sustainability

MDPI

Article

Rethinking Accessibility: How Universal Design Is Shaping Rural Areas in Lithuania

Živilė Gedminaitė-Raudonė and Monika Belhaj *

Lithuanian Centre for Social Sciences, Institute of Economics and Rural Development, 03220 Vilnius, Lithuania; zivile.gedminaite@ekvi.lt

* Correspondence: monika.belhaj@ekvi.lt; Tel.: +370-675-14960

Abstract

Population aging and the rising prevalence of disability are reshaping demographic dynamics worldwide, underscoring the need for inclusive environments that accommodate diverse functional abilities. While legal mandates for accessibility exist, structural and institutional barriers often hinder implementation. Universal Design (UD) provides a transformative framework that shifts the focus from individualized accommodations to systemic inclusion; however, its application in Lithuania, particularly in rural settings, remains underexplored. This study addresses this gap by investigating the integration of UD principles in the Ignalina region, a rural Lithuanian locality experiencing pronounced demographic decline and aging. Using the design thinking model, this research examined how public institutions navigate UD implementation across the phases of empathization, definition, ideation, prototyping, and testing. The findings reveal both promising developments and persistent challenges. Community-engaged initiatives, such as micro-grants, volunteer services, and digital accessibility platforms, have begun to enhance service inclusivity. However, issues such as outdated infrastructure, unclear legislative guidelines, and funding limitations continue to constrain progress. This study concludes that UD can serve not only as a mechanism for promoting accessibility but also as a strategic tool for rural socio-economic resilience, contributing to the discourse on inclusive spatial planning and policy development in aging and diversifying societies.

Keywords: universal design; accessibility; public services; design thinking model; regional development; Lithuania

check for updates

Academic Editor: Jianming Cai

Received: 24 August 2025
Revised: 11 September 2025
Accepted: 13 September 2025
Published: 16 September 2025

Citation: Gedminaitė-Raudonė, Ž.; Belhaj, M. Rethinking Accessibility: How Universal Design Is Shaping Rural Areas in Lithuania. *Sustainability* **2025**, *17*, 8311. https://doi.org/10.3390/su17188311

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

Population aging and the growing prevalence of disability are reshaping the global demographic landscape. Worldwide, the proportion of people aged 65 years and older relative to the working-age population (15–64 years old) is projected to increase to 15.8% by 2025 and 25.3% by 2050 [1]. Simultaneously, an estimated one billion people—approximately 15% of the global population—live with some form of disability [2,3]. These demographic trends underscore the urgent need to adapt the built and information environments to accommodate diverse life stages and functional capacities. Accessibility, therefore, must be viewed not only as a legal obligation but as a fundamental aspect of inclusive societal development.

Despite the existence of legal frameworks aimed at promoting accessibility, persistent systemic and structural barriers remain, reflecting deeper societal issues, such as ableism and a limited understanding of diversity in human functioning [4,5]. Institutional inertia, socio-cultural attitudes, and fragmented policy implementation often perpetuate these

barriers. In contrast, Universal Design (UD)—a holistic approach that advocates for the design of products, environments, and services to be usable by all people, to the greatest extent possible, regardless of age, ability, or status—offers a transformative framework. UD shifts the focus from accommodating individual impairments to proactively creating inclusive systems that transcend traditional accessibility limitations. As both a mindset and a practical methodology, UD has the potential to challenge and overcome entrenched inequities, fostering more equitable and resilient communities [6–8].

In Lithuania, the research on UD remains limited. Existing scholarship predominantly focuses on Universal Design for Learning (UDL) e.g., [9,10], with significantly less attention being paid to the broader application of UD principles across physical, informational, and service environments. Notable but scarce studies have explored UD in contexts such as accessible tourism [11,12], healthcare services accessibility [13], and design and management of the living environment [14]. However, these works remain fragmented and largely thematic, lacking a comprehensive, region-specific analysis of how UD principles are implemented across public infrastructure and services in the rural context.

This fragmentation creates two key gaps. First, while international scholarship highlights UD as a driver of social inclusion and economic resilience, there is little empirical evidence on how these dynamics play out in rural Lithuania. Second, at the regional level, the research is particularly scarce, leaving unanswered questions about the extent to which local policies and infrastructure foster or hinder accessibility in everyday life. These gaps matter because without localized insights, national accessibility strategies risk being overly abstract and disconnected from lived realities.

Against this background, the present study investigates accessibility in the Ignalina region of Lithuania through the lens of UD. To address these issues, the following research questions were developed:

- RQ1: How has the integration of Universal Design principles into the infrastructure and public services of the Ignalina region evolved?
- RQ2: In what ways has this process contributed to enhancing the region's socio-economic resilience?
- RQ3: What gaps or barriers hinder the full implementation of accessibility in the region?

By evaluating existing infrastructure and public services, identifying areas requiring improvement, and considering the implications of enhanced accessibility for community inclusion and regional socio-economic development, this study contributes both empirical evidence and practical insights. Its motivation lies in bridging the disconnect between policy rhetoric and regional realities, thereby advancing the discourse on how UD can serve as a catalyst for more inclusive and resilient communities in rural settings.

2. Literature Review

2.1. Understanding Universal Design: Its Origins, Principles, and Dimensions of Application

In the 1950s, the United States witnessed the emergence of the "Barrier-Free" movement, initiated by disabled war veterans alongside advocacy organizations representing individuals with disabilities [15]. This movement marked a significant early effort to promote the removal of physical obstacles in the built environment, laying the groundwork for later developments in accessibility and inclusive design. The primary goal was to ensure the full inclusion of people with disabilities in life, education, and employment, rather than placing them under care or supervision in specialized institutions. Over time, this movement evolved into a political initiative, leading to the legal adoption and implementation of accessibility standards [5,15].

The notable American architect Ron Mace played a pivotal role in developing the concept of UD [16], fundamentally transforming the global approach to design. According to Hamraie [5], having spent most of his life in a wheelchair, Ron Mace profoundly understood the challenges posed by an environment not designed for inclusivity. He was instrumental in revising North Carolina's building code, which later served as a national model in the USA. Mace defined universal design as follows:

> *Universal Design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design*. [17]

In 1997, the Centre for Universal Design, in collaboration with a group of USA-architects, product designers, engineers, and environmental design researchers, led by Ronald Mace, formulated the foundational principles of UD, thereby refining and elaborating the concept [17]. These seven principles include equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and appropriate size and space for approach and use (read more on the NCSU website). Collectively, they offer a foundational framework for guiding the design of environments, products, and services that are inclusive, user-centered, and responsive to the needs of a diverse population. However, given the advancements in modern safety standards, Harrison et al. [18] introduced an eighth principle, "Reduction of Fear", which should serve as a fundamental design parameter across the built environment, IT, and services. According to the authors, by expanding its scope and integrating health and safety considerations, universal design becomes more inclusive, appealing to clients, and beneficial to all users.

It is essential to discuss the context in which the principles of UD are applied. UD is commonly examined across four interrelated dimensions: accessibility of the physical (built) environment, information accessibility, product accessibility, and service accessibility [7,19–21]. According to Müller et al. [22], accessible physical environment refers to the ability of all individuals to move freely and use spaces and their components on an equal basis with others. This must be achieved inclusively and without discrimination, ensuring autonomy, comfort, and safety.

Accessible information involves the availability of clear, reliable, and up-to-date information about buildings, services, and their accessibility, both through digital platforms (e.g., websites and mobile applications) and at physical service locations [23,24]. Based on Crabb et al. [25], product accessibility ensures that everyday items are designed to accommodate and be usable by a wide spectrum of individuals with diverse needs, including children, left-handed users, individuals who are color blind or visually impaired, as well as those engaged in multitasking. This approach promotes equitable use and functionality by considering variations in user capabilities from the outset of the design process. Lastly, service accessibility—encompassing both on-site and digital services—ensures equal participation in a broad range of activities without imposing discriminatory practices [25,26]. This includes the provision of necessary support services, such as sign language interpretation and subtitling, which facilitate inclusive access for individuals with diverse communication needs. According to Fisk et al. [27], equally important is ensuring that service providers are trained in accessibility standards, disability awareness, and inclusive customer service.

While each dimension holds individual significance, their interdependence is critical to achieving truly inclusive environments. Addressing only one aspect in isolation is insufficient, as each domain reinforces the others. For example, an accessible public building (physical environment) is only fully functional if information about its accessibility is readily and easily available (information environment), if the products within it are designed and delivered for diverse users (product accessibility), and if the services provided there are inclusive to all individuals (service accessibility). This interdependence underscores the importance of both distinguishing and critically examining the relationship

between UD and accessibility, as a clear understanding of their differences, overlaps, and interconnections is essential for informing effective and inclusive policies and practices.

2.2. Universal Design vs. Accessibility

Before the international recognition of the concept of UD, several related non-discriminatory planning and design approaches were prevalent in the literature, including "barrier-free design", "accessible design", "inclusive design", and "design for all" [28–31]. While "barrier-free design" and "accessible design" were often associated with a more problem-focused or compensatory approach—frequently perceived as accommodating the needs of individuals with disabilities [32]—the latter two, "inclusive design" and "design for all" are widely regarded as synonymous with the concept of UD [29], emphasizing proactive, integrative strategies that benefit all users, not only those with specific needs.

These frameworks laid the groundwork for UD by emphasizing equitable access and usability, particularly for individuals with disabilities, and collectively contributed to the evolution of more holistic and integrative design philosophies. However, given this conceptual overlap and divergence, it is essential to understand the relationship and distinctions between the concepts of UD and accessibility more thoroughly. While some consider them synonymous [33,34], others emphasize the conceptual differences between them. Proponents of the latter view argue that each concept reinforces the other but should not be used interchangeably—Universal Design aims to create environments usable by all people to the greatest extent possible without the need for adaptation [29], whereas accessibility often refers to specific accommodations made for individuals with disabilities [35]. Nonetheless, UD and accessibility both aim to create inclusive environments that support equal participation; they just differ in scope and intent.

According to Null [36] and Kilmer and Kilmer [29], UD seeks to develop environments, products, services, and communication systems that are inherently usable by the widest possible range of people, regardless of age, ability, or other characteristics. The goal is to design inclusively from the outset, minimizing the need for later adaptations. Features such as automatic doors or touchless faucets exemplify this approach, benefiting all users, including those with disabilities, without requiring modifications. Moore et al. [32] further emphasize that UD has evolved beyond the elimination of physical barriers to include the creation of environments that foster inclusion and social participation. This expanded view recognizes the full diversity of human abilities and promotes proactive, equitable design strategies for everyday life. In contrast, accessibility focuses on ensuring that people with disabilities can access and use spaces, products, or services by removing barriers or making specific accommodations [5]. It typically involves complying with standards or legal requirements and may result in adaptations like installing ramps, elevators, or screen readers to meet the needs of people with disabilities.

In essence, UD is proactive and inclusive from the outset, seeking to serve and include all users [16], while accessibility is often reactive, ensuring compliance and accommodation specifically for people with disabilities [37]. However, as Lid [38] notes, accessibility is a fundamental component of implementing UD, serving to achieve broader outcomes, such as social inclusion and equal citizenship. Similarly, UD encompasses overarching goals of equality and inclusive participation, and it has been described as "a holistic expansion of accessibility" [3] (p. 87). Accordingly, this paper employs both terms, recognizing that while accessibility often refers to compliance with minimum legal or technical standards, UD represents a broader, proactive design philosophy that anticipates diverse needs.

