Understanding Key Challenges for People with Disabilities in Digital Accessibility in Ireland and Determining Effective Measurements for Improvement

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Abstract

Aim and Objectives: This research focuses on determining the key barriers faced by people with disability in Ireland due to the inaccessibility of digital resources. Furthermore, the research aims at determining the role of assistive technologies in improving digital accessibility for people with disability, and effective strategies to enhance digital accessibility in Ireland. The research also focuses on determining the perspectives and practices of different stakeholders, which can help in improving digital accessibility in Ireland.

Research Justification: The number of internet users has tremendously increased globally, and people highly rely on digital products to carry out their day-to-day activities. However, due to the inaccessibility of digital products, people with disability are unable to carry out basic online activities and benefit from digital resources. Thus, the research focuses on bringing attention to the people with disability in Ireland and the challenges faced by them due to digital inaccessibility.

Methodology: The research is conducted using the interview method, and the data is collected from 7 stakeholders. Interview was conducted using online platform of communication (Zoom) after all the processes essential for the primary data collection, such as consent form and interview schedule information as per the participants accessibility. Semi-structured interview questionnaire was used within which open-ended questions were covered, to gain in-depth insight into research subject of digital disability.

Findings: The findings revealed that people with disability face several challenges due to digital inaccessibility. Due to digital inaccessibility, people with disability miss out on important information, which intensifies feelings of incompetency among them. Thus, there is a need to improve awareness and competency among web developers, designers, and content creators in Ireland to help them effectively add accessibility features to digital products and improve the user experience of people with disability.

Recommendations for Future Researchers: *Future researchers are recommended to carry out a global context or cross-study based in two or three countries and conducts a study using the survey method to collect data from the wider population.*

Declaration

Submission of Thesis and Dissertation

National College of Ireland
Research Students Declaration Form
(Thesis/Author Declaration Form)

Name: Ruchi Pal

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Title of Thesis: Understanding Key Challenges for People with Disabilities in Digital Accessibility in Ireland and Determining Effective Measurements for Improvement

Thesis Supervisor: David Hurley

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Material submitted for award

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Chapter 1: Introduction

1.1 Background of the Research Topic

Digital accessibility is concerned with ensuring inclusivity on digital platforms by preventing barriers that prevent interaction with or access to websites or digital tools for people with disability (Botelho, 2021). According to the 2022 Global Digital Sentiment Survey, carried out by McKinsey, people are interacting with digital tools twice as much as they were before the COVID-19 pandemic (Hajro *et al.*, 2022). People significantly utilise digital tools and channels for their everyday tasks, including researching, socialising, banking, and buying online. However, over a billion people in the world are with a disability, which makes it difficult for them to effectively utilise or access the web source (Kronschnabl and Vieira, 2023). Thus, to ensure a seamless experience for people with disability, website owners must enhance the functionality of the websites to make them accessible to all. According to the 2022 Census in Ireland, 1,109,557 people reported to have a long-lasting condition or disability to some extent, which is around 22% of the total population in the country (Central Statistics Office, 2022). The figures significantly increased from 643,131, who identified themselves to be with disability in 2016 (Central Statistics Office, 2016). The proportion of the population identifying themselves as disabled has significantly increased over the years, which has increased the urgency for enhancing digital accessibility in the country.

The Disability Act 2005 is the statutory obligation that promotes the rights of the people with disability in Ireland, and the Act necessitates it for the public service providers to ensure accessibility of services for disabled people in the country, including the services rendered via digital sources (Irish Statute Book, 2005). Furthermore, the World Wide Web Consortium, the international standards organisation for the internet, laid down Web Content Accessibility Guidelines (WCAG), which was intended to enhance digital accessibility for people with disability to make web resources available for all (W3C, 2023). Improving digital accessibility not only helps in improving the accessibility of web resources for people with disability but may also help businesses and organisations. Digital accessibility can help businesses reach a wider audience and promote inclusivity, which may also help the business to improve its brand reputation in the market and create an image of responsible business (Ronen, 2022a). Furthermore, by enhancing digital accessibility, websites are better optimised for search engines, and making websites accessible is the key

consideration for businesses to excel in the e-commerce market. According to the research conducted by UserWay (cited in Alexiou, 2021), businesses offering website accessibility automation, reflected that in 2021, e-commerce businesses lost sales of around USD 828 million during the holiday season, as their websites were not accessible enough.

There are various types of disabilities that can act as barriers for users while accessing web sources, which include visual impairment, auditory, neurological, and cognitive impairments. By improving the accessibility of the websites, websites not only benefit people with disability but also the ageing audience who experience changing abilities, people with temporary disabilities, people using different modes of devices, or people with slow internet connectivity (W3C, 2024). There are various ways to enhance the accessibility of a website and optimise it for search engines, which include adding alternative text for images, adding transcripts for videos, and using good heading structures to make the website contents readable, especially for users with poor reading ability (Ronen, 2022b). However, digital accessibility is an evolving field, which is influenced by various new technologies and advancements. Thus, website owners and e-commerce businesses must ensure to integrate new and upgraded technologies to improve digital accessibility.

1.2 Justification for the Research

The European Union (EU) Web Accessibility Directive (Directive [EU] 2016/2102) has been in force since 2016, which suggests that websites related to public services must ensure accessibility for people with disability (Directive [EU] 2016/2102, 2016). In 2019, the European Accessibility Act was adopted, which introduced harmonised accessibility rules for private sector organisations, and provided them with a deadline of June 2025 to achieve complete digital accessibility and ensure inclusivity (European Commission, 2024). According to the 2023 Irish Digital Accessibility Index conducted by the National Council for the Blind of Ireland (NCBI), the private sector has not shown much improvement (Inclusion & Accessibility Labs, 2023). Only 27% of the top Irish companies have taken adequate measures to improve the digital accessibility of their websites. Among the top 100 Irish companies, only 26 have published accessibility statements and 20 companies are still following outdated standards of digital accessibility (Inclusion & Accessibility Labs, 2023). These figures reflect that top Irish companies are not taking adequate measures to enhance accessibility of their websites for people with disability, which highlights their inefficacy towards ensuring

inclusivity in their business. Moreover, if the companies fail to achieve digital accessibility on their websites before June 2025, then they may face legal action.

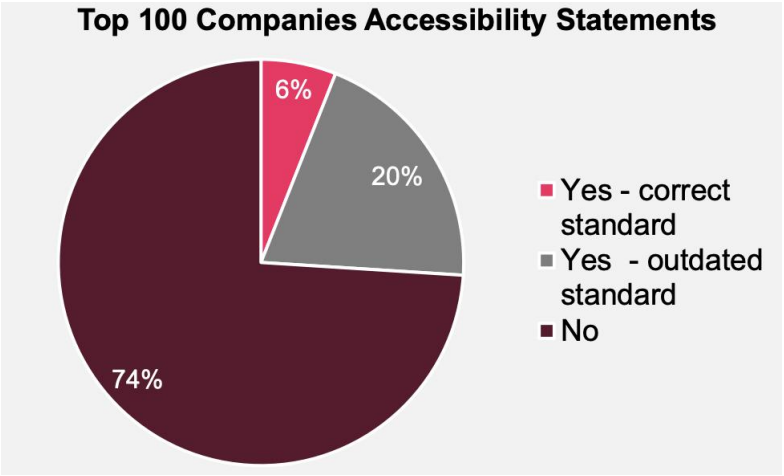

Figure 1: Accessibility Statement of top 100 Irish Companies

(Source: Inclusion & Accessibility Labs, 2023)

Due to a lack of digital accessibility, most of the internet is closed to people with disability, which violates their rights and prevents them from leading a normal life (International Labour Organization Global Business and Disability Network and Fundación ONCE, 2021). In this regard, the presented research may help in identifying various challenges faced by people with disability, while accessing digital resources. For instance, Guillermo Robles, a blind man, who wanted to order pizza from Domino's was unable to use a screen reader for the company's website and mobile app, which disabled him from ordering a pizza online from the fast-food restaurant, like Domino's other customers. Robles filed a legal case against Domino's, and a federal court agreed with him, and now it is the landmark case for the battle of people with disability on the internet (BBC News, 2019). According to NCBI, around 246,773 people in Ireland are blind or visually impaired (Walsh, 2021), which indicates that many more people, like Robles, must be facing accessibility issues on the internet in Ireland. This research seeks to help in enlightening various stakeholders about various issues faced by people with disabilities in Ireland while interacting with digital sources, tools, and technologies.

The research seeks to provide a better understanding of the needs and requirements of the people with disabilities in Ireland regarding digital accessibility, which is crucial for the development of

effective accessibility solutions. In this regard, this research shall contribute to the development and improvement of accessibility guidelines and standards for private and public websites to enhance their digital accessibility. According to the WHO (cited in Weitzman, 2023) more than 2.5 billion people with disability across the globe may need more than one assistive technology in 2030, to effectively utilise digital sources. There are various AI-powered solutions that may assist people with mental, physical, or learning impairments to effectively carry out every day and complex digital task with easy steps (Weitzman, 2023). In this regard, it can be justified that the research holds great importance, as it examines the role of assistive technologies in digital accessibility for people with disabilities. Thus, the findings of the research will help businesses and developers in Ireland in making informed decisions regarding the adoption and implementation of assistive technologies to meet updated standards of digital accessibility for digital sources in Ireland to ensure inclusivity. Similarly, the evidence provided in this research will help policymakers and regulatory bodies in optimising regulations relating to digital accessibility of the websites in the country.

