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WEB ACCESSIBILITY – A TOOL FOR SERVICE PROVIDERS TO ENHANCE E-INCLUSION OR A VIOLATION OF DATA PROTECTION RIGHTS?

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ABBREVIATIONS

ADA	Americans with Disabilities Act
AI	Artificial Intelligence
AIA	Artificial Intelligence Act
ALD	Assistive Listening Device
DAISY	Digital Accessible Information System
DORA	Digital Operational Resilience Act
DPIA	Data Protection Impact Assessment
DPO	Data Protection Officer
EAA	European Accessibility Act
EC	European Commission
ECJ	European Court of Justice
EDPB	European Data Protection Board
EECC	European Electronic Communications Code
EU	European Union
FM	Frequency Modulation, referred to as radio frequencies
GDPR	General Data Protection Regulation
GPSD	General Product Safety Directive
HTML	Hypertext Markup Language
ICT	Information and Communications Technology
IoT	Internet of Things
NIS	Network and Information Systems (Directive)
PDF	Portable Document Format
PII	Personally Identifiable Information
PSD2	Payment Services Directive 2
TV	Television
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities
W3C	World Wide Web Consortium
WAD	Web Accessibility Directive
WCAG 2.1	Web Content Accessibility Guidelines 2.1
WP29	Article 29 Working Party of the GDPR

ABSTRACT

The demand for easily available digital accessibility tools is on the rise as business processes and services are increasingly becoming digital, impacting various sectors and companies. In fact, accessibility technologies are essential for providing an inclusive digital environment since there are at least 87 million individuals in the European Union with disabilities.

However, lack of, or the misinterpretation of web accessibility tools carries several risks considering data protection and accessibility rights. For instance, failing to adopt technologies such as colour filters, custom fonts, and Braille support could potentially result in the collection and storage of personal information, invoking the General Data Protection Regulation, as well as the European Accessibility Act and other relevant legislation. As a result, it is essential for service providers using digital accessibility tools to carefully examine the data being gathered, how users and consumers are being informed, as well as for how long data is stored once it has been obtained. Thus, a variety of accessibility tools shall be adopted to stay compliant with the range of regulations that lack of tools may potentially violate together with the assurance of data protection and accessibility rights.

This research aims to examine potential safeguards for service providers exploiting web accessibility tools throughout their services and applications to enhance e-inclusion and compliance with data protection rights in terms of data breaches, discrimination, and other legal implications.

Keywords: web accessibility, disability, discrimination, accessibility tools, data protection, data breach

INTRODUCTION

The widespread use of information and communication technologies is required by their explosive expansion in all spheres of modern life, from education to governance. Accessibility and universal design have been extensively discussed in relation to international and national laws, as well as distinct regulations in the context of digitalization,[1] considering that the estimated number of persons with disabilities in the European Union (EU) is at least 87 million.[2] Making web technologies accessible for persons with varied gender identities, ages, backgrounds, cultures, and impairments is the main objective regarding the rise of digitalization. These components and access are so intricately linked that it is impractical to deny internet access the rights status without also reducing or rejecting the related functions.[3] Thus, having access to the web is essential for exercising one's human rights, whereas having access to the web accessibility tools alone is insufficient to ensure equality electronically. The effective utilisation of web accessibility tools is hindered by too complicated interfaces, a lack of alternatives, such as symbols alongside text, or captions instead of audio, and the inability to change the way elements are presented.[4]

This, however, may lead to situations where digital accessibility is not used correctly, or if there is lack of accessibility of these tools, persons with disabilities could potentially be subject to data breaches by entering sensitive information into faulty fields, for illustration. On another hand, the service providers could be held liable for the violation of data protection rights if appropriate safeguards are not applied. Using necessary accessibility tools prevents, for instance, entering credit card details into the delivery company's instructions field, while using magnification of screen, whereas the field titles and inputs are in an incorrect location or excessively far from each other. Despite initiatives in the European Union to increase web accessibility, persons with disabilities continue to encounter significant obstacles to accessing online content and services.[5] Therefore, the use of assistive technology and the application of online accessibility standards can

[1] International Telecommunication Union. (2021) *ICT accessibility assessment for the Europe region*. ITUPublications, p 2-5. ISBN: 978-92-61-33381-2.
[2] European Commission. (2023) *Employment, Social Affairs & Inclusion*. Retrieved from: *https://ec.europa.eu/social/main.jsp?catId=1202&langId=en*.
[3] Shook, W. W. (2019) *Expanding the Debate over Internet Access as a Human Right*. Retrieved from: *https://www.academia.edu/40688080/Expanding_the_Debate_over_Internet_Access_as_a_Human_Right*
[4] Hortizuela, R. (2019) *Achieving Web Equality: The Struggle for Accessibility by Persons with Cognitive Disabilities*, p 6-7. Retrieved from: *https://www.researchgate.net/publication/344426750_Achieving_Web_Equality_The_Struggle_for_Accessibility_by_Persons_with_Cognitive_Disabilities*
[5] Satari, A. (2021) *The Mobile Disability Gap Report 2021*. GSMA Assistive Tech, p 11; 15-16. Retrieved from: *https://www.gsma.com/mobilefordevelopment/resources/the-mobile-disability-gap-report-2021/*

help to alleviate these problems and encourage greater inclusion and involvement in the digital age for persons with disabilities.

This legal research aims to provide evidence that lack, or misemployment of web accessibility tools makes persons with disabilities vulnerable to data breaches and subject to other legal implications, such as discrimination or infringement of their additional accessibility rights. The paper's main hypothesis claims that along with other technical and organizational measures, regularly performing a Data Protection Impact Assessment (DPIA), assigning a Data Protection Officer (DPO), creating structured data breach response plans, emphasising informed consent and transparency, and thus keeping persons with disabilities from misusing web accessibility tools contributes to the prevention potential violations, such as breaches of sensitive information, as well as concerns related to privacy. The thesis consists of three chapters commencing with a theoretical overview of the context and importance of the topic. The evaluation of risks, misuse of tools, as well as potential implications are described. Moreover, different types of web accessibility tools are further represented. Second chapter of the paper investigates the legal compliance of service providers and other institutions offering web accessibility tool usage, as well as discloses interpretations of different national and international regulations, laws, and other relevant legal sources. The chapter provides a corpulent legal analysis of various eventualities for infringements, supported by case law thereafter. A case law overview is further supplemented, continuing with an analysis of various situations and interpretations of law with the emphasis on data protection, discrimination, and other accessibility rights. Third chapter of this research addresses potential safeguards for service providers and institutions, alongside with future considerations to attend to. While comparative analysis is the primary method employed in this research, it is important to note that the analysis is informed by a thorough review of relevant academic literature. Whereas the research question and its further development is supported by the exploitation of relevant academic literature, such as journals, peer-reviewed articles, case law, as well as national and international legislation, it provides a solid foundation to prove that the legal safeguards suggested in this paper could be effective and allows for a more nuanced understanding of the legal and regulatory frameworks governing the issue being examined.

The paper examines several legal safeguards that service providers or other institutions offering web accessibility tools could consider helping ensure greater accessibility and inclusivity for persons with disabilities in the digital age. To detect and reduce any privacy issues related to the use of assistive technology or online accessibility features, one significant approach is to undertake

a DPIA. Furthermore, the ability of people with disabilities to understand how their personal data is being gathered, processed, and shared is a crucial aspect of transparency. This involves giving accessible information about the data being gathered and how it is being used, as well as clear and succinct privacy rules. Having a data breach response strategy in place can assist to lessen the effects on people with disabilities and secure their sensitive information in the case of a data breach. Other safety measures include designing online content and services with accessible features from the start, frequently testing for accessibility, and making any necessary improvements. To further guarantee that online information and services remain inclusive and accessible to everyone, it might be beneficial to include people with disabilities in the design and testing phases. Ultimately, service providers and institutions can help to ensure that people with disabilities can fully participate in the digital age by implementing legal safeguards and additional measures. By prioritising accessibility and inclusion, one could create a more equitable and accessible society in which everyone would have the opportunity to participate and thrive.

1. THEORETICAL OVERVIEW

A disability is defined as any impairment of the body or mind that makes it more challenging for the person with the condition to perform specific duties or engage with their surroundings.[6] Although the term "persons with disabilities" can be generally utilized to refer to a single demographic, it in fact encompasses a comprehensive assemblage of individuals with a broad spectrum of necessities. Despite the fact that the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)[7] does not provide a thorough definition of a "person with a disability," it does mention in Article 1: “Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.“[8] For a person to be able to qualify under those circumstances, an individual must have a physical or mental impairment that has a "substantial" and "long-term" negative impact on their capacity to engage in "average routinely activities“, a definition that is roughly comparable of the one provided by the European Court of Justice in the case of *Chacón Navas v. Eurest Colectividades*[9] in the context of the Non-Discrimination Directive.[10] At present, there is no broad consensus or interpretation on the nomenclature or the definition of a "disabled person". Consequently, the UNCRPD defines these individuals as "persons with disabilities".[11] Given the significant quantity of ratifications by the EU Member States in a relatively brief amount of time, one can suggest that the Convention can thus be considered as a common framework for defining persons with disabilities across Europe. Consequently, the UNCRPD represents a broad paradigm shift in how equality for those with impairments is generally conceived.[12]

Nevertheless, two separate individuals with a comparable sort of impairment may experience completely different consequences. Some impairments may be embedded or difficult to detect.

[6] CDC (Center for Disease Control and Prevention). (2020) *Disability & Health Overview – Impairments, Activity Limitations, and Participation Restrictions*. Retrieved from: *https://www.cdc.gov/ncbddd/disabilityandhealth/disability.html#:~:text=A%20disability%20is%20any%20condition,around%20them%20(participation%20restrictions).*

[7] Council Decision of 26 November 2009 concerning the conclusion, by the European Community, of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD). OJ L 23, 27.01.2020, p 35-36.

[8] *Ibid.*, Art 1.

[9] C-13/05 *Chacón Navas v. Eurest Colectividades SA*, ECLI:EU:C:2006:456.

[10] Council Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation. OJ L 303, 2.12.2000, p. 16–22.

[11] See, e,g., UNCRPD Art. 1.

[12] Broderick, A. (2018) *The United Nations Convention on the Rights of Persons with Disabilities and the European Convention on Human Rights: a tale of two halves or a potentially unified vision of human rights?* Cambridge International Law Journal, Vol. 7 No. 2, p 205. Retrieved DOI: *10.4337/cilj.2018.02.02*.

Initially, the prevalent social notion of the association of disability and technologies continues to be the influential belief that advances in technology will greatly assist persons with impairments. As a result, disability is frequently used to justify the adoption of new technologies. Therefore, numerous stories about how innovation could benefit the community at large frequently include poignant and moving testimonials of how individuals with disabilities' lives have been transformed.[13] Disability is a persistent characteristic of digital inclusion that has only recently become increasingly apparent. A wide variety of physiological, perceptual, social, political, as well cultural identities, circumstances, and subjective experiences have been incorporated in the concept of disability. Persons with impairments could feel that they are viewed as a group in ways that disregard the vast differences and variation that occur across individuals, groups, and environments.[14]

1.1 Context and importance

Apart from barriers in participating in everyday activities, including cultural engagements,[15] access to services is generally challenging for those with impairments, especially given the possibility of prejudice.[16] A brief amount of research has been recognised underlining Information and Communications Technology (ICT) barriers that disadvantaged groups face, nevertheless, insufficient research has emerged remarking on how different technologies may worsen inequality.[17] For instance, a study concluded in 2019 investigating the penetration of ableist[18] communication norms contributes to the broader issue at hand, being that persons with disabilities – especially those who are deaf or hard of hearing – have difficulties using digital devices and media applications for socialization, as well as daily activities, such as phone calls, texting, and

[13] CDC (Center for Disease Control and Prevention. (2020) *Disability & Health Overview – Impairments, Activity Limitations, and Participation Restrictions*. Retrieved from: *https://www.cdc.gov/ncbddd/disabilityandhealth/disability.html#:~:text=A%20disability%20is%20any%20condition,around%20them%20(participation%20restrictions).*

[14] Goggin, G., Ellis, K., Hawkins, W. (2019) *Disability at the centre of digital inclusion: assessing a new moment in technology and rights*. New Media & Society February 2022 24(2), p 384. Retrieved from: *https://journals.sagepub.com/doi/10.1177/14614448211063173*

[15] Ferri, D. *et al*. (2022) *Implementing the Right of People with Disabilities to Participate in Cultural Life across Five European Countries: Narratives and Counternarratives*. Journal of Human Rights Practice, Volume 14, Issue 3, p 869-871. Retrieved from: *https://doi.org/10.1093/jhuman/huac035*.

[16] See, e.g., cases *Jolanta K. v. Carrefour Polska Sp.z.o.o.*; *Ventsislav Tsvetanov Ivanov and Ors v. "Optima Group" OOD* N 473/07.

