (41 per cent) and a very low capacity for implementation (21 per cent). Furthermore, the report asserts that 69 per cent of countries have a general regulatory framework, while 27 per cent have policies that cover accessibility for specific ICT products or services. Similarly, 16 per cent of countries have clear policies to promote accessible and assistive technologies. Table 1 shows implementation levels of laws, regulations and policies related to accessibility in ICT and assistive technologies. The report confirms that most countries have partial implementation of laws or regulations regarding most disabilities. Notably, 69 per cent have public procurement policies for promoting accessible ICTs.

Table 1: Implementation level of laws, regulations and policies (percentage)

Existing laws, regulations and policies	Not implemented	Partially implemented	Fully implemented
Laws/policies supporting the participation of disability organizations in regulation development	34	63	2
Accessible ICT procurement policy	69	30	0
Existing services and policies for assistive technology (vision and hearing impaired)	32	66	1
Policies for assistive technology and services by type of disability (cognitive)	42	57	1
Existing services and policies for assistive technology (physical and mobility impairment)	33	65	1
Using braille or sign language in official public communications	53	46	0

Source: G3ict (2017). 2016 CRPD ICT Accessibility Progress Report. Available at https://g3ict.org/publication/2016-crpd-ict-accessibility-progress-report.

The report also indicates that 78 per cent of countries have a dedicated government body for persons with disabilities, but only 20 per cent of those institutions have findings to support digital accessibility.

The creation of WCAG in 2008 by the World Wide Web Consortium (W3C) is an important and direct result of CRPD. These guidelines have significantly influenced web accessibility and became a reference for other international standards, guidelines, policies, and regulations in the context of web accessibility for disabled persons. Despite some low indicators in many world regions, a United Nations report on accessibility[6] indicates that 64 per cent of countries in the Americas, 95 per cent in Europe, 48 per cent in Africa, and 71 per cent in Oceania have accessibility standards or guidelines. The report also claims that as a direct result of reluctance in adopting or enforcing sound standards or guidelines, 61 per cent of governmental websites are inaccessible.

C. Industry e-accessibility adoption

1. Web browsers accesibility

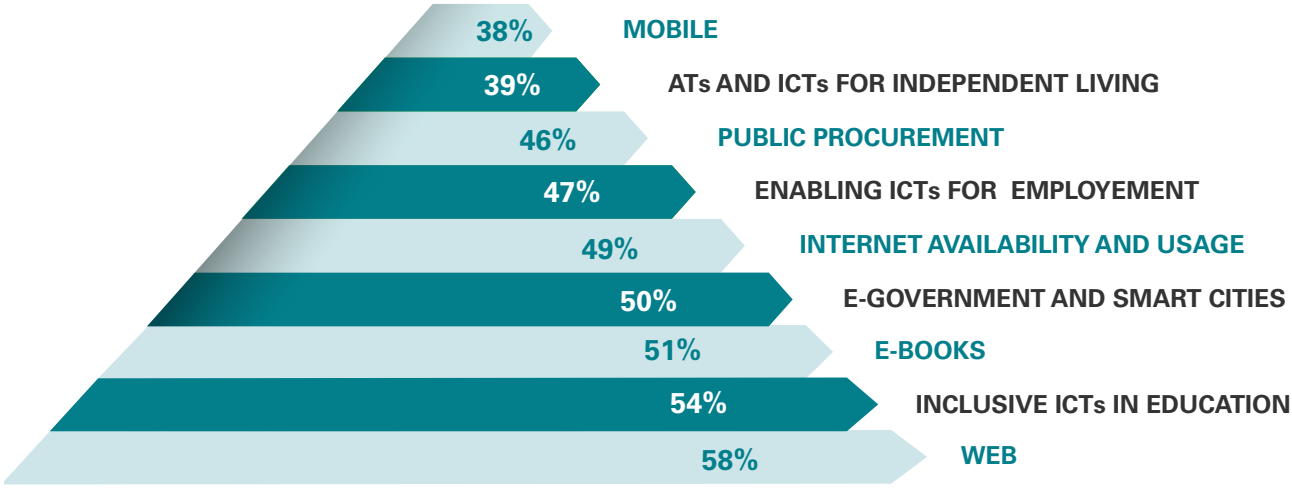
Universally accepted and leading web browsers such as Google Chrome, Microsoft Edge and Firefox have implemented accessibility features as part of their commitment to ensuing that the Internet is accessible to all. Their design of accessibility shortcuts, icons and other accessibility features are internationally accepted by people of different backgrounds. Many basic features are common among all browsers, including resizing text to accommodate the needs of users with partial vision impairment, colour adjustment, page zoom, keyboard navigation, and third-party accessibility extensions to help users with different impairments. All browsers have built-in screen readers in English only (for PDF also), and users need to install a multilingual text-to-speech feature. Many other features are readily available within the design of the browsers, which can be used to access and search old websites or those that do not include any accessibility features. These features serve people with different impairments and are designed in line with the most commonly required WCAG and UAAG guidelines.

2. Mobile phone accessibility

Mobile communication and smartphones are the most common means of accessing the Internet, including by persons with disabilities, for various reasons including design, interoperability and size. The most popular mobile operating systems (iOS and Android) have implemented more features for e-accessibility than web browsers, and are considered friendlier and more accessible. Smartphones using both operating systems include numerous important features for various disabilities. Users with vision impairment or no vision can enjoy hearing and vision support features, such as screen readers, translators, real-time transcripts, and live caption to navigate their phones. Additional features employ assistive technologies to help different disabilities, such as limited manipulation and mobility, limited language, cognitive and learning abilities, or any combination of multiple impairments. WCAG guidelines for web accessibility are easily mapped to mobile phones, since most interfaces are similar in terms of layout, colours, web pages, and mobile apps.

According to the latest G3ict report,[7] the percentages of implementation for various ICT accessibility areas show a low overall implementation of 49 per cent, but with promising trends mainly in web and accessibility in education. Figure 1 shows the global percentage of implementation and outcomes for the various ICT accessibility areas.

Figure 1: Global levels of implementation and outcomes of accessibility areas



Source: DARE Index 2020: Global Progress by CRPD States Parties.

D. International rankings

A 2018 report by G3ict[8] on countries' performance shows little progress in all terms of commitment and implementation, as shown in tables 2-5. Table 2 ranks the top 10 countries in terms of implementation outcome based on commitments, and compares their scores according to the recent 2020 Dare Index report.[9] Only two countries improved their overall score, namely, Qatar (89) and Italy (75.5). While Oman was ranked as the best performing country in 2018 with a score of 81, it dropped 15.5 points to 65.5, giving the top seat to another Arab country, namely, Qatar, with a 14-point score rise from 75 in 2018 to 89 in 2020. Surprisingly, all top-ranking countries showed a drop in their overall score. In contrast, implementation and outcome scores improved for most countries in the last two years. For example, the Russian Federation and South Africa improved their implementation score by 13 and 18 points, respectively. Only two countries scored less in 2020 than in 2018, namely, Oman and the United States. This clearly indicates a positive overall implementation level of necessary policies and accessibility regulations.

Table 2: Top 10 performing countries, 2018-2020

	2018		2020	
Country	Score/100	Implementation and outcome/50	Score/100	Implementation and outcome/50
Oman	81	31	65.5	23
Brazil	79	29	72	27
France	77	27	72.5	30
South Africa	76	10	75.5	28
Qatar	75	30	89	39

Country	2018 Score/100	2018 Implementation and outcome/50	2020 Score/100	2020 Implementation and outcome/50
United States	75	30	71.5	29
Italy	73	28	75.5	28
Russian Federation	73	13	61	26
United Kingdom	73	28	66.5	29
Kenya	72	16	70	25
Spain	72	27	62.5	25

Source: DARE index top performing countries. Available at https://g3ict.org/upload/DARE-Index-Top-Performing-Countries-Nov-5-2018.pdf and https://g3ict.org/upload/accessible_DARE-Index-2020-Top-Performing-Countries-ENGLISH-1.pdf.

Table 3 shows the top scoring countries with respect to their region, which clearly shows that Central and South Asian countries, with the exception of the Russian Federation, are way below world average. Notably, two Arab countries, Oman and Qatar, held the top position, Oman in 2018 and Qatar in 2020. Their efforts are noticeable despite the low implementation outcome and commitment of the entire region, as shown in table 4.

Table 3: Region ranking based on commitments, capacity and outcomes

Region	2018 Countries	2018 Score/100	2020 Countries	2020 Score/100
Africa	South Africa Kenya	76 72	South Africa Kenya	75.5 70
Central Asia	Russian Federation Turkmenistan	73 23	Russian Federation Tajikistan	61 52.5
East Asia and the Pacific	Australia China	71 62	Australia Philippines	80 53
Europe	France Italy	77 73	Italy France	75.5 72.5
Latin America and the Caribbean	Brazil Jamaica	79 60	Brazil Uruguay	72 67
MENA region/Arab countries	Oman Qatar	81 75	Qatar Oman	89 65.5
North America	United States Canada	75 57	United States Canada	71.5 56
South Asia	India Nepal	46 43	India Pakistan	53 46.5

Source: DARE index top performing countries. Available at https://g3ict.org/upload/DARE-Index-Top-Performing-Countries-Nov-5-2018.pdf and https://g3ict.org/upload/accessible_DARE-Index-2020-Top-Performing-Countries-ENGLISH-1.pdf.