The presented research may also assist in raising awareness regarding the importance of digital accessibility among various stakeholders, including private and public organisations, web developers, content creators and web designers. This may motivate business organisations to enhance the digital accessibility of their website to positively contribute to the welfare of the community. Moreover, the research aims to identify best practices, guidelines and successful case studies demonstrating best practices related to digital accessibility. In this regard, the research shall stimulate innovation in the field of digital accessibility by identifying and presenting information about successful technologies, tools, and techniques. In addition, this research is aimed at empowering the people with disability in Ireland by becoming their voice and highlighting the current issues they are facing due to inaccessibility of the web sources in the country. In this regard, the severity of the issue shall be captured in the research, which may positively contribute to the creation of effective solutions for ensuring the culture of inclusivity in the digital landscape in Ireland.

There is a literature gap of empirical evidence related to digital accessibility in Ireland and the experiences of people with disability with digital tools and web sources, which is aimed to be bridged in this dissertation.

1.3 Research Aim and Objectives

1.3.1 Aim

The key aim of this research is to ascertain current situation of digital accessibility in Ireland by exploring key barriers faced by people with disability due to inaccessibility of the digital tools, sources, and technologies. Furthermore, the research aims at highlighting the key measures, which may assist in improving digital accessibility in Ireland.

1.3.2 Objectives

1. Analyses the current state of Digital accessibility in Ireland by understanding the existing issues and challenges faced by people with disabilities in accessing the digital content, websites, mobile applications, and other e-services.
2. Examine the role of Assistive technologies for people with disabilities when accessing digital content and understand the effectiveness and challenges faced when interacting with digital platforms.
3. Identify the guidelines, standards and successful case studies from Ireland or similar context that show the effective structural plan for improving digital accessibility.
4. Understand the view and practices of various stakeholders such as web developers, designers and other people roles that are associated with accessibility to create and maintain digital creations.

1.4 Research Questions

What strategies and best practices can be implemented by the websites and e-commerce businesses in Ireland to address the challenges faced by people with disability in the country?

RQ1: What specific barriers do people with disability in Ireland encounter while accessing web sources and technologies?

RQ2: What are the challenges faced by the web developers, designers, and other stakeholders in implementing digital accessibility features in web resources?

1.5 Organisation of Research

Chapter 1: Introduction

This provides a brief background of the research topic, justification for the research topic, aims and objectives of the research, and key research questions.

Chapter 2: Literature Review

This chapter critically reviews the views of different scholars in past published literature in alignment with research objectives and questions.

Chapter 3: Research Questions

This chapter will discuss the objectives to be addressed with the undertaken research.

Chapter 4: Methodology

This chapter details the research method used for collecting and analysing data, which includes the data requirements, research sample, data collection instrument, analysis method and ethical considerations.

Chapter 5: Findings and Analysis

In this chapter, the findings of the research are systematically arranged, and commonalities determined in the findings are analysed under common themes developed in alignment with research objectives and questions.

Chapter 6: Discussion

This chapter is concerned with discussing the findings of the research and comparing with past published literature to determine the practical implications of the research findings for different stakeholders.

Chapter 7: Conclusion and Recommendations

This chapter summarises the findings of the research, and how the findings may impact or benefit various stakeholders. Additionally, recommendations for future researchers are provided to further bridge the gap of knowledge and contribute to the field.

Chapter 2: Literature Review

2.1 Introduction

This chapter is developed by critically evaluating and reviewing the views of various academics and scholars in the past published literature on the topic relating to digital accessibility. In this regard, this literature review chapter focuses on understanding the concept of digital accessibility, analysing the current state of digital accessibility, and examining the role of assistive technologies in digital accessibility. Furthermore, it aims to identify effective strategies for improving digital accessibility and understanding the different perspectives and practices of various stakeholders. Finally, at the end of the chapter, information regarding the gap of knowledge in past published literature is provided.

2.2 Concept of Digital Accessibility

The research focuses on digital accessibility in Ireland; thus, it is important to gain understanding of digital accessibility at this stage. According to Henni *et al.* (2022), digital accessibility is the process concerned with ensuring that digital content and technologies are available and accessible to everyone, including people with disability. In this regard, the key goal of digital accessibility is to remove all barriers, which may make it difficult for people with disability to effectively access digital content. In this context, Johansson, Gulliksen and Gustavsson (2021) highlighted that there are people with various types of disabilities, like visual impairment, auditory issues, physical disability, and cognitive impairment, which are unable to access certain digital tools, technologies, and sources. Furthermore, in the studies carried out by Acosta, Zambrano-Miranda and Luján-Mora (2020), it has been reflected that to enhance digital accessibility, the content on the web must be developed in a manner that it is accessible to all, irrespective of their sensory impairments. For instance, video content should add transcripts to allow people with auditory issues to access the content. It is supported by the *social model of disability* by Oliver (1983), which suggests that individuals are not disabled solely because of their impairments, as their disability is also influenced by societal barriers and attitudes. In this regard, the inability of physically or mentally impaired individuals to access digital resources, due to their lack of accessibility, intensifies their sense of being disabled, which emphasises the importance of addressing barriers associated with digital accessibility.

Current era is characterised with its interconnectivity, which makes digital accessibility not just a priority but a necessity to allow everyone a fair chance to have equal access to connect with others. In this regards, Heitplatz, Bühler and Hastall (2022) highlighted that it is important that the digital content is presented in plain and understandable language to ensure that individuals with cognitive impairment can easily understand the digital content. Additionally, as indicated by Botelho (2021), digital technologies must be robust to effectively work on different platforms and devices, to allow assistive technologies to help people with disability to effectively access digital content and technologies. Furthermore, by ensuring digital accessibility, the foundational principle of 'universal design', proposed by Mace (1985), can be achieved. According to the principle, products and services must be designed in a manner that they can be accessed by people of all abilities. Thus, the principle necessitates the designing of digital resources and interfaces that are accessible and inclusive.

2.3 Analysis of the Current State of Digital Accessibility by Evaluating Experiences of People with Disabilities

It is important to gain the understanding of the landscape of digital accessibility to determine the level of inclusivity digital sources ensure. According to the research carried out by Tsatsou (2020) using primary qualitative evidence, it has been ascertained that many digital resources are developed without considering the needs of disabled individuals, which increases the risk of social exclusion on digital platforms. Furthermore, as everything, including travelling, education or looking for job opportunities, is increasingly digitalised, thus, the inaccessibility of digital resources reduces the participation of people with disability in civic activities. Inal *et al.* (2020) carried out studies by collecting data from 167 UX professionals in Denmark. The findings reflected that according to UX professionals, digital accessibility was important, and their organisations ensured accessibility of digital resources; however, these professionals possessed limited knowledge about digital accessibility. It can be inferred from the findings that due to the limited efforts of the organisations in increasing awareness among UX professionals about digital accessibility, limited accessibility is ensured on digital resources. McCampbell, Schumann and Klerkx (2022) used the Rwandan case-study approach to evaluate the impact of designing on digital accessibility, and the findings indicated that regular human-centred design approaches may hinder the reflectiveness and responsiveness of digital resources for people with disability. Thus, responsible innovation is expected to be central to ensuring that digital innovation emergence ensures inclusivity. The findings are supported by the

person-centred approach, proposed by Rogers (1989), which posits that organisations must consider users' preferences, capabilities and needs in designing to prioritise the well-being of people with disabilities by actively involving them in the decision-making process. Thus, efforts to further enhance digital accessibility are important to meet the demands of users with disability to ensure inclusivity.

Furthermore, digital inaccessibility is not limited to people with disability, which makes it crucial to understand its impact on broader spectrum of users. The study conducted by Polgar *et al.* (2020) indicated that issues related to digital accessibility can be faced by individuals without disability too. The findings of their study suggested that 48% of individuals did not feel confident in accessing the internet due to the complexity of digital interface and security issues. On the other hand, Chang *et al.* (2021) analysed the data about small primary care practices' telehealth use in New York City which indicated that around 40% of the primary care practitioners are in low-income remote areas, where accessing the internet is difficult due to low connectivity. Thus, connectivity issues often hinder user experience and create a barrier to digital accessibility. Moreover, Chang *et al.* (2021) presented that in the USA, more than 24 million people who live in remote areas face connectivity issues and have limited digital literacy; thus, due to slow-running digital resources and complex internet interfaces, these people face digital inaccessibility. In this context, ensuring inclusivity in the access of digital sources can help in benefiting people with disability, as well as the people facing situational limitations.

In the present era, business organisations are highly focused on enhancing their digital presence and often use video content, which is easily accessible by everyone. However, Spina (2021) highlighted that video content may not be effective for people who are visually impaired or hard of hearing; thus, alternative formats are necessary for such individuals, so they do not miss out on important information that business organisations aim to convey. Contrarily, limited focus is paid by business organisations in creating alternative formats of video content; thus, they fail to ensure complete inclusivity of the content. In this regard, Eaton *et al.* (2021) reflected that a human rights framework, such as the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) is one of the ethical foundations towards ensuring inclusivity, which posits that people with disability have equal right to access service and support. In line with this convention, businesses must ensure to keep their digital resources accessible for all, including people with disability to ensure complete

inclusivity of their digital resources. By incorporating this framework in designing digital resources, business organisations can ensure the accessibility of their digital resources for everyone, including people with disability; additionally, they can improve the reach of the content.

Digital inaccessibility makes it difficult for the people with disability to carry out basic everyday activities. In this context, Cranmer (2020) highlighted that ensuring digital accessibility practices in the educational sector is often stigmatised and considered an extra load of work by designers and content creators. However, learning about digital resources is highly crucial for children in their initial years of formal learning, as digital literacy helps in their lifelong learning journey. However, due to digital inaccessibility, students with disability fail to enhance their digital literacy, which impacts their lifelong experiences with digital resources. Similarly, Kosova (2022) highlighted that due to digital inaccessibility, people with disability find it challenging to access the content, platforms, and tools of e-learning due to technological barriers, like compatibility issues with assistive technologies. Thus, the people with disability are unable to benefit from the services offered by the World's Best Universities. Moreover, Fernández-Díaz *et al.* (2023) pointed that many tourism websites and booking platforms lack digital accessibility, which makes it digital for people with digital accessibility to effectively participate in travel experiences. Additionally, people with disability still face issues in carrying out day-to-day activities on digital platforms, as indicated by the study conducted by Scanlan (2022), who used data from the 2017 Current Population Survey. This revealed that people with disability often find it difficult to carry out basic activities, like banking, filling out forms or attending online workshops or educational classes. This is due to the inaccessibility of digital tools or technologies, which limits the complete participation of people with disability in online activities and transactions. In this context, *affordance theory*, as outlined by Gibson (1977), holds significance, which posits that the design of the products and environment should be in alignment with the interests of users and shall meet their functional needs. Thus, high significance must be given to the designing of digital resources to ensure their usability for all, including for people with disability.