2.3. Legislative Frameworks for Universal Design: A Review of International Regulations

Human diversity forms the foundational premise of UD, which is grounded in the recognition of disability as an inherent aspect of the human condition [39]. The concept of UD is embedded as a fundamental principle in the "United Nations Convention on the Rights of Persons with Disabilities" [40]. Specifically, Article 2 defines UD as:

> *"Universal design" means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.* [40] (p. 4)

According to Hedvall et al. [41], the CRPD further emphasizes UD as the primary strategic approach to building sustainable and inclusive societies. UD is recognized as a key mechanism for advancing inclusion and safeguarding equal rights [39]. It signifies a paradigmatic shift away from traditional design norms centered on the "average" body [5] toward a more inclusive framework that embraces human diversity as a defining characteristic of a unified population with varied abilities and needs [41]. Until now, 186 countries have ratified the CRPD. All countries that ratified the treaty are required to amend or repeal national laws to align with its provisions on equal opportunities, raise awareness from an early age, and provide as much informational support as possible.

Key principles of the CRPD are also reflected in several international and European legal and policy instruments that support the implementation of UD. Notably, the Sustainable Development Goals (SDGs), particularly Goal 10 (Reduced Inequalities) and Goal 11 (Sustainable Cities and Communities), emphasize the importance of inclusive design for achieving equity and sustainability [42]. At the regional level, the "European Disability Strategy 2021–2030" promotes the application of UD across all areas of life, including education, employment, and digital environments [43]. Complementing this, the "European Accessibility Act (Directive (EU) 2019/882)" sets out common accessibility requirements for key products and services, such as ATMs, e-commerce platforms, and public transport, and explicitly endorses UD to prevent the need for separate solutions for persons with disabilities [44]. Similarly, the "Web Accessibility Directive (Directive (EU) 2016/2102)" mandates that public sector websites and mobile applications comply with harmonized accessibility standards, notably the "Web Content Accessibility Guidelines (WCAG)" [45].

Foundational rights are further affirmed in the "Charter of Fundamental Rights of the European Union" [46], which prohibits discrimination based on disability (Article 21) and guarantees the right of persons with disabilities to independence, social integration, and participation (Article 26). These commitments are reinforced by the "European Convention on Human Rights" [47], particularly through Article 14, which prohibits discrimination in the exercise of Convention rights. Collectively, these instruments form a robust legal framework that underscores the importance of UD in ensuring accessibility, equality, and full participation for all individuals, regardless of ability.

2.4. Integrating Universal Design Principles in Regional Development

Following an examination of the key international legislative frameworks, it is essential to consider the broader impact of UD and its principles on regional development, social inclusion, and economic growth. According to Garofolo [48], UD is crucial in fostering inclusive environments that benefit diverse populations, contributing to more equitable and accessible communities. It also impacts access to services and strengthens local economies [7,49] through tourism and other sectors. This is particularly relevant in the context of the European Commission's long-term vision for the EU's rural areas [50], which was launched in June 2021 to achieve a sustainable future by 2040. This initiative

emphasized that rural areas are vital to Europe's identity and economic potential, calling for preservation and investment in their future [51].

However, the Communication on "Demographic Change in Europe: A Toolbox for Action" [52] identified several challenges in rural areas, including aging populations, depopulation, limited connectivity, underdeveloped infrastructure, and a lack of adequate employment opportunities. According to the Communication document [52], in the coming years, the EU's population is expected to continue declining, potentially posing challenges to its economy, society, and global standing. Additionally, Europe is experiencing an aging population, with the dependency ratio projected to rise from 33% to 60% by 2100. If left unaddressed, demographic change will intensify labor shortages and place additional strain on public budgets, thereby hindering both private and public sector efforts to advance inclusive and accessible transitions. Such dynamics intensify territorial disparities that not only constrain regional development but also undermine social cohesion and weaken the legitimacy of democratic institutions, as evidenced in Rodríguez-Pose et al.'s [53] analysis.

In this context, the concept of socio-economic resilience becomes highly relevant. Socio-economic resilience is generally defined as the capacity of communities and regions to withstand, adapt to, and recover from demographic, economic, or environmental shocks while maintaining or improving quality of life [54,55]. In rural areas, it encompasses both economic stability—employment, entrepreneurship, and service provision—and social dimensions such as cohesion, inclusion, and equal participation [56,57]. According to Oria-Segura and Muñoz-Medina [58], integrating UD principles into regional development, therefore, contributes directly to resilience. By enabling wider access to services and opportunities, UD strengthens adaptive capacity, supports labor force participation, and fosters community cohesion. In rural contexts, UD can play a particularly significant role. Ensuring inclusive access to healthcare, mobility, and digital services enhances the capacity of rural regions to retain population, stimulate local economies, and reinforce social capital, all of which are essential dimensions of socio-economic resilience [6,57,59].

Therefore, based on the report from the European Commission [51], the long-term vision for rural areas outlines ten shared goals and four key areas of action aimed at fostering stronger, more connected, resilient, and prosperous rural regions by 2040. To achieve these objectives, the Commission committed to launching a rural pact to mobilize public authorities and stakeholders to address the needs and aspirations of rural residents. Additionally, an EU rural action plan was introduced, outlining 30 actions to be implemented across various EU policy areas. In this vision, the integration of UD principles is seen as vital for improving infrastructure, services, and opportunities, thereby stimulating local economies and enhancing the quality of life for both residents and visitors.

While EU and national strategies emphasize inclusivity, sustainability, and resilience, their translation into practice often remains uneven, particularly in rural regions. This disconnect between ambitious policy rhetoric and everyday realities underscores the importance of examining how UD principles are implemented on the ground and whether they meaningfully contribute to socio-economic resilience in vulnerable territories. For example, the research on urban spaces in northern Nicosia (Cyprus) reveals persistent shortcomings in achieving fully accessible environments, with recommendations focused on improving bus stops, sidewalks, pedestrian crossings, urban furniture, and related infrastructure [60]. Similarly, Kapedani et al. [61] examined owner-occupied Passive House standard homes in Flanders (Belgium) that incorporated lifelong living measures. Their findings show that while residents prioritized family needs over broader sustainability goals and considered energy efficiency information more accessible than UD, they also faced resistance from architects and contractors when advocating for UD integration.

Although these studies highlight critical shortcomings in different contexts, the rural dimension of UD remains largely underexplored. The absence of empirical evidence on how UD contributes to resilience and inclusivity in rural territories represents a significant research gap that this study seeks to address. Bridging this gap requires not only aligning political and strategic commitments with practice, but also ensuring the active involvement of diverse stakeholders—from education and training to implementation and monitoring—to embed UD as a substantive rather than symbolic framework.

3. Contextual Background

3.1. Universal Design in Lithuania: Regulations and Statistical Insights

In addition to international and European legislation that Lithuania, as an EU member, must comply with, national laws and regulations also acknowledge the concept of UD. A key piece of legislation, the "Law on Construction (19 March 1996 No I-1240)" [62], formally defines Universal Design in Article 2, Clause 109, outlining its scope and applicability within national law. According to this definition:

> *Universal Design refers to the design of products and environments that can be used without special adaptation by children, adults, men, women, the elderly, persons with disabilities, people of different nationalities, and other groups*. [62]

While this definition acknowledges inclusivity, it differs from the broader international definition, which emphasizes design that is universally accessible to all individuals, regardless of abilities or backgrounds, without requiring modifications or specialized solutions. The Lithuanian approach, though recognizing multiple target groups, remains somewhat more limited in scope.

Importantly, Lithuania's legal framework largely positions UD through the lens of accessibility. As Sakalauskaitė et al. [12] note, legislation and policy are centered on persons with disabilities, with accessibility serving as the main benchmark, while UD receives limited systematic regulation. For example, the "Law on the Fundamentals of Protection of the Rights of Persons with Disabilities" guarantees equal rights and opportunities for persons with disabilities in society, aligning with the CRPD and other international legal principles. But only the Law on Construction defines UD and establishes the obligation to ensure that buildings comply with its requirements. The Law on Architecture, the Regulation on Building Accessibility, and other legal acts within various sectors briefly reference UD principles.

This shows that accessibility in Lithuania is still primarily understood as compliance with technical and legal requirements, whereas UD represents a broader but less operationalized ambition. Nevertheless, the National Progress Plan 2021–2023 [63] explicitly seeks to integrate UD into long-term development, with measures designed to ensure that both physical and information environments become universally usable—thereby linking accessibility compliance with UD-inspired inclusion.

That said, Lithuania is adapting and implementing UD principles according to its context and pace. Like other countries, it reflects the distinct characteristics of its national and regional territories, each shaped by specific mindsets, historical experiences, and socio-cultural factors influencing the interpretation and application of UD. For instance, the research findings by Grangaard et al. [64] revealed differing application approaches across Nordic countries. Norway quickly developed its version of UD, adopting a top-down approach despite criticism. In contrast, Denmark has been hesitant, focusing on accessibility and waiting for sectors to adopt UD through a bottom-up strategy. Sweden, meanwhile, blends these approaches, emphasizing UD as a guiding principle alongside

accessibility and usability. This highlights that, despite international laws and regulations that require countries to implement certain measures, each nation chooses its own path.

3.2. Current Situation on the Application of UD Principles in Lithuania

Due to ongoing demographic changes in Lithuania, such as rapid population aging, declining birth rates, and increasing life expectancy, both accessibility and UD are becoming increasingly relevant. Accessibility remains the baseline requirement for enabling people with disabilities to participate in society, but the broader UD approach frames these efforts as part of a systemic strategy to serve diverse groups, including older adults and families with young children [65].

Available data indicate that while accessibility and inclusive environments in Lithuania are gradually improving, they still demand increased attention. For example, the 2024 study "Regulation and Practice of Universal Design Principles", presented by the Commission for the Monitoring of the Rights of Persons with Disabilities on 28 May 2025 [66], identified several persistent gaps in the implementation of UD principles. The study's findings reveal a marked disparity between larger and smaller municipalities in both the understanding and application of UD principles. In smaller municipalities, implementation remains fragmented and lacks strategic direction. Furthermore, it was observed that regional municipalities tend to rely primarily on national legislation and technical standards, with limited reference to international legal frameworks or internal policy documents. Implementation of UD principles at the regional level remains partial, focusing mainly on physical and informational accessibility, and even these efforts are limited in scope. In terms of service accessibility, the application of UD principles is inconsistent and selective.

As a result, the primary barriers to effective implementation include insufficient knowledge and expertise, as well as constrained financial resources. These patterns reveal a recurring conflation of accessibility and UD, that is, municipalities often equate compliance with accessibility requirements with the full application of UD, leaving broader experiential, social, and systemic aspects underdeveloped [67]. In addition, although Lithuania has made progress in implementing the provisions of the Convention in the field of UD, a significant gap remains between legal regulation and practical implementation [66]. There is also a clear demand for methodological support in the regions to enhance capacity for effective implementation. This slow uptake reflects a broader resistance to change.

3.3. Description of the Ignalina Region

Although the previously discussed aspects highlight notable deficiencies in the implementation of UD principles in Lithuania, a deeper and more systemic issue persists—the lack of a comprehensive, centralized national framework. While accessibility standards guide minimum requirements, the absence of a coordinated UD framework prevents a more ambitious, inclusive approach. As Pineda [68] notes, legislation alone is insufficient. This structural gap impedes coordinated efforts and undermines the ability to assess the impact of existing measures, especially in rural areas, which frequently receive limited attention and support.