Results also show that Europe and North America outperformed the rest of the regions in implementation and outcome, with 55.1 and 63.8, respectively. However, all regions scored low in their capacity to implement or in commitment, as shown in table 4 below. The Middle East and North Africa (MENA), including non-Arab countries, have fair implementation and capacity to implement but with low overall commitment.

Table 4: Regional rankings, 2020

Region	Implementation and outcome	Capacity to implement	Commitment	Overall Score
Central Asia	13.8	6.9	14.4	35.1
South Asia	8.3	8.8	15.7	32.8
Africa	7	10.8	14.5	32.3
East Asia and the Pacific	10.4	11.4	14.3	36.1
Latin America and the Caribbean	11.2	11	17	39.2
MENA	13.7	11.9	16.3	41.9
Europe	20.1	16	19	55.1
North America	20	20	23.8	63.8

Source: DARE Index 2020. Global Progress by CRPD States Parties.

Table 5: Global e-accessibility commitment (percentage)

Commitment	Global average
Ratification of CRPD	93
Ratification of the Marrakesh Treaty	37
Laws to protect the rights of persons with disabilities	88
Defining reasonable accommodation	68
E-accessibility defined	61
Overall commitment	65

Source: DARE Index 2020. Global Progress by CRPD States Parties.

Although 93 per cent of countries have ratified CRPD and 37 per cent have ratified the Marrakesh Treaty, only 65 per cent of countries have made commitments to advance e-accessibility for persons with disabilities. As table 5 shows, less than 70 per cent of countries have a clear definition of e-accessibility. The present report also identifies several issues causing the slowdown of e-accessibility at the global level, which include the following:

The 2018 Disability and Development Report[10] provides several recommendations to strengthen the inclusion and accessibility of persons with disabilities, which include the following:

Raise awareness and knowledge of ICT accessibility.

Involve persons with disabilities and specialized agencies in drafting policies, recommendations and regulations.

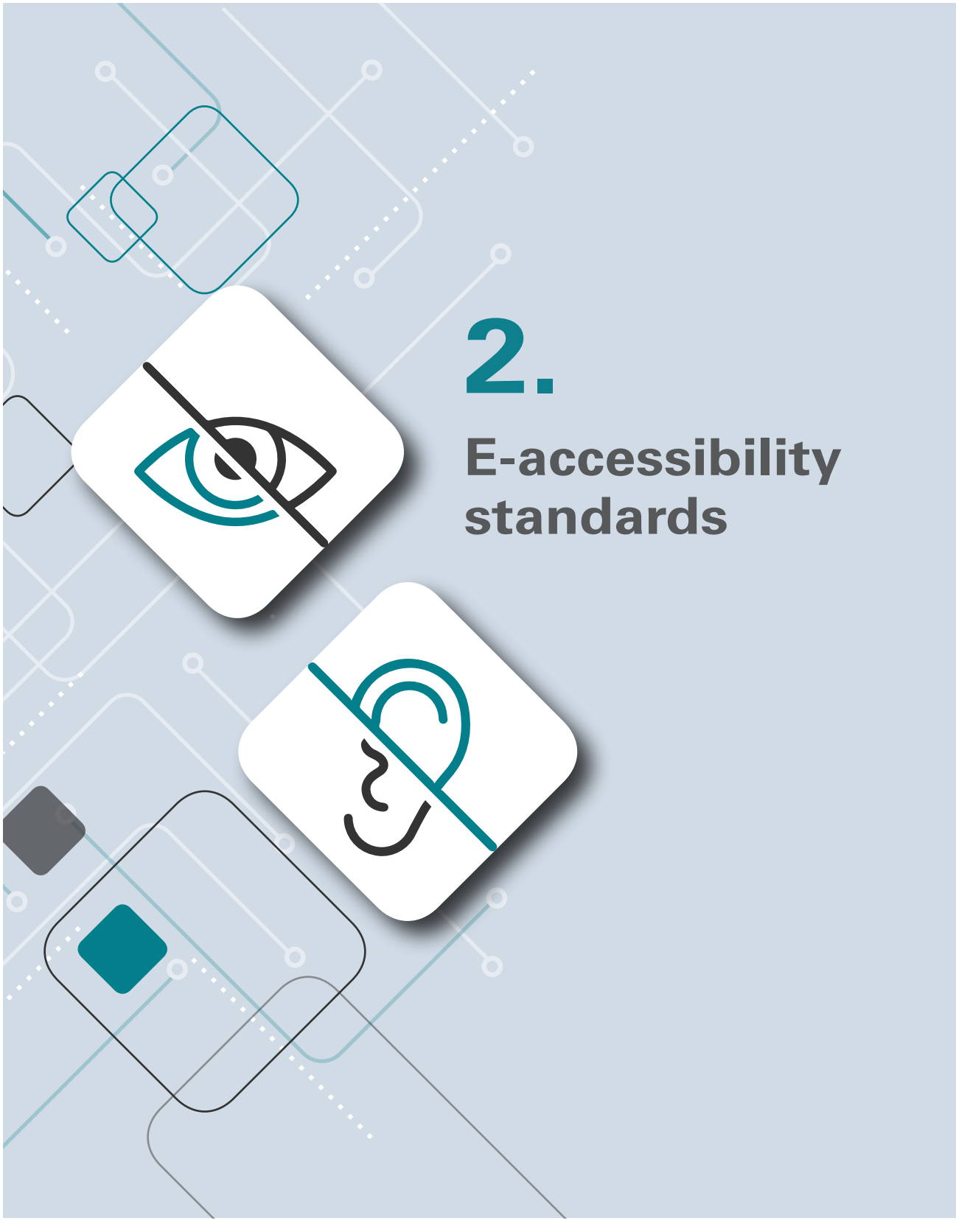
Encourage the ICT industry and the public sector to adopt the Seven Principles of Universal Design[11] on equitable use and perceivable information, which directly impact e-accessibility.

Implement national accessibility policies and regulations.

Create dedicated governmental organizations to oversee ICT accessibility.

Provide equal and affordable Internet access for persons with disabilities.

Encourage Government and private-sector funding to support open-source software development and Universal Design at a low cost for persons with disabilities.



2.

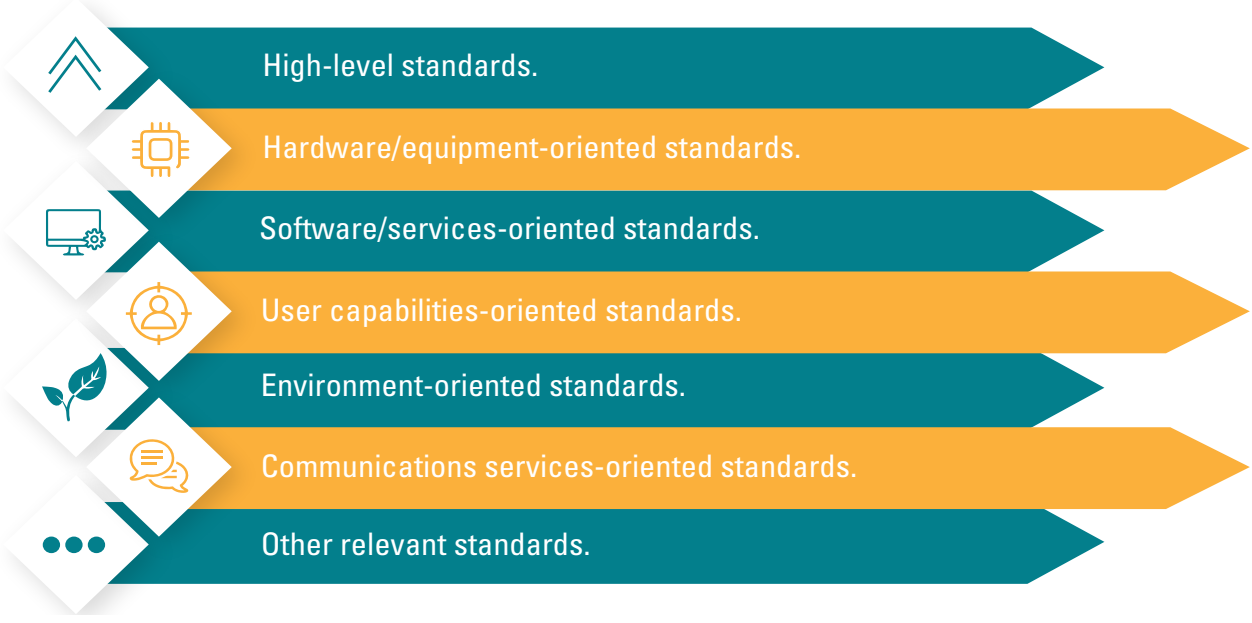
E-accessibility standards

2. E-accessibility standards

Digital accessibility standards and guidelines define technical specifications and rules for the development of platforms and applications to enrich user experience. They also help promote accessibility and active participation of persons with disabilities, since they cover different accessibility needs and diverse classifications. These sets of rules follow concise and comprehensive principles to ensure interoperability, compatibility and consistency of products, applications and services.