[17] Thompson, S. (2018) *Mobile Technology and Inclusion of Persons with Disabilities*. K4D Emerging Issues Report. Brighton, UK: Institute of Development Studies, p 4. Retrieved from: *https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/13834*

[18] Ableism is defined as discrimination in favour of persons who lack disabilities.

other interactions.[19] It was thus stated that persons with disabilities encountered considerable pressure to adhere to the norms of socialization.[20] Digital inclusion of people with disabilities means making sure that these information communication technologies are usable and accessible to everyone, including people with impairments. The accordance and social interactions of developing technologies are reshaping the landscape of digital inclusion, with profound consequences for those who suffer the most from inequality, exclusion, and marginalisation. These societal and technological integration discourses, however, typically miss the reality and contexts of digital inequality. This is particularly relevant for individuals who have disabilities. A keen focus on various facets of disability when it pertains to technological advances, creativity, and design has complex and expanded prior research on accessible, universal, and inclusive design. [21]

One could contend that addressing both sensory and cognitive accessibility barriers, as well as providing appropriate assistive devices and computer skills development are required for individuals with impairments to be digitally included.[22] On the other hand, digital exclusion for persons with disabilities can take many different forms, such as physical barriers to using digital technology, a lack of available electronic data, and a lack of training in technological abilities. The above may result in social marginalisation, a lack of participation in the digital society, a loss of accessibility to important data and amenities, etc.[23] In order to ensure digital inclusion for people with disabilities, access barriers such as inaccessible websites and a lack of technological assistance needs to be eliminated in addition to providing accessible digital goods and amenities. It has been professed that barring persons with impairments from engaging with technology might have negative consequences, such as fewer job opportunities and limited utilisation of healthcare and social assistance.[24] Overall, accessibility constraints, as well as the affordability of assistive technology and digital skill development, are directly connected to digital engagement and social

[19] Bitman, N. John, N. A. (2019) *Deaf and Hard of Hearing Smartphone Users: Intersectionality and the Penetration of Ableist Communication Norms*. Journal of Computer-Mediated Communication, Volume 24, Issue 2, p 62-67. Retrieved from: *https://doi.org/10.1093/jcmc/zmy024*
[20] *Ibid.*, p 57-59.
[21] Goggin, G., Ellis, K., Hawkins, W. (2019) *Disability at the centre of digital inclusion: assessing a new moment in technology and rights*. New Media & Society February 2022 24(2), p 384. Retrieved from: *https://journals.sagepub.com/doi/10.1177/14614448211063173*
[22] Tsatsou, P., Hildebrandt, K. A. (2018). *Digital inclusion of persons with disabilities: A neglected area in the field of ICT for development?* Information Technology for Development, 24(3), p 431. Retrieved DOI: *10.1080/02681102.2017.1416648*.
[23] Thompson, S. (2018) *Mobile Technology and Inclusion of Persons with Disabilities*. K4D Emerging Issues Report. Brighton, UK: Institute of Development Studies, p 4. Retrieved from: *https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/13834*
[24] Seymour, W. *et al.* (2020). *Digital inclusion and accessibility for people with disabilities*. Universal Access in the Information Society, 19(1), p 1. Retrieved DOI: *10.1007/s10209-019-00701-1*.

isolation for people with impairments. Addressing these concerns is critical to ensure that persons with disabilities have equal access to and engagement with the digital economy.

Within instances past, abrasive, and adaptive technologies were used to promote individuality and participation. Technology for those with impairments would initially be prohibitively expensive, necessitating either customised independent software or hardware.[25] Text-to-speech and voice recognition, along with the ability to modify contrast and colour systems, touch and motion input, and screen magnification, have all become easily accessible. ICT serves the ability to assist people with disabilities to live independently, seek employment, educate themselves, and get access to essential government facilities. The web and ICT may assist people with impairments participate in social, economic, and civic activities. Several ICT formats, channels, and services enable people with various impairments to access information and communication via methods that they both understand and favour.[26] The availability of functionality in standard ICT has brought a remote reduction in prices while simultaneously inspiring unique ICT for inclusive applications.

To encourage integration for individuals with impairments, efforts must focus on increasing consciousness among varied participants and strengthening competence for providing accessible and unrestricted digital spaces.[27] Thus, persons with disabilities must be included from the outset in the conceptualization, planning, and implementation of ICT activities. The intricacy of the gadgets, the reactive design of assistive technology, and the inability of designers and merchants to incorporate people with disabilities into their designs, according to critics, are all examples of the social marginalisation of people with disabilities to a greater extent.[28] In 2021, a study revealed that the majority of participants' criticisms of technology focused on its poor usability and accessibility, as well as flaws in the mechanism it was constructed with. The subjects of concern included concerning matters with security, e.g., violations of privacy, fraud, phishing, or hacking, as well as improper or unauthorised use of user data; accessibility tools' efficacy being minimal or variable; inadequate availability in common technologies and operations; complicated understanding and use of the tools; unclear equipment-use guidance or processes; tools not being

[25] Seymour, W. *et al.* (2020). *Digital inclusion and accessibility for people with disabilities*. Universal Access in the Information Society, 19(1), p 6. Retrieved DOI: *10.1007/s10209-019-00701-1*.
[26] *Ibid*.
[27]Thompson, S. (2018) *Mobile Technology and Inclusion of Persons with Disabilities*. K4D Emerging Issues Report. Brighton, UK: Institute of Development Studies, p 6. Retrieved from: *https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/13834*
[28] Tsatsou, P. (2021) *Is digital inclusion fighting disability stigma? Opportunities, barriers, and recommendations*. Disability & Society, 36:5, p 706-707. Retrieved from: https://doi.org/10.1080/09687599.2020.1749563

customised to the demands of the users; too much variety, too little standardisation; incompatibility of earlier technology items, as well as the design being unfriendly to users; as well as other critiques, such as low literacy or skills, restrictive copyright laws and unreliable information or services regarding the tools available. It shall be emphasized that some impairments are more compatible with certain technological interfaces than others, for illustration, persons with intellectual disabilities found it difficult to use new, upgraded, or subsequent versions of a gadget or software; technological advances have become complicated and using particular devices along with completing specific activities requires numerous separate actions with the addition of novel instruments and functionality paths. Due to both technological and functional limitations, disability can be established as a bio-medical obstacle to digital inclusion.[29]

[29] Tsatsou, P. (2021) *Is digital inclusion fighting disability stigma? Opportunities, barriers, and recommendations*. Disability & Society, 36:5, p 713. Retrieved from: https://doi.org/10.1080/09687599.2020.1749563

1.2 Web accessibility

Web accessibility is a critical problem that has gained traction in recent years, particularly in Europe.[30] Web accessibility tools are software or hardware gadgets that enable people with impairments to access online content on webpages and mobile apps. Screen readers, magnifiers, voice recognition software, and alternative input methods are illustrations of these products.[31] These instruments might have legal repercussions, and their use is governed by a variety of laws and rules. The UNCRPD acknowledges persons with disabilities' right to equitable access to information and communication technologies (ICTs). The use of digital accessibility tools by persons with disabilities is safeguarded by the UNCRPD, which all EU Member States have ratified. According to Article 9 of the UNCRPD, "States Parties shall adopt adequate measures to guarantee that people with disabilities have equitable access to information and communication tools, including the Internet."[32] This implies that those with impairments have the right to use online accessibility tools to access digital content, and governments and other entities are responsible for making digital content accessible. Furthermore, the European Union Web Accessibility Directive (WAD)[33] entered into effect in 2016, requiring all public sector websites and mobile apps to be available to persons with impairments.[34] Consequently, the EU WAD requires public sector websites and mobile apps to be available to people with disabilities, including those who have visual, hearing, and motor limitations. The Directive requires EU Member States to take steps to ensure that their websites and mobile apps are accessible, including the use of accessibility tools and testing methods. The EU WAD emphasises the importance of groups prioritising online accessibility and taking steps to ensure that their digital material is available to all people, including those with impairments. It thus mainly aims to provide for a harmonized accessibility standard which encourages EU Member States to "extend the application /…/ to private entities that offer facilities and services /…/ provided to the public".[35]

[30] European Commission. (2023) *Web accessibility*. Retrieved from: *https://digital-strategy.ec.europa.eu/en/policies/web-accessibility*
[31] Berkeley University of California. (2023) *Types of assistive technology*. Retrieved from: *https://webaccess.berkeley.edu/resources/assistive-technology*
[32] UNCRPD Art. 9 s 1 ss (b).
[33] Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies (WAD). OJ L 327, 02.12.2016, p 1-15.
[34] European Commission. (2023) *Web accessibility*. Retrieved from: *https://digital-strategy.ec.europa.eu/en/policies/web-accessibility*
[35] WAD, para 34.

The European Accessibility Act (EAA) was thus implemented in Europe in 2019[36], with the goal of harmonizing accessibility standards for goods and services in the EU internal market. The EAA includes a broad variety of goods and services, such as websites, mobile apps, and other digital content.[37] The EAA mandates that digital content be made accessible to those who are disabled, as well as that web accessibility technologies be available and useful. National rules and regulations further safeguard the use of web accessibility tools. For instance, the Equality Act 2010[38] in the United Kingdom mandates that websites and mobile apps be available to those who are disabled.[39] It could further imply that entities have a legal duty to make their digital content available, and that people with disabilities have the right to access that content using online accessibility tools. Furthermore, the Danish Act on Accessibility of Websites and Mobile Applications (*Lov om tilgaengelighed af websteder og mobile applikationer*)[40] mandates public sector websites and mobile applications to be accessible to persons with disabilities, including adhering to the WCAG 2.1.[41] The legal consequences of online accessibility tools extend beyond government webpages and mobile apps. Accessibility requirements apply to private sector websites and mobile apps as well, particularly if they provide vital services or goods. The EAA mandates that websites and mobile apps in the private sector shall be equally accessible to persons with disabilities[42], and that web accessibility tools be available and useful.[43]

Ultimately, in Europe, the use of online accessibility tools by people with disabilities is safeguarded by a variety of rules and regulations. These tools are critical for people with disabilities who want to access digital material on websites and smartphone apps. Governments and other entities have a duty to make digital material accessible, as well as to make web accessibility tools available and usable. Web accessibility tools have legal consequences for both public and private sector websites and mobile apps, and their implementation is safeguarded by international and national legislation and laws. The legal implications referred to are further evaluated and investigated in Chapter 3 of this paper.

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[36] Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (EAA). OJ L 151, 07.06.2019, p 70-115.
[37] *Ibid.*, Art. 2 s 2; s III ss (c).
[38] Legislation.gov.uk. (2010) *Equality Act 2010*. Retrieved from: *https://www.legislation.gov.uk/ukpga/2010/15/contents*
[39] *Ibid.*, pt 2 ch. 2 s 20.
[40] Act no. 692 of 08/06/2018 of the Ministry of Finance on accessibility of public bodies' websites and mobile applications. AE002551, 08.06.2018. Ministry of Finance, Digitalization Agency, j.no. 2016-1277. Retrieved from: *https://www.retsinformation.dk/eli/lta/2018/692*
[41] WCAG 2.1, s 3; s 3 ss 4.
[42] EAA. Art 29 s 2 ss (b).
[43] *Ibid.*, Annex I, s 1 ss 1 sd (a) p (i)-(iv); ss 1 sd (b) p (i)-(ix).

1.3 Evaluation of risks

There are several risks associated with using web accessibility tools for persons with disabilities, including security risks, for instance. Web accessibility tools may require the download of extra software, plugins, or add-ons,[44] which may introduce security flaws that hackers or malware could exploit. The software or plugin could contain malware or other malicious code that could damage the user's device or expose their confidential data. Inadvertently downloading the incorrect software or plugin could end up resulting in a security vulnerability at some point.[45] Furthermore, a few web accessibility tools might demand the software or plugin to be given a certain degree of access or permissions, which might increase the risk of unauthorised access or data breaches.[46] When obtaining and launching any software or application, the user should exercise caution and ensure that it comes from trustworthy sources and is frequently updated to correct any security flaws. Considering data privacy, web accessibility tools may necessitate the gathering, processing, or storing of personally identifiable information (PII), such as login passwords or browser history.[47] If this data is not correctly safeguarded or enters into the grasp of improper individuals, it could be used for identity fraud or other malicious purposes. For instance, if PII is not properly safeguarded, it may be used for other types of malicious purposes, such as the possibility for hackers to use PII collected through accessibility tools to launch phishing attacks, or emails designed to deceive users towards offering sensitive information, such as credit card details.[48] Hackers could also use the PII obtained to conduct social engineering attacks, in which they influence people into disclosing private information or conducting actions that may jeopardise their security.[49] Web accessibility tools may thus not be compatible with all websites or platforms, which could prohibit people with impairments from viewing certain online material or services. Some online accessibility tools, such as text-to-speech or screen readers, may rely on third-party suppliers for certain features, e.g., Accessibility Spark, Google Assistant, Accessibility Scanner,

[44] T, Tashia. (2023) *Top 7 Wordpress accessibility plugins every website should be using in 2023*. Hostinger Tutorials. Retrieved from: *https://www.hostinger.com/tutorials/best-wordpress-accessibility-plugins#:~:text=Accessibility%20plugins%20are%20software%20add,%2C%20cognitive%2C%20or%20motor%20impairments.*

[45] Kalman, G. (2022) *10 common web security vulnerabilities: insecure direct object references*. Toptal. Retrieved from: *https://www.toptal.com/security/10-most-common-web-security-vulnerabilities*

[46] *Ibid*., *Authentication and Authorization: a cybersecurity primer*.