Nevertheless, the "Comprehensive Plan of the Territory of the Republic of Lithuania 2030" [69], a key strategic document guiding national territorial development, outlines ambitious objectives. These include reducing economic, social, and regional disparities and ensuring the provision of high-quality, universally accessible public services. The plan also emphasizes the expansion of regional infrastructure and service networks as part of a broader strategy to enhance accessibility and operational efficiency nationwide. These strategic priorities are closely aligned with UD principles, which similarly advocate for

inclusivity, equal service access, and systemic adjustments to meet the diverse needs of all population groups, especially those in underserved and rural areas.

Within this strategic context, the Ignalina region is identified as a territory with untapped development potential [69]. This case study illustrates that accessibility measures are often applied as the baseline standard, while the broader potential of UD to move beyond compliance remains only partially realized. Ignalina thus serves as a representative example for examining both the challenges and opportunities of applying UD principles in a rural and demographically vulnerable setting. The analysis focuses particularly on the availability and accessibility of public services through the lens of Universal Design, and the following sections present a detailed overview of the region's socio-economic landscape.

3.3.1. General Information About the Ignalina Region

In the "Ignalina Region Local Development Strategy 2023–2029" by the Local Action Group (hereinafter—LAG) [70], the Ignalina region is primarily characterized as a region rich in lakes and forests, making it an ideal region for recreation, tourism, and sports. The Ignalina LAG territory is a peripheral region of Lithuania, located in the country's easternmost area. It borders the Republic of Belarus to the east, the Zarasai region to the north, the Švenčionys region to the south, and the Utena region to the west (see Figure 1). A significant part of the LAG territory lies within the border zone, as it includes an external European Union border. This border stretches 93.85 km, nearly matching the length of Lithuania's Baltic Sea coastline.

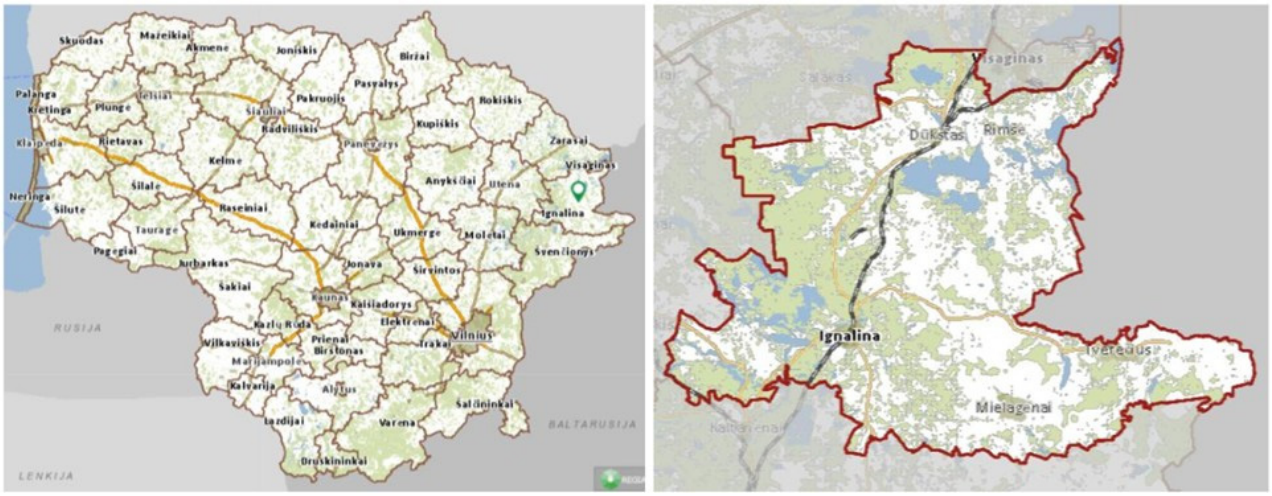


Figure 1. Map of Lithuania (on the left side) and the territory of Ignalina District Municipality (on the right side). Source: https://regia.lt/map/regia2 (accessed on 12 September 2025).

According to the "Strategic Development Plan of the Ignalina District Municipality for the period 2025–2034" [71], in 2024, the municipality had 13,817 permanent residents, of whom 5501 (39.8%) lived in urban areas and 8316 (60.2%) in rural areas. The region stands out for its exceptional combination of valuable recreational resources (second only to the seaside), including numerous water bodies, pine forests, a diverse landscape, and the absence of industrial activity [72,73]. It is one of the most lake-rich areas in Lithuania and is home to the country's oldest national park, as well as numerous protected areas. Part of the territory has been designated as a resort area. The region is also notable for its rich cultural heritage, including ethnographic villages, significant archaeological sites, and distinct traditional events.

Despite this cultural wealth, the area faces severe socio-economic challenges [70–73]. The Ignalina region falls into the category of sparsely populated areas, characterized by an

exceptionally low population density. It has the highest aging index in Lithuania, a rapidly declining population—nearly 3,5 times the national average—and the highest number of social benefit recipients per 1000 inhabitants. Economic activity and entrepreneurship are markedly low, with business activity in the LAG territory three times below the national average. This contrast exemplifies the broader disparities between cultural potential and socio-economic resilience in rural areas.

3.3.2. Rural Development of the Ignalina Region: SWOT Analysis

During the preparation of the "Local Development Strategy 2023–2029" [70], efforts were made to involve residents from diverse sectors, age groups, and social backgrounds across the entire LAG territory. Various methods were employed to assess rural development processes and community needs. One key approach was a resident survey, which gathered insights from 95 respondents, helping to identify the region's strengths, weaknesses, opportunities, and threats. Most survey responses came from individual residents (40%), followed by business sector representatives (23.2%) and community and civil society organization members (20%). The lowest participation was from local government and public sector representatives.

The main strengths identified as very important (rated 5 points) were high recreational potential, with numerous clean lakes and protected areas (49 responses); strong traditions of active tourism and outdoor sports, with established visitor flows and dedicated services (44 responses); and the absence of polluting industries and large enterprises (42 responses). Additionally, three respondents mentioned rural tourism as a significant area.

However, the survey also revealed major weaknesses, with the most critical issues being a lack of services for residents and tourists, as public, social, and other essential services are becoming less accessible to rural communities (52 responses); low levels of entrepreneurship and income, with a high proportion of economically inactive residents (48 responses); and a shortage of qualified specialists and motivated workers, as existing jobs are unattractive due to low wages (47 responses). Open-ended responses further highlighted poor road conditions as a recurring concern among residents.

The resident survey also identified key opportunities and threats impacting the region's development. The most important opportunities (rated 5—"very relevant") include the growing popularity of active recreation, sports, tourism in natural environments, and a healthy lifestyle (42 responses); the region's resort area status, which creates favorable conditions for the development and expansion of recreational and wellness services (42 responses); and the potential of natural and recreational resources to foster green economy initiatives, remote or mobile services, and knowledge-based employment opportunities (35 responses). Additionally, 13 respondents provided open-ended answers, which primarily highlighted two opportunities: the expansion of mobile services and the development of wellness and community-based businesses.

Nevertheless, residents also expressed concerns about major threats to the region. The most pressing issue is the migration of young and working-age residents to the capital or other major cities, identified as highly relevant by 48 respondents. Another significant concern is the growing disparity in quality of life between the sparsely populated rural areas and urban centers, particularly in terms of employment and business development opportunities (39 responses). Open-ended responses further emphasized the lack of services and the decline of small businesses as additional challenges.

The social situation overview of the LAG territory underscores several critical development needs, which this Local Development Strategy seeks to address. These include expanding and diversifying services for both residents and tourists while enhancing their quality; improving social inclusion and accessibility of services—particularly in remote

areas—through the promotion of mobile service delivery; and fostering the growth of the silver economy by developing and adapting services and products to meet the needs of an aging population. Further analytical research will offer in-depth insights into the extent to which these objectives are being achieved.

4. Materials and Methods

This research employed a case study methodology, supported by qualitative in-depth interviews and a focus group meeting, to explore the adaptation of UD principles in public organizations in the Ignalina region. This case study was guided by the Universal Design approach, which served both as the subject of inquiry and as a conceptual and analytical framework for assessing inclusivity in institutional practices. The case study method was particularly suitable for this purpose, as it enables the examination of complex, real-life phenomena within their specific social and organizational contexts [74]. The in-depth interviews with key stakeholders allowed for the elicitation of detailed insights into how UD principles are interpreted, implemented, and negotiated within public service structures. Additionally, a focus group brought together diverse perspectives, fostering dialogic engagement and collective reflection that helped surface shared values and contested understandings.

These qualitative methods were chosen not only for their ability to capture the richness of lived experiences, but also for their alignment with the inclusive, participatory ethos of the UD paradigm [39,74]. Framing this research through a UD lens enabled the assessment of not only functional and spatial accessibility, but also the broader institutional commitments to equity and user diversity [75]. The triangulation of data collection methods strengthened the credibility and depth of the analysis. It highlighted the transformative potential of UD when applied both as a design goal and as a methodological orientation. The set of mentioned approaches helped uncover new ways of adapting UD principles within the existing infrastructure, highlighting the importance of Universal Design in today's society, as it lies in the ability to ask significant questions and challenge dominant assumptions. The case study structure was compiled using the 5-phase design thinking framework [76,77], consisting of empathization, definition, ideation, prototyping, and testing phases.

4.1. Design Thinking Framework

Empathization phase. The empathization phase of the universal design approach emphasizes a deep understanding of diverse users' experiences, challenges, and needs to ensure inclusive and accessible design outcomes. This phase relies on immersive and experiential techniques that help designers genuinely connect with users' perspectives [78–80]. Through role-playing, interviews, observation, ethnographic research, user shadowing, and co-design workshops, designers can uncover latent needs and contextual factors that are not always apparent through traditional research approaches [81,82]. Questioning concerns the recipient's gained experiences with existing products and services [83]. The empathization phase within the Universal Design framework centers on developing a deep understanding of users lived experiences and challenges when interacting with public infrastructure. This phase typically involves three core methods: observing users, engaging directly with them, and actively listening to their narratives [77]. These activities are intended to surface unmet needs and values, forming the foundation for user-informed problem definition. Rather than rushing to solutions, this stage prioritizes insight-building to inform subsequent design decisions.

Definition phase. The definition phase is a foundational stage that establishes the scope, objectives, and user requirements that inform inclusive and accessible design solutions.

The insights gained in the previous phase are summarized into concrete needs to formulate a relevant challenge [83]. This phase emphasizes stakeholder engagement, including users with diverse abilities, to identify potential barriers and ensure that design intentions align with the principles of universality and equity. Key activities involve user research, needs analysis, and contextual inquiry to create a comprehensive understanding of the environment and its users. The aim is to articulate clearly defined goals that accommodate the broadest possible range of users from the outset, thereby minimizing the need for later adaptations. As Steinfeld and Maisel [75] highlight, this early integration of inclusive thinking ensures that universal design is not an add-on but a central component of the design strategy, enhancing both functionality and social inclusion.

Ideation phase. This phase focuses on generating a diverse range of inclusive design concepts that address the needs identified during the Definition phase. The objective is to generate numerous ideas for the next phase [83]. Ideation is typically achieved by combining conscious and unconscious thought, as well as rational thinking with imagination. This stage encourages interdisciplinary collaboration and creative problem-solving, often employing brainstorming, co-design workshops, and scenario development methods. A key feature of ideation in UD is the active involvement of users with varying abilities, ensuring that their lived experiences inform the development of design alternatives. According to Pullin [84], ideation in inclusive design requires striking a balance between innovation and empathy, recognizing that diversity in user needs can lead to more robust and adaptable solutions [84,85]. This phase fosters creativity and ensures that emerging design directions remain anchored in accessibility, usability, and social participation. To maintain the innovation potential generated through ideation, the considered selection should help bring multiple ideas into Prototypes. In our case, the most used methods were brainstorming and co-design workshops.