Many national and international organizations have implemented the guidelines and standards for digital accessibility that cover all areas of ICT. The International Organization for Standardization (ISO), ITU, W3C, and the International Electrotechnical Commission (IEC) are the major organizations that have contributed greatly to developing key ICT standards and guidelines. Some of these standards are general in nature and can be applied to wide areas in ICT, while others are specific and are applied only to one particular area of digital accessibility. These standards and guidelines have gained great attention since the adoption of CRPD.

According to ISO/IEC TR 29138-2:2009,[12] standards are divided into seven categories based on their breadth of application, as follows:



A. Web accessibility standards

Websites and web-based applications are the dominant means of accessing and searching the Internet using web browsers. Website design has changed dramatically since the Internet was launched some 30 years ago. Websites became popular during the early 1990s with the newly developed publishing language, Hypertext Markup Language (HTML). Early basic websites were only text-based content and linear in the way they displayed information. Few graphics were present, and hyperlinks used to connect other web page content. The design of websites and HTML-based pages has become more sophisticated over the last 20 years with the introduction of the graphical user interface (GUI) design and artwork that could be embedded in web pages.

This development has led to an unprecedented surge in the number of users of all ages and ethnic backgrounds. Early designs did not address the special needs of persons with disabilities. The concept of digital accessibility became a major requirement to fulfil the principles of equality, justice and accessibility on which the Internet was built.

Many standards govern the design of web pages in terms of publishing languages, styles, GUI layout, and functionalities, and the use of multimedia elements, including audiovisual content. Web accessibility standards and guidelines are probably the most important and widely adopted for digital accessibility issues. They cover a wide range of disabilities, such a visual impairment, hearing impairments, voice disorders, motor skill issues, language, or learning. WCAG are considered the foundation for most nationally and internationally adopted guidelines. WCAG are built on four POUR concepts that underpin the principles for website accessibility.

The following are the main standards, guidelines and recommendations for digital accessibility:

- W3C recommendation: WCAG 2.0;[13] the main web content accessibility standard (/ISO/IEC 40500:2012) (Arabic translation)[14].
- W3C recommendation (June 2018): WCAG 2.1;[15] extends WCAG 2.0.
- ITU-T recommendation F.790:[17] general guidelines to standardize telecommunications equipment, associated software and services for persons with disabilities.
- W3C guidelines: WCAG 2.2;[16] extended additional criteria to all compliance levels of WCAG 2.1;
- EN 301 549 standard:[19] a European standard that covers functional performances for diverse disabilities and generic e-accessibility requirements.
- Americans with Disabilities Act Accessibility Guidelines, Section 508 Standards:[18] ensures accessible ICT infrastructure, equipment and services for persons with disabilities.
- ISO/IEC 29138-1:2018:[20] a comprehensive international standard made up of three parts addressing user interface accessibility: part 1: user accessibility needs (TR 29138-2); part 2: standards inventory (TR 29138-3); and part 3: guidance on user needs for developers. Additional documents are included within the standard to better understand the guideline[21] and the techniques on how to implement them.[22] The conformance requirements section of WCAG 2.0 suggests three conformance levels (A, AA, AAA). Level A is the lowest level while AAA level is significantly hard to achieve. All WCAG guidelines include success criteria for web content design. Level AA has medium impact on the design when compared with A and AAA levels. While level A is not required to be visible, level AA is visible and less strict. It is considered accessible by assistive technology on all mobile devices and desktop machines.

B. E-accessibility standards for web designers and developers

There are two key guidelines that address the important issues of authoring tools and user agents to support web design and content rendering. The Authoring Tool Accessibility Guidelines (ATAG 2.0)[23] have two parts: the first focuses on creating authoring tools that are accessible for authors with disabilities, while the second focuses on developing authoring tools that help authors produce accessible content. The User Agent Accessibility Guidelines (UAAG) 2.0[24] guides developers in designing web content rendering applications, such as web browsers, audiovisual players and e-readers.

C. E-Accessibility standards for mobile phones and tablets

Current smartphones and tablets perform all major functions of a regular computer, such as accessing and searching the Internet, viewing web and web-based apps, reading and composing emails, and watching and listening to audiovisual content. Mobile design and web-based mobile apps do not have a separate set of standards. They are covered by the main e-accessibility standards mentioned in the web accessibility standards section, which do not have any specific guidelines or criteria for mobile devices. However, they are sufficient to address all accessibility issues for persons with disabilities since the design of mobiles or tablets are built on web paradigms. WCAG 2.0 criteria for resizing text (1.4.4) or contrast control (1.4.3) apply directly to all handheld equipment with screen displays, as do keyboard criteria (2.1.1) and focus order (2.4.3). Moreover, sections 1194.21, 1194.22 and 1194.31 of the US 508 standards can be easily applied to mobile apps and content.

D. Multimedia accessibility standards

ITU has approved a number of standards for multimedia, including audiovisual content for persons with disabilities. Such standards are intended for people with vision and hearing impairments. Table 6 lists some of the main standards that also comply with WCAG. They cover a wide range of ICT services related to e-accessibility in general, not just web accessibility. They include television content delivery, Internet Protocol television (IPTV) systems, Internet via fixed or mobile broadband networks, multimedia and other ICT issues such as e-publishing and social collaborating platforms.

Table 6: Multimedia guidelines, standards and definitions

Standard	Covering	Standard	Covering
ITU-T H. 702 (11/2015) [a]	Guidelines for Internet Protocol TV (IPTV) systems accessibility	ITU-T FSTP-AM (2015)[b]	Accessing audiovisual meetings
ITU-T F. 921(08/2018) [c]	Audio navigation system for people with vision impairment	ITU-T H-series Supplement 17 | ISO/IEC Guide 71(2014)[d]	Addressing audiovisual accessibility in standards
ITU-T F. 930(03/2018) [e]	Multimedia telecommunication relay services	ITU-T FSTP-ACC-RemPart (2015)[f]	Remote audiovisual meeting and other meeting requirements

Source:

a www.itu.int/rec/T-REC-H.702
b www.itu.int/pub/T-TUT-FSTP-2015-AM
c www.itu.int/rec/T-REC-F.921.
d www.itu.int/rec/T-REC-H.Sup17/en.
e www.itu.int/rec/T-REC-F.930.
f www.itu.int/pub/T-TUT-FSTP-2015-ACC.

E. E-accessibility success in the European Union

European Union countries have achieved excellent progress in digital accessibility. Collectively, they took practical actions during a ministerial meeting in 2003 towards creating an open knowledge-based society accessible to all citizens by adopting the Web Accessibility Initiative (WAI) guidelines for all public websites. In 2004, a comparative survey to assess conformance of websites to web accessibility guidelines in four European countries, namely, France, Germany, Ireland, and the United Kingdom, was carried out.[25] The survey included websites from different categories including arts and entertainment, education, government, science, and the environment. The overall conformance of sampled websites to web accessibility guidelines was poor. None of the sites satisfied the AAA WCAG level, and only 6 per cent met the A level. Notably, 1 per cent of sites in the United Kingdom passed the AA level, while 100 per cent of sites in the other three countries failed to meet it. Since ratifying CRPD, website accessibility has improved significantly, as shown by the Click-Away Pound research survey conducted in 2016 to measure the accessibility of e-commerce websites for persons with disabilities.[26] It showed noticeable improvements in many accessibility issues. The survey reported almost 50 per cent compliance of e-commerce sites with WCAG2 criteria but with significant inaccessibility issues, such as poor links, poor navigation content, poor access to screen readers, and poor keyboard access.

A 2019 survey by Click-Away Pound revealed major important setbacks in e-accessibility issues. Despite the fact that more than 7 million people have access needs (an increase of 1 million since the 2016 survey), many websites still suffer from accessibility barriers. Around 66 per cent of surveyed websites have crowded content that hampers navigation by people with needs. Similarly, filling forms, colour contrast, text layouts, and animated images are still challenging issues, with less than 50 per cent compliance. This indicates that full compliance with WCAG2 is a real challenge.

F. Legislative framework for e-accessibility

The 2010 Digital Agenda for Europe calls for addressing challenges related to website accessibility and online services for persons with disabilities.[27] With emphasis on providing help and training to ensure inclusion and active participation of persons with disabilities, the Agenda urges continual evaluation of legislation to ensure compliance with CRPD. All new websites have to be in compliance with WCAG 2.0-AA. This was followed, in 2016, by a directive by the European Union on the accessibility of websites and mobile applications of public-sector bodies,[28] in line with WCAG guidelines, to improve accessibility to public-sector websites and e-government mobile apps for persons with disabilities.

A recent report by the European Disability Forum[29] analyses the accessibility of parliament websites of European Union member States and other European websites. Results show that only three sites had an accessibility rating above the industry average, while over 89 per cent of websites were rated with poor accessibility structures.

The 2019 European Accessibility Act, which sets out accessibility requirements for products and services to make the European Union fully accessible to persons with disabilities, covers a wide range of products such as general purpose computers, tablets, laptops and

their operating systems, payment terminals, automated teller machines (ATMs), airport ticketing and check-in machines, handheld devices, IP and smart televisions, and electronic readers. It also covers a number of services such as telecommunication, video streaming, web-based mobile apps, kiosks, and e-commerce services.