[47] Bernstein, C. (2023) *Personally Identifiable Information (PII)*. TechTarget. Retrieved from: *https://www.techtarget.com/searchsecurity/definition/personally-identifiable-information-PII*

[48] galaxkey. (2023) *How do hackers use stolen PII?* Retrieved from: https://www.galaxkey.com/blog/how-do-hackers-use-stolen-pii/

[49] Kurian, A. (2021) *„Every bit of compromised PII can be used for social engineering attacks to target individuals or institutions"*. CISOMAG. Retrieved from: *https://cisomag.com/pii-for-social-engineering-attacks/*

and other similar tools.[50] If these service providers encounter technological problems or terminate their business operations, it may affect the accessibility of the websites or services for persons with disabilities. The use of third-party tools may also make troubleshooting issues more difficult, while there could possibly be difficulties with compatibility within various third-party tools, resulting in a decrease in total website or service functionality.[51] Web accessibility tools may thus not always provide the intended degree of accessibility or may provide incorrect alt-text or descriptions of online content, limiting the user's ability to view and engage with the content.[52] If service providers fail to adhere with data security laws or accessibility rules when adopting web accessibility tools, they may face legal action or fines. Comprehensively, it is critical for service providers to carefully evaluate and employ web accessibility tools for disabled persons in a way that reduces these risks, withal providing effective and dependable accessibility solutions.

1.4 Misuse

Web accessibility tools might be misused to an extent by persons with disabilities, which raises questions regarding their usefulness and potential effects on the greater disability community. These types of abuse deserve to be taken extremely seriously given that they may diminish the usefulness of web accessibility tools and result in the exclusion of people with disabilities from content on the internet. Furthermore, they ought to risk contributing to negative stereotypes related to disabled people as dishonest or deceitful operators which would be detrimental to the broader disability community. Recognising the potential for abuse is crucial, as is attempting to create solutions that address these problems while advancing accessibility for all.

1.4.1 Damage to others

It is worth noting that the majority of disabled people who use online accessibility tools do so properly and for the intended purpose of getting digital content and services, as assumed. However, any tool or technology has the potential to be misused or abused, and web accessibility tools are no exception. While accessibility tools are intended to help disabled people access internet material, there are times when their abuse can be harmful. Web accessibility tools frequently

[50] Accessibility Spark. (2022) *12 awesome accessibility apps in 2022*. Retrieved from: *https://accessibilityspark.com/12-awesome-accessibility-apps-in-2022/*
[51] Harker, K. (2022) *Don't sink your website with third parties*. Smashing Magazine. Retrieved from: *https://www.smashingmagazine.com/2022/06/dont-sink-website-third-parties/*
[52] TPGi. (2022) *Top ten most common web accessibility issues*. Retrieved from: *https://www.tpgi.com/ten-common-web-accessibility-issues/*

depend on automatic programmes or bots to evaluate web page content and provide alternative forms or interfaces for users with impairments. These automated tools may be used to scrape personal data from websites without appropriate permission or lawful basis,[53] possibly violating data security laws. Disabled people may be enticed to use accessibility tools to obtain access to confidential information about others that they would not have otherwise. As the collection and processing of personal data without permission is forbidden,[54] this could result in a violation. Accessibility tools have the potential to be used to obtain unauthorised access to limited or secured sections of a website. For instance, an automatic script intended to help users register onto a website could be used to circumvent security measures and obtain access to confidential information. The use of online accessibility tools may result in unauthorised access to limited sections of webpages or web apps, potentially exposing the disabled user to liability if they gain unwanted access to private or proprietary information. Web accessibility tools further have the potential to be used to manage spamming or other harmful actions. An automatic software intended to help users in filling out online forms, for example, could be used to overwhelm a website with spam entries. Such tools may be used to avoid digital rights management systems that safeguard protected material, potentially resulting in intellectual property rights violation. Another possible legal implication is a breach of the web service provider's conditions or terms of service, or other contractual arrangements. If a disabled person breaches the conditions of service or other agreements of the provider, they may be held legally liable for any resulting injury, including monetary damages or other sanctions. These potential misapplications are not restricted to web accessibility tools and could apply to any tool or technology that interacts with digital material. However, it is critical to be conscious of these risks and take suitable precautions to avoid them. To identify and prevent illegal access, data scraping, or other harmful activities, service providers should implement appropriate security measures and track them afterwards, such as limiting access to confidential information or demanding extra verification for specific activities. The Web Content Accessibility Guidelines 2.1 (WCAG 2.1),[55] which provide guidelines for making online material more available, thus include recommendations for tackling accessibility-related security problems.

[53] Campbell, F. (2019) *Data scraping – considering the privacy issues*. Fieldfisher. Retrieved from: *https://www.fieldfisher.com/en/services/privacy-security-and-information/privacy-security-and-information-law-blog/data-scraping-considering-the-privacy-issues*

[54] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (GDPR). OJ L 119, 04.05.2016, p 1-88. Art. 6 s 1.

[55] Web Content Accessibility Guidelines (WCAG) 2.1. W3C Recommendation 05.06.2018. Retrieved from: *https://www.w3.org/TR/WCAG21/*

1.4.2 Individual harm

Apart from creating damage to others, disabled individuals can also cause harm to themselves. One possible legal implication for disabled people who use accessibility tools is that they may provide confidential information to unauthorised individuals or third-party organisations inadvertently. This could happen if a disabled person inputs confidential personal information, such as a bank details or other sensitive information into fields of a website that are not meant for that purpose. In such instances, the service provider may be held responsible for any ensuing damage, such as money losses or identity fraud. Additionally, if a disabled person uses a screen reader tool to access a website but the tool is not properly set or configured, the individual may be provided with inaccurate or wrong information. This could result in the individual suffering harm, such as making a poor decision or acting in a manner that will harm them. For example, disabled people who use accessibility tools may unintentionally violate data security rules such as enforced by the GDPR. If a disabled person communicates personal information unintentionally with unapproved individuals or suppliers, the service providers may be held responsible for any resulting damage or violation of data protection laws. In such instances, the accessibility tool's creator or supplier may be held liable for any harm created by their negligence or failure to provide accurate and dependable tools.[56] Furthermore, if the individual was not given sufficient guidance or training on how to properly use the tool, they may be held liable for any damage created by their own negligence. Another feasible danger connected with the abuse of online accessibility tools is that they may give the user a mistaken sense of security. A user with limited mobility may depend on an accessibility utility that enables them to browse a website using only the keyboard, further known as "keyboard-only navigation".[57] While this tool may make it simpler for the user to view the website, it does not ensure that the webpage is completely available or that it adheres to accessibility standards. Expressly, even with the use of accessibility tools, a webpage may still have inaccessible content or features that the user is unable to reach.

Furthermore, there is a danger that some disabled people will become overly dependent on accessibility tools, to the point where they will battle to use a website or application that lacks such tools. This may limit their internet encounters and possibilities. As a result, it is critical for disabled people to grasp the limitations of accessibility tools and, if required, seek out alternative methods of accessibility. It is critical that disabled people who use accessibility tools are conscious of these

[56] See, e.g., Art. 2 of Directive 85/374/EEC and Art. 5 of Directive 2011/83/EU.
[57] Dolson, J. C. (2016) *Using keyboard-only navigation, for web accessibility*. PracticalEcommerce. Retrieved from: *https://www.practicalecommerce.com/Using-Keyboard-only-Navigation-for-Web-Accessibility*

possible legal matters and take proper precautions to avoid unintentional damage. This may include closely examining online site terms of service agreements and privacy policies, employing security measures such as routers and antivirus software, and, if required, obtaining legal guidance. Furthermore, disabled people can profit from education and training programmes or guidelines[58] that teach them how to use accessibility tools correctly in order to reduce the risk of injury or legal responsibility. Necessarily, service providers who provide online accessibility tools to their users may also have a duty to ensure that their tools do not harm their users. This includes giving clear directions and recommendations on how to use their tools safely and effectively, as well as adopting measures to prevent overuse or abuse of these tools. Failure to do so may result in legal responsibility if a user is injured as a result of using the accessibility utility.

It is crucial to inform those who possess disabilities on how to use web accessibility tools correctly and the potential repercussions of doing so in order to address these problems. Additionally, the operators of websites ought to establish security measures into effect to stop unauthorised access and guarantee that all users can access their content. The use of CAPTCHAs, two-factor authentication,[59] and additional security measures may assist in guarantee that only authorised users can access material that is protected. Promoting an inclusive and understanding culture is also essential. Disability is a diverse and complex condition, and it is crucial to understand that not all people with disabilities have the same needs or abilities. Additionally, one can make the online space more accessible and inclusive to all individuals by continuing to make an effort to comprehend and account for these disparities.

[58] Short, K. (2021) *Accessibility and Digital Security*. security.org. Retrieved from: *https://www.security.org/digital-safety/accessibility-guide/*
[59] GEETEST. (2020) *CAPTCHA vs. Multi-factor Authentication: Can MFA or 2FA Replace CAPTCHA?* Retrieved from: *https://blog.geetest.com/en/article/captcha-vs-2fa-can-2fa-replace-captcha*

1.5 Tools for web accessibility

Web accessibility tools may be effective in facilitating accessibility given that disability constitutes one of the targeted categories where digital technologies have been suggested to be beneficial for reducing hindering barriers. Web accessibility tools are software or hardware solutions that help disabled users view digital material. These tools are critical for ensuring that people with disabilities can navigate the web, engage with digital material, and completely partake in online activities.[60] Various examples of online accessibility aids for persons with disabilities are presented below.

1.5.1 Alt-text and transcripts

Alt-text tools are a form of online accessibility tool that allows visually disabled people to view visual material on webpages. These tools function by giving substitute text explanations for images, graphics, and other visual components found on webpages.[61] When a visually challenged person views a website with a picture, the alt-text tool provides a written description of the image that the user's screen reader can read. Alt-text tools are important for visually impaired or blind people because they allow them to access visual material that they would otherwise be unable to see. Individuals with poor vision, colour blindness, or other visual impairments can also benefit from these aids. Alt-text tools help these people comprehend and explore website material by offering alternative text descriptions. In addition to their advantages for people with visual impairments, alt-text tools are critical for adhering to online accessibility standards like the WCAG 2.1. All pictures, logos, and other visual components on a website must have substitute written explanations that are available to screen readers and other assistive technologies, according to the WCAG 2.1.[62] Alt-text tools can be applied in a variety of ways, including by having website writers manually enter alternative text descriptions or by using automatic tools that create alternative text descriptions based on picture recognition algorithms. "alt" tags in HTML code, [63]

[60] Lawton Henry, S. (2018) *Essential Components of Web Accessibility*. World Wide Web Consortium (W3C). Retrieved from: *https://www.w3.org/WAI/fundamentals/components/*

[61] Harvard University. (2023) *Write good Alt Text to describe images.* Retrieved from: *https://accessibility.huit.harvard.edu/describe-content-images#:~:text=Alternative%20(Alt)%20Text%20is%20meant,example%20of%20a%20missing%20image.*

[62] See, e.g. WCAG 2.1 Success Criterions 1.4.5 and 1.4.6.

[63] Pennsylvania State University. (2023) *Image ALT Tag Tips for HTML*. Retrieved from: *https://accessibility.psu.edu/images/imageshtml/#:~:text=ALT%20text%20%E2%80%93%20the%20concept%20of,attribute%20within%20the%20IMG%20tag.*

picture recognition software,[64] and machine learning techniques[65] are all instances of alt-text tools. Alt-text tools are a critical component of web accessibility, guaranteeing that people with visual impairments can access and explore online material. They are also necessary for complying with online accessibility standards and legal web accessibility requirements.

Transcript tools provide a written form of audio or video material such as lectures, interviews, or recordings.[66] These tools can be extremely beneficial to people who are deaf or hard of hearing, as well as those who prefer to peruse rather than listen to material. Transcript tools function by automatically converting audio or video material into text using voice recognition technology.[67] Users can then peruse the text in addition to or instead of listening to or viewing the audio or video. Some transcript tools also allow you to look for particular words or sentences within the transcript or change the playback pace of the audio or video.[68] Transcript tools can be incorporated into websites, video players, and other digital platforms to ensure that all users have access to the same material in the format that is most convenient for them. Transcript tools, like other online accessibility tools, can help guarantee compliance with accessibility standards and encourage inclusion for people with disabilities.

1.5.2 Colours and fonts

Colours and fonts are essential elements of online accessibility that can have a big effect on disabled users. Some people may struggle to differentiate between different hues or typefaces, making it difficult for them to read and traverse webpages. Consequently, there are numerous web accessibility tools accessible to assist in addressing these issues. Colour contrast tools, for example, can assist users in determining whether the colour difference between text and background fulfils specific accessibility standards. This is especially essential for people with vision impairments who may have trouble distinguishing between different hues. Some colour contrast tools may also recommend different colour combos that comply with accessibility standards.[69]

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[64] Tromans-Jones Spiteri, M. (2021) *Image alt text generation using image recognition*. GainChanger. Retrieved from: *https://www.gainchanger.com/image-alt-text-generation/*
[65] Rodriguez, N. R. (2019) *Using artificial intelligence to generate alt text on images*. CSS-TRICKS. Retrieved from: *https://css-tricks.com/using-artificial-intelligence-to-generate-alt-text-on-images/*
[66] Siva, A. (2023) *Transcription.* G2. Retrieved from: *https://www.g2.com/glossary/transcription-services-definition*
[67] *Ibid.*
[68] See, e.g., Sonix, Happy Scribe, or Descript.
[69] Colorado State University. (2023) *What is Color Contrast?* Retrieved from: *https://www.chhs.colostate.edu/accessibility/best-practices-how-tos/color-contrast/*

Font tools, on the other hand, can assist users in customising the look of text on webpages to better meet their specific requirements.[70] Individuals with dyslexia, for example, may profit from fonts intended specifically to enhance readability.[71] Individuals with vision impairments may also profit from larger typefaces or fonts with greater letter spacing to make writing simpler to read. Aside from these particular tools, there are wider accessibility features that can be incorporated into online design to improve readability and usability. These may include choices for raising font height or changing a website's colour design.