Prototyping phase. The Prototyping phase is dedicated to iteratively generating artifacts, aiming to answer questions that guide the designer closer to the final solution [83]. This phase serves as a critical juncture where abstract concepts are transformed into tangible, testable representations of inclusive design solutions. Prototypes can be represented as exemplary role plays or as models. A central feature of prototyping is its iterative nature—designers develop, refine, and adapt prototypes based on ongoing feedback from users with diverse abilities. It enables the early identification of usability issues and supports participatory design practices, where users actively shape the design's development. According to Lid [38], prototyping within a universal design framework allows for the exploration of innovative solutions while ensuring that accessibility and inclusivity are embedded from the outset. The prototyping process tests functionality and aesthetic appeal and evaluates the inclusiveness of the interaction between users and the design solution. In our case, we seek innovative actions that can adapt public infrastructure to meet society's needs by applying UD principles within organizations. Prototypes are helpful because they allow organizations to try them out and gain valuable experience. Prototype and Test are modes recommended to be considered in tandem, rather than in transition [76].

Testing phase. This phase is devoted to testing the created prototypes and making improvements. This phase is crucial for evaluating whether proposed solutions effectively meet the diverse needs of all intended users. This phase involves iterative usability assessments, user testing with individuals representing a broad spectrum of abilities and applying inclusive performance metrics. A key feature of this stage is the focus on real-world contexts, which allows for the identification of unforeseen accessibility barriers and refinements to be made before final implementation. Testing in UD is not solely about technical functionality but also about assessing ease of use, user satisfaction, and equitable access. According to Clarkson et al. [86], inclusive testing methodologies must priori-

tize participatory engagement and consider both quantitative outcomes and qualitative insights to validate universal usability. Through iterative feedback loops and adaptive design strategies, the Testing phase ensures that the product or environment achieves its intended inclusivity and usability outcomes for the broadest range of users [86]. The tests also provide an opportunity to gain further information about the user and to change the formulation of the challenge, if necessary, by going back to different phases: most often, to Ideation, sometimes to Definition, and sometimes to empathization [76].

Finally, the design thinking framework [76,77,83] stresses that iteration is fundamental to good design. Therefore, it is recommended to iterate both by cycling through the process multiple times and by iterating within a step. A case study helps generate an in-depth understanding of complex phenomena such as Universal Design and its adaptation in a real-life context. Design thinking approach enables a detailed and comprehensive exploration of UD adaptation to society's needs, logic, and development phases, to conceptualize the design processes as the result of UD adaptation.

4.2. Data Collection

The research design for this case study included data collection methods, the selection of public organizations for qualitative in-depth interviews and experts for a focus group, the conduct of qualitative in-depth interviews and one focus group discussion, and data analysis techniques. In-depth interviews with key stakeholders provided detailed insights into institutional practices. Focus group discussion enabled shared reflection, dialogue, and the surfacing of diverse perspectives.

The Ignalina region, specifically among Lithuania's 60 municipalities, was selected as a representative case for this study, assessing the role of Universal Design (UD) in rural Lithuania, due to its classification as a territory with untapped development potential [69,70]. Its socio-economic challenges and demographic profile reflect broader patterns found in rural areas across the country. Moreover, the Local Development Strategy 2023–2029 emphasizes inclusive participation and accessibility, positioning Ignalina as a relevant site for evaluating how UD principles are integrated into rural development planning and public service provision; it aligns with broader debates on rural place-planning [59]. Notably, the strategy emphasizes that strengthening access to services is crucial for enhancing the participation of both residents and tourists in utilizing public services, thereby contributing to the region's vitality, social inclusion, and overall attractiveness as a destination and a place to live.

The selection of organizations for in-depth interviews and experts for a focus group was implemented in collaboration with the Ignalina Replication Lab. The Ignalina Replication Lab was established in 2024 to facilitate the exchange of diverse types of knowledge (scientific, technical, practical, and others) and to involve related actors and users in knowledge development, innovation implementation, and the addressing of real regional needs. The Quadruple Helix innovation approach [87] was employed to identify key stakeholder groups active in the implementation of UD in the Ignalina region. Usually those key groups are four: private organizations (food and tourism service providers, educators, etc. as implementers of UD principles), governmental organizations (regional governments, municipalities, and other relevant public institutions, which are central to designing and approving the implementation of UD design), research organizations (universities, research centers, and think tanks, which provide evidence-based recommendations) and non-governmental organizations (NGOs) (representatives of rural communities and associations, which ensure that the plan addresses social inclusion, sustainability, and the needs of marginalized groups).

In this research, the assessment focused on public organizations, as they play a central role in rural regions by delivering essential services to residents. Given their responsibility for ensuring equitable access to public goods, these institutions are expected to be at the forefront of implementing Universal Design principles to promote inclusion, accessibility, and social sustainability.

Seven public organizations from the Ignalina region were selected based on the recommendation of Ignalina Replication Lab for analysis based on their dual role: they provide essential public infrastructure for residents and engage in functions that support and promote tourism-related activities. The organizations involved were from various fields such as education, culture, tourism, sports, and public transport, representing a diverse range of public services.

This case study was conducted in two phases (January 2025 and April 2025), aiming to elucidate and explore the holistic evolutionary shift from the start of adaptation of UD principles until more developed results on assessing and implementing universal design principles to improve service accessibility for all in public infrastructure in one of the selected regions of Lithuania, the Ignalina region.

The primary data for this explanatory case study were collected through qualitative in-depth interviews with 11 key stakeholders from the selected organizations, which provided a comprehensive understanding of the investigated phenomenon and directly addressed the research questions. The interviewees held positions ranging from managerial to operational roles, providing a more diverse range of perspectives on the topic discussed. The interviews were conducted in January 2025, each lasting approximately 2 to 3 h. The qualitative data collected were analyzed in conjunction with systematically compiled secondary information drawn from publicly available sources, including the official websites of the selected organizations, social media platforms, newspapers, and news portals.

The semi-structured in-depth interview questionnaire was developed to explore how UD principles are understood, implemented, and managed within public organizations in the Ignalina district. The instrument begins with introductory questions assessing respondents' conceptual understanding of UD and its relevance across four core dimensions: physical environment, information environment, goods, and services. The second section includes general questions focused on institutional practices, such as the accessibility of services, measures employed to enhance access, challenges faced, and resource needs. Further sections address the technical and practical aspects of physical and informational accessibility, covering issues such as transport options, wayfinding systems, signage, digital accessibility, and compliance with EU web accessibility directives. Questions also examine organizational management practices related to UD, including responsibility allocation, inter-institutional cooperation, internal monitoring mechanisms, and evaluation procedures. Respondents were also invited to share success stories and reflect on their institution's strategic planning in relation to UD. This comprehensive structure allows for both standardized comparison and rich qualitative insights into the state of UD in rural public service provision.

In the second phase of the research, a focus group discussion was conducted, involving representatives from the selected public organizations and the local municipality. A focus group meeting was organized in April 2025. The objective of this session was to facilitate a deeper examination of the contextual factors influencing the adaptation of UD principles in the Ignalina region. A focus group discussion aimed to gather diverse stakeholder perspectives on the implementation of UD principles in rural public services. Participants included representatives from public institutions, NGOs, policymakers, and service providers. The discussion began with a contextual introduction to UD and a presentation of key findings from earlier in-depth interviews. Participants were then divided into

mixed-institution groups to discuss five thematic areas: challenges to UD implementation, successful practices, inter-institutional collaboration, practical solutions, and strategies for impact measurement. The discussion generated actionable proposals for improving accessibility, fostering intersectoral collaboration, and enhancing policy and funding frameworks, while also reinforcing participants' commitment to inclusive regional development.

The data collected through in-depth interviews and the focus group discussion were analyzed using standard qualitative analytical procedures. Initially, all transcripts were carefully read and annotated to identify key themes and patterns. This was followed by contextualization, allowing the data to be interpreted in relation to the institutional and regional setting. The material was then segmented into thematic categories aligned with the research questions. Each segment was examined in detail, enabling the development of interpretive insights. This iterative process facilitated the systematic addressing of the research aims through analytical writing. The following section presents a more detailed account of the data analysis, structured around the thematic dimensions and analytical steps applied. To enhance reliability, a second researcher independently coded a subset of interview and focus group transcripts. Coding results were then compared and discussed to ensure consistency and refine categories. While formal intercoder reliability metrics were not calculated, this collaborative approach helped minimize bias and improve the credibility of findings, aligning with accepted standards in qualitative research.

5. Empirical Results

One of the most pressing challenges in the Ignalina region is rapid depopulation; between 2001 and 2021, the population declined by over 30%, one of the steepest drops among Lithuanian regions [88]. In response, local public institutions have revised their strategies for serving customers in providing their services. Public organizations have increasingly focused on tourism development as a strategic tool to counteract economic stagnation and generate alternative sources of income. Initiatives aimed at enhancing tourism infrastructure and services are vital for economic revitalization and promoting regional cohesion, accessibility, and inclusive growth. Integrating UD principles in these efforts is essential to ensuring that tourism development addresses the needs of an aging and diminishing population while attracting diverse visitor groups.

The Ignalina region presents a compelling case of how UD principles can be effectively integrated into rural community development to address demographic and social challenges. With a steady aging population and ongoing depopulation, the region prioritizes inclusive infrastructure and services that meet the needs of diverse social groups, particularly the elderly, youths, and individuals with disabilities. Public organizations play a central role in this transformation, incorporating UD principles through participatory processes, community feedback, and active collaboration with residents. Initiatives such as transportation services for the elderly, accessible libraries, and inclusive sports and education programs demonstrate the practical applications of UD across various sectors. Youth and seniors contribute significantly through volunteering and local engagement, supported by organizations like the Ignalina Local Action Group (LAG). Additionally, efforts to make cultural and natural heritage sites accessible not only foster inclusivity but also strengthen rural tourism, attracting a broader visitor base and enhancing local economies. These measures directly improve social resilience, economic opportunity, and community cohesion. By ensuring accessible, affordable, and high-quality services for all, the Ignalina region emerges as a model of rural revitalization through UD, reinforcing long-term sustainability, social inclusion, and quality of life for its residents and visitors alike.

However, certain limitations were also identified in the scope and application of UD principles in the Ignalina region. This supports the data discussed in the literature

review, indicating that in smaller municipalities in Lithuania, such as the Ignalina region, UD implementation remains fragmented and lacks strategic direction. These issues are discussed further.

5.1. Key Findings Through the Lens of Design Thinking

The adaptation of UD principles in the Ignalina region has followed a process analogous to the design thinking approach, progressing systematically through all five phases of the design thinking model (see Table 1). Each phase, along with its key findings, will be discussed in further detail below.

Table 1. UD adaptation process according to the design thinking approach.