G. Key European Union actions and milestones

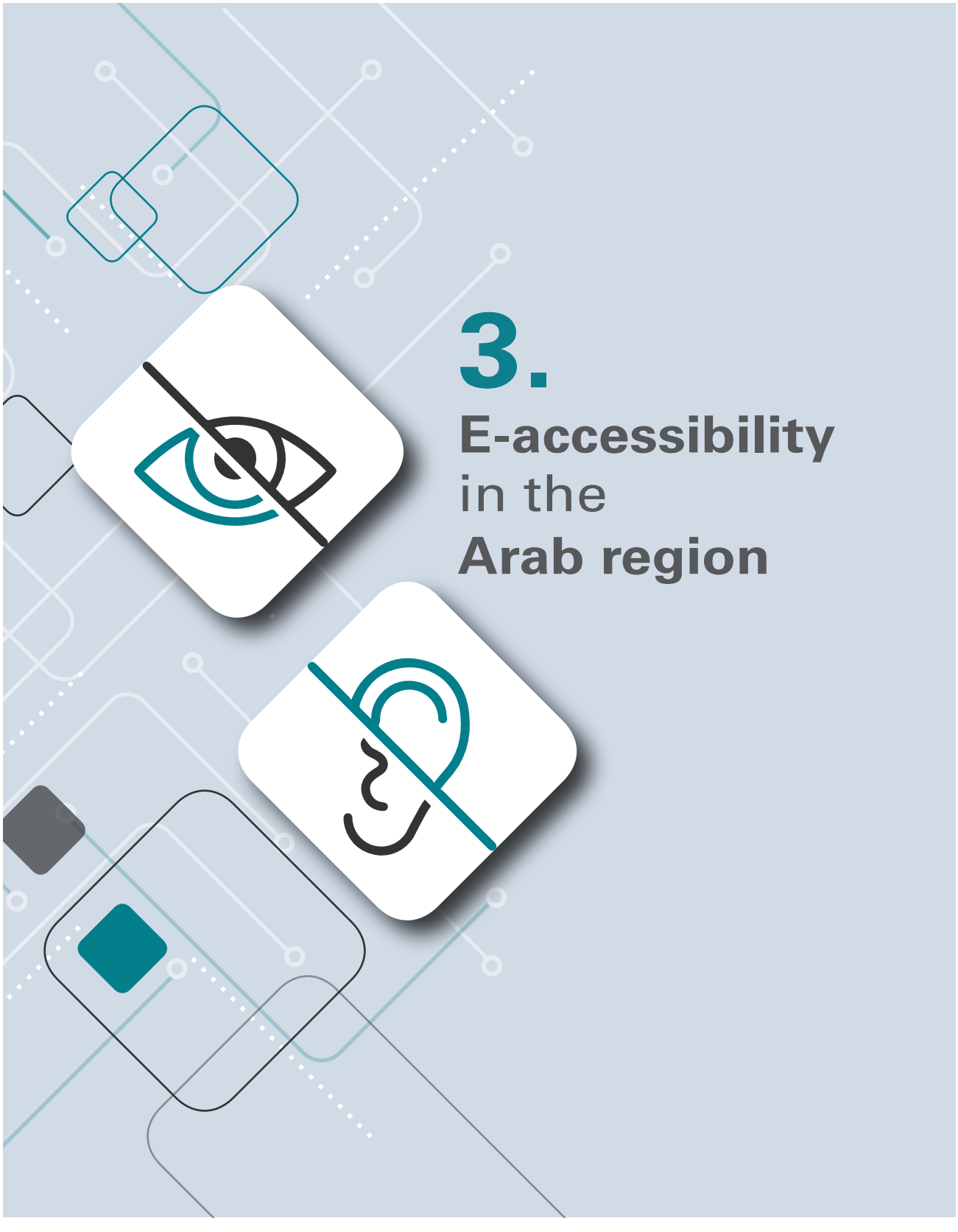
In 2017, a directive was adopted by the European Union to enshrine the Marrakesh Treaty in European Union law, which allows blind, visually impaired, or print-disabled people to access more books and other print material in formats that are accessible to them, with a mandatory exception for copyright and related rights.[30]

1. Switzerland published a government standard on digital accessibility, which is based on the WCAG 2.1 guidelines and inspired by the e-accessibility directive of the European Union.[31]

2. On 6 July 2020, the United Kingdom released a report on the latest accessibility testing of more than 800 local authority websites and public-sector sites in preparation for the newer version of e-accessibility guidelines to take effect in September 2020.[32]

3. The European Commission funds research and innovation for the development of new technologies to enhance the functional capabilities of persons with disabilities and to inspire independence and autonomous use of information technology. These technologies include applications based on artificial intelligence (AI), sensor technologies, machine learning, 3D games, and virtual reality.[33]

However, European Union countries face a number of obstacles and challenges related to technological and quality issues. The existence of multiple standards, diverse platforms and services, even within a country, is a real challenge that hinders the adoption of common accessibility standards. Furthermore, the diversity of spoken languages makes implementation of audiovisual services hard to achieve. In addition, the high cost of technology is seen as a major obstacle facing the European Union.



3.
E-accessibility in the Arab region

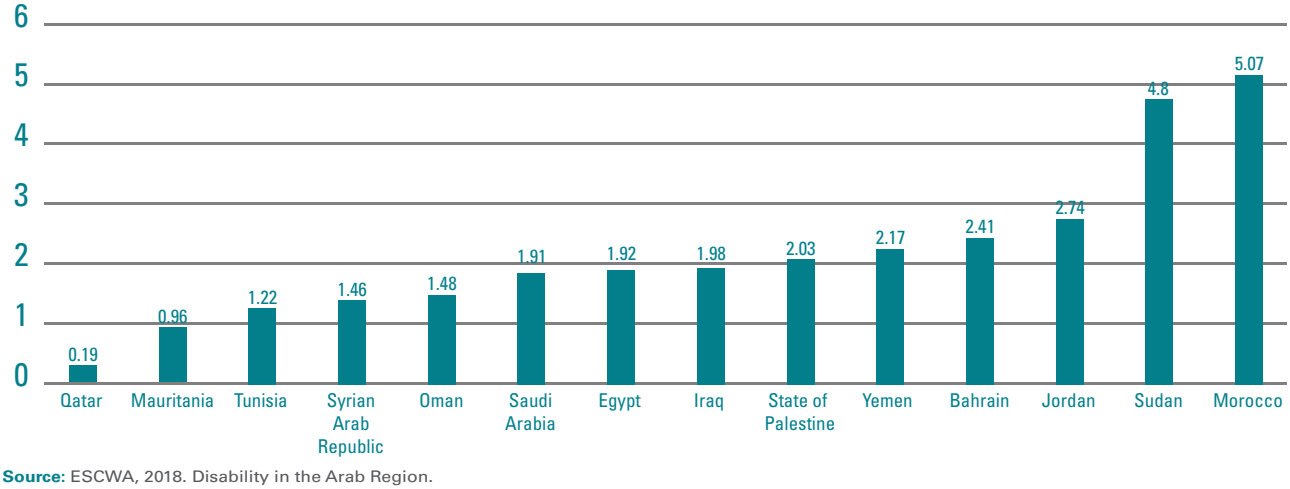
3. E-accessibility in the Arab region

The technological revolution and digital opportunity have had a major impact on many Arab countries. Most of them have adopted ambitious plans to move towards a digital and knowledge-base economy. This achievement is mirrored by the increase in Internet penetration with broadband connectivity and the upsurge in the use of smartphones. E-government programmes in many countries, mainly countries of the Gulf Cooperation Council (GCC) have a world-class maturity level in providing e-services that are accessible to all citizens including those with special needs and disabilities.

A. Disability prevalence in the Arab region

The accuracy of disability statistics in the Arab region depends on the way each country disaggregates disability, and the source and date of data. According to a 2018 ESCWA report on disability in the Arab region,[34] disability prevalence rates in Arab countries were below the world average of 15 per cent, ranging between 0.19 per cent in Qatar and 5 per cent in Morocco, with varying prevalence between men and women as shown in figure 2. Based on the types of disabilities, the report shows that mobility is the most prominent disability at 21.6 per cent in Qatar and 43.3 per cent in Egypt, and vision impairment is the second highest with 12.6 per cent in Qatar and 26.5 per cent in Iraq and the State of Palestine.

Figure 2: Disability prevalence in the Arab region



Source: ESCWA, 2018. Disability in the Arab Region.

However, all Arab countries have shown commitment to the care of persons with disabilities through the establishment of governmental institutions responsible for disabilities and the ratifying of CRPD. In addition to the growing number of civil society initiatives, international non-governmental organizations and private-sector institutions for the care and awareness of disability, the growth and maturity of the ICT sector in the Arab region has led to the advancement of education, business and e-government services. According to the ESCWA 2019 Arab Digital Development Report, average mobile phone subscriptions exceed 100 per cent and the Internet penetration rate of 51.6 per cent was close to the world average.[35] The report identified important findings with great effects on ICT in the region, including the following: firstly, the noticeable surge in 3G and 4G smart mobile usage among all age groups; secondly, the average number of women connected to the Internet, which exceeds the world average, especially in GCC countries, despite high Internet costs in most countries; and thirdly, a very low usage rate of e-government services in the region, while e-commerce is well below the world average.