1.5.3 Text-to-speech, assistive listening devices and audio descriptions

Screen readers are software applications that read the text of a webpage or document audibly to the user. They convert text to speech and allow blind or visually disabled users to view and engage with digital material.[72] Screen readers use keyboard instructions to browse a website and provide input to users about page components such as headings, links, and form forms.[73] Text-to-speech software translates printed text into spoken speech, giving users another method to view digital content.[74] This technology is especially beneficial for users who have difficulty comprehending or are unable to scan written material. Text-to-speech software can be tailored to specific users' preferences, including speaking speed and tone.[75]

Assistive listening devices (ALDs) enhance or provide better sound for people with hearing problems. This technology is especially beneficial for users who have trouble hearing in noisy settings or who require help detecting specific noises or wavelengths. Some ALDs can thus be used to amplify noises from TVs or telephones, allowing users to converse and interact with others more easily. Hearing aids, cochlear implants, and FM systems are examples of assistive listening equipment.[76]

Audio descriptions[77] are spoken explanations of visible material, such as movies, theatre performances or other live acts. This technology is critical for people who are blind or visually

[70] See, e.g., EasyRead or Readable.
[71] See, e.g., Dyslexie Font or OpenDyslexic.
[72] Göransson, D. (2019) *What is a screen reader?* axess lab. Retrieved from: *https://axesslab.com/what-is-a-screen-reader/*
[73] See, e.g., JAWS, NVDA, and VoiceOver.
[74] See, e.g., NaturalReader, Read&Write and Google Text-to-Speech.
[75] Skinner, O. (2020) *What is text to speech software used for?* Voices. Retrieved from: *https://www.voices.com/blog/text-to-speech-software-use-cases/*
[76] Victory, J. (2022) *Assistive listening devices and systems*. Healthy Hearing. Retrieved from: *https://www.healthyhearing.com/help/assistive-listening-devices*
[77] See, e.g., Verbit or the Audio Description Project (ADP).

impaired because it allows them to comprehend visual material. Audio explanations, which are usually added between speech and sound effects, explain the action, characters, and locations of the visual material.[78]

1.5.4 Braille support and sign language interpretation

Braille screens are hardware devices that show digital information in a tactile manner. They have a number of pins that rise and lower to make Braille characters that blind or visually challenged users can read. Braille displays, which can be linked to a computer or mobile device,[79] enable users to view and explore digital material in Braille.[80]

Sign language interpretation is the visual explanation of spoken language that enables users to comprehend spoken material through visual signs and motions.[81] This technology is especially beneficial for people who are deaf or hard of hearing, or who prefer to communicate in sign language as their main language. Sign language interpretation can use a variety of methods, including in-person translators, video remote translating, and avatar-based interpreting.[82]

1.5.5 Closed captioning

Text subtitles for auditory material, such as videos, presentations, or podcasts, are provided by closed captioning. This technology is important for people who are deaf or hard of hearing as it enables them to access audio material. Closed captioning can be open, in which the subtitles are accessible to all users, or closed, in which the user must activate the captions. Closed captioning can be generated directly or automatically, and it is increasingly popular on websites and social media networks.[83]

1.5.6 Voice recognition

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[78] Lewis, E. (2021) *What is Audio Description?* 3PLAYMEDIA. Retrieved from: *https://www.3playmedia.com/blog/what-is-audio-description/*

[79] Fable Tech Labs Inc. (2023) *What is a Braille Display?* Retrieved from: *https://makeitfable.com/glossary-term/braille-display/*

[80] See, e.g., Focus Blue or the Orbit Reader 20.

[81] Centre for Excellence in Universal Design. (2023) *Sign Language Interpreting*. Retrieved from: *https://universaldesign.ie/technology-ict/archive-irish-national-it-accessibility-guidelines/digital-tv-equipment-and-services/guidelines-for-digital-tv-equipment-and-services/sign-language-interpreting/#:~:text=Sign%20language%20interpreting%20is%20the,language%20is%20their%20first%20language.*

[82] See, e.g., Video Relay Service (VRS), SLAIT, or SignAll.

[83] Chen, M. (2022) *What is Closed Captioning? Everything You Need to Know is Here*. Notta. Retrieved from: *https://www.notta.ai/en/blog/closed-captioning*

Users of speech recognition software can use voice commands to operate their computer or mobile device.[84] This technology is especially beneficial for users who have limited movement or are unable to use a keypad or mouse. Voice recognition software can be used to launch apps, browse webpages, and enter text.[85] Speech detection software examples include Dragon Naturally Speaking and Google Voice Typing.

1.5.7 Magnification software

Magnification software[86] enlarges a website's content, making it simpler to comprehend for users with vision disabilities. Magnification software is especially beneficial for users with low vision or who require a bigger font size to comprehend. The software can be tailored to individual users' requirements, and it can be used to zoom in on particular sections of a website or to magnify the complete screen.[87]

1.5.8 Keyboard alternatives and head-tracking software

Different secondary keyboard options[88] offer users an alternative to using a conventional keyboard and mouse to communicate with a website. This technology is especially beneficial for users who have mobility issues or are unable to use a normal keypad and trackpad. On-screen keyboards, switch devices, and speech recognition applications are examples of keyboard replacements.[89]

Head tracking software employs a camera to monitor a user's head motions, enabling them to operate a cursor on the screen without the use of a conventional mouse or computer. This technology is especially beneficial for users with restricted movement or who are unable to use a conventional input device.[90] These tools enable users to direct the mouse cursor with their head movements, making it simpler for them to navigate digital material.[91]

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[84] IBM. (2023) *What is speech recognition?* Retrieved from: *https://www.ibm.com/topics/speech-recognition*
[85] Hawkins, C. (2022) *The best dictation software in 2023*. Zapier. Retrieved from: *https://zapier.com/blog/best-text-dictation-software/*
[86] See, e.g., ZoomText, SuperNova or Apple's Display Zoom.
[87] RNIB. (2023) *Screen magnification*. Retrieved from: *https://www.rnib.org.uk/living-with-sight-loss/assistive-aids-and-technology/tech-support-and-information/computers/screen-magnification/#:~:text=Screen%20magnification%20software%20or%20the,on%20a%20screen%20without%20enhancements.*
[88] See, e.g., Tobii Dynavox I-12+/I-15+, QuadJoy 3 Motuh, and enPathia.
[89] AbilityNet. (2021) *Keyboard and mouse alternatives and adaptations*. Retrieved from: *https://abilitynet.org.uk/factsheets/keyboard-and-mouse-alternatives-and-adaptations*
[90] Eyeware Beam Staff, (2022) *How Eye Tracking and Head Tracking Help Disabled Gamers Level Up.* EyewareBeam. Retrieved from: *https://beam.eyeware.tech/disabled-gamers-level-up-head-eye-tracker/*
[91] See, e.g., EyeGaze, HeadMouse, and Tobii.

1.5.9 Other tools and interfaces

Alternative formats allow individuals to interact with digital material such as papers, videos, or pictures in a different manner. This technology is especially beneficial to users who have visual impairments or are unable to view normal digital material. DAISY (Digital Accessible Information System) books[92], accessible PDFs, and 3D printing are some instances of alternative forms. Essentially, web accessibility tools are critical for ensuring that people with disabilities have access to and engage with digital material. Screen readers, Braille displays, magnification software, voice recognition software, closed captioning, keyboard alternatives, text-to-speech software, alternative formats, assistive listening devices, audio descriptions, sign language interpretation, and head tracking software are among the tools available to help users navigate the web. By incorporating these tools into their design and development processes, website developers and content producers can aim to make their digital material available to all users, including those with disabilities.

[92] Kearney, G. (2011) *DAISY: What is it and why use it?* National Federation of the Blind. Retrieved from: *https://nfb.org/sites/default/files/images/nfb/publications/bm/bm11/bm1102/bm110210.htm*

2. LEGAL COMPLIANCE AND DATA PROTECTION

There are considerable structural barriers impacting disabled people in general. Concerns about affordability, a lack of knowledge and skills, inadequate assistive equipment, and poor web service design are all instances of structural obstacles. Even while disabled people have access to assistive technology to aid them in using the internet, it is usually incompatible with particular web-browser designs. However, it may be contended that it does not involve the internet in its entirety that is inaccessible to persons with disabilities, but rather certain web-based amenities that affect them in distinct ways.[93]

It has previously been argued that country-specific practises influence how authorities develop legal requirements to comply with web accessibility requirements. The curb-cut phenomenon, including accessible design concepts, asserts that designing with individuals who have impairments in mind facilitates all parties and encourages greater inventiveness. Some studies envision an environment in which inclusively built online communication commercial systems, as well as hiring, education, and accreditation systems, benefit all parties while disrupting the status quo in tackling global economic concerns.[94]

Some of the legal implications connected with using web accessibility tools for disabled people for the purposes of this chapter shall include the following:

- **Non-compliance with data protection legislation**: If online accessibility tools gather, process, or keep personal data in a manner that violates data protection laws such as the GDPR, service providers may face legal action or fines.
- **Infringement of accessibility regulations:** The European Accessibility Act mandates certain kinds of digital services to be accessible. If online accessibility tools are not implemented in accordance with these rules, service providers may face legal action or fines.
- **Discrimination claims**: Individuals with disabilities may be unable to access certain online material or services if web accessibility tools are not correctly applied, which may be deemed discrimination under disability rights laws.

[93] Stephen J. Macdonald & John Clayton. (2013) *Back to the future, disability and the digital divide*. Disability & Society, 28:5, 702-718, DOI: 10.1080/09687599.2012.732538 Retrieved from: *https://doi.org/10.1080/09687599.2012.732538*.
[94] Blanck, P. (2014). *Disability, law and public policy, and the world wide web*. Behavioral Sciences & the Law, 32(1), p 2.

- **Contractual disputes:** If service providers fail to provide the degree of accessibility guaranteed to clients, they may face financial penalties or judicial action.

Collectively, service providers must ensure that web accessibility tools are applied in a way that complies with all relevant laws and rules while also providing effective and dependable accessibility solutions. The subsequent overview has been gathered from various laws, regulations, and other pertinent legal sources to provide an overview of the acts that regulate web accessibility tools.

2.1 General Data Protection Regulation

The GDPR[95] is a European Union law that regulates the handling of individuals' personal data within the EU and is thus intended to safeguard people' privacy and confidential data, including those with impairments. Misuse or absence of online accessibility tools for disabled people can violate GDPR, resulting in legal ramifications for entities. Organizations must guarantee that personal data is handled lawfully, fairly, and in a transparent manner under the GDPR.[96] This means that when processing personal data, groups must consider the requirements of people with disabilities. Individuals with disabilities may be unable to access and control their personal data if online accessibility tools are not given or are abused, resulting in a violation of their GDPR rights. The GDPR thus demands businesses to guarantee personal data security,[97] meaning that individuals with impairments may be at risk of having their personal data exposed or taken if online accessibility tools are not employed or are abused, resulting in an infringement of their GDPR data protection rights. The GDPR further requires organizations to provide people with clear and concise information about how their personal data is handled,[98] which may result in individuals with disabilities being unable to access this information. Furthermore, the GDPR requires businesses to give people access to, as well as a copy of their personal data.[99] Aside from the aforementioned requirements, the GDPR requires organizations to ensure that confidential data

[95] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (GDPR). OJ L 119, 04.05.2016, p 1-88.
[96] *Ibid.*, Art. 5 s 1 ss (a).
[97] *Ibid.*, Art. 32 s 1.
[98] *Ibid.*, Art 13 s 1-2.
[99] *Ibid.*, Art 15 s 1, 3.

is correct and up to date.[100] The GDPR thus requires organizations to provide people with the right to have their confidential data erased, also known as the right to be forgotten.[101] Individuals with impairments may be unable to utilize their right to erasure, ensuing in a breach of their right to be forgotten under GDPR. Additionally, the GDPR requires organizations to give people the right to object to the handling of their personal data.[102] This could thus evolve to a breach of their right to object under GDPR. Consequently, the misuse or absence of online accessibility tools for disabled people may violate GDPR. Organizations must make sure that online accessibility tools are available and used correctly so that people with impairments can access and handle their personal data. Organizations may face legal ramifications for failing to provide or misusing online accessibility tools, including fines and other sanctions, as referred to in Art 83 of the GDPR. Therefore, it is critical for businesses to emphasise web accessibility and ensure that their digital content is available to all people, including those with disabilities. While accessibility tools for persons with disabilities are intended to assist in accessing and interacting with digital content, there is a risk of data breaches and privacy violations that must be considered in light of GDPR.