Digital inaccessibility also limits the overall participation of people with disability on digital platforms. In this regard, Baumgartner, Rohrbach and Schönhagen (2023) highlighted that due to digital inaccessibility, people with disability may find it difficult to access social media, messaging applications and online communities, which may exacerbate feelings of social isolation among them.

Additionally, Bhogal-Nair *et al.* (2023) suggested that digital inaccessibility increases the dependency of people with disability on others, which induces sense of inadequacy among them and negatively impact their morale and mental well-being. Thus, to avoid negative implications on mental health of people with disability, digital inclusion and accessibility is important.

2.4 Examination of the Role of Assistive Technology in Digital Accessibility

Assistive technologies play a crucial role in enhancing digital accessibility for people with disabilities. In this context, *intersectionality theory*, proposed by Crenshaw (1989), holds great significance, as it posits that individuals' experiences are intersected by their social factors, including their gender, race, class, and disability. Assistive technologies acknowledge the diverse needs and experiences of individuals with a disability and offer them solutions to effectively access the digital tools; thus, enhancing their experiences while intersecting with content on digital platforms. In this regard, Edughele *et al*. (2022) highlighted that assistive technologies enable individuals with disabilities to effectively navigate the digital interface and access digital content with the help of alternative input methods, like keyboard commands, voice commands or speech recognition, and eye-gaze technologies. Moreover, Shahira, Sruthi and Lijiya (2022) indicated that assistive technologies also help people with disability to get output results in an alternative manner. The assistive technologies, like screen readers, and text-to-speech software, offer auditory feedback to individuals, who are visually impaired or have a learning disability, which makes reading the text a complex task for such individuals. Furthermore, Senjam, Manna and Bascaran (2021) presented that a screen reader is one of the key assistive technologies that is used for digital resources. It helps the user in converting the visual content into speech or braille output, which allows the users who are visually impaired to effectively access and consume the digital content.

Wu *et al.* (2020) highlighted that screen magnification software is an important assistive technology that helps users in enlarging the on-screen content. This assistive technology specifically helps people with low vision, who find it difficult to read small text or see smaller images and videos. Thus, with the help of screen magnification software such individuals can effectively set the level of magnification of the digital screen and consume the content conveniently. In addition, Buckingham *et al.* (2022) stated that voice recognition software is significantly helpful for people with mobility and dexterity impairment, as these people can give voice commands to control digital devices and

perform tasks on digital platforms. With the help of this software and these tools, users can convert spoken words into written input, which can help in navigating through the digital menus and executing commands hand-free. Furthermore, assistive technologies, like augmentative and alternative communication (AAC) systems, are significantly helpful for people with speech and communication impairment, as indicated by Hustad (2020). These technologies may help such individuals to effectively express themselves and communicate to convey the command to navigate and use digital resources.

Millet (2021) highlighted the importance of assistive technologies, like captioning and transcription tools, for people who are deaf or hard of hearing. Captioning and transcription tools can help such people by providing them with text-based alternatives for audio and video content, which enhances the accessibility of digital content for people with a hearing disability. These tools automatically generate captions for the users, which allow people with disability to avoid missing out on any important information provided by the digital resource. Furthermore, Sánchez-Álvarez, Jaramillo-Álvarez and Jiménez-Builes (2023) highlighted the importance of adaptive software and hardware solutions, which includes adaptive keyboards, switches and controllers that are designed in a manner that can accommodate the diverse needs and preferences of the individuals with disabilities, like impaired motor skills or visual impairments. Moreover, Angelopoulos and Mourtzis (2022) highlighted that adaptive software and hardware tools have customisable interfaces; thus, they can be tailored according to the diverse needs of people with disability. In this context, by leveraging the use of assistive technologies for digital resources, individuals with disabilities can be empowered and barriers associated with digital accessibility can be removed.

2.5 Identification of Effective Strategies for Improving Digital Accessibility

Improving digital accessibility is concerned with implementing strategies and adopting best practices to make digital content, tools, and technologies more accessible to people with disability. In this regard, AlMeraj *et al.* (2023) highlighted that raising awareness and improving the commitment of various stakeholders can help in improving digital accessibility. Business organisations should focus on improving awareness regarding digital accessibility among various stakeholders, including developers, designers, and content creators, to ensure that digital resources or tools developed and made available online are accessible to all, including people with disability. Geurs *et al.* (2024)

carried out a comprehensive literature review and determined that one of the best practices associated with digital accessibility is promoting inclusive design principles. In this regard, during the development process, designers and developers must be prompted to consider the needs and preferences of users with disabilities and accommodate accessibility features into the digital resource. This is supported by the *cognitive load theory* by Sweller (1988), which posits that the cognitive demands of learning tasks impact the learning outcomes. In the context of digital accessibility, if the digital resources and technologies are designed with the focus of decreasing the cognitive load on the users, then people with learning and cognitive disability can access them.

Bricout *et al*. (2021) suggested the engagement of people with disability during the development of digital resources and technologies. It can help in gaining the feedback of diverse people with disability and ensuring that the digital product is inclusive and accessible to people with diverse disabilities, including visual, cognitive, neurological, and motor impairments. On the other hand, Campoverde-Molina, Luján-Mora and Garcia (2020) highlighted the importance of considering various accessibility guidelines and standards, like the Web Content Accessibility Guidelines (WCAG), during the development of digital resources, which can help in ensuring that digital resources and technologies meet accessibility criteria. These standards and guidelines can help digital resource owners incorporate the accessibility principles in designing and developing of the resources. Furthermore, Cain and Fanshawe (2021) reflected that business organisations must ensure to regularly carry out audits of digital resources and technologies to identify barriers that are disabling the digital resources, content, and technologies from becoming accessible to people with disability. Additionally, regular audits can help business organisations in assuring that the digital resources, content, and technologies are developed in line with web accessibility guidelines. In this context, Mökander *et al*. (2021) indicated that organisations or owners of digital resources can consider various forms of auditing methods, including automatic testing tools, manual testing and evaluations, and user feedback. This can help business organisations in ensuring continuous improvements of their digital resources and enhanced digital accessibility.

Additionally, Botelho (2021) identified that organisations must offer adequate training and support to the developers, designers, and content creators to effectively incorporate the characteristics of digital accessibility in digital content and technologies. The developers, designers and content

creators should also be made aware of the expectations of people with disability and best practices associated with digital accessibility to help them meet the expectations and accessibility needs of people with disability. In this regard, Tiwary and Mahapatra (2022) highlighted the importance of adding alternative texts for images and video contents to make visual elements of web sources accessible for the people with visual impairments. Another best practice related to digital accessibility, as indicated by Mitchell *et al.* (2022), is ensuring keyboard accessibility. In this regard, designing and developing the digital interface should be in a way that is fully navigable and operable with the keyboard, and the users should not be required to use a mouse or touch screen for the same. This shall make the content accessible to people with motor skills and dexterity impairments. Furthermore, Samy and Hesham (2023) suggested optimising the colour and contrast of the digital content by utilising high-contrast colour schemes. Additionally, the designers and developers should avoid completely relying on the colours or colour schemes for conveying a message; moreover, the graphical presentation of the text must be in a manner that is readable by the users. This practice can help the designers and developers in ensuring that the digital content is accessible to people who have visual impairments or are suffering from colour blindness.

2.6 Understanding the Significance of Perspectives and Practices of Various Stakeholders

It is crucial to understand the diverse perspectives and practices of different stakeholders involved in the development, designing and use of digital resources and technologies, as it can facilitate the development of a digital environment that is inclusive and accessible to all. In this regard, Gregori and Holzmann (2020) suggested that developers and designers play a critical role in the development of digital resources and technologies; thus, their perspectives regarding digital accessibility highly impact the implementation of the accessibility features. The developers and designers can promote the digital accessibility of digital resources by complying with the guidelines and standards of digital accessibility while designing or developing any resource or technology. However, Spyridonis and Daylamani-Zad (2021) highlighted that due to the complex and ambiguous nature of web accessibility guidelines, like WCAG, designers find it challenging to completely comply with the guidelines and ensure accessibility of digital resources. Other important stakeholders are content creators and publishers, as they are responsible for producing the content of the digital resources and their perspective can influence the content and usability of digital resources, as indicated by Acosta *et al.* (2020). The practices that content creators can follow that can improve digital accessibility,

include providing alternative texts for the visual elements on the website and adding captions or transcripts for the video. This can help in ensuring that the content of the website is accessible to people who are visually impaired or hard of hearing.

Tursunbayeva and Renkema (2023) highlighted that the perspectives of accessibility experts and consultants also play an important role, as they can help in making informed decisions regarding the development and designing of digital resources and technologies and assess whether the digital resources and technologies are accessible to the people with disabilities. In this regard, these experts and consultants can improve the awareness of diverse stakeholders by offering them adequate training and providing them constructive feedback, which can improve their understanding of the diverse needs of people with disability. These needs can be considered during the development process, which can make digital resources, tools and technologies accessible. Other important stakeholders of digital accessibility are users with disability. In this context, Tsatsou (2020) highlighted that their perspectives matter, as their views and opinions can be considered by the developers and designers of digital content and technologies to incorporate the diverse needs and preferences of people with disability. Their practices can help in improving the digital accessibility of tools and technologies include offering valuable feedback and insights by participating in the testing of the products and sharing their experiences. This can improve the development process and offer a solution for digital accessibility.