This uptake of ICT-enabled services is having a great impact on the status of digital accessibility in most Arab countries, and on promoting digital inclusion for all, including persons with disabilities, within the framework of digital transformation and digital economy. The 2016 and 2017 ICT Development Index (IDI)[36] show high rankings for GCC countries, especially Bahrain, Qatar and the United Arab Emirates, and low rankings for the Sudan and the Syrian Arab Republic, as shown in table 7. The E-Government Development Index and the E-Participation Index for the region show that GCC countries are outperforming other Arab countries and have a good world ranking.

Table 7: ICT Development Index, e-Government Development Index, and e-participation in the Arab region

Country	IDI 2016 rank	IDI 2017 rank	EGDI 2020	E-participation 2020
Bahrain	30	31	38	51
Qatar	36	39	66	77
United Arab Emirates	34	40	21	16
Saudi Arabia	45	54	46	66
Oman	64	62	50	38
Lebanon	65	64	127	148
Jordan	66	70	117	148
Kuwait	70	71	46	18
Tunisia	95	99	91	73
Morocco	98	100	106	106
Algeria	106	102	120	183
Egypt	104	103	111	106
Libya	112	115	162	189
State of Palestine	122	123	NA	NA
Syrian Arab Republic	124	126	131	106
Sudan	141	145	170	175

Sources: www.itu.int/net4/ITU-D/idi/2017/index.html#idi2017byregion-tab and https://publicadministration.un.org/egovkb/en-us.

This rapid growth in ICT, especially the growing Internet penetration rate, in Arab countries is providing substantial benefits to all social groups, including persons with disabilities. This has encouraged local governments and civil society organizations to initiate different programmes and use ICT to provide IT-based services for persons with disabilities. New accessibility features allow persons with disabilities to enjoy reading, viewing and listening to multimedia content available on the Internet in a personalized way that suits their needs.

B. Arab accessibility legislation and initiatives

The active participation of Arab countries in shaping digital accessibility is particularly evident in two key initiatives: the 2013 Marrakesh Treaty and the 2007 Cairo Declaration on Supporting Access to Information and Communication Technology Services for Persons with Disabilities.
The Marrakesh Treaty establishes lenient restrictions on traditional copyright laws to allow reproduction of published books in formats accessible by people with blindness or visual impairments. Several Arab countries have endorsed and signed the Treaty (table 8).

The Cairo Declaration was issued at a regional conference on best practices in ICT services for persons with disabilities. The 57 countries attending the conference, including 14 Arab countries, called upon Governments to play a more active role in developing local national strategies and policies on disability. They also called on Governments to adhere to CRPD and supply accurate and up-to-date statistics on disability. The Declaration calls for the exemption of ICT devices and assistive equipment from all taxes and customs duties for persons with disabilities, and to facilitate the use, design and implementation of Arabic-based user-friendly software for persons with disabilities.

However, according to the G3ict ranking, Arab countries ranked low in 2018 with the exception of Oman that ranked first worldwide, and Qatar that ranked fifth. However, in the 2020 rankings, Qatar came first, and Oman dropped to number 16. Table 9 shows the rankings of Arab countries according to G3ict, government sites responsible for disability and if e-accessibility is mentioned in a policy or a strategy. Surprisingly, some countries have no data and thus no G3ict rank. Table 9 also shows that all Arab countries have mentioned digital accessibility in one way or another in their digital policies or strategies for digital transformation and inclusion.

Table 8: Arab signatory countries to the Marrakesh Treaty

Party	Signature	Instrument	In force
Jordan	June 2013	Ratification: 2018	September 2018
Lebanon	June 2013		
Morocco	June 2013	Ratification: 2019	August 2019
Qatar		Accession: 2018	January 2019
Saudi Arabia		Accession: 2018	February 2019
Sudan	June 2013		
Tunisia	June 2013	Ratification: September 2019	December 2016
United Arab Emirates		Accession: October 2014	September 2016

Source: WIPO-Administered Treaties, 2017.

Table 9: Rankings, government sites and e-accessibility inclusion

Country	Global ranking 2020	Global ranking 2018	Government websites: disability inclusion	E-accessibility mentioned in an ICT policy/strategy
Qatar	1	5	Ministry of Administrative Development Labour and Social Affairs	X
Oman	16	1	Persons with Disabilities	X
Egypt	25	27	National Council for Persons with Disabilities	X
Algeria	43	36	https://www.msnfcf.gov.dz	X
Yemen	69	42	http://www.yemen.gov.ye/portal/mosal/%D%8A%7D%84%9D%8B%1D8%A%6D8%9A%D%8B%3D8%9A%D%8A9/tabid/2201/Default.aspx	X
Lebanon	103	78	National Council for Disability Affairs	X
Morocco	62	78	Ministry of Solidarity, Social Development, Equality, and Family	X
Iraq	82	84	Commission for the Care of People with Disabilities and Special Needs	X
Tunisia	91	78	http://www.social.gov.tn/	X
State of Palestine	106	87	Ministry of Social Development	X
Jordan	26	NA	Higher Council for the Rights of Persons with Disabilities	X
Bahrain	NA	NA	High Committee for Disabled Affairs	X
Kuwait	NA	NA	Public Authority of the Disabled	X
Saudi Arabia	NA	NA	Council for the Care of PWDs	X
Syrian Arab Republic	NA	NA	Central Council for Disability Affairs Services for PWDs	X
Sudan	NA	NA	National Council for Persons with Disabilities	X
United Arab Emirates	NA	NA	People of Determination	X

Source: Collected from official websites.

Governments and civil society organizations in the Arab region are focusing on web accessibility and on implementing their own recommendations to achieve W3C requirements. Some use particular parts of the new standards or guidelines, while others are still using old guidelines in the design of their websites. No Arab country has enforced a law on Government or private-sector websites to comply with any e-accessibility standard or guidelines. For example, the e-government programme of Saudi Arabia (Yesser) issued a recommendation and detailed guidelines for website design that include important sections on e-accessibility, but compliance is voluntary. Similar recommendations issued by the Central Bank of Kuwait on web accessibility include sound guidelines for people with visual and hearing impairments and for public websites to ensure equal participation by persons with disabilities. In Morocco, the Ministry of Solidarity, Social Development, Equality, and Family built its own site based on WCAG2.0 guidelines. However, the Ministry does not impose design guidelines on any other governmental or non-governmental entities.

Another example is Jordanian law No. 20 of 2017 on the rights of persons with disabilities.[37] Article 40 calls on all media organizations to facilitate the granting and renewal of licensing requirement for persons with disabilities in accordance with international regulations, and to ensure access for persons with disabilities to all media materials.[38] The Ministry of Digital Economy and Entrepreneurship issued the Jordanian Government's website checklist to allow Government institutions to review planned guidance activities, in accordance with the Government of Jordan Web Standards and Guidelines 2019,[39] so as to make Jordanian Government websites more usable, user-centric and universally accessible.

C. Challenges and opportunities

1. Challenges

Digital accessibility is a multidimensional issue that includes conflicting requirements and needs. It covers people, regulations, technology, and education, with complicated regulations and complementing roles. Although disability is common among different users from all countries, there are many external and internal challenges in addition to technological and educational challenges.

Persons with disabilities in all societies face common challenges and local challenges, which are influenced by poverty, culture, social background, education, and awareness. Although ICT is advancing accessibility, many challenges remain. For example, a study on web accessibility challenges[40] identified three categories of challenges with direct influence on e-accessibility advancement. The main challenge was related to regulations and standards, while the other two challenges revolved around the design and evaluation phases. The first challenge includes guideline ambiguities, limited/inadequate translation to other languages, incomplete guidelines, and navigational problems. The second challenge entails lack of accessibility awareness and motivation owing to the cost of additional design. The third category of challenges includes problems with either automated testing or evaluation tools, or user-based evaluation and testing owing to the time, cost and degree of knowledge and skills required.

Based on interviews with members of the Jordanian Higher Council for the Rights of Persons with Disabilities, the following e-accessibility challenges and opportunities were identified (by no means unique to the Arab region):

In many countries, e-accessibility is either a part of a law or included in a policy/strategy, which makes compliance voluntary rather than mandatory.

Disability is narrowly defined, and data disaggregation varies between countries, which affects accurate and reliable disability statistics.

There is lack of compliance with international standards/guidelines or even national ones by the public and private sectors, including Government, universities, business, and service providers, although all Arab States are signatories to CRPD.

The cost of assistive technologies and services is high, and the financial situation of the majority of people with disabilities is difficult, particularly in poor and rural areas (affordability).

There is lacking awareness of the needs of persons with disabilities and of their accessibility issues when designing web-based or mobile apps or government e-services.

There are cultural issues including high illiteracy rate among persons with disabilities and high school dropout rates.

Priorities differ for the care of persons with disabilities, especially in countries experiencing conflicts, security and political instability.

Technology challenges are emerging, including the Internet of Things, AI, unmanned vehicles and robotics, wearables, and virtual and augmented reality.