Empathize	Define Key Challenges	Ideate	Prototype	Test
Alignment with the Expectations and Needs of Residents and Tourists	Absence of Clear and Practical Guidelines	Upgrading Public Infrastructure	Accessibility Upgrade of Selected Public Buildings	Limited Accessibility for Young Children
	Lack of a Comprehensive Assessment of UD Implementation	Funding Scheme for Low-Cost Adaptations	Financial Schemes and Participation in the EU-Funded Projects	Wheelchair Navigation is Hindered by Slopes
	Limited Financial Resources	Inclusive Revalorization of Cultural Heritage Sites	Prototype UD Checklist and Design Protocol Toolkit	Lack of Wheelchair Seating Areas
	Architectural and Structural Constraints	Accessible Digital Information Platforms	Workshops on Institutionalization of UD	Poor Quality of Past Renovations
	Insufficient Human Resources	Volunteer Programs	Update of Websites and Creation of a Mock-Up of a Mobile App	Insufficient Funding for Complex Adaptations
	Deficient Information Flow		Volunteer Initiative Pilot for Accessibility Support	

Source: Created by the authors, 2025.

5.1.1. Empathization Phase

During the empathization phase, public organizations in the Ignalina region employed various methods to understand the needs, limitations, and aspirations of residents, particularly elderly individuals, tourists, and service providers. The integration of UD principles within public institutions in the Ignalina region began in the early 2000s, initially led by organizations involved in tourism service provision. Over time, the adoption of UD expanded to a broader range of public institutions.

The approaches used during the empathization phase are summarized in Table 2, which categorizes the methods by type and intended purpose.

Table 2. Overview of methods used during the empathization phase to identify user needs and accessibility challenges.

Category	Method/Activity	Purpose
1. Direct Observation	Observing diverse user groups (elderly, families, tourists, etc.)	Understanding user interaction with public spaces and services
2. Formal Data Collection	Customer satisfaction surveys after public events Structured user interviews	Gathering structured feedback and service quality evaluations
3. Informal Community Engagement	Spontaneous conversations in public spaces during non-working hours	Capturing lived experiences and identifying everyday accessibility barriers
4. Routine Institutional Practice	Service user interaction during daily activities	Real-time qualitative feedback collection from residents and visitors
5. Capacity Building	Participation in seminars and training on UD	Increasing institutional understanding of accessibility principles
6. Shadow Tourist Assessment	Simulated navigation by “shadow tourists”	Capturing lived experiences and identifying everyday accessibility barriers

Source: Created by the authors, 2025.

Figure 2 illustrates the timeline of how UD principles have been progressively institutionalized in the Ignalina region, showing key moments from initial experimentation in the tourism sector to broader public adoption and strategic alignment in recent years.

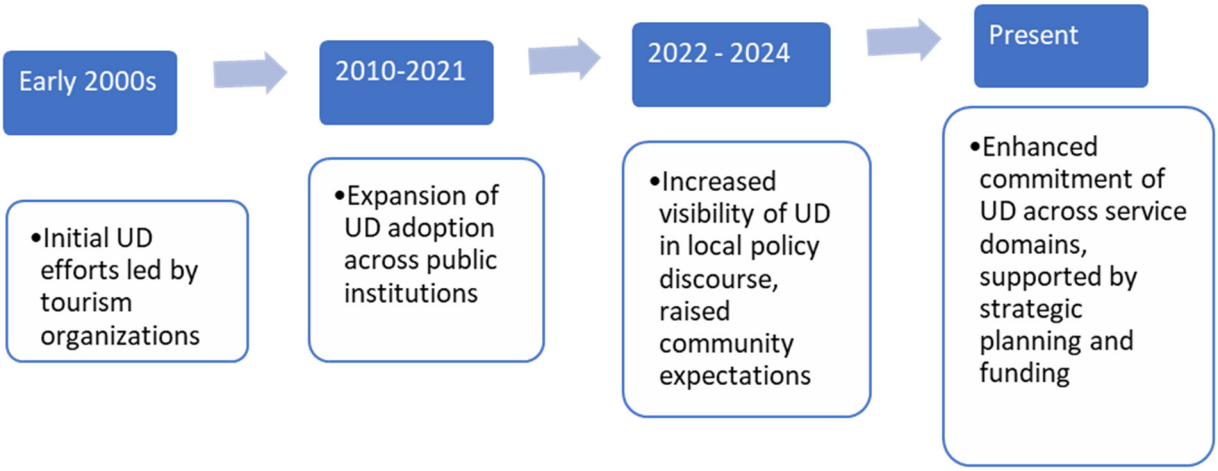


Figure 2. Timeline of the integration of universal design principles in public institutions in the Ignalina region (2000–Present). Source: Created by the authors, 2025.

The findings from the empathization phase of the research indicate that public service users, comprising elderly residents, younger families, individuals with disabilities, and tourists, hold several core expectations regarding public services and infrastructure in the Ignalina region. Foremost among these is the expectation of equitable access to cultural, recreational, and tourism-related services.

They expect greater physical accessibility, such as the installation of ramps, provision of adequate signage, and availability of inclusive transportation options. These features are particularly critical for elderly users and people with mobility impairments, who frequently encounter structural and environmental barriers in accessing public spaces. There is also a strong demand for clearer information and communication infrastructures, supporting physical navigation and informational access, which are particularly important for visitors and those with cognitive or sensory limitations.

Furthermore, public service users expect public institutions to internalize the principles of UD not merely as technical modifications, but as part of a broader cultural and operational shift toward inclusivity. The increasing visibility of UD in local policy discourse since 2022 has raised community awareness and expectations that the Municipality of Ignalina will implement concrete and coordinated actions to improve accessibility and inclusivity in both the built and service environments. The fact that public organizations have participated in seminars and educational activities focused on UD further reinforces the anticipation of tangible progress and accountability in applying this knowledge to practice.

Finally, public service users expect their voices gathered through lived experience, informal narratives, and participatory engagements to actively shape institutional responses. This aligns with UD and sustainable development principles, emphasizing participatory governance and responsiveness to diverse user needs. These expectations underscore a growing demand for systemic, user-informed, and future-oriented change in how public services are designed and delivered in the Ignalina region.

5.1.2. Definition Phase

Implementing UD principles in public institutions across the Ignalina region has been increasingly discussed in recent years. While stakeholders widely recognize the necessity and value of integrating UD principles into institutional practices, public sector entities

are constrained by the requirement to comply strictly with national legislation. As a result, institutional initiatives are often limited to measures explicitly outlined in legal frameworks. Representatives of public institutions and the municipality of Ignalina emphasize that the integration of UD principles would be significantly facilitated if existing legislation provided a clearly defined set of mandatory measures or guidelines for implementing UD principles.

A primary challenge in advancing the accessibility of both the physical and information environment lies in the absence of a comprehensive, district-wide assessment of the current state of UD application in the Ignalina region. Such an evaluation, encompassing public institutions and urban infrastructure, is considered a prerequisite for the systematic and coordinated implementation of context-specific solutions. Respondents suggest that the Municipality of Ignalina, often the founding authority of local institutions, should assume responsibility for initiating and organizing this assessment.

Another substantial barrier identified relates to the deficiencies in the early design phase of public infrastructure projects, particularly the lack of relevant information and guidance on UD requirements during project planning. Without such input, designers and implementers are often unaware whether proposed solutions will adequately address the needs of diverse user groups. Consequently, post-implementation feedback frequently reveals shortcomings in accessibility, as expressed by dissatisfied users who encounter barriers in the newly designed facilities.

The key limitations to UD implementation identified by public service users and institutional representatives are grouped thematically in Table 3. These include physical infrastructure barriers, gaps in communication and policy guidance, as well as persistent limitations in funding, staffing, and accessible transport. Collectively, these challenges reflect the structural and institutional complexities of advancing UD in rural public service contexts.

Table 3. Critical limitations hindering the implementation of Universal Design in public institutions of the Ignalina region (2000–2025).

Thematic Area	Identified Limitation	Description
1. Physical and Infrastructure Barriers	Inaccessible infrastructure for elderly residents Underutilized cultural heritage sites Architectural and structural constraints in older public buildings	Built environment limits participation and access, particularly in cultural, recreational, and public spaces.
2. Information and Communication Gaps	Lack of information for tourists with limited mobility Deficient information flow during building design stages	Limited availability of user-centered, accessible, and early-stage design information.
3. Policy and Strategic Framework Weaknesses	Absence of clear and practical guidelines for UD Lack of a comprehensive regional assessment of UD implementation	Institutions lack formal guidance and evaluative tools to implement UD consistently across the region.
4. Financial and Human Resource Constraints	Inadequate financial resources Insufficient human resources dedicated to accessibility planning and service delivery	Budget limitations and staff shortages undermine the capacity to plan, implement, and maintain UD adaptations.
5. Mobility and Transportation Issues	Poor transport options for elderly residents	Insufficient public or adapted transportation hinders access to public services and events.

Source: Created by the authors, 2025.

These findings underscore the need for integrated policy development, enhanced institutional capacity, and improved legal and technical support to facilitate the practical implementation of UD principles in the public sector at the local level (see Table 1).

5.1.3. Ideation Phase

During the Ideation stage, respondents identified various mechanisms through which observations and ideas for applying Universal Design (UD) were generated and developed in public institutions within the Ignalina region. Three primary sources of insight informed this phase: (1) suggestions from institutional employees, who contributed their observations based on daily practices and interactions; (2) feedback from institutional visitors, gathered through post-event surveys that highlighted accessibility challenges and user experiences; and (3) informal conversations with residents, often occurring in public or community settings outside formal working hours. These informal exchanges, facilitated by the small-scale and close-knit nature of Ignalina (with approximately 4000 inhabitants), served as a valuable source of community-based knowledge that enriched the ideation process with lived experiences and context-specific concerns.

The process of adapting UD principles involves multiple categories of participants, each contributing in distinct ways to the institutionalization of inclusive practices:

1. Institutional Staff Participation: More than half of the representatives surveyed from public organizations reported that all employees are actively involved in discussions related to UD. These discussions are often conducted as internal consultations or staff meetings, fostering a shared sense of responsibility for accessibility improvements.
2. Volunteer Engagement: Both youths and elderly volunteers contribute to the implementation of UD principles by engaging in the organization's day-to-day activities. Their contributions include event support, participation in accessibility assessments, and minor adaptations within institutions.
3. External Expertise: In cases where internal knowledge is insufficient, external specialists are consulted to provide professional guidance on implementing UD. Notably, public service providers in the Ignalina district are invited annually to participate in training sessions and seminars on UD, such as those organized by the Lithuanian Union of People with Disabilities, which focus on applying UD principles in public spaces. Moreover, institutions collaborate with designers, consultants, and other professionals for tailored advice.

In addition, the national tourism promotion agency "Keliauk Lietuvoje" (Travel in Lithuania) plays an advisory role. The agency conducts annual assessments using an "anonymous traveler" model, evaluating the accessibility and service quality of local tourist attractions. Institutions subsequently receive detailed feedback reports informing strategic decisions on service enhancement and UD implementation.

Building on the findings of the Definition phase, several strategic and actionable ideas were generated. These proposals aim to address both user-expressed needs and systemic constraints that hinder the full realization of UD principles in the region (Table 4).