2.1.1 Potential violations

Some instances of potential data breaches and privacy threats include personal data collection, third-party monitoring, breach of security, incorrect data, as well as user profiling. Some accessibility tools, such as screen readers, require personal data to work properly, such as access to a user's microphone or webcam. In such occurrences, website makers and utility suppliers must ensure that personal data is collected and processed in accordance with GDPR requirements. Obtaining user consent, giving explicit and transparent information about data processing, and ensuring that data is only gathered for stated objectives all serve as instances. Some accessibility tools, such as tracking user activity to provide personalised suggestions, may depend on third-party tracking tools or analytics to work properly. Thus, website developers and tool providers must ensure that they follow the GDPR regulation for third-party monitoring, such as getting user permission and limiting data sharing to trustworthy third-party partners. Accessibility tools that gather personal information or depend on third-party monitoring are also vulnerable to security breaches, which can result in illegal access, use, or disclosure of personal information. To avoid such breaches, website developers and tool providers must adopt suitable security measures such as encryption, access controls, and frequent security assessments. Various accessibility tools may

[100] *Ibid.*, Art 5 s 1 ss (d).
[101] *Ibid.*, Art 17 s 1.
[102] *Ibid.*, Art 21 s 1-2.

gather erroneous data or misunderstand user behaviour, resulting in incorrect conclusions about user preferences or requirements, whereas the developers must ensure that they have procedures in place to handle user concerns or complaints, such as offering a means for users to submit mistakes or errors, in such instances. Accessibility tools that depend on data gathering or third-party tracking may also result in user profiling, which is the process of using user data to build profiles or segments for targeted marketing or other reasons. Users must have the right to access and delete their personal data, as well as the right to refuse to the use of their data for profiling or commercial reasons, according to GDPR laws. Ultimately, while accessibility tools are critical for ensuring that people with disabilities can access and engage with digital content, website creators and accessibility tool providers must be mindful of the potential data leaks and privacy risks that these tools may pose. Website developers and tool providers can help mitigate these risks and protect user privacy by adhering to GDPR regulations such as obtaining user consent, providing transparent information about data processing, implementing appropriate security measures, and ensuring user rights to access and delete personal data.

2.2 The European Accessibility Act

The EAA[103], which was passed in 2019, seeks to increase the accessibility of goods and services to people with impairments. While the EAA does not address data privacy and security issues related to accessibility tools explicitly, it does require that all goods and services protected by the Directive satisfy certain accessibility standards.[104] Annex I of the EAA specifies comprehensive accessibility guidelines for a variety of goods and services, including websites and mobile apps, as well as ICT-specific requirements. The EAA sets minimal accessibility standards for a broad variety of goods and services, such as websites, mobile apps, and public transportation. As a result, certain criteria must be met by website makers and tool suppliers in order to prevent infringing on the rights of people with disabilities. The act seeks to guarantee that people with disabilities have equal access to goods and services, as well as the same degree of freedom and autonomy as everyone else.[105] The EAA also seeks to encourage market innovation and rivalry by setting common accessibility standards that businesses can use to create accessible goods and services.[106]

[103] Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (EAA). OJ L 151, 07.06.2019, p 70-115.
[104] *Ibid.*, Art. 4; Annex I.
[105] See, e.g., Articles 1, 4-6 and 11 of the EAA.
[106] European Commission. (2023) *Employment, Social Affairs & Inclusion*. Retrieved from: *https://ec.europa.eu/social/main.jsp?catId=1202&langId=en*.

Conveniently, there may be some possible data leaks and privacy dangers connected with the use of accessibility tools under the EAA, which website developers and tool providers should be aware of.

2.2.1 Potential violations

One of the EAA's primary objectives is to make all goods and services accessible to persons with disabilities. This means that website writers and accessibility tool suppliers must ensure that their tools are effective and satisfy the required standards.[107] People with disabilities may be unable to access a website or service if an accessibility tool is ineffective or does not reach the necessary standards. This may be deemed an infringement of their rights. The EAA bans disability-based prejudice, however people with impairments may be denied access to a website or service if an accessibility tool is not accessible or is ineffective. This could be deemed biased, and the website creator or tool supplier could thus face legal action as a consequence. People with impairments should also have the same degree of control over their internet experience as everyone else. People with disabilities may feel denied a degree of freedom and autonomy that is their right if an accessibility tool does not provide sufficient user control. This could be deemed a violation of their liberties.[108] According to the EAA, all goods and services must be functional with assistive devices used by people with impairments. People with impairments may be unable to use an accessibility tool efficiently if it is incompatible with a specific assistive technology, which may be deemed an infringement on its own. Some users may require extra support or aid in order to successfully use accessibility tools. Website makers and utility suppliers must ensure that assistance is available and accessible to all users.[109] If assistance is not given, people with disabilities may be unable to utilise the website or service, which may be deemed an infringement of their rights. Briefly, the EAA is intended to guarantee that people with disabilities have the same degree of access and authority over internet services as everyone else. Website developers and accessibility tool suppliers must ensure that their tools satisfy the required standards and are successful for everyone who requires them. Failure to do so may result in judicial action being taken against the website creator or tool supplier, as well as a violation of persons exploiting disabilities' rights.

[107] See, e.g., Articles 4, 6 and 7-8 of the EAA.
[108] UNCRPD, Art. 3.
[109] EAA, Art. 4.

2.3 Other relevant legal sources

There are other EU laws that are pertinent to the subject of data leaks involving people with disabilities besides GDPR and the European Accessibility Act. The ePrivacy Directive (Directive 2002/58/)[110] is a legislation that governs the handling of personal data in the electronic communications industry. It addresses problems such as communication security, the use of cookies, and the handling of location data. The ePrivacy Directive may be especially pertinent to the use of accessibility tools on websites, as these tools may gather data about users via cookies or other monitoring technologies. The General Product Safety Directive (GPSD)[111] is a legislation that establishes standards for the safety of goods put on the market in the EU. Their rules extend to all products, including those made specifically for persons with disabilities. The GPSD requires that goods be secure for their intended use and that any hazards connected with the product be at the lowest level feasible, recognised and handled.[112] The WAD further mandates accessible public sector websites and smartphone applications, requiring public sector organisations to follow a collection of accessibility guidelines known as the WCAG 2.1. The WAD may thus be applicable to the use of accessibility tools on government webpages, as these tools may be required to meet the WCAG 2.1 criteria. The World Wide Web Consortium (W3C),[113] a global community with member organisations, a full-time staff, and members of the public who cooperate to establish online standards that guarantee the web is accessible to everyone, is another example. The EDPB has thus provided specific set of instructions on how to establish an accessible web by establishing guidance on virtual voice assistants. The suggestions primarily consist of requirements to comply with EU legislation, such as the ePrivacy Directive and the GDPR. For instance, the service provider is required to obtain consent, provided that it remains strictly necessary for the processing of data, as well as have a legal basis for obtaining the information through the voice assistant.[114] The Non-Discrimination Directive is a further tool to ban prejudice on the basis of disability in a number of sectors, including access to products and services. This legislation pertains to all economic areas and mandates companies to make reasonable accommodations for persons with

[110] Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications). OJ L 201, 31.07.2002, p. 37-47.
[111] Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety (GPSD). OJ L 11, 15.01.2002, p 4-17.
[112] See, e.g., Articles 1, 5 and 8 of the GPSD.
[113] World Wide Web Consortium (W3C). (2023) *W3C Mission*. Retrieved from: *https://www.w3.org/Consortium/mission*
[114] European Data Protection Board (EDPB). (2021) Guidelines 02/2021 on Virtual Voice Assistants, p 21-23. Retrieved from: *https://edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-022021-virtual-voice-assistants_en*.

disabilities.[115] The Non-Discrimination Directive may apply to the use of accessibility tools on websites since these tools could require being made accessible to disabled users as a proper solution. Consequently, there are several EU laws that are pertinent to the subject of data breaches involving people with impairments in addition to GDPR, EAA, ePrivacy Directive and other measures. These legal requirements address problems such as product safety, the accessibility of government platforms, the lawful processing of data, as well as the prohibition of disability prejudice.

2.4 Case law overview

The paper thus continues with various pertinent examples of case law relating to the EU rules and other legislation mentioned previously. In 2019, the European Court of Justice (ECJ) released a decision in the Planet49 case (C-673/17)[116] that clarified the requirements for getting valid permission for the use of cookies on websites. The case concerned a German website that needed users to consent to the use of cookies in order to engage in an online lottery. The ECJ found that the website's pre-ticked cookie consent checkbox did not represent legitimate consent under the ePrivacy Directive because the user had not taken active action to express their permission.[117] In 2018, the ECJ released a decision in the Poland case (C-530/16)[118] that defined the GPSD's standards for product safety. The lawsuit concerned a rail fastening device that had been engaged in several mishaps. The ECJ found that the manufacturer had not taken adequate measures to identify and resolve the risks connected with the product, and thus had breached the GPSD.[119] In 2014, the ECJ released a decision in the *Fag og Arbejde* case (C-335/14)[120] that defined the criteria for reasonable accommodations under the Non-Discrimination Directive.[121] The case concerned a Danish trade union that declined to make its website available to a blind member. The European Court of Justice found that the trade union had broken the Non-Discrimination Directive by

[115] Council Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation. OJ L 303, 02.12.2000, p 16-22.
[116] C-673/17 (Planet49 case). *Bundesverband der Verbraucherzentralen und Verbraucherverbände - Verbraucherzentrale Bundesverband e.V. v. Planet49 GmbH*. ECLI:EU:C:2019:801.
[117] Press release No 111/19 of the European Court of Justice, para 38. Retrieved from: *https://curia.europa.eu/jcms/upload/docs/application/pdf/2019-10/cp190125en.pdf*
[118] C-530/16, *European Commission v. Republic of Poland*. ECLI:EU:C:2018:430.
[119] See paragraphs 25, 28, 30-33, 35, 39 of the judgment.
[120] C-354/13, *Fag og Arbejde v. Koomunernes Landsforening*. ECLI:EU:C:2014:2463.
[121] Council Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation. OJ L 303, 02.12.2000, p 16-22.

neglecting to make a fair adjustment for the member's impairment.[122] These are just a few of the many instances involving infringements involving people with disabilities that have been filed under EU law. These examples demonstrate the significance of adhering to EU regulations and ensuring that goods and services are secure, available, and non-discriminatory.

There are no specific EU data security case rules on the subject of web accessibility tools for disabled persons. However, the ECJ has decided on the significance of data security and privacy in the context of internet services in a number of instances. The ECJ decided in the Google Spain case[123] that people have the right to seek the erasure of personal data from search engine results if the information is incorrect, insufficient, unnecessary, or excessive.[124] This decision emphasises the significance of data security and privacy in online services, including digital accessibility tools. Furthermore, in the case of Weltimmo s.r.o. v Nemzeti Adatvédelmi és Információszabadság Hatóság,[125] the ECJ emphasised the significance of data security in the setting of online services. The court decided in this case that a data controller must follow the data security rules of each nation in which it operates, even if it is based in another country.[126]

2.5 Other accessibility rights

There are a few other case studies and examples of legislation implementation from several European countries. For instance, in the collective complaint of the *Association des Paralysés de France (APF) v. the French State*, the APF, a French disability rights group, sued the French government for not making its services available for those with impairments. The French Council of State decided in favour of the APF, concluding that the French government breached the EU UNCRPD as well as the French Code of Digital Administration.[127] The court thus placed a fine on the government for failing to make its services available within a certain period. This is a great instance of the failure from a governmental standpoint to comply with fundamental rights of persons with disabilities, which may indicate the need for further harmonization across the EU.

[122] See paragraphs 38 and 45-46 of the judgment of case C-335/14.
[123] C-131/12, *Google Spain SL, Google Inc. v. Agencia Española de Protección de Datos (AEPD), Mario Costeja González*. ECLI:EU:C:2014:317.
[124] See paragraphs 81, 85 and 97 of the judgment.
[125] C-230/14, *Weltimmo s.r.o. v Nemzeti Adatvédelmi és Információszabadság Hatóság*. ECLI:EU:C:2015:639.
[126] See paragraphs 28-29, of the judgment, as well as paragraph 48 of case C-131/12 judgment.
[127] Hild, A., Félix, A. (2018) *Organisations representing persons with disabilities lodge complaint against France*. Retrieved from: *https://www.inclusion-europe.eu/organisations-representing-persons-with-disabilities-lodge-complaint-against-france/*

Another instance deserving attention includes the implementation of EU laws into a country that has permanently resigned from being a Member State in the Union, such as the United Kingdom with Brexit. It has been stated that the withdrawal may result in essential and complex consequences, whereas the regulations have been already enacted into the statute, remaining in effect, regardless of the withdrawal. However, among the primary challenges posited considers the monitoring of performance of complying with these regulations, as the United Kingdom is unlikely to have any supra-level surveillance, that has contributed to dissatisfaction with regard to the United Nation's scathing evaluations of the country's progress on responsibility, disability, and web accessibility. Additionally, the United Kingdom will not pose the protections established by an autonomous regulator.[128] This further indicates the necessity of a certain authority designed to coordinate the activities and supervise their compliance with said regulations in order to balance distinct national and international objectives for web accessibility for persons with disabilities. Ultimately, while there are no explicit EU case laws relating to the misuse or absence of online accessibility tools for disabled people infringing distinct data, discrimination and accessibility protection laws, there are several cases relating to web accessibility and the rights of persons with disabilities. These examples highlight the significance of making digital material available to all people, including those with disabilities, and the legal ramifications of failing to do so.

[128] Lewthwaite, S., James, A. (2020) *Accessible at last?: what do new European digital accessibility laws mean for disabled people in the UK?*. Disability & Society, 35:8, p 1362, Retrieved from: *https://doi.org/10.1080/09687599.2020.1717446*

3. SAFEGUARDS AND FUTURE CONSIDERATIONS

Service providers must safeguard people with impairments from data breaches and other risks associated with utilising web accessibility technologies, however it might be difficult to establish safe web accessibility tool usage for persons with disabilities. In addition to establishing stringent data privacy and security policies and complying with all relevant laws and regulations, service providers need to implement precautions to make sure that their accessibility tools remain successful in addressing the needs of people with disabilities. Thus, they must take appropriate measures to protect persons with disabilities from data breaches and other implications that may arise from using accessibility tools.