The use of Arabic in technology-based applications and services is not fully developed, in addition to high costs, low quality and localization issues.

The private sector is hesitant to adopt e-accessibility owing to cost-benefit considerations.

There is a shortage of designers/developers who are familiar with accessibility design and evaluation tools. This is a problem for people with cognitive impairment, in particular those who require special and simplified language in e-accessibility solutions.

There are security and privacy issues.

2. Opportunities

An international and domestic supportive context, mainly through CRPD and the Marrakesh Treaty.

Political will in all Arab countries, which creates a supportive environment.

A young generation that embraces technology and is capable of creating technological momentum that will benefit everyone.

Emerging technologies that positively impact assistive technology for persons with disabilities.

Digital infrastructure that serves all societal sectors, especially rural areas.

High Internet penetration and high numbers of smart mobile owners in many countries, especially among young people.

D. Case study on e-accessibility: Qatar

Two Arab countries were ranked among the top 10 e-accessible countries worldwide in 2016. Both countries, Qatar and Oman, have embraced the issue of accessibility for people with disabilities, not only to public places and services, but also to information and e-services. They developed their own regulations and legislation in line with international standards, thus becoming leaders in e-accessibility.

While Qatar ranked fifth in 2016, it jumped to first place in 2020 in the G3ict ranking of e-accessibility (DARE Index 2020). As part of the Accessible Qatar initiative,[41] e-accessibility has received great attention from governmental organizations and the private sector. This is reflected in official Government websites that have implemented the minimum required accessibility functions, such as text resize. Moreover, the Government Communications Office has an accessibility page explaining the web accessibility design priorities and the adopted guidelines.

In 2011, the Supreme Council of Information and Communication Technology issued the e-Accessibility Policy of Qatar[42] based on the National Development Strategy 2011-2016,[43] which emphasized the role of ICT as an important enabler for the inclusion of persons with disabilities, mainly children and older persons. It identified a number of barriers to an accessible ICT ecosystem in Qatar, and called upon all stakeholders to reduce these barriers in five years. These technical barriers include inadequate and inaccessible Arabic websites and Arabic content since many assistive technologies do no support Arabic,

including screen readers, translators and text-to-voice convertors. Moreover, inaccessible telecom services and physically inaccessible kiosks and automated bank tellers greatly impact e-service suitability and accessibility.

As a result, many programmes and initiatives address the issue of e-accessibility, driving Qatar to its current ranking. For example, Mada,[44] a centre for the inclusion of persons with disability, was founded in 2010. It is considered a worldwide centre of excellence for Arabic e-accessibility. Mada has built three major components to help not only people with disabilities, but their families, schools and the community at large. The Mada Assistive Technology Portal offers people with disabilities a wide range of information about assistive technology, in both Arabic and English. The Mada Innovation Programme is a regional incentive to encourage innovation in finding Arabic accessibility solutions to overcome challenges facing persons with disabilities in the region. The third component is a digital accessibility consulting service and a platform to provide accreditation and compliance testing for different platforms, including websites, mobile phones, kiosks, and public sites, in accordance with international standards.

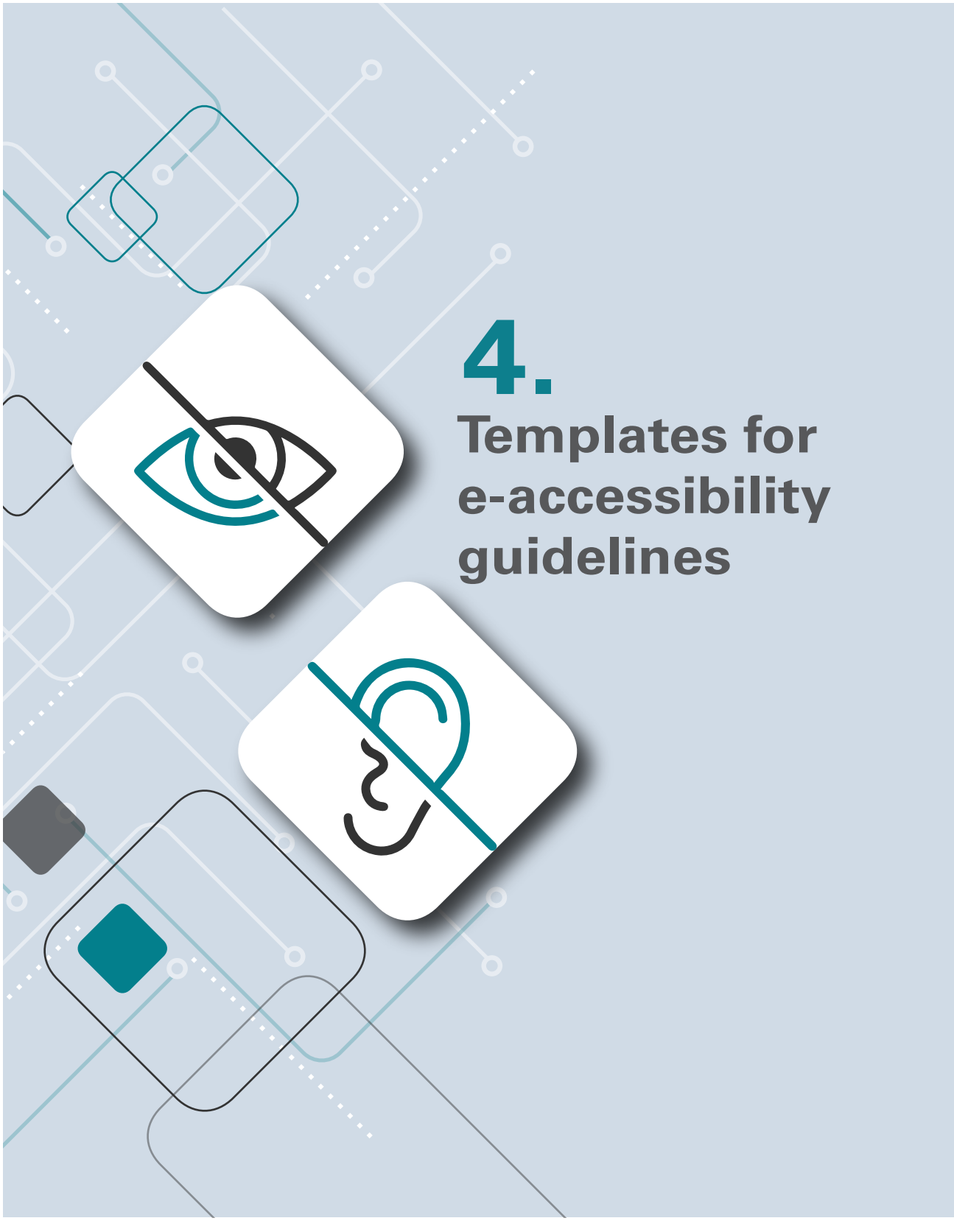
Sasol, an international integrated chemicals and energy company, developed the Accessible Qatar initiative, in collaboration with local Qatari businesses and international partners, to raise societal awareness on the importance of including persons with disabilities to promote social acceptance. It implemented a smartphone application and website to enhance understanding through sport events, cultural activities, art, and education.

E. Case study on e-accessibility: Oman

Oman has outperformed many nations in accessibility adoption for persons with disabilities. It currently ranks sixteenth in the 2020 DARE Index.[45] Digital accessibility and the inclusion of persons with disabilities in Omani society received great attention and commitment from the Government. It issued the Law on the Care and Rehabilitation of the Disabled in 2008, which established rehabilitation centres to further the cause of disability. Furthermore, in 2009, the Information Technology Authority of Oman developed its main portal to be fully accessible for all citizens and residents. This was complemented with awareness programmes within governmental organizations to build web-accessible sites, in accordance with best practices and international guidelines. This initiative was extended to the private sector to ensure that all sectors complied with government e-transformation plans.

The e-accessibility policy of Oman has two major components.[46] The first is based on the use of ICT devices by all persons with disabilities, and the availability of data and information in a form that suits their impairment. The second component addresses the use of assistive ICT products and tools to access e-services and applications. The policy calls on all governmental entities and private businesses to adhere to the requirements by providing equal access for persons with disabilities to all types of information, services, applications, and websites, and to accommodate the needs of persons with disabilities in their regulations and practices. The policy also calls for WCAG2.0 adoption and compliance for all websites and e-services.

Oman tourist sites and hotels are marketed by major booking services as having the best-equipped facilities worldwide for both physical and digital accessibility. The Oman e-government portal, Omanuna,[47] includes all e-services provided for the public in an accessible fashion with links to 285 e-services and 168 accessible forms. It also includes a dedicated page on accessibility that defines the term, with a link to the accessibility policy. In addition, the page provides a list of accessibility guidelines, features and shortcuts derived from WCAG standards to assist users and persons with disabilities.



4.
Templates for e-accessibility guidelines

4. Templates for e-accessibility guidelines

A major component of the Arab Digital Inclusion Platform is to develop e-accessibility templates to help ESCWA member States implement national guidelines on broad e-accessibility issues, including web accessibility, telecom equipment accessibility, and audiovisual media and assistive technology accessibility, to ensure equal access to ICT for all.