Proposed action "Upgrading Public Infrastructure" focuses on enhancing the physical accessibility of public buildings to ensure accessible environments for individuals with disabilities, particularly in cultural, recreational, and administrative facilities. Proposed action "Funding Scheme for Low-Cost Adaptations" focuses on establishing a micro-grants program to support public institutions in implementing affordable, high-impact UD solutions, such as ramps, tactile signage, and induction loops. Priority should be given to institutions serving vulnerable groups. The proposed action "Inclusive Revalorization of Cultural Heritage Sites" focuses on launching pilot initiatives to reinterpret and adapt heritage sites using UD principles. Examples include developing virtual tours, tactile exhibits, and inclusive guided experiences (e.g., sign language interpretation or audio description), complemented by modest structural adaptations where feasible. The proposed action, "Integration of UD in Early-Stage Planning", focuses on developing and institutionalizing design checklists and consultation protocols for the earliest stages of public infrastructure

planning and procurement. These should include requirements for stakeholder consultation, particularly users with disabilities, and the inclusion of UD review points in public procurement documentation. Action "Institutional Integration of UD Principles": Encourage public institutions to incorporate UD objectives into their strategic plans, focusing on the physical environment and creating accessible information systems. This integration should reflect a long-term commitment to inclusive design. Action "Mobile Accessibility Services for Elderly Residents": To mitigate the exclusion of older adults from public events due to mobility and transport barriers, establish a mobile shuttle service synchronized with local cultural and sports events, with accessibility features and support staff. Action "Accessible Digital Information Platforms": Develop a centralized, user-oriented digital platform that aggregates real-time information on accessible services, events, routes, and amenities in the Ignalina region. Features should include filters for physical, auditory, and visual accessibility, as well as multilingual interfaces. Action "Volunteer Programs": Create structured volunteer and internship initiatives for young and elderly residents to support event organization, accessibility assessments, and institutional capacity building. These programs would also serve as a means of civic engagement and community participation.

Table 4. Summary of strategic and actionable ideas developed during the Ideation phase to advance Universal Design implementation in the Ignalina region.

Thematic Area	Proposed Action	Purpose/Impact
Infrastructure Improvement	Upgrading Public Infrastructure	Enhancing the physical accessibility of public spaces for individuals with disabilities.
Financial Mechanisms	Funding Scheme for Low-Cost Adaptations	Supporting institutions with micro-grants for quick, high-impact UD interventions.
Cultural Heritage and Inclusion	Inclusive Revalorization of Cultural Heritage Sites	Promoting access to cultural assets via virtual, tactile, and low-barrier experiences.
Planning and Procurement	Integration of UD in Early-Stage Planning	Institutionalizing UD in infrastructure design, procurement, and stakeholder consultations.
Strategic Governance	Institutional Integration of UD Principles	Embedding UD goals in institutional strategies and internal planning documents.
Transport and Mobility Solutions	Mobile Accessibility Services for Elderly Residents	Reducing transport-related exclusion of elderly individuals from cultural and public life.
Digital Accessibility	Accessible Digital Information Platforms	Improving online access to service-related information through inclusive design and navigation.
Community Participation and Support	Volunteer Programs	Mobilizing local residents (youth and elderly) to support accessibility efforts and civic engagement.

Source: Created by the authors, 2025.

The primary driver of institutional change, as noted by respondents, is the existing legislative framework, which mandates compliance with accessibility and non-discrimination principles. However, beyond formal requirements, institutions increasingly seek to engage employees, service users, and external stakeholders in the co-creation of inclusive environments. Public service users often play an informal but vital role by reporting deficiencies and proposing adjustments based on their everyday experiences. These user-led insights provide valuable input for continuous service improvement and contribute to the evolving discourse on UD at the local level.

5.1.4. Prototyping Phase

The initial implementation of UD principles in the Ignalina region primarily focused on improving physical infrastructure within public institutions. These early interventions, which began in earnest around 2010, included the installation of ramps, elevators, tandem support devices, adjusting door thresholds, and adapting sanitary facilities. Institutions

initially involved in tourism service provision were among the first to adopt UD principles, which were subsequently embraced by a broader range of public organizations. Community involvement has also played a crucial role in UD implementation. Volunteers, including both youths and older adults, have contributed actively to event coordination, guest assistance, content creation, and traffic management. Their engagement exemplifies a participatory approach to accessibility enhancement.

In more recent years, the scope of UD applications has expanded beyond the physical environment to include the design of the information environment. Public institutions in Ignalina have undertaken initiatives to enhance accessibility through user-friendly websites, inclusive signage, and informational materials adapted for individuals with specific needs. Notable efforts include the provision of Braille and audiobooks, as well as tailored resources for children with autism spectrum disorders. Furthermore, the development of user-centered spaces continues, with plans for 2025, including renovating cultural venues to incorporate rest areas, comfortable waiting zones, and improved navigation access.

Additionally, institutions have piloted the creation of a UD Checklist and Design Protocol Toolkit to systematize implementation. Feedback from service users—collected through direct communication, digital platforms such as Booking.com, and institutional consultations—is reviewed collaboratively by staff and municipal specialists to inform ongoing improvements.

The primary funding sources for UD initiatives have included national and municipal budgets, institutional renovation allocations, and European Union structural support instruments, such as the INTERREG program. These resources have enabled both infrastructural adaptation and the realization of broader accessibility goals aligned with inclusive development strategies.

Defined examples based on the Ideation stage were implemented in the Prototyping phase.

1. Accessibility upgrade of selected public buildings in the Ignalina region as a prototype site for adapting accessible infrastructure, implement temporary and reversible solutions, such as portable ramps, wayfinding signage, or automatic doors, and evaluate user feedback through direct observation and post-use surveys. The pilot would serve as a model for scaling similar interventions across the district.
2. Financial schemes and participation in EU-funded projects for Public Institutions as cultural heritage sites. Launch a prototype round of the proposed funding scheme to implement quick-win accessibility solutions (e.g., installing tactile paths or updating restrooms for wheelchair accessibility). Monitor the process from application to implementation, assess the administrative feasibility, and collect data on user satisfaction and cost-effectiveness.
3. Prototype UD Checklist and Design Protocol Toolkit. Design a draft version of a UD integration toolkit for infrastructure planning teams, including a step-by-step checklist and sample consultation procedures with end users. Test the toolkit with a public institution planning renovations or procurement to assess usability, clarity, and integration potential within existing workflows.
4. Workshops on Institutionalization of UD. Organize a prototype planning session within one public institution, where staff collaboratively revise their strategic plan to incorporate UD objectives. Use templates and facilitation tools to prototype how UD commitments might be operationalized across organizational activities (e.g., communication, procurement, staffing).
5. Update websites and create a mock-up of a mobile app based on UD principles. Develop a low-fidelity prototype (e.g., interactive wireframes) of a centralized digital platform that provides accessible information on public services and events in the

Ignalina region. Test the prototype with target user groups, particularly individuals with disabilities and older adults, through various events and meetings.

6. Volunteer Initiative Pilot for Accessibility Support. Establish a prototype volunteer program by recruiting a small group of community members (youth and elderly) to support one local event. Assign tasks like wayfinding assistance, basic accessibility audits, or service user liaison. Use this trial to refine the structure, training needs, and impact assessment tools for long-term implementation.

5.1.5. Testing Phase

The self-assessment process revealed that while services provided by the institutions are generally accessible to a broad range of users, notable gaps that require targeted attention remain. Three primary challenges were identified: (1) limited accessibility provisions, (2) physical barriers for individuals with mobility and visual impairment, due to the inadequately designed spaces or the absence of tactile surfaces, and (3) the absence of designated, spacious seating areas in event halls to accommodate people using wheelchairs.

A significant structural constraint identified during the assessment pertains to the poor quality of past building renovations. Specifically, earlier refurbishments did not adequately address essential accessibility features, such as door width, accessible circulation areas, and inclusive shared space design. Given the building's age and architectural constraints, the scope for implementing comprehensive accessibility upgrades is limited and must be approached incrementally and within the bounds of heritage or structural feasibility. Furthermore, the municipal authorities must review and approve any substantial changes, introducing additional procedural complexity.

Importantly, service users themselves contribute to monitoring accessibility standards by reporting deficiencies in both physical and informational environments. Institutional staff have expressed intent to participate in future training programs on UD to remain informed about emerging standards and best practices. While simple adaptations are often implemented effectively, more complex interventions are hindered by limited financial resources and a lack of technically feasible solutions. These findings underscore the need for a sustained, well-resourced, and collaborative approach to advancing UD within the institution's operational framework.

Through iterative cycles of user-centered testing and refinement, public organizations can develop sustainable and inclusive service models that meet the needs of both aging local populations and diverse tourist groups, boosting regional vitality and contributing to rural resilience.

6. Discussion

This study contributes to the growing body of scholarship on Universal Design by examining its adaptation within the institutional context of a demographically challenged rural region. Through the case of Ignalina, the research offers empirical insights into how UD can evolve beyond its traditional application to the built environment, emerging instead as a strategic framework for inclusive service delivery, participatory governance, and social sustainability [58,89,90]. The findings demonstrate that, even under conditions of limited resources and structural constraints, UD can be meaningfully embedded into local public sector practices when supported by community engagement, institutional learning, and alignment with strategic development priorities.

A key contribution of this study lies in empirically illustrating the interplay between grassroots practices and institutional frameworks. The involvement of service users, volunteers, and frontline employees in shaping UD practices highlights the role of co-production in rural public service innovation. This area remains underexplored in UD literature. More-

over, the analysis highlights how UD can serve as a mechanism for institutional reflexivity, encouraging public organizations to re-examine the inclusivity of their operations through iterative feedback and adaptation.

This study also reveals structural barriers—such as aging infrastructure, unclear legal mandates, and fragmented funding mechanisms—that persistently hinder the implementation of UD. These findings align with prior critiques of accessibility policy gaps in Central and Eastern Europe [e.g., 38,75], emphasizing the importance of context-specific policy instruments. The alignment of UD goals with regional development strategies and European funding frameworks (e.g., ESF+, ERDF) in Ignalina suggests that territorial development agendas can function as critical enablers of inclusive design, provided they are accompanied by institutional capacity-building and clearer regulatory standards.

By analyzing the case of Ignalina, this study presents a replicable rural governance model in which UD serves as a cross-cutting principle embedded in strategic planning, rather than merely a set of technical adjustments. This shifts the normative understanding of UD from a compliance-driven standard to a transformative tool for addressing spatial, social, and digital inequalities in rural areas. Ultimately, the findings underscore that the long-term success of UD initiatives will depend on their institutionalization through intersectoral collaboration, legally grounded guidelines, and sustained evaluation mechanisms.

7. Conclusions

This research examined the implementation of Universal Design principles in the Ignalina region of Lithuania, a rural area characterized by significant demographic shifts, including depopulation and population aging. With over a 30% population decline between 2001 and 2021, the region has turned to inclusive service design and tourism development as strategic responses to economic stagnation. The application of UD in public institutions—originally concentrated in tourism services—has expanded across sectors to address accessibility challenges faced by elderly residents, individuals with disabilities, and other vulnerable groups.

This research followed the design thinking model, guiding the institutional transformation through the phases of empathization, definition, ideation, prototyping, and testing. In the empathization phase, public institutions directly engaged with users to identify barriers to physical access and information provision, particularly in cultural and recreational contexts. Definition phase findings highlighted structural and legislative constraints, particularly the absence of clear UD implementation guidelines and inadequate infrastructure assessment at the municipal level. These factors, coupled with financial limitations and old building constraints, continue to hamper full UD integration.

During the Ideation phase, institutions, in collaboration with community members and external experts, generated practical proposals such as micro-grant schemes, mobile accessibility services, and digital platforms to enhance access. These ideas were subsequently piloted during the Prototyping phase, where initiatives such as volunteer-based accessibility support and the creation of UD checklists began to demonstrate tangible progress.