3.1 Data Protection Impact Assessment

Service providers must keep constant surveillance on their systems for potential security risks and data breaches. This means establishing mechanisms into operation for identifying and tackling security-related incidents, including completing frequent security audits and vulnerability assessments. Service providers ought to have contingency measures prepared to minimise damage and quickly resume regular operations in the event of any breaches of information or security events. One of the applicable measures is conducting a DPIA to find and evaluate possible risks to people with disabilities who use their online accessibility tools. This will assist service providers in identifying and mitigating possible data security risks, as well as implementing suitable technological and organisational safeguards to avoid data breaches. Conducting a DPIA is a GDPR prerequisite[129] for high-risk processing tasks. This entails evaluating the risks to the personal data of people with impairments who use online accessibility tools and devising mitigation measures. The assessment record shall consist of a progress report of the service provider in regards of the GDPR, showcasing the risks they might be susceptible to, as well as the proceedings to eliminate or minimize these risks.[130] DPIAs are a helpful instrument for service providers to use to ensure that they are in compliance with data protection legislation and that suitable safeguards are in place to protect the personal data of people with disabilities.

[129] GDPR Art. 35.
[130] Xuereb, K. *et al*. (2019) *The impact of the general data protection regulation on the financial services' industry of small European* states. International Journal of Economics and Business Administration, 7(4), p 250. Retrieved from: *https://www.um.edu.mt/library/oar/handle/123456789/53068*

The WP29 has also released European Data Protection Board (EDPB) endorsed DPIA recommendations,[131] which detail how to perform a DPIA in the context of the GDPR. These recommendations include a list of factors to consider when performing a DPIA, such as the type, scope, context, and objectives of the processing,[132] as well as the risks to individuals' data security rights and freedoms.[133] Annex 2 of the WP29 DPIA recommendations presents a detailed checklist for criteria of a satisfactory DPIA, which data controllers can use to determine whether it is compliant with the GDPR. These criteria include, *inter alia*, the nature, scope, purposes, necessity, and proportionality of the processing, as well as potential risks and interested parties regarding their interests.[134] Furthermore, the WAD mandates website and mobile applications' operators to perform frequent accessibility assessments of their goods and services, as well as monitor and report it using the methodology referred to in the said Directive.[135] This involves assessing any risks or barriers to accessibility and putting means in place to resolve those risks or barriers.

However, conducting a sufficient DPIA might entail lack of clarity to some degree. Initially, Article 35 section 3 of the GDPR requires officiating a DPIA in the case of either processing a broad scale of special categories of data, a vast assessment of personal characteristics that could have an outsized impact on their personal life, as well as a widespread systematic monitoring of an accessible area.[136] Consequently, not all vulnerable data processing procedures requiring a DPIA are regulated, which could allow an opening for a distinct interpretation and implementation of said article of the Regulation. Thus, a processing regarded to as "high-risk" must nonetheless have a DPIA being carried out even if it is not established within the Regulation. In that regard, Article 35 section 1 persists as somewhat ambiguous considering the notions that it covers, while excluding some processing activities that qualify for a DPIA, resulting in several data subject groups' security and protection put into jeopardy. To preclude the aforementioned from occurring, consideration should be given to the form, scope, context, and purpose of the processing to be able to determine the probability and magnitude of the interference with the data subject's rights and

[131] WP 248 rev.01. Guidelines on Data Protection Impact Assessment (DPIA) and determining whether processing is "likely to result in a high risk" for the purposes of Regulation 2016/679. Retrieved from: *https://ec.europa.eu/newsroom/article29/items/611236*
[132] *Ibid.*, p 13, 17.
[133] *Ibid.*, p 8-10.
[134] See, e.g., page 22 of the WP29 guidelines.
[135] Council Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation. OJ L 303, 02.12.2000, Art. 5 s 3; Art. 8 s 1-3.
[136] GDPR Art. 35 s 3.

freedoms. An impartial risk assessment should serve as the basis for deciding whether data processing operations involve a low or high risk.[137]

Since the ECJ considers WP29, EDPB, and other such organisations as the "guardians" of European data protection law[138], it is encouraging that the GDPR gives EU Member States a clear obligation to make sure they have the resources needed to properly regulate and thus advise controllers as well as, whenever appropriate, employ their regulatory powers.[139] Nevertheless, while adopting online accessibility tools, data controllers should consider performing a DPIA to ensure that they are following with data protection legislation and minimising any dangers to individuals' data protection rights. This evaluation should be carried out in compliance with the GDPR, and any applicable advice issued by the EDPB or other regulatory bodies.

3.2 Technical and organizational measures

The Network and Information Systems (NIS) Directive (2016/1148/EU)[140] is a relevant EU legislation that seeks to guarantee a high common degree of security for network and information systems across the EU. The Directive requires essential service operators and digital service providers to adopt suitable technological and organisational steps to control the threats to the security of their network and information systems. This could imply, in the context of online accessibility tools, that service providers should implement appropriate technical and organisational measures to guarantee the protection of personal data. To safeguard the confidential data of people with disabilities who use their online accessibility tools, they can use encryption, pseudonymization, access limits, and regular security upgrades, for example. The GDPR mandates service providers to adopt suitable technical and organisational steps to guarantee personal data security. Encryption, pseudonymization (e.g., hash function),[141] access controls, and frequent

[137] GDPR Rec. 76.
[138] C-518/07, *European Commission v. Federal Republic of Germany*. ECLI:EU:C:2010:125, para 23; C-614/10, *European Commission v. Republic of Austria*. ECLI:EU:C:2012:631, para 52; C-288/12, *European Commission v. Hungary*. ECLI: EU:C:2014:237, para 53.
[139] GDPR Art. 52 s 4.
[140] Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union. (NIS Directive) OJ L 194, 19.7.2016, p. 1–30.
[141] Spanish data protection authority (AEPD) (2019). *Introduction to the hash function as a personal data pseudonymisation technique*, p 21-22. Retrieved from: *https://edps.europa.eu/sites/edp/files/publication/19-10-30_aepd-edps_paper_hash_final_en.pdf*

security updates are examples of such steps.[142] Implementing these steps can help to reduce the risk of data leaks while also protecting the confidential information of people with impairments who use online accessibility tools. The ePrivacy Directive thus sets forth the handling of personal data in the electronic communications industry. The Directive requires service providers to safeguard personal data against accidental or unlawful deletion, loss, modification, improper exposure, or access, as well as to guarantee the confidentiality of interactions.[143] In the context of online accessibility tools, this could imply ensuring that the tools are intended to safeguard the confidentiality of any personal data gathered or processed during their use, as well as that suitable security measures are in place to prevent unauthorised access to such data. Service providers should provide regular data protection and cybercrime training to their workers to ensure that they are aware of their responsibilities and are prepared to protect the personal data of people with disabilities who use their online accessibility tools. The GDPR requires service providers to guarantee that their workers are informed of their data security obligations.[144] This includes regular data protection and cybersecurity training to ensure that workers are prepared to safeguard the confidential data of people with disabilities who use online accessibility tools. Furthermore, it is suggested that service providers shall implement various accessibility practises already in the development process of the product. In particular, while considering the WCAG 2.1. standards, service providers shall identify, and rank accessibility requirements tailored to their specific users' needs.[145] Considering the design process, it is recommended that service providers include both able-bodied and disabled persons,[146] as well additional accessibility features in their already developed design patterns,[147] thus facilitating the use of those patterns whenever needed for accessibility purposes. Additionally, the implementation of adaptive user interfaces shall be adopted, whereas the code generated for the interface is self-generated[148] and can be adapted for specific requirements afterwards. Consequently, human intervention evaluations shall be carried

[142] GDPR Art. 32 s 1.
[143] ePrivacy Directive Art. 4 s 1-2, Art. 5 s 1.
[144] GDPR Art. 32 s 4.
[145] Kelly, B., *et al.* (2007). *Accessibility 2.0: people, policies and processes*. In Proceedings of the 2007 international cross-disciplinary conference on Web accessibility (W4A), p 138-147. Retrieved from: *https://dl.acm.org/doi/abs/10.1145/1243441.1243471*.
[146] Nganji, J. T., Nggada, S. H. (2011) *Disability-aware software engineering for improved system accessibility and usability*. International Journal of Software Engineering and Its Applications, 5(3), p 47-62. Retrieved from: *https://www.researchgate.net/publication/264422652_Disability-Aware_Software_Engineering_for_Improved_System_Accessibility_and_Usability*.
[147] Sánchez-Gordón, S. *et al.* (2018). *Integration of accessibility design patterns with the software implementation process of ISO/IEC 29110*. Journal of Software: Evolution and Process, Volumr 31, Issue 1, p e1987. Retrieved from: *https://doi.org/10.1002/smr.1987*.
[148] Ferati, M., Sulejmani, L. (2016) *Automatic Adaptation Techniques to Increase the Web Accessibility for Blind Users*. SPRINGER (ed.) Communications in Computer and Information Science, Volume 618, p 30-36. Retrieved from: *https://link.springer.com/chapter/10.1007/978-3-319-40542-1_5*.

out in order to complement automatic assessment of accessibility.[149] To validate accessibility compliance – which may not always be accurate with automated evaluation tools – perhaps an interpretation of context is required so as to authenticate the output of the tool. For instance, a programmable device could indicate that a website has some extent of text, yet it is unable to identify whether the text is meaningful or automated.[150] Therefore, all design characteristics as well as interfaces should at least include a tiny bit of human oversight as a way of verifying their accurateness.

3.3 Informed consent

Before gathering, processing, or keeping personal data from people with impairments, service providers should seek informed agreement from them. Individuals should be able to withdraw their permission at any moment if it is specific, freely provided, and informed. Individuals must provide informed permission before their personal data is gathered, processed, or kept, according to the GDPR.[151] This means that service providers must provide people with plain and concise information about how their personal data is collected, processed, and stored. Individuals must also have the right to revoke their permission at any moment, and it must be specific, freely provided, and informed.[152] Website administrators must ensure that users are told about the purpose of web accessibility tools, how the tools will be used, and any data that will be gathered or handled through the tools. Users must also be provided the option to agree or decline consent to the use of the tools and any related data processing. The EDPB has thus released guidelines on consent under the GDPR, emphasizing on the elements of a valid consent, considering that the consent given shall be freely given, it should be specific and informed to comply with Article 4 s 11 of the GDPR.[153] The guidelines shall provide the service providers with enough information on how to comply with obtaining, managing, as well as the removal of consent by the data subject. Aside from the GDPR, the EU ePrivacy Directive requires website owners to acquire informed

[149] Cisneros, D., Huamán Monzón, F., Paz, F. (2021) *Accessibility evaluation of E-Government web applications: A systematic review*. SPRINGER, Cham, International Conference on Human-Computer Interaction, p 214-220. Retrieved from: *https://link.springer.com/chapter/10.1007/978-3-030-78224-5_15*.
[150] Acosta-Vargas, P., Acosta, T., Luján-Mora, S. (2018) *Challenges to assess accessibility in higher education websites: A comparative study of Latin America universities*. IEEE, Vol. 6, p 36504. Retrieved from: https://ieeexplore.ieee.org/abstract/document/8388714.
[151] GDPR Art 6 s 1 ss (a).
[152] *Ibid.*, Art 7 s 3.
[153] European Data Protection Board (EDPB). (2020) Guidelines 05/2020 on Consent Under Regulation 2016/679, p 7, 13, 15, 22. Retrieved from: *https://edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-052020-consent-under-regulation-2016679_en*.

permission from users before putting or viewing certain kinds of information, such as cookies, on the user's device.[154] While the ePrivacy Directive does not explicitly address informed consent for online accessibility tools, website owners are required to acquire informed consent from users prior to gathering or processing any personal data. This includes information gathered or handled by online accessibility tools. Whereas it has been stated that users have difficulties accepting, reading or comprehending consent notices in general,[155] it is essentially relevant that, prior to the collection or usage of sensitive or personal data, including data gathered or handled through web accessibility tools, website operators must seek informed permission from users. Website administrators must provide users with clear and thorough information about the purpose of the data processing, the kinds of data gathered, and any third parties who may have access to the data in order to receive informed permission. Users must also be provided the option to agree or deny consent to data handling.

3.4 Transparency

One of the guiding principles of the GDPR is transparency,[156] given that it should be considered as a general obligation that involves remaining open, forthcoming, and genuine.[157] It is thus an essential element of data protection legislation because it enables people to comprehend how their personal data is processed and to exercise their data protection rights. The GDPR requires data controllers to provide certain details to people when gathering and processing their personal data.[158] Service providers should provide plain and succinct information to people about the gathering, processing, and storing of their personal data. They should also educate people about their rights, such as the right to view, correct, or erase their personal data.[159] Individuals should be given plain and concise information about the gathering, processing, and storing of their personal data by service providers. Individuals with disabilities should be able to obtain and comprehend

[154] ePrivacy Directive Art. 5 s 3.
[155] Utz, C. *et al.* (2019) *(Un)informed Consent: Studying GDPR Consent Notices in the Field.* In Proceedings of the 2019 ACM SIGSAC Conference on Computer and Communications Security (CCS '19). Association for Computing Machinery, New York, NY, USA, p 983-985. Retrieved from: *https://doi.org/10.1145/3319535.3354212*.
[156] GDPR Art. 5 s 1 ss (a), Rec. 39; European Commission. (2018) Guidelines on Transparency Under Regulation 2016/679 (wp260rev.01*)*. Retrieved from: *https://ec.europa.eu/newsroom/article29/items/622227*.
[157] Gratton, L.-P. (2022) *Expert commentary on Article 12 GDPR. Transparent information, communication and modalities for the exercise of the rights of the data subject*. Retrieved from: *https://gdpr-text.com/read/article-12/#links_gdpr-a-12_1*
[158] GDPR Art. 12 s 1, 3.
[159] GDPR Art. 13 s 1-3.

this information if it is presented in an accessible and comprehensible manner. Individuals should also be informed about their rights, such as the right to view, rectify, or erase their confidential data, from service providers. Furthermore, the EAA mandates website operators to make public certain details about their accessibility features and services. The EAA specifically requires website owners to provide information on the accessibility of their goods and services,[160] as well as any known limitations or limits discussed further in the technical documentation.[161] This information should be given in a straightforward and available manner, such as a declaration of accessibility or a similar document. According to the ePrivacy Directive, website owners must provide users with clear and thorough information about the kinds of information gathered or handled through the use of online accessibility tools, as well as how this information will be used.[162] This information should be provided in a way that users can readily obtain and comprehend. Transparency is an essential prerequisite under both data protection and accessibility law, and website owners should take measures to ensure that they provide clear and thorough information to users about their online accessibility tools and any data gathered or handled through these tools. All users, including those with impairments, should have easy access to and understanding of this material.