Additionally, policy makers and regulators also play a crucial role in enhancing the digital accessibility of various digital products, as highlighted by Botelho (2021). Policymakers are involved in developing the guidelines, policies and regulations associated with the development of digital products and services. In this regard, their perspectives can influence the legal requirements regarding digital accessibility and help in ensuring the inclusivity of digital products and services. Their practices that can influence digital accessibility positively include effectively enacting and implementing the standards and guidelines for digital accessibility to help the designer, developers and content creators ensure the accessibility of digital resources and technologies for people with disability. Furthermore, Chambers (2023) highlighted educators and trainers are responsible for enhancing the awareness and understanding of digital accessibility among developers and designers. Thus, their perspectives can influence the way developers, designers and content creators perceive digital accessibility. In this regard, their best practice can include integrating the best practices of

ensuring digital accessibility in the learning process and developing a better understanding of the individuals involved in the development of digital resources and technologies. This can help in improving digital accessibility, as the efforts of all the stakeholders involved in the designing and development process can be aligned with the efforts of educators.

2.7 Summary and Literature Gap

From the overall analysis, it has been determined that digital accessibility is the practice that is associated with ensuring that digital resources, tools, and technologies are accessible to all, including people with disability. In this regard, it has been determined that the current state of digital accessibility across the globe is not too good. Most of the digital resources are developed without considering the diverse needs and preferences of people with disability, which makes them inaccessible to them. There are various digital accessibility issues faced by the people with disability due to inaccessible websites, complex interfaces, uncaptioned multimedia elements, poor colour contrast on website and lack of keyboard accessibility. Due to these issues, increase barriers for people with disability to acquire adequate education and benefit from employment opportunities. Furthermore, digital inaccessibility limits the connectivity for people with disability on social media and online communities, which may result in social isolation and negatively impact well-being of the individuals.

Assistive technologies play an important role in helping people with disability effectively access digital resources and technologies. For instance, screen readers are useful for visually impaired users or users with learning disabilities; additionally, screen magnification is the best software for people who cannot see properly. Voice recognition software is useful for people with mobility and dexterity impairments. Furthermore, it has been determined that digital tools and technologies can be made more accessible for people with disability by raising awareness and commitments of the developers, designers, and content creators regarding digital accessibility, and implementing standards, like web content accessibility guidelines, in their practices. Additionally, enhancing the involvement of users with disability can help the developers, designers and content creators better understand their needs and preferences, which can offer a perfect solution to make digital resources and technologies more accessible for them. It has been ascertained that key stakeholders in digital accessibility are developers, designers, users with a disability, content creators, educators or trainers, and

policymakers. Thus, their perspectives and best practices can significantly help in improving the digital landscape for the people with disability.

From the overall literature review, it has been determined that there is adequate research carried out on the topic of digital accessibility. However, limited research focuses on the digital accessibility in Ireland and needs or perspectives of people with disability regarding digital accessibility in the selected region. Thus, this identified gap of information in the past published literature is aimed to be bridged with the help of undertaken research.

Chapter 3: Research Questions

In alignment with the literature gap, the following main research question is developed, which is aimed to be addressed with the undertaken research:

'*How and to what extent digital accessibility in Ireland works to serve people with disability and what are the needs and preferences of the people with disability regarding digital accessibility in this region?*'

By addressing this question, the current state and efforts made towards digital accessibility in Ireland can be determined, which can help in ascertaining the need and scope of improvement in the digital landscape to effectively meet the standards and guidelines associated with digital accessibility. Furthermore, by addressing the 'needs and preferences of people with disability regarding digital accessibility in this region (Ireland)', specific needs and preferences of the people with disability in the country can be identified. This can help in determining the key issues faced by people with disability in accessing digital resources, tools, and technologies in the country, which can help in guiding the actions of designers, developers, content creators and policymakers in the country to enhance digital accessibility. Moreover, with this research question, the research can be specifically focused on Ireland, to highlight the issues of people with disability in the region and determine the best-suited solutions that are region-specific and are also culturally aligned with the values and cultures of Ireland.

In addition to this main question, various sub-questions are also addressed in this research project, to address related objectives.

Sub-Question 1: What are the key accessibility issues facing people with disability in accessing digital content?

- To explore issues in digital content accessibility to the people with disability
- To reveal common and different barriers in digital accessibility in Ireland

Sub-Question 2: How and to what extent digital platforms in Ireland comply with existing accessibility regulations and standards?

- To evaluate compliance of digital platforms in Ireland in alignment of WCAG 2.1
- To identify gaps between legal compliance of digital platforms in Ireland and accessibility guidelines

Sub- Question 3: How important is it to maintain collaboration with the stakeholders for maintaining digital accessibility?

- To identify stakeholders and their role in implementing and maintaining digital accessibility

Sub-Question 4: What are the best solutions and reforms essential to be taken for stimulating digital accessibility in Ireland?

- To identify the best practices in specific to the technological changes/advancements and legal compliance
- To evaluate the impact of the proposed practices on digital accessibility in Ireland, to support people with disability.

Chapter 4: Methodology

4.1 Introduction

Research methodology offers a systematic framework, which comprises of collection, organisation and analysis of data that is necessary to address research questions and problems in a structured manner. By delineating the right research method, researchers are enabled to promptly fulfil research objectives (Melnikovas, 2018). The method to be adopted for the research depends on the nature of the research topic, research objectives and availability of data. In this regard, the chapter focuses on outlining the data requirements to address research objectives, which guide research methods and strategy. Additionally, information regarding the research sample, instrument, analysis method and ethical consideration is provided in the chapter.

4.2 Data Requirements in Alignment to Research Objectives

In alignment to the first research objective, to analyse the current state of digital accessibility in Ireland and understand the issues faced by people with disability in accessing digital content, websites and applications, various data requirements, like demographic information and user experiences were determined. The demographic information is the information about the people with disability in Ireland, including their disabilities and their distribution across different ages and regions. User experiences are the user feedback about the digital accessibility level on different digital platforms; moreover, user experiences are concerned with insights into the specific challenges faced by users with different disabilities in accessing digital resources. In line with the second research objective, to determine the current role of assistive technologies in digital accessibility for people with disability in Ireland, data related to the utilisation of assistive technologies, their effectiveness and challenges faced in the use of these technologies were required. The utilisation of assistive technologies includes the adoption rates or prevalence of assistive technology usage among people with disability in Ireland. To determine the effectiveness of assistive technologies for people with disability, it was required to assess the extent to which assistive technologies enhance the accessibility of digital resources for people with disability. Furthermore, to ascertain the challenges associated with the use of assistive technologies for people with disability, common accessibility barriers, usage issues, and learning curves that negatively impact users' experience were required.

In alignment with the third research objective, to identify best practices and guidelines, a wide range of data was required, including information regarding policy and regulatory framework, guidelines, and best practices for digital accessibility in Ireland. In terms of policy and regulatory framework, the data concerning the level of adoption of international and national digital accessibility guidelines by digital resources in the country is required to be evaluated. For determining the best practices for enhancing digital accessibility in Ireland, data comprising perspectives of users with disability and other stakeholders regarding addressing the challenges associated with digital accessibility was required. This data shall help in making informed suggestions for the businesses in Ireland to improve inclusivity by enhancing digital accessibility for people with disability and become socially responsible businesses. Finally, in line with the fourth and last objective, to understand the perspective and practices of web developers, designers and other stakeholders, the data requirements include key stakeholders associated with digital accessibility in Ireland, their perspectives about the best practices related to digital accessibility and key issues faced by them in effectively implementing the elements of digital accessibility in digital products.

4.3 Proposed Research Methodology

The research methodology is proposed in line with data requirements, and for the selection of appropriate research method and approach to address research objectives and questions, the Saunders' Onion Model is used. This model has multiple layers (see Figure 2), like an onion, which guides and enables the researcher to select different components of the research methodology, including philosophy, approach, strategy and design, collection method, time horizon and analysis (Saunders, Lewis and Thornhill, 2023).

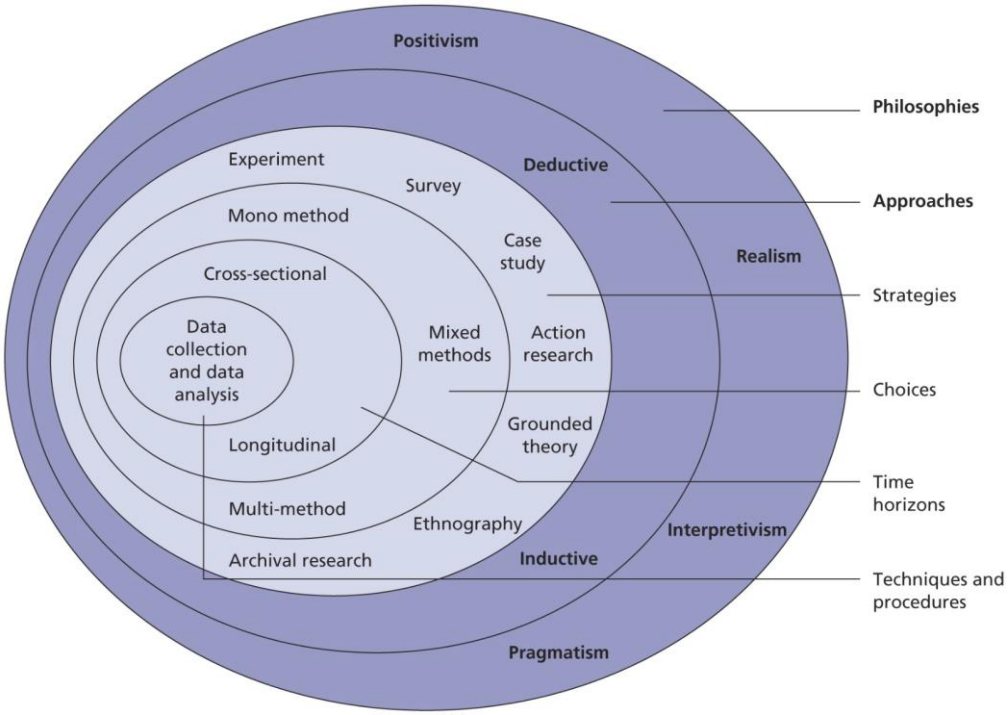

Figure 2: Saunders' Onion Model

(Source: Saunders, Lewis and Thornhill, 2023)