Many standards have classified accessibility guidelines in three main groups. The first group is based on the desired WCAG success criterion (A, AA, AAA). The second is based on functionality (disability type), and the third is based on requirements. For the purpose of creating the templates, three models are proposed, namely, web accessibility, mobile accessibility, and public access terminals and smart card accessibility. While relaxing some of the stricter criteria to encourage further adoption of more specific guidelines, the proposed templates accommodate the different definitions of disability.

Two important guidelines, the Authoring Tool Accessibility Guidelines (ATAG 2)[48] and the User Agent Accessibility Guidelines (UAAG)[49], are part of WCAG and complement other guidelines in achieving accessible web content. If ATAG 2 was applied, it would help developers create accessible web content for persons with disabilities. UAAG enables developers to create web content rendering applications, such as browsers, accessible.

They serve the following disability categories:

- Auditory disability (low hearing to deaf).
- Cognitive and neurological disability (attention deficit hyperactivity, learning disabilities, dyslexia, memory impairments).
- Speech disability (fluency, stuttering, muteness).
- Visual disability (low vision, blind, colour blind).
- Multiple disabilities.

The templates will address the following ICT accessibility issues:

- Web accessibility.
- Mobile accessibility.
- Bank automated teller machines and similar information-providing terminals.
- Electronic payment and entry cards.
- ICT procurement.

The e-accessibility templates are based on the following standards and guidelines, with different mappings:

- Web Content Accessibility Guidelines 2.2[50].
- Revised section 508 standards published on 18 January 2017 and corrected on 22 January 2018[51].
- EN 301 549 V3.1.1 (2019-11) Harmonised European Standard: accessibility requirements for ICT products and services[52].
- Both ATAG 2.0 and UAAG 2.0 are applicable to all operating systems installed on personal computers or handheld devices.

These guidelines serve as basis for ICT hardware and software procurement. Any product that complies with these guidelines is considered accessible. These templates need to be revised periodically to include the updated versions of the above-mentioned standards.

Templates for e-accessibility technical guidelines

The seven items listed in table 10 are common among all templates for documentation purposes.

Table 10: Items common to all templates

Guidelines title (Arabic/English/French…)	☐
Guidelines version	☐
Document language	☐
Date and revisions/Date approved	☐
Organization responsible for developing/enforcing the guidelines	☐
Intended entities for compliance with the guidelines	☐
Legal disclaimer	☐

Source: Compiled by ESCWA.

1. Template 1

Websites minimum critical criteria

Complying with WCAG levels is desirable and done gradually from level A to level AA or AAA. Sufficient time and assistance must be provided for entities to comply if it becomes mandatory. However, new websites or web-based application must comply with the national guidelines from the start.

This template includes minimum critical functions that must exist for a web page to be accessible. It also includes mappings with functional disabilities, as identified in chapter 3 of Revised Section 508 and in chapter 4 of the EN 301 549 V3.1.1. Table 13 lists the 10 most recognized functional disabilities and the mappings between the two standards.

Table 11: Common recommended guidelines among all levels for websites in Arabic

1. Web page first loads in Arabic unless other language is intended	☐
2. Action icons to perform	☐
3. Clear action icons to perform: switch language, resize fonts and contrast adjustment (action icon/or text) (E, F, ع) with direction adjustment	☐
4. A clear accessibility statement (Arabic/English or French) on main page	☐
5. Each page has a clear simple path with/without extension (optional)	☐
6. Website discoverable by search engines	☐
7. The government entity should have a clear Arabic domain URL (optional)	☐

Source: Compiled by ESCWA.

Table 12: Minimum critical functions

WCAG #	Criterion	Description	FDIs*
1.1.1	Non-text content	Images and non-textual content must be provided with alternative text in Arabic or intended language	1,2,4,5,9
1.2.1	Audio-only and video-only (pre-recorded)	Equivalent alternative information should be provided for audio-visual content, depending on impairment.	1,2,4,5,9
1.2.2	Captions (pre-recorded)	In a pre-recorded audio or video, captions are provided in preferred language (Arabic is default language).	4,5,9
1.3.3	Sensory characteristics	Instructions should not depend on a single sensory channel (appropriate text in Arabic, Braille or preferred language must be provided).	1,2,4,5,9
1.3.4	Orientation	User should be able to select portrait or landscape orientation of view.	1-9
1.4.1	Use of colour	Colour should be used for decoration and to convey information.	1,2,3,9
1.4.2	Audio control	User should be able to control audio if it runs for more than three seconds (stop, pause and volume controls).	1,5,9
1.4.3	Contrast (minimum)	Minimum of 4.5:1 contrast is provided for viewable text elements (text and images of text).	2,3
1.4.4	Resize text	Ability zoom up to 200 per cent should be provided where appropriate, without any information loss.	2
1.4.11	Non-text contrast	For UI components and graphics.	2
2.1.1	Keyboard	User should be able to navigate a page using keyboard.	1,2,7
2.1.2	Keyboard trap	Never lock a keyboard on any part of a page (navigate-in, navigate-out).	1,2,7
2.2.1	Timing adjustable	Users can adjust time limits or are alerted to do so using speech, text or sound.	1,2,7,9
2.2.2	Pause, stop, hide	User should be able to stop, pause or hide moving, blinking or scrolling content.	9
2.3.1	Three flashes or below	More than three-in-one-second flashes should be avoided for any content.	10

WCAG #	Criterion	Description	FDIs*
3.1.1	Language of page	Web page language must be recognized by user, assistive technology or user agent.	1,2,4,5,9
3.2.2	On input	No substantial change should be added to a page as a result of user inputting information.	1,2,9
3.3.1	Error identification	Error detection should be provided through appropriate means (text, speech or audio alerts).	1,2,4,5,9
3.3.3	Error suggestions	Error correction for detected errors should be provided through appropriate means (text, speech or audio).	1,2,7,9
3.3.4	Error prevention	User should be able to roll back or undo any erroneous actions and ensure ability to recover from errors.	1,2,3,4,5,7,9

* FDI stands for functional disability index.

Table 13: Functional disabilities

Index No.	Section 508	EN 301 549	Functional disability
1	302.1	EN 4.2.1	Without vision (WV)
2	302.2	EN 4.2.2	With limited vision (WLV)
3	302.3	EN 4.2.3	Without perception of colour (WPC)
4	302.4	EN 4.2.4	Without hearing (WH)
5	302.5	EN 4.2.5	With limited hearing (WLH)
6	302.6	EN 4.2.6	Without speech (WS)
7	302.7	EN 4.2.7	With limited manipulation (WLM)
8	302.8	EN 4.2.8	With limited reach and strength (WLRS)
9	302.9	EN 4.2.9	With limited language, cognitive and learning abilities (WLL/C/LA)
10	302.10	EN 4.2.10	Minimize photosensitive seizure triggers (MPZ)

Source: WCAG 2.2. FDI: Functional disability index.

2. Template 2

Mobile accessibility

There are no specific standards or guidelines dedicated to mobile devices. However, WCAG 2.x and other standards are highly applicable to both web and non-web mobile content and applications. Mobiles or wireless devices include any handheld device, regular mobile phones, smartphones, tablets, and wearables. The following guidelines are derived from WCAG 2.2 with additional recommended best practices.

Table 14: Mobile accessibility template

WCAG # section	Criterion	Description	
1.1	Text alternatives	Images and non-text content must be provided with alternative text in Arabic or intended language.	☐
1.2	Time-based media	This includes nine success criteria to provide alternatives for audio-visual content.	☐

WCAG # section	Criterion	Description	
1.3	Adaptable	This includes six success criteria for adaptable content and layout with no information loss.	☐
1.4	Distinguishable	This includes 13 success criteria to be able to see and hear content in different situations.	☐
2.1	Keyboard accessible	This includes four criteria to access all features by keyboard.	☐
2.2	Enough time	This includes six criteria. Users can extend or adjust any time limit in accessing content.	☐
2.3	Seizures	This includes three criteria. There should be no content that causes seizures or physical reactions.	☐
2.4	Navigable	This includes 13 criteria on different methods and ways to navigate content.	☐
3.1	Readable	This includes six criteria for textual content readability and understandability.	☐
3.2	Predictable	Web pages are designed with ease of predictability.	☐
3.3	Input assistance	This includes eight criteria. Users should be able to discover, avoid, correct, and recover from mistakes.	☐
4.1	Compatible	Design should provide for maximum compatibility with user agents and assistive technologies.	☐

Source: WCAG standard. www.w3.org/WAI/standards-guidelines/wcag/.

3. Template 3

Public access terminals and smart cards accessibility

Public access terminals include ATMs, kiosks, ticketing machines, and public terminals that provide services or information. Smart cards are electronic devices (with a SIM card or an electronic chip) that hold digital information to identify holders and help in performing e-services. No guidelines are available for these devices, but the template is based on priorities proposed by the Centre for Excellence in Universal Design (CEUD)[53] and EN 301 549 V2.1.2 (2018-08).[54]

Table 15: Public access terminals and smart cards accessibility

Criteria	Description
Reachability	All operable parts (screen, buttons or controls) are reachable by persons with disabilities while sitting or standing.
Size and layout controls	Controls are grouped according to a set criteria (logical or operational), easily accessed and well sized.
Operational suitability	They can be operated with minimal strength and body movement or without being touched.
Perceivable output	All outputs can be perceived by users with vision or hearing impairments.