3.5 Data Protection Officers

Service providers should designate a DPO to supervise their data protection activities and ensure compliance with applicable data protection legislation. The Data Protection Officer (DPO) is in charge of investigating and monitoring the privacy practises of their organisation. The duties of a DPO vary, however they must involve at least the following: educating and training the controller or processor and staff about their responsibilities under applicable data protection legislation; monitoring compliance with applicable data protection law and internal rules, including responsibility assignment and awareness-raising and training workers involved in processing tasks, as well as associated audits; advising on how to complete DPIAs and evaluate their effectiveness; acting as the supervisory authority's point of contact for issues relating to the organization's processing operations; as well as if needed, consult with regard to any other

[160] EEA, Art. 14 s 2.
[161] *Ibid.*, Art. 7 s 2.
[162] ePrivacy Directive Art. 5 s 3.

subjects.[163] To carry out their responsibilities successfully, the DPO should have the required expertise, resources, and authority.[164] Certain organisations are required by the GDPR to designate a DPO to oversee their data security operations.[165] The DPO can assist in ensuring that service providers comply with data protection laws and that adequate measures are in place to protect the personal data of people with disabilities who use online accessibility tools.

3.6 Data breach response plans

Service providers ought to keep a data breach response strategy in order to guarantee that they can respond to any data breaches as swiftly and efficiently as possible. This strategy should include protocols for informing people and authorities, as well as mitigation measures for the damage caused by the intrusion. The GDPR requires service providers to have a data breach response strategy in place to ensure that they can respond to any data breaches that may occur promptly and effectively. Procedures for informing people and authorities, as well as measures to minimise the damage caused by the intrusion, should be included in the plan. One of the most relevant requirements concerning a data breach response strategy is the 72-hour span notification obligation deriving from the GDPR.[166] The EDPB has thus provided specific guidance for service providers to evaluate their compliance with personal data breach notifications, including the set requirements for notification spans, processor obligations, information necessary to be provided to the data subject, as well as record keeping, risk assessment, and cross-border breaches.[167] A data breach reaction strategy can help to reduce the risk of data leaks and safeguard the personal data of people with disabilities who use online accessibility tools. The NIS Directive further requires operators of essential services and digital service providers to have a security strategy and incident handling procedures in place, which include the detection and reporting of security incidents, as well as the assessment and management of risks to their network and information systems.[168] In addition, the Directive requires these operators and providers to develop and keep an incident response plan

[163] GDPR Summary (2018). *Data Protection Officer (DPO)*. Retrieved from: *https://www.gdprsummary.com/gdpr-definitions/data-protection-officer/?gclid=CjwKCAjw__ihBhADEiwAXEazJtGAEjpRVUL1r3xX3uAlcIrxOzKSSUVoHYjeL4ffcngFLFQ7y_Z56xoC8T0QAvD_BwE*
[164] GDPR Art. 37 s 5.
[165] GDPR Art. 37 s 1.
[166] *Ibid.*, Art. 33 s 1-2.
[167] European Data Protection Board (EDPB). (2023) Guidelines 9/2022 on Personal Data Breach Notification under GDPR. Version 2.0, p 10, 13, 14, 17, 20-23, 26. Retrieved from: *https://edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-92022-personal-data-breach-notification-under_en*.
[168] NIS Directive Art. 7 s 1 ss a, d; Art. 23 s 1.

outlining the steps to be followed in the event of a security incident or data leak.[169] Another important enactment is the Payment Services Directive 2 (PSD2) (2015/2366/EU),[170] which governs financial services throughout the EU. Payment service providers must have efficient incident management protocols and contingency plans in place to identify and react to security events and data breaches, according to the Directive.[171] The ePrivacy Directive is also pertinent, as it mandates providers of electronic communications services to take suitable technological and organisational steps to protect against data breaches and guarantee personal data protection.[172] This involves developing and implementing an incident response strategy that outlines the steps to be taken in the case of a data breach. Another rather interesting take on addressing the necessary response plan is the Digital Operational Resilience Act (DORA),[173] which requires the initiation as well as execution of ICT-related incident management processes by entities providing financial services. The ICT-related incident management processes (e.g., warning indicators, responsibility assignment, reporting, communication, identification and categorization, etc.) shall further apply to consequential cyber threats,[174] which implies that all financial entities providing services shall further safeguard their services, as well as their websites in order to have a response plan available in case of any potential breaches. Lastly, the GPSD mandates product manufacturers and dealers to guarantee product safety and to take suitable steps to avoid and handle any dangers that may emerge.[175] This further involves developing and implementing a reaction strategy in the event of a product safety problem or mishap. Therefore, while developing data incident reaction plans, service providers should ensure that they adhere with all pertinent EU laws and regulations. This involves complying with the NIS Directive and PSD2 incident reaction requirements, as well as the ePrivacy Directive and GPSD security and data protection requirements. Service providers can help to safeguard the privacy and security of personal data by taking these measures, as well as react effectively in the case of a data breach.

[169] *Ibid.*, Art. 14 s 1, 5.
[170] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (PSD2). OJ L 337, 23.12.2015, p. 35–127.
[171] *Ibid.*, Art. 5 s 1 ss (h); Art. 95 s 1.
[172] ePrivacy Directive, Art. 4 s 1.
[173] Regulation (EU) 2022/2554 of the European Parliament and of the Council of 14 December 2022 on digital operational resilience for the financial sector and amending Regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014, (EU) No 909/2014 and (EU) 2016/1011 (DORA). OJ L 333, 27.12.2022, p. 1–79.
[174] DORA Art. 17 s 1-3.
[175] GPSD Art. 8 s 1.

3.7 Tool design

It is essential that service providers consider the elements of web accessibility tool design while constructing their websites and applications. Lack of or inaccessible tool design could lead to non-compliance with WCAG 2.1 criteria and other legislation in terms of web accessibility. One instance constitutes a study where persons with disabilities were assessed regarding the use of travel planning, booking, and accommodation. It was found that arguably the most websites are inaccessible for those with impairments seeking to advance tourism, consisting of several drawbacks such as non-text usage, contrast errors, and magnification issues.[176] One of the major arguments included the loss in quality and multiplied costs to cover the construction of an accessible website.[177] Nevertheless, there are several EU laws that shall apply for the enhancement of e-inclusion among persons with disabilities, with the aim to develop the necessary designing elements of the tools. The EEA might possibly be the most important legislation to consider concerning tool design, as it aims to enhance the accessibility of goods and services for people with disabilities across the EU. The Act mandates product and service providers to consider accessibility standards when designing and developing their goods and services, and to ensure that they are available to people with disabilities. In the context of web accessibility tools, this may imply ensuring that the tools are built with accessibility in mind and that they meet the Act's accessibility standards. The Act further establishes particular accessibility requirements for the user interface and user experience of ICT goods and services.[178] The EAA mandates that the user interface and user experience be built with people with disabilities in mind, including the use of assistive devices and the supply of accessible documentation and support documents. The WAD is another pertinent legislation that mandates all public sector bodies to guarantee that their websites and mobile applications have accessible user interfaces and user experiences.[179] The Directive specifies precise accessibility standards for user interfaces and user experiences, such as using clear and consistent navigation,[180] providing accessible forms and controls,[181] and using alternative text for non-text material.[182] The European Electronic Communications Code

[176] Singh, R. and Sibi, P.S. (2020) *Evaluation of Hotel Websites for Disabled People: An Accessibility Approach*. International Journal of Advanced Research in Engineering and Technology, 11(12), 2020, p 263-265. Retrieved from: *http://www.iaeme.com/IJARET/issues.asp?JType=IJARET&VType=11&IType=12*.
[177] *Ibid.*, p 267.
[178] Section I of Annex I of the EAA, s 2.
[179] WAD para 37.
[180] *Ibid.*
[181] *Ibid.*, Art. 7 s 1.
[182] *Ibid.*, para 19.

(EECC)[183] thus mandates electronic communications service companies to provide accessible user interfaces and user experiences for their services.[184] This involves making sure that communication devices and services are functional with assistive technologies like hearing aids, and that user interfaces are available to people with impairments.[185] At last, the EU has ratified the UNCRPD, which requires States Parties to promote the accessibility of information and communication technologies, including the design and development of web accessibility tools with accessible user interfaces and user experiences.[186] Several EU laws and regulations require accessible user interfaces and user experiences in online accessibility tools. These rules establish specific accessibility standards for user interfaces and user experiences, such as the use of assistive technologies, the supply of accessible documentation and support materials, and the use of straightforward and uniform navigation. By adopting these legal safeguards, service providers can improve e-inclusion while also adhering to data security rights in the event of a data leak, meaning that web accessibility tool designers can assist in ensuring that their goods and services are available to all people, including those with impairments. These steps can also assist service providers in establishing confidence with people with disabilities and demonstrating their dedication to protecting their confidential information.

3.8 Legal considerations

The rise of new technologies may have major legal ramifications for online accessibility tools for people with disabilities. Certain emerging technologies, such as the use of artificial intelligence (AI), machine learning, and the Internet of Things (IoT),[187] have the potential to greatly alter online accessibility tools for individuals with impairments. However, the advancement of new technology may result in the creation of new hurdles to accessibility. Websites and programmes that rely on voice-activated interfaces, for instance, may be inaccessible to those with speech or hearing issues. Similarly, whereas the algorithms are not created with accessibility in mind, the use of machine

[183] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code (EECC), PE/52/2018/REV/1. OJ L 321, 17.12.2018, p. 36–214.
[184] *Ibid.*, para 182; Art. 39 s 2; Art. 73 s 1 ss (f).
[185] EECC para 226.
[186] UNCRPD Art. 4 s 1 ss (f).
[187] Yang, P., Xiong, N., Ren, J. (2020) *Data Security and Privacy Protection for Cloud Storage: A Survey*. IEEE Access, Special Section on Emerging Approaches to Cyber Security, vol. 8/2020, p 131723-131724. Retrieved DOI: *10.1109/ACCESS.2020.3009876*.

learning to personalise website content may mistakenly exclude persons with particular impairments.

As new technologies evolve further, online accessibility tools will need to conform with the most recent accessibility standards to ensure that they are available to all users, including those with impairments. Failure to meet these requirements may result in legal action being taken against service suppliers. Additionally, as new technologies may entail the gathering, processing, and storing of personal data, privacy and data protection concerns may arise. To safeguard users' privacy and personal data, service providers must ensure that they are in compliance with pertinent data security laws and regulations, such as GDPR and the EAA. While novel technologies can improve accessibility for disabled people, they can also lead to prejudice if not correctly developed and applied. Service providers must ensure that their technologies do not inadvertently discriminate against disabled users, which could lead to judicial action and social harm. As new technologies emerge, concerns about intellectual property rights, such as patents and copyrights, may arise in relation to online accessibility tools. Service providers must ensure that they are not intruding on the intellectual property rights of others and should seek legal guidance if there are any concerns. New technologies may raise the risk of cyberattacks and data leaks, potentially causing legal and social harm to service providers. To safeguard users' data and reduce the chance of breaches, service providers must implement suitable cybersecurity steps.

3.9 Artificial Intelligence

In the future, AI could possibly enhance the accessibility of online tools for disabled people.[188] AI can be used to create more complex online accessibility tools capable of detecting and responding to a variety of user requirements and preferences. For example, AI-powered accessibility tools could automatically change colour contrast and typeface size for visually impaired users or provide voice-activated guidance for mobility-impaired users. Furthermore, AI can be used to automate online accessibility testing and compliance tracking. Such programmes could evaluate websites and applications for accessibility shortcomings while offering suggestions on how to solve them. Therefore, it could make it simpler and more effective for web developers and service providers to guarantee that all users, including those with impairments, can access their digital material.

[188] Soni, P. (2021) *How AI improves Accessibility for People with Disabilities*. Retrieved from: *https://www.analyticssteps.com/blogs/how-ai-improves-accessibility-people-disabilities*

Moreover, machine learning algorithms may be used by AI-powered internet accessibility solutions to discover additional information about the preferences and needs of certain users. This would enable the tool to offer the user-specific settings and suggestions for assistive technologies that will enhance their internet browsing. AI has the potential to enhance natural language processing by rendering it simpler for people with speech or language disorders to engage with web material. For instance, AI-powered voice recognition systems may improve online communication for people who have speech difficulties. AI may thus enhance real-time translation skills, facilitating online communication for people with hearing or linguistic challenges. Additionally, novel technologies could assist in making it more feasible for those with visual impairments to access information by increasing picture and video recognition skills. The latter may involve automatically generated captions for videos or images that describe what is being shown on screen.