4.4 Research Philosophy

In alignment with the Saunders' Onion Model, there are four philosophies, namely positivism, realism, interpretivism, and pragmatism. For this research, the interpretivism philosophy is considered, as it enables the researcher to interpret and explore the in-depth meaning of collected data (Kaushik and Walsh, 2019). Thus, the application of interpretivism research philosophy was considered appropriate, as it is useful to explore the key barriers associated with digital accessibility faced by people with disability in Ireland and interpret effective strategies that can help in enhancing digital accessibility in the country. Moreover, interpretivism philosophy offers a better scope to gain subjective knowledge that aids deep understanding, while avoiding ambiguities (Melnikovas, 2018). This research focuses on understanding the perspectives of people with disability and other stakeholders associated with digital accessibility in Ireland, which necessitates the collection and analysis of qualitative data. Thus, with the help of interpretivism philosophy qualitative data can be collected and analysed in a better way.

4.5 Research Approach

There are two types of research approaches, namely inductive and deductive, which guide the plan or strategy for conducting the research (Saunders, Lewis and Thornhill, 2023). To fulfil the data requirements, this study mainly focuses on collecting qualitative data regarding the barriers/challenges faced by people with disability in Ireland and effective ways to address those challenges. Hence, in association with the qualitative research method, the inductive research approach is considered for this research, which guides in having a detailed investigation of a particular research phenomenon (Dannels, 2018). Moreover, the inductive research approach helps in generalising the findings (Melnikovas, 2018). Thus, with the help of this approach, the specific findings gained from the research can be generalised for every person with a disability in Ireland. Additionally, with this approach an in-depth insight can be gained and perspectives of people with disability and other stakeholders in Ireland can be understood.

4.6 Research Strategy

The third layer of Saunders' Onion Model is a research strategy, which is associated with the determination of specific methods or techniques to be used to collect and analyse the data for effectively addressing the research objectives. As this research study seeks to utilise qualitative data and understand the perspectives of different individuals, the interview method is determined to be the most appropriate method for this study. This is the most common qualitative method, which can be used for collecting the primary data; moreover, this method shall help in effectively fulfilling the data requirements. For instance, for the collection of demographic information and user experience, the interview method is appropriate, as it enables the researcher to gather information from participants in a detailed form (Bell and Waters, 2018). Additionally, an interview enables the researcher to gain in-depth insight into the research problem with an open-ended data collection procedure, which helps in achieving the goal of comprehensive data collection and makes understanding of the research problem feasible in terms of comprehensibility (Fowler, 2013; Quinlan, 2019). The interview method helped in indulging in deep conversations with the participants and comprehensively understanding the current state of digital accessibility in Ireland. Following completion of all procedures necessary for the primary data collection, including consent forms, and

interview schedules tailored to each participant's accessibility, interviews were performed using the Zoom online communication platform. Zoom meeting ID and password were shared to the participants along with schedule, so to manage interview without delayed.

To get comprehensive understanding of the research topic of digital disability, a semi-structured interview questionnaire covering open-ended questions was employed. The questions asked in interviews are open-ended, which offers participants an opportunity to offer additional explanations and clarify their responses or tailor them to the requirements of the research; thus, making the findings relevant (Gerson and Damaske, 2020; Quinlan, 2019; Bell, Bryman and Harley, 2019). With the interview method, the perspective and practices of relevant stakeholders could be tailored according to the requirements of the research. Moreover, unlike a structured survey, the interview method offers flexibility to the participants to present their diverse experiences and thoughts (Mashuri et al., 2022). Thus, the interview method facilitated in evaluation of the negative experiences of people and their feelings about digital inaccessibility. Additionally, the interview method helped in exploring the experiences of people with disability with assistive technologies and their perspectives about the same. Interview methods identify the participants as the co-creators of knowledge, which helps in encouraging them to effectively contribute to knowledge generation by sharing their perspectives, insights, and experiences (Wengel, McIntosh and Cockburn-Wootten, 2019). Thus, by empowering the interviewees, their perspectives, and insights regarding best practices for enhancing digital accessibility in Ireland can be gained. Additionally, with the interview method, there is a scope for further clarification and explanation in the interview method.

4.7 Qualitative Data Primary Collection

Open-ended questionnaire has used as the research instrument to collect opinions of the participants. For data collection, 2 sets of questionnaires were developed one for the people with disability and other for the stakeholders. Within these questionnaires, total of 7-8 questions were asked to the participants along with scope of adding new questions in case of any doubt and lack of clarity about the response. Semi-structured interview questionnaires in this research have designed using structure of general to specific questions, to develop interests of the participants and further their engagement in the interview procedure. No personal questions were asked to the participants, to secure from psychological harm and personal identity (Easterby-Smith et al., 2018). Open-ended

questionnaires led to manage interactive discussion through the interview process that showed worthy of the qualitative research and data collection instrument for this research about digital accessibility in Ireland.

4.8 Population

Research sample selection in primary research is one of the critical tasks or goal to be addressed for the successful outcomes. A selection of the right sample facilitates collecting data in relevant to the research questions and objectives and thus, it is important to focus on research sample identification, selection and then access of consent in alignment of the ethical norms (Bell, Bryman and Harley, 2019). In this research about digital accessibility, experiences of the people facing this issue has required, getting their views and perceptions of the ongoing trend of digital accessibility in Ireland. For this purpose, person with disabilities, SMEs and representative from organization working in this field were contacted in this research as a sample population. These interviewees' experiences and viewpoints are proved worthy to find challenges and potential solutions for enhancing digital accessibility in Ireland.

The selected sample of person with disabilities is in the vulnerable group, but participation of this sample population is important, to address the research purpose. Proper procedure has followed before scheduling interview with them including consent from their guardians or contact person and questions relevant to the subject were asked with easy comprehensibility, so that they can understand questions and share own experiences in the intended research direction. In addition to this, SMEs and representative from organisations working in digital accessibility will be selected, to get more details about the research problem addressing the research questions. Views from this sample has found relevant to underpin data from person with disabilities and existing scholars' work in the same direction, to present valid findings. Sample size of population for interview purpose was total of 7 participants, including 3 people facing disability and 4 participants were representative from organisations. To prevent issue in getting consent from vulnerable group and SMEs or representatives, convenience sampling strategy has used for the participants' selection. This sampling strategy has aided managing primary data collection with timeliness and easiness because participants' availability and accessibility were given importance over other ways of sampling, such as random and purposive sampling (O'Leary, 2017). Sample and sample size selection has aided to address

research problem of digital accessibility in Ireland works to serve people with disability based on valid, relevant, and credible data. Document analysis has also conducted using varied and recently published secondary sources of information (Easterby-Smith et al., 2018).

4.9 Analysing Qualitative Data

Data collected using open-ended questionnaire and interview process has been analysed using commonly preferred qualitative data analysis method of thematic analysis. The chosen method has aided to present pattern of knowledge from the comprehensive and detailed data (Miles and Huberman, 2019). This data analysis has provided scope to present common and different set of opinions shared by the participant, to help in reaching at the generalizable conclusion. Under this data analysis method, Braun and Clarke's six step model has used to present coding of the response and generation of the themes for the data findings, analysis and discussion (Bell, Bryman and Harley, 2019). Overall, thematic analysis method is reflected opinions in the understandable form addressing the research main and sub-questions.

4.10 Ethical Issues

The presented research has fulfilled the ethical considerations to ensure the reliability and credibility of the research. First and foremost, the research is secured from plagiarism, as plagiarism is a common issue associated with research work, which arises due to the negligence of the researcher and includes copying others' work (Bowen and Nanni, 2021). To avoid plagiarism, utmost care is given to avoid any academic misconduct and the authors or academicians, whose works are used in the research, are adequately credited throughout the research. Furthermore, the research collects data from primary sources; thus, care was taken to avoid violating the interests of participants. All the participants of the research have a right to maintain their anonymity to ensure safeguarding their privacy (Gregory, 2003). Thus, in the presented research, participants are given pseudonyms to maintain their anonymity. Additionally, participants were provided adequate information about the research and its purpose, and the data was collected and utilised after gaining their consent. The participants were given the option to opt out of the research at any point in the data collection process. The collected data has been stored in a password-secured folder to avoid the misuse or manipulation of data, which is planned to be permanently destroyed 6 months after the completion of this research.

4.11 Limitations to Research

The time component that would be addressed by routine follow-up and research might be impacted by obtaining information from organisations and interviewing persons with impairments. Additionally, this study has concentrated on digital accessibility in Ireland, which may have constrained the search scope, as a comparison analysis would show the critical form of digital accessibility management efficiency.

4.12 Summary

This chapter outlines the data requirements of the research based on research objectives, and in line with the data requirements, interpretivism philosophy, inductive research approach, and interview method were determined for the research. The data was collected using an open-end questionnaire from 7 participants. Furthermore, the collected data was analysed using the thematic analysis method, and to ensure safeguarding the interest of the participants and maintaining academic integrity, the research work is based on ethical grounds.