Criteria	Description
Language use/switchable	Users are able to switch between different languages. Simple language is used to convey textual or audible information.
Biometrics alternatives	Biometric devices are not the only means of access. A secure alternative should be provided.
Three flashes or below threshold	More than three-in-a-second flashes should be avoided for any content.
Timing adjustable	Users can adjust time limits or are alerted to do so using speech, text or sound.
Roll back	Any transaction can be rolled back and recovered from errors or mistakes.
Consistent interface	Interface should be consistent for multiple pages/services.
Training	Audio-visual training and support should be provided to users.
Privacy and security	Privacy and security measures should be provided, and secure alternatives offered.
Smart cards	
Distinguishability	Cards can be easily distinguished from other cards by size, texture or engraved characters.
Card orientation	Cards can be determined without requiring vision, and can be used in any orientation.
Card authentication	Card authentication method is accessible for different disabilities, with alternatives.

Source: The Centre for Excellence in Universal Design (CEUD); and EN 301 549 V2.1.2 (2018-08).

4. Template 4

Procurement of ICT products and services

This template provides minimum guidelines for procurement of accessible ICT products and services, including hardware, software and web or mobile applications. It is written in a general form, respecting the different procurement regulations and policies in member States.

The template is divided into two parts. The first part, shown in table 16, lists required criteria by ICT products to meet accessibility needs for persons with different functional disabilities, with or without assistive technologies. ICT products in the first part include closed functionality products, two-way voice communication, products with video capability, and generic hardware requirements. The second part, shown in table 17, maps the EN 301 549 V2.1.2 requirements (websites, non-web document, open or closed functionality software, authoring tools, product and support docs) with criteria from template 1 (table 12).

Table 16: Procurement of ICT products and services – Part 1

Criterion reference	Subcriteria	Description
	Functional performance	
4.2 Functional disabilities	4.2.1 Usage without vision 4.2.2 Usage with limited vision 4.2.3 Usage without perception of colour 4.2.4 Usage without hearing 4.2.5 Usage with limited hearing 4.2.6 Usage without vocal capability 4.2.7 Usage with limited manipulation or strength 4.2.8 Usage with limited reach 4.2.9 Minimize photosensitive seizure triggers 4.2.10 Usage with limited cognition 4.2.11 Privacy	**ICT products must provide** access to information to persons with listed functional disabilities and provide adequate privacy.
	ICT products with closed functionality	
5.1 Closed functionality	5.1.3 Non-visual access 5.1.4 Text enlargement 5.1.5 Visual output for auditory information 5.1.6 Operation without keyboard interface	**ICT products must provide** access alternatives when using closed or self-contained products with appropriate controls.
5.2 Activation of accessibility features	-	**ICT products must provide** access to features based on needs.
5.3 Biometrics	-	**ICT products must provide** alternative biometric identification (voice, retina, fingerprint).
5.4 Preservation of accessibility information during conversion	-	**ICT products must preserve** accessibility information.
5.6.2 Visual status	-	-
	ICT with two-way voice communication	
6.2 Real-time text functionality	6.2.2 Display of real-time text 6.2.3 Interoperability 6.2.4 Real-time text responsiveness	**ICT products must provide** real-time text and voice that are responsive and interoperable.
6.3 Caller ID	-	**ICT products must provide** caller ID in multiple modalities.

Criterion reference	Subcriteria	Description
6.4 Alternatives to voice-based services	-	**ICT products must provide** voice mail or interactive voice response.
6.5 Video communication	6.5.4 Synchronization between audio and video	**ICT products must provide** two-way synchronization between audio and video.
	ICT with video capabilities	
7.1 Caption processing technology	7.1.1 Captioning playback 7.1.2 Captioning synchronization 7.1.3 Preservation of captioning	**ICT products must provide** the ability to display caption information (timing, colour and positioning) while preserving synchronization.
7.2 Audio description technology	7.2.1 Audio description playback 7.2.2 Audio description synchronization 7.2.3 Preservation of audio description	**ICT products must provide** playback ability for audio description while preserving synchronization.
7.3 User controls for captions and audio description	-	**ICT products must provide** user controls for audio description (position, text colours, text style, and text fonts).
	Hardware	
8.1 General requirements	8.1.2 Standard connections	**ICT products must provide** at least one standard IO* connection.
8.2 Hardware products with speech output	8.2.1 Speech volume gain	**ICT products must provide** appropriate controls to adjust volume
8.3 Physical access to ICT	8.3.2 Clear floor or ground space 8.3.3 Reach range for ICT 8.3.4 Visibility 8.3.5 Installation instructions	These are country specific requirements

Source: ETSI, Accessibility requirements for ICT products and services, 2018.

* IO stands for input/output.

Table 17: Procurement of ICT products and services – Part 2

Criteria	EN 301 549 criteria	ICT product must provide
1.1.1 Non-text content (level A)	9.1.1.1 (Web) 10.1.1.1 (Non-web document) 11.1.1.1.1 (Open Functionality Software) 11.1.1.1.2 (Closed Functionality Software) 11.8.2 (Authoring Tool) 12.1.2 (Product Docs) 12.2.4 (Support Docs)	☐
1.2.1 Audio-only and video-only (pre-recorded) (level A)	9.1.2.1 (Web) 10.1.2.1 (Non-web document) 11.1.2.1.1 (Open Functionality Software) 12.1.2 (Product docs) 12.2.4 (Support docs) 11.1.2.1.2.1 and 11.1.2.1.2.2 (Closed software) 11.8.2 (Authoring tool)	☐
1.2.2 Captions (pre-recorded) (level A)	9.1.2.2 (Web) 10.1.2.2 (Non-web document) 11.1.2.2 (Open functionality software) 11.1.2.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
1.3.3 Sensory characteristics (level A)	9.1.3.3 (Web) 10.1.3.3 (Non-web document) 11.1.3.3 (Open functionality software) 11.1.3.3 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
1.3.4 Sensory characteristics (level A)	9.1.3.4 (Web) 10.1.3.34 (Non-web document) 11.1.3.4 (Open functionality software) 11.1.3.4 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
1.4.1 Use of colour (level A)	9.1.4.1 (Web) 10.1.4.1 (Non-web document) 11.1.4.1 (Open functionality software) 11.1.4.1 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐

Criteria	EN 549 301 criteria	ICT product must provide
1.4.2 Audio control (level A)	9.1.4.2 (Web) 10.1.4.2 (Non-web document) 11.1.4.2 (Open functionality software) 11.1.4.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
1.4.3 Contrast	9.1.4.3 (Web) 10.1.4.3 (Non-web document) 11.1.4.3.1 (Open functionality software) 11.1.4.3.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
1.4.4 Resize text	9.1.4.4 (Web) 10.1.4.4 (Non-web document) 11.1.4.4.1 (Open functionality software) 11.1.4.4.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
1.4.11 Non-text contrast	9.1.4.11 (Web) 10.1.4.4 (Non-web document) 11.1.4.4 (Open functionality software) 11.1.4.4 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
2.1.1 Keyboard (level A)	9.2.1.1 (Web) 10.2.1.1 (Non-web document) 11.2.1.1.1 (Open functionality software) 11.2.1.1.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
2.1.2 No keyboard trap (level A)	9.2.1.1 (Web) 10.2.1.1 (Non-web document) 11.2.1.1.1 (Open functionality software) 11.2.1.1.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
2.2.1 Timing adjustable (level A)	9.2.2.1 (Web) 10.2.2.1 (Non-web document) 11.2.2.1 (Open functionality software) 11.2.2.1 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐

Criteria	EN 549 301 criteria	ICT product must provide
2.2.2 Pause, stop, hide (level A)	9.2.2.2 (Web) 10.2.2.2 (Non-web document) 11.2.2.2 (Open functionality software) 11.2.2.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
2.3.1 Three-flashes-or -below threshold (level A)	9.2.3.1 (Web) 10.2.3.1 (Non-web document) 11.2.3.1 (Open functionality software) 11.2.3.1 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
3.1.1 Language of page (level A)	9.3.1.1 (Web) 10.3.1.1 (Non-web document) 11.3.1.1.1 (Open functionality software) 11.3.1.1.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
3.2.2 On input (level A)	9.3.2.2 (Web) 10.3.2.2 (Non-web document) 11.3.2.2 (Open functionality software) 11.3.2.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
3.3.1 Error identification (level A)	9.3.3.1 (Web) 10.3.3.1 (Non-web document) 11.3.3.1.1 (Open functionality software) 11.3.3.1.2 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
3.3.3 Error suggestions	9.3.3.3 (Web) 10.3.3.3 (Non-web document) 11.3.3.3 (Open functionality software) 11.3.3.3 (Closed software) 11.8.2 (Authoring tool) 12.1.2 (Product docs) 12.2.4 (Support docs)	☐
3.3.4 Error prevention	9.3.3.4 (Web) 10.3.3.4 (Non-web document) 11.3.3.4 (Open functionality software) 11.3.3.4 (Closed functionality software)	☐

Source: Compiled by ESCWA.

Endnotes

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