A significant milestone towards regulating AI in the European Union is the Proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules on artificial intelligence (Artificial Intelligence Act) (AIA).[189] The AIA intends to create a thorough framework that guarantees the ethical and safe research, implementation, and use of AI systems in a variety of industries. It presents a risk-based methodology, classifying AI systems into three distinct categories according to the potential danger they pose to fundamental rights, with higher-risk systems being subject to more onerous rules.[190] The Act thus covers human supervision, data quality, accountability, openness, and responsibility, with a focus on safeguarding essential rights. In the AIA, there are three different uses of AI or its systems that establish either an unacceptable risk, a high risk, or a low/minimal risk. Considering the previously mentioned novel or potential application aims of AI tools and systems, these outputs rather represent tools and systems which shall be classified as having a low or minimal risk. These actions and contributions shall confer to Title II of the proposed Regulation, meaning that they shall not: deploy subliminal techniques beyond a person's consciousness to distort their behaviour causing harm; exploit any vulnerabilities of a specific group of persons or an individual causing substantial harm; or public authorities establishing services that give rise to unfavourable treatment of persons or groups.[191] Whereas some of the opportunities mentioned could potentially have a possibility to be a high-risk

[189] Proposal For A Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts. Brussels, 21.4.2021, COM/2021/206 final, 2021/0106(COD).
[190] See, e.g., point 5.2.2. of the proposed Regulation.
[191] See Title II and Art. 5 of the proposed Regulation.

AI system in the future, they shall adhere to regulations that demand stringent testing, accountability systems with human control, as well as accurate data record keeping.

However, it is essential to recognise that AI is not a panacea and that there are still obstacles to overcome. For instance, if AI models are not correctly taught and evaluated, they can propagate biases and discrimination.[192] The above can occur when AI models are developed on skewed data or have not been properly reviewed. If a machine learning system is programmed upon data with gender or racial prejudices, it may acquire and repeat such biases in its algorithmic decision-making output.[193] This can result in discriminatory implications, such as employment applications being disregarded on the basis of the applicant's gender or ethnicity. To avoid the latter, it is critical to guarantee that artificial intelligence models are trained on varied and representative data sets and are tested for equitable treatment and veracity. The following necessitates a strong and transparent data collecting, data labelling, and model construction procedure, as well as continual assessment and surveillance. A further problem is the reality that AI has the capacity to exacerbate current disparities in power. If artificial intelligence systems are used to make recruiting decisions, for illustration, they may favour people who currently possess particular benefits, such as access to schooling or connections on social media. This has the potential to exacerbate previously existing inequities and limit chances for people who are already marginalised. Furthermore, persons have become accustomed to bearing with humanly mistakes in thought processes, therefore tolerating numerous grey areas being ingrained in social interactions, as well as societal operating systems. The society is aware that they have distinct prejudices, faulty or influenced memory, whereas the ability of reasoning is far more developed than the capacity to make just judgments. Despite the belief that humans are able to make logical decisions, those are nonetheless influenced by post-rationalized emotions. However, there are much broader expectations for AI, as one shall refrain from using AI applications if they do not necessitate a clear and auditable decision-making process. Less complicated algorithms may be absent of this issue, but it is rather challenging to comprehend a process that has gone through numerous decision-making procedures and is thus influenced by the weight of non-identical parameters at each stage. Although humans have developed a certain extent of control and coping mechanisms that have served as a mitigation

[192] Buiten, M. C. (2019) *Towards Intelligent Regulation of Artificial Intelligence*. European Journal of Risk Regulation, Volume 10, Issue 1, p 52, 55. Retrieved DOI: *doi:10.1017/err.2019.8*.
[193] Zuiderveen Borgesius, F. J. (2020) *Strengthening legal protection against discrimination by algorithms and artificial intelligence*. Routledge Taylor & Francis Group. The International Journal of Human Rights. 2020, Vol. 24, No. 10, p 1574-1576. Retrieved from: *https://doi.org/10.1080/13642987.2020.1743976*.

strategy to lessen the effects of imperfect human interaction, the widespread use of AI is still a relatively unexplored area.[194]

To overcome these issues, it is critical to create AI systems that encourage equality, responsibility, transparency, and accessibility. This necessitates a dual-stakeholder strategy that includes specialists from several domains such as ethics, legislation, ICT expertise, and social science disciplines, as well as suggestions from impacted communities. As a result, it is critical that AI be created and implemented responsibly and ethically in order to help all users, including those with disabilities. To put it briefly, while artificial intelligence has an opportunity to promote accessibility and diversity, it is critical that individuals remain mindful of its limits and potential biases. Inevitably, one must take efforts to guarantee that artificial intelligence technologies are created and deployed ethically and accurately, with involvement from a wide range of interest groups and an ongoing dedication to advancing equality and equitable use of resources.

[194] Karu, K. (2021) *Tehisintellekti keerukad küsimused. (Complex issues in artificial intelligence)*. Juridica 2021/1, p 51-53.

CONCLUSION

The aim of this research was to examine potential safeguards for service providers using web accessibility tools to minimize the risk for data breaches among persons with disabilities, as well as enhance e-inclusion and compliance with data protection rights. The primary hypothesis of the research was that distinct and specific safeguards are among the most successful strategies of avoiding potential data breaches or other infringements of EU legislation. The hypothesis was supported with evidence that conducting a DPIA, appointing a DPO, compiling structured data breach response plans, as well as emphasizing informed consent and transparency along with other technical and organizational measures helps to prevent the misuse of web accessibility tools by persons with disabilities, as it precludes potential violations, including data leaks and privacy concerns. It is evident that persons with disabilities are more vulnerable to the misuse of different web accessibility tools, which is precisely why it is especially vital to employ different protections to ensure the safe use of these tools.

In the first chapter and its sub-chapters, academic theoretical research was conducted for the purposes of background information about the importance and context of the chosen topic, alongside with theoretical overview of distinct web accessibility tools, such as text-to-speech, voice recognition, Braille support, transcript, keyboard alternatives and other assistive tools as well as technologies to provide persons with disabilities with a set of available assistance measures while using the internet. Besides that, the first chapter addressed the overriding matter of persons with disabilities generally possess difficulties while using any kinds of technologies, including those produced for facilitating their specific needs. This research suggests that the main issue with persons with disabilities using web accessibility tools is possible infringements of different kinds of appropriate legislation, such as the European Accessibility Act and General Data Protection Regulation, alongside with general difficulties with usage, including physical barriers to using technologies, lack of training in technological abilities, as well as other sensory and cognitive accessibility barriers. Whereas digital technologies are aimed at assisting persons with disabilities in performing their ordinary activities and relieve the completion of necessary communication with governmental (and other) institutions, it is crucial to further emphasize the importance of creating these tools with the needs of disabled individuals from the start. An evaluation of risks was carried out in the paper, suggesting that the failure, incorrect or misuse of these technologies could end up in rather serious vulnerabilities or accidental law infringements to an extent. For instance, some automated tools may be employed to assemble sensitive personal data without the

data subject's permission or legal grounds, which could inevitably lead to the infringement of the General Data Protection Regulation concerning the lawfulness of data processing. Another relevant example is that disabled individuals may cause harm to themselves apart from infringing other people's rights by providing confidential or sensitive information to unauthorised third parties or individuals without perceiving the width of the situation. The latter could occur whereas a person with visual impairments enters sensitive data into wrong fields on a website, causing an exposure of confidential information to persons with unauthorised access to said data. Some people might be overdependent on accessibility tools, leading to the limitation of web access in general. Thus, taking appropriate measures and precautions is crucial in order to guarantee equal treatment of internet users with various impairments.

These specific matters are being supported in chapter three by various European legislation on web accessibility and data protection in general. An enormous emphasis is put on EU Member States establishing efforts to create their own national legislation regarding the topic, however the Union has already composed their own set of regulations and directives to comply with. Starting with the General Data Protection Regulation regulating the handling of personal data within Member States as well as safeguarding people's privacy in general, it requires institutions to secure the lawful, transparent, and fair processing of data under the Regulation. Whereas it is a rather accurate possibility for web accessibility tools to be inaccessible, not used correctly or even abused, the Regulation includes the data handlers — including service providers — to provide clear instructions and processes of how, when, where and by whom the data is handled. Failure to do so will result in legal ramifications, including sanctions and fines. Additionally, the data gathered shall include user consent for obtaining the data, which shall be provided through clear and concise methods, given that the language and processing aim is easy to understand even for persons with impairments. The data collected shall thus be only gathered for objectives stated beforehand, including the options to review and erase it. The European Accessibility Act mandates the accessibility guidelines for services and products, demanding service providers to coordinate their services with the needs and propensities of persons with disabilities. The Act provides minimal accessibility standards for various goods and services, including information technology services. Considering the option that disabled people could be denied access to a service of website while the tool provided is inaccessible or not effective, the service provider could be deemed biased in light of the Act and therefore face legal repercussions. Briefly, the Act requires that all services shall be accessible and easy to use for all kinds of persons, including those with impairments, otherwise the website or service provider shall be deemed to infringe primary

accessibility rights. The matter is further analysed through the lens of the ePrivacy Directive, the General Product Safety Directive, the Web Accessibility Directive, as well as requiring service providers to meet the WCAG 2.1 criteria. All the mentioned suggestions assist in reducing discrimination towards persons with disabilities, as well as guarantee that services provided to the public are thus accessible for persons with various impairments, be it visual, mobile, cognitive, speech, or hearing related. The analysis further continues with relevant case law, bringing examples through appropriate ordinary situations where people have declared injustice within the previously mentioned legislation. For instance, incapability to fairly adjust for a person's impairment may result in a serious violation of the Non-Discrimination Directive just by refusing by the service provider to make one's website available and accessible to a blind member of a trade union. Furthermore, the Planet49 case represents a great example of how not contributing to obtaining valid consent through a website's privacy policy may result in a violation of data protection rights under the General Data Protection Regulation. Even if there are no characteristic case law on the topic of web accessibility tools regarding persons with disabilities, these instances are still a legitimate ground for conferring responsibility for infringements.

In the third chapter, several possible safeguards are provided by the author to protect persons with disabilities from the dangers of employing web accessibility technologies, including the risk for occurring data breaches or leaks. Subsequently, service providers are obligated to ensure that all users, including those with disabilities, can access their digital platforms, as well as provide appropriate measures to ensure that persons with impairments are protected from distinct implications that may arise from the use of such tools. Accessibility demands the use of efficient web access technologies, which must be safeguarded by regular audits, communication with customers with disabilities, staff training, and adherence to applicable standards and norms. Primarily, service providers shall adopt the establishment of a DPIA, considering the creation of mechanisms that tackle and identify relevant incidents, including completing audits, as well as vulnerability assessments regularly. Whereas conducting such an assessment is a prerequisite of general data protection laws, the assessment could thus be useful to monitor whether service providers are in compliance and up to date with relevant regulations concerning data protection. Another method to reduce the risks is to establish organizational and technical measures, including the use of access limits, regular security updates, pseudonymization and encryption to prevent possible leaks and breaches. The providers of web accessibility tools shall further educate their staff and employees to ensure that their entity is willing and able to hinder possible infringements. The adoption of such measures is required by several legal acts, such as the General Data

Protection Regulation, as well as the ePrivacy Directive. Informed consent, besides transparency is a relevant indicator that service providers exploit requisite tools to forestall the situation where some extent of information is processed unlawfully or incorrectly. Appointing a Data Protection Officer might develop into a convenient measure to establish, as they shall be in charge for monitoring and refining the data handling or processing practises of the supplier providing services. Moreover, a provider shall have a data breach response strategy at hand in order to react promptly to potential breaches that may occur. A relevant plan is supported by the General Data Protection Regulation, the Network and Information Security Directive, as well as the Payment Services Directive 2, covering distinct types of responses to infringements and occurrences of data incidents, alongside the appliance of these kinds of legislation across numerous fields of business operations. Using these safeguarding measures, service providers are able to guarantee that all users have access to their information and services equally and that their web accessibility tools meet the expectations of people with disabilities.

The chapter continues with tool design, putting an emphasis on the involvement of persons with disabilities in the design of appropriate accessibility tools from the start, thus explaining the legal considerations that may derive from the continuous evolvement of web accessibility tools. In addition, Artificial Intelligence could be used to facilitate the use of these tools, by changing colour contrast or typeface size for the user itself, besides providing voice-activated guidance on the internet for those with mobility impairments. Machine learning could thus be employed for automatic evaluation and risk assessment of the tools or sites, as well as providing user-specific recommendations or alterations in the technical functioning of the tools. There are numerous examples of what Artificial Intelligence could improve regarding the use of web accessibility tools by persons with disabilities and thus it is essential to acknowledge the still-developing field of modern technology with the precaution of it malfunctioning or not being accessible for those who could employ the tools the most. Therefore, it is essential that the creators of Artificial Intelligence or the tools derived from this technology include the encouragement of responsibility, accessibility and equality while developing novel technologies, keeping in mind that in most cases to achieve this, a human input shall be considered. Ultimately, users shall remain mindful of the limits and potential biases although Artificial Intelligence has the potential to promote equality and accessibility for those in need. It is essential that distinct aforementioned safeguards are employed already at present to protect those with impairments from possible infringements of various applicable legislation, with input from a wide range of interest groups and a dedication to advance equality and fair resource utilisation.

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