Chapter 5: Findings and Analysis

5.1 Introduction

This chapter presents the findings of the research gathered using semi-structured interviews, and the findings are analysed using thematic analysis. Under thematic analysis, four themes are developed in alignment with the research objectives, and recurring ideas in the findings or interview transcripts are organised and analysed under common themes. There were 7 interviewees, who were given pseudonyms. Respondent A, Respondent B and Respondent C are the people with disability in Ireland, while Respondent D, Respondent E, Respondent F and Respondent G are the stakeholders, whose perspectives and insights matter for this research.

5.2 Thematic Analysis

5.2.1 Theme 1: Existing Issues and Challenges faced the People with Disability in Ireland in Accessing Digital Content, Websites, Applications and Online Services

This theme is developed in alignment with the first research objective, which focuses on understanding the current state of digital accessibility in Ireland by evaluating the challenges and barriers experienced by people with disability in the country. In this regard, Respondent A, Respondent B and Respondent C were asked about the specific challenges they face while accessing digital resources and content, while Respondent D, Respondent E, Respondent F and Respondent G, were asked about their thoughts regarding common challenges faced by the people with disability in Ireland. In this context, Respondent A stated, "*I am visually impaired, and it is common for me to be unable to access digital resources due to lack of screen reader compatibility, poorly structured content and missing alternative text for visual elements.*" In a similar vein, Respondent D opined "*Well, people with different disability face different challenges. Like, visually impaired people find it difficult to access content due to lack of compatibility for screen readers and ineffective colour contrast.*" On the other hand, Respondent B said "*As someone with motor impairment, I find it challenging to navigate the web resources that require rapid mouse movements. Additionally, I am usually unable to click and select small icons, links, or interactive elements.*" Respondent C suggested, "*Being deaf, I often find it challenging to access video or audio content that does not have proper captions or transcripts.*" From these responses, it is evident that people with different

disabilities encounter different challenges.

Adding to the views of these respondents, Respondent E suggested "*According to me technological barrier may be the one common issue faced by people with disability, as they might find it difficult to access the web resources due to incompatibility of resources with assistive technologies.*" In line with different views presented by people with different disabilities in Ireland, Respondent E's opinion can be justified, as web resources that lack compatibility with assistive technologies are completely inaccessible for people with disability. Furthermore, according to Respondent F "*people with disability are expected to encounter barriers in accessing essential services and support, including healthcare, education and social services.*" Alternatively, Respondent G reasoned "*(prevalence of digital inaccessibility in Ireland) is due to the limited budgets and priorities of the website owners.*" Respondent G further elaborated on this and stated "*Well, the website owners prioritise lead generation and conversions over making the website accessible to people with disability. Thus, more efforts and budget is allocated for making the website attractive for people without disability, who form the maximum proportion of internet users.*" Thus, it can be analysed that web resources owners are negligent and inconsiderate of the needs of people with disability in Ireland, which makes it difficult for these users to access the support services that are meant for their welfare.

Thereafter, the participants with disability were questioned about the impact of accessibility challenges on their ability to effectively engage with digital resources. Respondent A highlighted "*Well, these challenges actually make me feel incompatible and disabled, as I am unable to carry out online transactions or any online activity in general*." Respondent B suggested "*I am unable to independently access these resources*", while Respondent C indicated "*I often miss out on the important information conveyed through audio or video, due to lack of transcripts or visual cues; thus, it hinders my capability to fully engage with digital resource*." From the aforementioned opinions of the participants, it has been analysed that due to challenges and barriers in accessing digital resources, the people with disability in Ireland miss out on important information, which hinders their capabilities to effectively engage with digital content. When these respondents were asked how they felt about the same, Respondent A expressed to often feel frustrated, while Respondent B often felt left out on digital platforms. Alternatively, Respondent C shared an experience that made the participant lose interest in digital resources, "*I once attended a webinar for enhancing productivity; however, due to lack of live transcripts, I was unable to understand anything,*

which made me feel incompetent and disabled." From the quoted responses, it can be analysed that digital inaccessibility intensifies the feelings of being incompatible and disabled among people with disability, as these issues increase their dependency on others.

When the stakeholders were asked about their opinions regarding the impact of challenges associated with digital accessibility on user experience (of users with disability), Respondent E advocated "*These challenges may make them feel frustrated with the digital resources and have negative experience.*" Similarly, Respondent F opined "*It may make them feel frustrated, as they are unable to access the services and support that is designed for their well-being.*" Alternatively, Respondent D suggested, "*I think these challenges may make them feel excluded due to their disability.*" Thus, from the cited quotes, it can be analysed that stakeholders have an adequate understanding of the negative impact digital inaccessibility has on the user experience of people with disability in Ireland, yet limited efforts are made to enhance digital accessibility.

5.2.2 Theme 2: Current Role of Assistive Technologies in Digital Accessibility for People with Disability in Ireland

This theme is developed in alignment with the second objective which focuses on understanding the role or importance of assistive technologies in enhancing digital accessibility for people with disability. The participants were asked whether assistive technologies help them in overcoming the challenges or barriers associated with digital accessibility. The responses of the participants indicate a high reliance of people with disability in Ireland on assistive technologies, as suggested by Respondent C, "*I heavily rely on captioning tools and speech-to-text tools, which help me in understanding the audio messages.*" Similarly, Respondent A answered "*I'm highly dependent on-screen reader software for navigating websites and applications. However, the technologies fail if the website or digital content lacks screen reader compatibility*." Additionally, Respondent B stated "*I often use technologies, like voice recognition software and alternative devices, like keyboards and joysticks, to access digital content. This helps me to navigate through various resources on digital platforms; thus, offering me some independence online*." These findings further suggest that assistive technologies make navigation on digital platforms easy for people with disability, which improves accessibility of digital products for them. Additionally, it has been analysed that assistive technologies help ensure that people with disability can independently access digital products and

benefit from their services.

The stakeholders were also asked to share their insights about the role of assistive technologies in enhancing digital accessibility in Ireland. In this context, respondents highlighted the significance of assistive technologies for offering digital accessibility to people with disability. Respondent E stated, "*Assistive technologies promote inclusivity due to their universal design, which allow the people with diverse disabilities to effectively access digital products.*" Alternatively, Respondent D opined "*I firmly believe that assistive technologies play a pivotal role in bridging the gap between digital content and users with diverse disabilities by ensuring that everyone can fully participate in digital platforms*." On the other hand, Respondent F highlighted the significance of assistive technologies and stated, "*they align with the commitments of policymakers to uphold the principle of equality and non-discrimination in Ireland, as these technologies offer people with disability an equal access to digital content and services*." The views revealed that assistive technologies play a significant role in ensuring inclusivity in the digital world and enhancing digital accessibility for people with disability in Ireland. It has been analysed that assistive technologies have universal design and ensure to accommodate the needs of users with diverse disabilities, which ensures complete engagement of everyone with digital resources.

Contrarily, Respondent G indicated "*Assistive technologies can highlight the areas in digital products that fall short in terms of accessibility, which prompts the web developers, designers and content creators to optimise the code for better compatibility and create interfaces and landscapes that are more user-friendly*." Thus, it can be analysed that using assistive technologies helps in determining the area of digital products that is not accessible for people with disability, which helps web developers, designers, and content creators to identify the scope of improvement and create products with better accessibility.

5.2.3 Theme 3: Effective Strategies for Improving Digital Accessibility in Ireland

In the light of the third research objective, this theme is developed, which focuses on determining best practices, guidelines and cases in Ireland that demonstrate effective strategies to enhance digital accessibility in the country. When the participants with disability were asked about their suggestions for effective strategies to enhance digital accessibility in Ireland, they shared different opinions.

Respondent A opined "*make the content compatible for assistive technologies, especially screen reader technologies, by effectively structuring the content and adding alternative texts for the visual elements.*" Alternatively, Respondent C indicated "*For people with hearing impairments, I think adding transcripts for audio and video content can help in making content accessible*." On the other hand, Respondent B stated, "*I think enhancing keyboard accessibility, optimising touch-screen interfaces and providing customising options, like adjusting interface layout and button sizes, can significantly help*." Thus, from the analysis, it has been inferred that people with different disabilities have different ideas about digital accessibility. In this regard, it is important to consider the diverse needs and expectations of people with different disabilities to ensure complete accessibility of digital products and make the digital landscape inclusive.

To further identify the improvement strategies and best practices for digital accessibility in Ireland, stakeholders were asked to present their suggestions. In this context, Respondent F noted that there is limited knowledge and experience regarding digital accessibility among web developers, designers, and content creators in different industries. Thus, Respondent F stated "*collaborations among businesses and industries in Ireland can offer a chance for knowledge and resource sharing. This may offer the stakeholders to collectively address the issues related to digital accessibility in the country and ensure inclusivity on digital platforms*." Similarly, Respondent D suggested "*According to me, the best way to enhance digital accessibility is by enhancing awareness among web developers, designers, and content creators. This requires educating them about significance of digital accessibility and making them capable to implement best practices for the same*." From the aforementioned suggestions, it has been inferred that there is a need to enhance awareness and compatibility among web developers, designers and content creators to implement best practices regarding digital accessibility, and one way of achieving the same is through collaborations among businesses and industries.

Contrarily, Respondent E opined "*I think the best way to enhance digital accessibility is by enhancing user engagement. The users with disability must be encouraged to share their feedback on regular basis to help the businesses to improve their digital products*." Furthermore, Respondent E supported the opinion by quoting the examples of Google, Microsoft, and Apple, who focus on considering user feedback to identify the scope of improvement to continuously align their efforts with users' interests and make digital products more and more accessible for people with disability. On the other

hand, Respondent G noted the significance of monetary incentives as businesses always prioritise monetary benefits and suggested "*the best way of enhancing digital accessibility is providing incentives to the businesses for prioritising accessibility of their digital products and enforcing accessibility standards*." Thus, it has been analysed that to motivate private businesses to prioritise the digital accessibility of their products, they shall be offered monetary incentives.