The Testing phase revealed meaningful service improvements but also uncovered persistent gaps. Key challenges include insufficient accessibility for pre-school children, wheelchair navigation issues due to steep inclines, and limited space for mobility devices in public venues. Structural renovation quality and old infrastructure were also identified as enduring barriers to physical accessibility. Nonetheless, community-driven monitoring, user feedback mechanisms, and staff training initiatives have laid the groundwork for more inclusive, responsive public service models.

Overall, the integration of UD principles in Ignalina illustrates how Universal Design can serve as both a social and economic development strategy in rural regions. Although

significant obstacles remain, especially in terms of funding, structural feasibility, and policy clarity, the participatory and iterative approach adopted has fostered greater institutional accountability, strengthened local engagement, and contributed to regional resilience.

Author Contributions: Conceptualization, Ž.G.-R. and M.B.; Data Curation, Ž.G.-R. and M.B.; Formal Analysis, Ž.G.-R.; Investigation, Ž.G.-R. and M.B.; Methodology, Ž.G.-R. and M.B.; Validation, Ž.G.-R. and M.B.; Visualization, Ž.G.-R. and M.B.; Writing—Review and Editing, Ž.G.-R. and M.B.; Writing—Original Draft, Ž.G.-R. and M.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Horizon Europe GRANULAR project, grant number 101061068.

Institutional Review Board Statement: Not applicable. According to the Guidelines for the Assessment of Compliance with Research Ethics approved by the Chief Official for Academic Ethics and Procedures of the Republic of Lithuania (Order No. V-60, 10 December 2020), Ethics Committee approval is required only in cases involving interventions, vulnerable groups, risks of significant harm, or when mandated by law or funders (para. 27). This study, which included human participants providing information about public institutions' activities, did not involve interventions, sensitive data, or vulnerable groups, and therefore did not require Ethics Committee approval.

Informed Consent Statement: An informed consent form was provided to the participants. Informed consent was obtained from all subjects involved in this study.

Data Availability Statement: The datasets presented in this article are not readily available because they form part of an ongoing research project. Access may be granted upon reasonable request.

Acknowledgments: This research was made possible through the support of the GRANULAR project and Ignalina's Local Action Group, who facilitated access to the field and data collection. The European Union funds the GRANULAR project under grant number 101061068. During the preparation of this manuscript, the authors used ChatGPT-5 to improve the readability and language of the manuscript. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

CRPD	Convention on the Rights of Persons with Disabilities
SDGs	Sustainable Development Goals
UD	Universal Design

References

1. Higo, M.; Khan, H.T. Global population aging: Unequal distribution of risks in later life between developed and developing countries. *Glob. Soc. Policy* **2015**, *15*, 146–166. [CrossRef]
2. Ibrahim, N.A. A statistical analysis of the disability problem and its social impacts. *Int. J. Entrep.* **2021**, *25*, 1–14.
3. Kajita, M. Accessibility and social inclusion. *Nord. J. Archit. Res.* **2016**, *28*, 83–110.
4. Bogart, K.R.; Dunn, D.S. Ableism special issue introduction. *J. Soc. Issues* **2019**, *75*, 650–664. [CrossRef]
5. Hamraie, A. *Building Access: Universal Design and the Politics of Disability*; University of Minnesota Press: Minneapolis, MN, USA, 2017.
6. Abdelmaksoud, N.S.A. Universal design approach to a smart, sustainable, safe, and accessible city for all. *WIT Trans. Ecol. Environ.* **2022**, *260*, 259–270.
7. Klaus, P.; Edwards, K.; Norvik, D.; Manthiou, A.; Luong, V.H. Inclusive servicescapes: The imperative of universal design principles. *J. Serv. Mark.* **2024**, *38*, 1089–1098. [CrossRef]
8. Prestamburgo, S.; Sgroi, F.; Venudo, A.; Zanin, C. Universal design as resilient urban space plan strategy: New scenarios for environmental resources' sustainable management. *AIMS Environ. Sci.* **2021**, *8*, 321–340. [CrossRef]

9. Galkiene, A.; Monkeviciene, O. *Improving Inclusive Education Through Universal Design for Learning*; Springer Nature: Cham, Switzerland, 2021; p. 323.
10. Kaminskiene, L.; Galkiene, A. Teacher education in Lithuania. In *The Reform of Teacher Education in the Post-Soviet Space: A Comparative Analysis of Fifteen Independent Countries*; Routledge: New York, NY, USA, 2024.
11. Macerinskiene, A. Access to nature in Lithuania: Limits, perceptions and design issues. In *Science and Stewardship to Protect and Sustain Wilderness Values: Tenth World Wilderness Congress Symposium, 4–10 October 2013, Salamanca, Spain*; Watson, A., Carver, S., Krenova, Z., McBride, B., Eds.; U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: Fort Collins, CO, USA, 2015; Proceedings RMRS-P-74; pp. 58–63.
12. Sakalauskaitė, G.; Šaparnienė, D.; Reinholde, I. Accessible tourism development in the post-Soviet country context: A case of Klaipėda City, Lithuania. *Sci. Pap. Univ. Pardubice Ser. D Fac. Econ. Adm.* **2020**, *28*, 1–12.
13. Staševičienė, A.; Fatkulina, N. Sveikatos priežiūros paslaugų prieinamumo, taikant universalaus dizaino principus, neįgaliems asmenims nustatymas Lietuvoje. *Visuom. Sveik.* **2021**, *3*, 51–60.
14. Grazuleviciute-Vileniske, I.; Seduikyte, L.; Teixeira-Gomes, A.; Mendes, A.; Borodinecs, A.; Buzinskaite, D. Aging, living environment, and sustainability: What should be taken into account? *Sustainability* **2020**, *12*, 1853. [CrossRef]
15. Persson, H.; Åhman, H.; Yngling, A.A.; Gulliksen, J. Universal design, inclusive design, accessible design, design for all: Different concepts—One goal? On the concept of accessibility—Historical, methodological and philosophical aspects. *Univ. Access Inf. Soc.* **2015**, *14*, 505–526. [CrossRef]
16. Tauke, B. The evolution of universal design. *Inf. Raumentwickl.* **2019**, *5*, 36–41.
17. North Carolina State University. College of Design, Center for Universal Design. Available online: https://design.ncsu.edu/research/center-for-universal-design/ (accessed on 4 March 2025).
18. Harrison, J.; Busby, K.; O'Flynn, J.; Pennisi, Y. Widening the circle: Is there an eighth principle for universal design? In *Universal Design 2024: Shaping a Sustainable, Equitable and Resilient Future for All*; IOS Press: Amsterdam, The Netherlands, 2024; pp. 34–41.
19. Arias Badia, B.; Bestard-Bou, J.J.; Hermosa-Ramírez, I. Designing, making, and validating accessible products and services. *J. Audiov. Transl.* **2022**, *5*, 57–75. [CrossRef]
20. Mitchell, F.R.; Mulcaster, A.; Horton, S.; Scharoun Benson, S.; Mogyorody, V.; van Wyk, P.M. Accessibility, usability and universal design across fitness and recreational facilities: A rapid review. *Leisure/Loisir* **2024**, 1–31. [CrossRef]
21. Sanderson, N.C.; Kessel, S.; Chen, W. What do faculty members know about universal design and digital accessibility? A qualitative study in computer science and engineering disciplines. *Univ. Access Inf. Soc.* **2022**, *21*, 351–365. [CrossRef] [PubMed]
22. Müller, L.; Wojahn, D.; Sandström, I.; Hedvall, P.O. Planning for human diversity: Design patterns of universal design. *Nord. J. Archit. Res.* **2022**, *34*, 75–104.
23. Mander, C. First-hand experience of accessible information. *Tizard Learn. Disabil. Rev.* **2015**, *20*, 80–87. [CrossRef]
24. Waight, M.; Oldreive, W. Investigating accessible information formats with people who have learning disabilities. *Learn. Disabil. Pract.* **2024**, *27*, 1–9. [CrossRef]
25. Crabb, M.; Heron, M.; Jones, R.; Armstrong, M.; Reid, H.; Wilson, A. Developing accessible services: Understanding current knowledge and areas for future support. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19), Glasgow, UK, 4–9 May 2019; ACM: New York, NY, USA, 2019; pp. 1–12.
26. Oncins, E.; Orero, P. Let's put standardisation in practice: Accessibility services and interaction. *Hikma* **2021**, *20*, 71–90. [CrossRef]
27. Fisk, R.P.; Dean, A.M.; Alkire, L.; Joubert, A.; Previte, J.; Robertson, N.; Rosenbaum, M.S. Design for service inclusion: Creating inclusive service systems by 2050. *J. Serv. Manag.* **2018**, *29*, 834–858. [CrossRef]
28. Dantas, C.; Louceiro, J.; Dias, L.; Moreira, A.; Kotradyová, V.; Čerešňová, Z.; Podrekar, N. Design for all: An overview of needs and gaps in formal education in four European countries. *Interdiscip. Perspect. Built Environ.* **2023**, *3*, 1–11.
29. Kilmer, R.; Kilmer, W.O. *Designing Interiors*, 3rd ed.; John Wiley & Sons: Hoboken, NJ, USA, 2024.
30. Kose, S. From barrier-free to universal/inclusive design: How far have we progressed during these 60 years in Japan? In *Universal Design 2021: From Special to Mainstream Solutions*; IOS Press: Amsterdam, The Netherlands, 2021; pp. 32–40.
31. Sharma, A.; Kumar, K. A review of barrier-free design in built environment. *Int. J. Multidiscip. Innov. Res.* **2022**, *2*, 33–37.
32. Moore, A.; Boyle, B.; Lynch, H. Designing for inclusion in public playgrounds: A scoping review of definitions, and utilization of universal design. *Disabil. Rehabil. Assist. Technol.* **2023**, *18*, 1453–1465. [CrossRef]
33. Bamzar, R. Assessing the quality of the indoor environment of senior housing for a better mobility: A Swedish case study. *J. Hous. Built Environ.* **2019**, *34*, 23–60. [CrossRef]
34. Sørensen, R.; Ryhl, C. User or expert? In *Proceedings of ARCH17—The 3rd International Conference on Architecture, Research, Care and Health*; Aalborg Universitet, Polyteknisk Boghandel og Forlag: Copenhagen, Denmark, 2017; pp. 302–315.
35. O'Neill, J.L. Accessibility for all abilities: How universal design, universal design for learning, and inclusive design combat inaccessibility and ableism. *J. Open Access L.* **2021**, *9*, 1. [CrossRef]
36. Null, R. (Ed.) *Universal Design: Principles and Models*; CRC Press: Boca Raton, FL, USA, 2013.