5.2.4 Theme 4: Perspectives and Practices of Web Developers, Designers and Other Stakeholders Involved in Creation and Maintenance of Digital Resources

This theme is aligned with the fourth research objective, which aims at understanding the perspectives and best practices of web developers, designers and other stakeholders in Ireland related to digital accessibility in the country. In this regard, the responses of Respondent A and Respondent G suggested that the Government is the most important stakeholder, who helps in enhancing digital accessibility and creating an inclusive digital environment. Respondent A claimed, "*Government can make it compulsory for the digital product owners to make their content accessible for people with disability and guide the search engines to rank the websites based on their accessibility.*" Alternatively, Respondent G stated, "*They have the authority to allocate funding for research in digital accessibility and develop policies to incentivise businesses who prioritise digital accessibility*." From these findings, it can be analysed that the Government has the authority to direct and alter the efforts of the businesses or owners of digital resources, which makes them important stakeholders.

On the other hand, some participants highlighted the importance of enhancing awareness and knowledge about digital accessibility among web developers, designers, and content creators. In this regard, Respondent B pointed out that it is the responsibility of businesses to make their digital products accessible and stated, "*They shall enhance their investments to raise awareness and enhance practices of web developers, designers and content creators.*" Furthermore, Respondent D identified important stakeholders, who play a pivotal role in preparing the next generation of web developers, designers, and content creators, and suggested that "*integrating digital accessibility in their curriculum can help them in understanding its significance and best practices to be considered in their future projects*." On the other hand, Respondent F opined "*I think technology companies and web developers working in these companies are the key stakeholders, as they have adequate knowledge and expertise about the digital accessibility and expectations of people with a disability*

regarding digital accessibility." Moreover, Respondent F elaborated "*they may play a crucial role in enhancing awareness and capabilities to implement best practices related to digital accessibility among other web developers and designers working in other industries*." In this way, the capability of web developers, designers, and content creators to implement digital accessibility elements in digital products can be enhanced by including it in their learning curriculum and facilitating knowledge transfer through collaborations.

Alternatively, Respondent C, being a person with a hearing disability, identified content creators as important stakeholders, and suggested "*They should focus on adding captions and transcripts for audio contents to make it easy for deaf people to understand the content.*" Furthermore, Respondent E pointed out that advocacy groups or individuals with a disability are important stakeholders and elaborated "*they can be instrumental in advocating digital accessibility and holding digital product owners accountable to ensure inclusive practices*."

When the participants with disability were asked to share their perspectives about the reasons behind the inaccessibility of digital resources, Respondent A suggested that budget constraints and lack of awareness among digital resource owners are the key reasons behind digital inaccessibility. Respondent A further elaborated and stated, "*The businesses do not have adequate budget to enhance accessibility of the web resources, while web developers, designers and content creators have inadequate awareness about digital accessibility.*" Respondent B and Respondent C shared similar opinions and highlighted that it is the negligence of website owners and content creators. In this regard, Respondent B stated, "*I think it is the negligence of website owners and lack of their interest to make their websites inclusive, as most of the internet users do not have any disability*." Respondent C claimed, "*The disinterest and negligence of content creators and digital resource owners to ensure inclusivity in their resources*."

Furthermore, to understand the current practices to enhance digital accessibility in Ireland, the stakeholders were asked to highlight the common best practices related to digital accessibility that are considered in Ireland. In this regard, Respondent E suggested "*It is adding the alternative texts for the visual elements, like images and GIFs. It is common as it is one way of optimising the website for search engines; thus, this practice is considered keeping SEO in mind*." Similarly, Respondent G stated, "*Adding alternative texts, which helps the businesses to meet SEO standards and optimise web resources for voice search*." From these findings, it is clear that alternative text for visual

elements is added to optimise the websites for search engines, and not to make them accessible for visually impaired users. Furthermore, Respondent D suggested "*It is the use of semantic HTML markup, which enhances the structure of web document. This helps in optimising the use of assistive technologies, as they can effectively interpret and navigate through these documents.*" Alternatively, Respondent F highlighted that web developers and designers consider keyboard accessibility, while developing digital products, and explained, "*designers and developers understand that not everyone can access the web resources with the mouse; thus, it ensures keyboard accessibility is important to reach wider audience*."

These stakeholders were also questioned about the key challenges that they face while enhancing the digital accessibility of their products, to which Respondent G proclaimed, "*The knowledge and awareness regarding digital accessibility is limited, which makes it difficult to find qualified professionals, who can help business in enhancing accessibility of their digital products*." On the other hand, Respondent E highlighted compatibility issues as the key challenge and suggested "*inconsistent placement of alternative text may make it difficult for screen-reader assistive technologies.*" Furthermore, Respondent D and Respondent F identified technical complexity as the key challenge faced by web developers and designers in enhancing the digital accessibility of resources. In this context, Respondent D stated "*ensuring semantic HTML markup is complex especially for large web resources. The developers may find it difficult to meet standards and integrate accessibility features in the digital resources.*" Alternatively, Respondent F suggested "*web developers and designers often feel pressured to enhance digital accessibility without compromising the functionality of digital product.*" It has been inferred that there is a need to increase investments in capability development for web developers and designers to help them effectively carry out the technically complex tasks to make digital products accessible, without compromising their functionality.

5.3 Summary

It can be summarized that in Ireland, people with disability face various challenges and barriers in

accessing digital resources and carrying out day-to-day activities online, which makes them feel incompetent and isolated. Assistive technologies play a significant role in enhancing digital accessibility for people with disability in Ireland; however, many websites and digital resources lack compatibility with these technologies. Thus, it is important to implement strategies that necessitate digital accessibility elements for digital resources for the interest and benefit of people with disability.

Chapter 6: Discussion

This chapter aims to make an in-depth review of findings gained through interviews and their analysis carried out using thematic analysis. The review of these findings is elaborated in this chapter, by discussing them in alignment with the literary findings. The findings are discussed systematically to address the research questions, where the interpretations derived from interview findings are supported or compared with literary findings to further derive robust conclusions. About the key research question that aims at determining the strategies or best practices that can be implemented by the websites and e-commerce businesses in Ireland to address the challenges faced by people with disability in the country, various findings have been derived.

The review of the interview findings revealed that people with diverse disabilities may have diverse needs and expectations regarding digital resources. Based on the responses from people with disability, it has been determined that digital accessibility can be enhanced by improving the overall structure of the website to make it compatible with assistive technologies, like screen readers. Other ways to enhance digital accessibility, as noted by respondents, include adding captions or transcripts for visual elements and improving keyboard accessibility. It is supported by the literary findings, which indicate that people may have diverse disabilities, and it is the responsibility of the web developers, designers, and creators to consider the needs of these people, as it can help them in effectively incorporating the digital accessibility features in digital products (Geurs et al., 2024). In the literature review, similar suggestions were made, like adding alternative texts for visual elements on websites (Tiwary and Mahapatra, 2022) and improving keyboard accessibility of digital products (Mitchell et al., 2022). Furthermore, unlike interview findings, the literary findings noted the importance of optimising the colour scheme of the web resources to benefit people with visual impairment. This may enhance the readability of the content on the website, which may not only benefit the visually impaired people but all users in general (Samy and Hesham, 2023).

Furthermore, the interview findings highlighted the significance of improving awareness and capabilities among web developers, designers, and content creators to enhance digital accessibility. It is supported by the literature findings, which noted that by increasing investments in the training of web developers, designers and content creators, businesses can enhance awareness and capabilities among them, which can help them effectively incorporate the features of digital accessibility into

their website (Botelho, 2021; AlMeraj et al., 2023). Alternatively, stakeholders recommended enhancing collaborations among different industries in Ireland to foster a culture of knowledge sharing, which can enable web developers and designers in every industry to enhance digital accessibility. In the interview, the significance of advocacy for people with disability has also been noted, as their regular feedback and suggestions can optimise the development of digital products and improve their accessibility. It is supported by literature, which signified engagement of people with disability during the development process of digital products (Bricout et al., 2021). Another effective strategy discussed in the interview findings is offering monetary incentives to businesses, as incentivising digital accessibility can help motivate businesses to prioritise the digital accessibility of their digital products.

In alignment with the first research question, it has been identified that various barriers faced by people with disability in Ireland while accessing digital resources, as per the interview findings. It has been discussed that people with disability commonly face accessibility issues due to the lack of compatibility of digital products with assistive technologies. For instance, due to ineffective content structure and missing alternative texts, screen readers are unable to operate properly. This intensifies digital inaccessibility for people with disability. Similarly, the literature review revealed that business and web resource owners pay less to no attention to enhancing the digital accessibility of their products, as most of their users are without any disability (Spina, 2021). It has been discussed that businesses prioritise financial benefits over digital accessibility of their products; thus, their priorities do not align with the interests of people with disability. From the interview findings, it has been inferred that due to a lack of digital accessibility, people with disability fail to carry out basic online activities; thus, they are unable to effectively access the support services that are meant for their well-being. Similarly, it has been noted in the literature that due to digital inaccessibility, people with disability are unable to carry out basic everyday tasks, like benefiting from e-learning opportunities (Cranmer, 2020; Kosova, 2022), using services of tourism websites (Fernández-Díaz et al., 2023), and carrying out banking activities, filling employment forms or attending webinars (Scanlan, 2022).

In this regard, it has been discussed that due to digital inaccessibility, the dependence of people with disability increases on others, which intensifies the feelings of being incompetent and disabled. Additionally, digital inaccessibility limits digital connectivity for people with disability, which makes them feel isolated, and it is likely for people with disability to miss out on important information due

to digital inaccessibility. Further revelations made by interview outcomes indicated that due to digital inaccessibility, people with disability are expected to feel frustrated and isolated; thus, there is a need for inclusive design of digital products. These findings are also supported by literature findings (McCampbell, Schumann and Klerkx, 2022; Spina, 2021; Chang et al., 2021). In this context, it has been discussed that assistive technologies play a pivotal role in promoting inclusivity, which allows people with diverse disabilities to easily access digital resources.

In line with the second research question, which focuses on ascertaining the key challenges faced by web developers, designers, and other stakeholders in implementing digital accessibility features in digital products, it has been discussed that web developers and designers have limited knowledge and competencies to implement digital accessibility features. Moreover, it has been discussed that developers and designers find it difficult to manage complex technologies, like maintaining consistency of HTML mark-up for large web resources. The developers, designers or content creators are likely to constantly feel pressured to ensure accessibility of the digital products without compromising their functionality. Additionally, it has been discussed that due to the limited engagement of people with disability in the development process of digital products, developers, designers, and content creators are expected to have ambiguity about the needs and expectations of such users. The literature findings hold significance here, as it has been noted in the literature that opinions or insights of accessibility experts and consultants may help the web development team to make informed decisions during the production phase and add all the elements of digital accessibility.

Practical Implications of the Findings on Different Stakeholders

The research findings may have practical implications for various stakeholders, including Government, Businesses, Web Developers and Designers, and People with Disabilities.

Government: The findings of the research revealed that digital accessibility awareness is limited among web developers, designers, and content creators; thus, they fail to meet the expectations of people with disabilities. Thus, the research may encourage Government bodies to allocate resources and funding towards initiatives aimed at enhancing digital accessibility, like training programmes, accessibility audits and collaborations with people with disabilities for web developers, designers, and content creators.

Businesses: The findings also revealed that businesses only prioritise profitability and financial benefits. In this regard, the research may motivate businesses to become socially responsible and consider the needs of people with disability by enhancing the accessibility of their digital products.

Web Developers and Designers: The research findings may underscore the importance of digital accessibility and need for the web developers and designers to enhance their competencies and awareness by indulging in training programmes. The training programmes may help them bridge the skills gap and equip them with the capabilities to create inclusive digital designs.

People with Disabilities: The research is expected to empower people with disabilities, as the research findings bring attention to the current problems faced by them; thus, improving the scope for enhancement of digital accessibility in Ireland, which may allow people with disabilities to participate fully in digital society.

Chapter 7: Conclusion and Recommendations

7.1 Conclusion

In the presented research, a detailed investigation has been made regarding the challenges faced by people with disability in Ireland due to digital inaccessibility. Furthermore, the perspectives of different stakeholders in Ireland regarding digital accessibility have been explored to determine effective measures for improvement, and these perspectives have been inquired by interviewing 7 participants in Ireland. Based on the analysis of the findings from the interview, it has been concluded about the first research objective that despite continuous efforts of the Government and concerned authorities, there is limited digital accessibility for people with disability in Ireland. The findings showcased that people with diverse disability face different challenges, for instance, people with visual impairments are unable to access visual elements on digital products, while people with hearing impairments are unable to access information in audio or video formats. Due to the inaccessibility of web products, people with disability often miss out on important information that is digitally available. The literary findings and interview findings alike suggested that due to digital inaccessibility, people with disability are unable to carry out everyday tasks, like banking activities, or attending e-learning programmes or workshops. Furthermore, it has been inferred that due to digital inaccessibility, people with disability may fail to effectively access and benefit from the support services meant for them.

Furthermore, it has been inferred that due to digital inaccessibility, people with disability often feel left out, frustrated, and isolated. As digital inaccessibility increases the dependency of people with disability on others, they are expected to experience negative emotions and the feelings of being incompetent and disabled intensify. Due to the lack of digital accessibility, there is limited engagement of people with disability with digital products in Ireland, and stakeholders have adequate awareness of the same, yet limited efforts have been made to improve the situation in the country regarding digital accessibility.

In alignment with the second research objective, to examine the current role of assistive technologies in improving digital accessibility, it has been concluded that people with disability highly rely on assistive technologies to access digital products. Assistive technologies, like screen-readers, help people with visual impairment and learning disabilities to understand the content on the website

while captioning tools help people with hearing disability to access information in audio or video format. The interview findings revealed that assistive technologies allow people with disability to independently access and benefit from the digital products, and effectively carry out online activities and benefit from the support services available digitally. Similar conclusions were derived from literature findings, which indicated that assistive technologies help people with disability to access the same content in different formats to suit their needs. It gives them a sense of accomplishment and enhances the overall user experience of people with disability on online platforms.

Additionally, with the help of the literature review, various assistive technologies have been identified, including screen readers, screen-magnification software, voice recognition software, augmentative and alternative communication (AAC) systems, and captioning and transcription tools. These technologies help in addressing the diverse needs of people with diverse disabilities and offering outputs in alternative formats. Thus, it has been concluded that there are various options to improve digital accessibility for people with disability in Ireland; however, the interview findings noted that many websites and digital resources are not compatible with assistive technologies. In this regard, it has been inferred that using assistive technologies in the testing of digital products can help web developers and designers identify the scope of improvement in digital products and optimise them as per the needs and requirements of people with disability.

In line with the third research objective, to identify best practices that demonstrate effective strategies for improving digital accessibility in Ireland, it has been concluded that there is a need for enhancing the compatibility of digital resources with assistive technologies to make them accessible to people with disability. From the analysis and discussion, it has been inferred that there is a need to improve awareness and capabilities among web developers, designers, and content creators to consider the diverse needs of people with disability in Ireland and develop products that meet their needs and expectations. Based on the recommendations provided by participants in an interview, it has been concluded that there is a need to improve the education and training for web developers, designers, and content creators by adding a subject area regarding digital accessibility in their curriculum and helping them to effectively develop competencies. Furthermore, the skills can be developed by fostering and promoting collaborations among web development teams in different industries and business organisations.

From the interview findings, it has also been concluded that digital accessibility can be improved by increasing the advocacy of people with disability during the development of digital products. It can help in gaining real-time feedback and suggestions from people with disability and incorporating the changes according to their needs and expectations. Alternatively, it has been inferred that businesses are unwilling to incorporate elements of digital accessibility in their digital products, as it increases overall costs for them. In this regard, it has been concluded that by incentivising the digital accessibility of products, businesses can be encouraged to change their priorities and ensure the digital accessibility of their products.

Finally, in alignment with the final objective, to understand the perspectives and practices of different stakeholders regarding digital accessibility, it has been concluded Government is the most important stakeholder, as the Government has the authority to alter the actions of businesses and necessitate it for them to improve digital accessibility of their products and resources. Furthermore, the Government can make efforts to increase funding for the training and development of web developers, designers, and content creators to make them competent and skilled to make digital products accessible for people with disability and maintain their accessibility. Based on the literature findings, it has been noted that content creators play a crucial role in enhancing digital accessibility of digital products, as they can add captions for all the visual and audio elements on the website or digital resources and make them accessible for the people with hearing and visual impairments. From the literary findings, it has been concluded that web developers and designers can promote digital accessibility by complying with the guidelines and standards of digital accessibility while developing and designing digital products. Furthermore, it has been inferred that web developers and designers need to use semantic HTML markup for digital products to improve the structure of web documents and make them compatible with assistive technologies.

The interview findings helped in determining that web developers, designers and content creators face various challenges in enhancing digital accessibility of digital resources due to technological complexities. In this regard, it has been inferred that there is a need for businesses to invest in the training and development of web developers, designers, and content creators to improve their skill sets and help them effectively enhance the digital accessibility of their resources.

7.2 Recommendation for Future Research

This study is based on Ireland's digital accessibility; thus, applying its findings to other countries or geographical locations is not feasible. In this regard, future researchers are recommended to conduct similar studies in a global context or cross-study based in two or three countries, by analysing international frameworks, regulations and case studies related to digital accessibility. This can help in determining the generalised measures to effectively enhance digital accessibility for people with disability. Furthermore, the presented study derived conclusions using the interview method; thus, information was collected from a small population. In this regard, future researchers are recommended to survey method, which can enable the researcher to collect data from a larger population in less time. This method can help the researchers to carry out the study on a wider population, which may facilitate the researcher to derive robust outcomes and enhance the credibility and accuracy of the research findings. Moreover, the use of the survey method can help in determining diverse issues and challenges faced by people with disability, which can enhance awareness among stakeholders and help them determine effective strategies to address such challenges. The presented research briefly explores the role of assistive technologies in improving digital accessibility. Hence, future researchers are recommended to further explore emerging technologies and innovations, like AI and assistive technologies, and their role in enhancing user experience and digital accessibility for people with disability.

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Appendices

Appendix 1- Interview Questionnaire

1. Can you share specific challenges or barriers that you encounter when accessing digital content, websites, applications, and online services due to your disability?
2. How do these accessibility challenges impact your ability to effectively engage with digital resources?
3. How does it make you feel?
4. Do the assistive technologies help you in any way to overcome these barriers or challenges?
5. So, in your opinion, what measures and initiatives must be taken to improve digital accessibility for people with impairments?
6. Do you think any stakeholder can help in enhancing digital accessibility in Ireland?
7. From your perspectives, what may be the reasons behind inaccessibility of digital resources?

Thanking You

Appendix 2: Participant Consent Form

Understanding Key Challenges for People with Disabilities in Digital Accessibility in Ireland and Determining Effective Measurements for Improvement

Consent to take part in research

- I…… voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
- I understand that participation involves interview that will last 30 – 60 minutes.
- I understand that I will not benefit directly from participating in this research.

- I understand that all information I provide for this study will be treated confidentially.

- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.

- I understand that disguised extracts from my interview may be quoted in dissertation.

- I understand that if I inform the researcher that myself or someone else is at risk of harm, they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.

- I understand that signed consent forms will be retained in word documents that will be password protected who only the researcher will have access to until the exam board confirms the results of their dissertation.

- I understand that a transcript of my interview in which all identifying information has been removed will be retained for two years from the date of the exam board.

- I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.

- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

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Signature of research participant

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Signature of participant Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study.

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Signature of researcher Date