37. Griesmeyer-Krentz, J.; Griffen, J.; Tevis, T. Institutional access through a culture of accessibility: The role of disability services providers as institutional change agents. *Can. J. Disabil. Stud.* **2022**, *11*, 92–128. [CrossRef]
38. Lid, I.M. Implementing universal design in a Norwegian context: Balancing core values and practical priorities. *Disabil. Stud. Q.* **2016**, *36*. [CrossRef]
39. Lid, I.M. Universal design and disability: An interdisciplinary perspective. *Disabil. Rehabil.* **2014**, *36*, 1344–1349. [CrossRef] [PubMed]
40. United Nations. Convention on the Rights of Persons with Disabilities and Optional Protocol (CRPD). Available online: https://www.un.org/disabilities/documents/convention/convoptprot-e.pdf (accessed on 25 April 2025).
41. Hedvall, P.O.; Ståhl, A.; Iwarsson, S. Accessibility, usability and universal design—Still confusing? Harmonisation of key concepts describing person–environment interaction to create conditions for participation. *Disabil. Rehabil.* **2025**, *14*, 1–10. [CrossRef]
42. United Nations. Transforming Our World: The 2030 Agenda for Sustainable Development. A/RES/70/1. Available online: https://www.un.org/sustainabledevelopment/sustainable-development-goals/ (accessed on 25 April 2025).
43. European Commission. European Disability Strategy 2021–2030. Available online: https://ec.europa.eu/social/main.jsp?catId=1484&langId=en (accessed on 25 April 2025).
44. European Parliament and Council. Directive (EU) 2019/882 on the accessibility of products and services. *Off. J. Eur. Union* **2019**, *L 151*, 70–115. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0882 (accessed on 25 April 2025).
45. European Parliament and Council. Directive (EU) 2016/2102 on the accessibility of public sector websites and mobile applications. *Off. J. Eur. Union* **2016**, *L 327*, 1–15. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L2102 (accessed on 25 April 2025).
46. European Union. Charter of Fundamental Rights of the European Union 2000/C 364/01. *Off. J. Eur. Communities* **2000**, *C 364*, 1–22. Available online: https://www.europarl.europa.eu/charter/pdf/text_en.pdf (accessed on 25 April 2025).
47. Council of Europe. European Convention on Human Rights. Available online: https://www.echr.coe.int/documents/convention_eng.pdf (accessed on 25 April 2025).
48. Garofolo, I. The role and implication of UD to foster inclusion in built environments. In *Design for Inclusion*; IOS Press: Amsterdam, The Netherlands, 2023; pp. 68–75.
49. Lee, P.; Hunter, W.C.; Chung, N. Smart tourism city: Developments and transformations. *Sustainability* **2020**, *12*, 3958. [CrossRef]
50. European Commission. A Long-Term Vision for the EU's Rural Areas—Towards Stronger, Connected, Resilient and Prosperous Rural Areas by 2040. Available online: https://rural-vision.europa.eu/index_en (accessed on 25 April 2025).
51. European Commission. The Long-Term Vision for the EU's Rural Areas: Key Achievements and Ways Forward. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52024DC0450 (accessed on 25 April 2025).
52. Secretariat-General of the European Commission. Communication "Demographic Change in Europe: A Toolbox for Action". Available online: https://commission.europa.eu/publications/communication-demographic-change-europe-toolbox-action_en (accessed on 15 April 2025).
53. Rodríguez-Pose, A.; Dijkstra, L.; Poelman, H. *The Geography of EU Discontent and the Regional Development Trap*; Publications Office of the European Union: Luxembourg, 2023. Available online: https://ec.europa.eu/regional_policy/sources/reports/Geography_of_Discontent_and_development_trap_forlay-out.pdf (accessed on 17 April 2025).
54. Heijman, W.; Hagelaar, G.; Van Der Heide, M. Rural resilience as a new development concept. In *EU Bioeconomy Economics and Policies: Volume II*; Springer International Publishing: Cham, Switzerland, 2019; pp. 195–211.
55. Sustainability Directory. Socio-Economic Resilience. Available online: https://esg.sustainability-directory.com/area/socio-economic-resilience/?utm_source=chatgpt.com (accessed on 10 September 2025).
56. Hassink, R.; Chu, H. Resilience. In *The Encyclopedia of Human Geography*; Warf, B., Ed.; Springer: Cham, Switzerland, 2024; pp. 1–5.
57. Zhu, F.; Ying, B.; Xiang, C. Advancements in rural resilience research over the past two decades and its significance for sustainable development. *Discov. Sustain.* **2025**, *6*, 145. [CrossRef]
58. Oria-Segura, M.R.; Muñoz-Medina, M.À. Universal Design Applied to Inclusive and Sustainable Economy for All. In *Transitioning to a Circular Economy. Studies on Entrepreneurship, Structural Change and Industrial Dynamics*; Rego, C., Lucas, M.R., Sánchez-Hernández, M.I., Cagica Carvalho, L., Backx Noronha, A., Eds.; Springer: Cham, Switzerland, 2025; pp. 1–18.
59. Gkartzios, M.; Gallent, N.; Scott, M. A capitals framework for rural areas: 'Place-planning' the global countryside. *Habitat Int.* **2022**, *127*, 102625. [CrossRef]
60. Duman, Ü.; Asilsoy, B. Developing an evidence-based framework of universal design in the context of sustainable urban planning in Northern Nicosia. *Sustainability* **2022**, *14*, 13377. [CrossRef]
61. Kapedani, E.; Herssens, J.; Verbeeck, G. Designing for the future? Integrating energy efficiency and universal design in Belgian passive houses. *Energy Res. Soc. Sci.* **2019**, *50*, 215–223. [CrossRef]
62. Seimas of the Republic of Lithuania. Law on Construction of the Republic of Lithuania (No. I-1240). Available online: https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.312477 (accessed on 30 May 2025). (In Lithuanian)

63. Republic of Lithuania. Resolution on the Approval of the National Progress Plan for 2021–2030 (2020). National Progress Plan 2021–2023. Available online: https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/c1259440f7dd11eab72ddb4a109da1b5?jfwid=- (accessed on 28 April 2025).
64. Grangaard, S.; Hedvall, P.O.; Lid, I.M. Universal design and accessibility as an act or a state—A comparison of policies in Norway, Sweden, and Denmark. In *Universal Design 2024: Shaping a Sustainable, Equitable and Resilient Future for All*; IOS Press: Amsterdam, The Netherlands, 2024; pp. 2–9.
65. Government Strategic Analysis Centre (STRATA). The Ageing Lithuanian Society: Analytical Review. Available online: https://strata.gov.lt/wp-content/uploads/2024/02/20210324-senstanti-lietuvos-visuomene-2020.pdf (accessed on 28 April 2025). (In Lithuanian)
66. Commission for the Monitoring of the Rights of Persons with Disabilities. Regulation and Practice of Universal Design Principles. *Research Presentation.* Available online: https://www.youtube.com/watch?v=Hf_02aNUeoU (accessed on 29 April 2025). (In Lithuanian).
67. Ministry of Finance of the Republic of Lithuania. Annual Report on the Implementation of the National Progress Plan for 2023. Available online: https://lrv.lt/public/canonical/1725868399/361759/NPP_ataskaita_patikslinta.pdf (accessed on 29 April 2025). (In Lithuanian)
68. Pineda, V.S. *Building the Inclusive City: Governance, Access, and the Urban Transformation of Dubai*; Palgrave Macmillan: Cham, Switzerland, 2020; Available online: https://library.oapen.org/bitstream/handle/20.500.12657/22843/1007318.pdf (accessed on 5 May 2025).
69. Government of the Republic of Lithuania. Resolution on the Approval of the Comprehensive Plan of the Territory of the Republic of Lithuania. No. 789. Available online: https://e-seimasx.lrs.lt/portal/legalAct/lt/TAD/ab6b8b21266f11ec99bbc1b08701c7f8 (accessed on 29 April 2025). (In Lithuanian)
70. Ignalina District Local Action Group. Ignalina District Local Development Strategy 2023–2029. Available online: https://www.irvvg.lt/Ignalinos-rajono-vietos-pl-tros-strategija-2023-2029-m/ (accessed on 14 March 2025). (In Lithuanian).
71. Ignalina District Municipal Council. The Strategic Development Plan of the Ignalina District Municipality for the Period 2025–2034. Available online: https://ignalina.lt/doclib/ixmtolq4nyz22sndehkhd8n7k4d6y739?lang=en (accessed on 6 June 2025). (In Lithuanian)
72. Ignalina District Municipality. 2024–2026 Strategic Activity Plan (No. TAD/704dcf43cf6811ee9269b566387cfecb). Available online: https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/704dcf43cf6811ee9269b566387cfecb (accessed on 29 April 2025). (In Lithuanian)
73. Ignalina District Municipality. Local Development Strategy for Ignalina City 2024–2029. Available online: https://ignalina.lt/doclib/aal23dpmcs9k7m68zqj15zk8w94w2q2p (accessed on 30 May 2025). (In Lithuanian)
74. Yin, R.K. *Case Study Research and Applications: Design and Methods*, 6th ed.; Sage Publications: Thousand Oaks, CA, USA, 2018.
75. Steinfeld, E.; Maisel, J. *Universal Design: Creating Inclusive Environments*; Wiley: Hoboken, NJ, USA, 2012.
76. Hasso Plattner Institute of Design at Stanford. Design Thinking Bootleg. Available online: https://dschool.stanford.edu/resources/design-thinking-bootleg (accessed on 30 May 2025).
77. Luchs, M.G. A brief introduction to design thinking. In *Design Thinking: New Product Development Essentials from the PDMA*; Luchs, M.G., Swan, S., Griffin, A., Eds.; Wiley-Blackwell: Hoboken, NJ, USA, 2015; pp. 1–12.
78. Brown, T. *Change by Design: How Design Thinking Creates New Alternatives for Business and Society*; Harvard Business Press: Boston, MA, USA, 2009.
79. Center for Universal Design. *The Principles of Universal Design, Version 2.0*; North Carolina State University: Raleigh, NC, USA, 1997.
80. IDEO.org. *The Field Guide to Human-Centered Design*; IDEO: San Francisco, CA, USA, 2015.
81. Sanders, E.B.N.; Stappers, P.J. Co-creation and the new landscapes of design. *CoDesign* **2008**, *4*, 5–18. [CrossRef]
82. Bichard, J. Extending Architectural Affordance: The Case of the Publicly Accessible Toilet. Doctoral Dissertation, University College London, London, UK, 2015. Available online: https://discovery.ucl.ac.uk/id/eprint/1467131/2/Bichard%202014%20Res.pdf (accessed on 12 September 2025).
83. Vidickienė, D.; Simonaitytė, V.; Lankauskienė, R.; Gedminaitė-Raudonė, Ž. Servitization of farming: A new approach to local food systems building. *Eur. Countrys.* **2023**, *15*, 1–17. [CrossRef]
84. Pullin, G. *Design Meets Disability*; MIT Press: Cambridge, MA, USA, 2009.
85. Williamson, B. Design Meets Disability, by Graham Pullin. *Des. Cult.* **2010**, *2*, 251–253. [CrossRef]
86. Clarkson, P.J.; Coleman, R.; Hosking, I.; Waller, S. *Inclusive Design: Design for the Whole Population*; Springer: London, UK, 2013.
87. Marques, C.; Marques, A.V.; Braga, V.; Ratten, V. Technological transfer and spillovers within the RIS3 entrepreneurial ecosystems: A quadruple helix approach. *Knowl. Manag. Res. Pract.* **2021**, *19*, 127–136. [CrossRef]
88. Statistics Lithuania. Demographic Statistics of Lithuanian Municipalities 2001–2021. Official Statistics Portal. Available online: https://osp.stat.gov.lt (accessed on 25 April 2025).

89. Ministry of Social Security and Labour of the Republic of Lithuania. An Accessible Environment for People with Disabilities Enhances Their Independence. Available online: https://socmin.lrv.lt/lt/naujienos/zmonems-su-negalia-prieinama-aplinka-didina-ju-savarankiskuma/ (accessed on 17 March 2025). (In Lithuanian)
90. Ministry of Social Security and Labour of the Republic of Lithuania. 2021–2030 Development Programme for an Inclusive Environment in All Areas of Life for People with Disabilities. Available online: https://socmin.lrv.lt/lt/veiklos-sritys/strateginis-valdymas/aktualus-strateginiai-dokumentai/pletros-programos/ (accessed on 17 March 2025). (In Lithuanian)

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.