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Accessibility of Cultural Heritage Sites for People with Disabilities: A Case Study on Krakow Museums

Zygmunt Kruczek * , Katarzyna Gmyrek , Danuta Ziżka, Karolina Korbiel and Karolina Nowak

Department of Tourism Geography and Ecology, Institute of Tourism, Faculty of Tourism and Recreation, University School of Physical Education in Kraków, 31-571 Kraków, Poland; katarzyna.gmyrek@awf.krakow.pl (K.G.); danuta.zizka@awf.krakow.pl (D.Z.); karolina.korbiel@awf.krakow.pl (K.K.); karolina.nowak@doctoral.awf.krakow.pl (K.N.)

* Correspondence: zygmunt.kruczek@awf.krakow.pl

Abstract: The aim of this paper is to assess the accessibility of flagship cultural attractions—that is, museums located in Krakow, a city with a rich historical heritage included in the UNESCO World Cultural and Natural Heritage List and distinguished by being a recipient of the Access City Award—for people with disabilities. This research shows the degree to which these museums have been adapted to receive visitors with disabilities. Assessments were also conducted with regard to access to the museums’ websites and the possibility for virtual tours of their collections. Out of a total of 50 museums, 31 were selected for this study, both leading museums in terms of attendance, such as Wawel Royal Castle, the National Museum, the Museum of Krakow, and the Wieliczka Salt Mine, and smaller ones such as the Aviation Museum. The research results indicate that Krakow museums are well-prepared for receiving people with physical disabilities and seniors but are less well adapted to receiving visually impaired and blind people and hearing-impaired and deaf people. Analysis of the museums’ websites showed that they are well-prepared in terms of compatibility and comprehensibility but that they received worse assessment scores with regard to their perceivability and functionality. Visitors to the museums are principally adults, adolescents, and seniors. People with disabilities make up 10% of all visitors.

Keywords: accessibility; culture heritage; inclusive tourism; museum; people with disabilities; Krakow



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1. Introduction

As shown in WHO reports, over a billion people around the world, that is, 15% of the population, are currently affected by some type of disability. This number is growing rapidly due to the aging population, the spread of chronic diseases, and complications caused by the COVID-19 pandemic [1].

The convention on the rights of people with disabilities [2], adopted in 2006 by the United Nations and ratified by all the member states of the European Union, ensures the full integration of this group of people. The full inclusion of people with disabilities involves increasing their activity levels in the public sphere, including via improvements in accessibility to various means of spending leisure time. Accessible tourism is increasing in popularity, with an ever-growing number of attractions, hotels, and restaurants declaring that they are open for people with disabilities. According to the definition provided by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), “accessible tourism is a form of tourism that involves collaborative processes between stakeholders that enables people with access requirements, including mobility, vision, hearing and cognitive dimensions of access, to function independently and with equity and dignity through the delivery of universally designed tourism products, services and environments. This definition adopts a whole of life approach where people through their lifespan benefit from accessible tourism provision. These include people with permanent

and temporary disabilities, seniors, obese, families with young children and those working in safer and more socially sustainably designed environments” [3].

One of the key concepts in the approach to accessible tourism is the accessibility chain, defined as a series of transactions based on the supply of products, services, and tourist experiences required by the accessible tourism market [4–6].

According to the proposal of the UNWTO, this chain encompasses the urban environment, recreational activities, and excursions [7]. In this context, elements of natural and cultural heritage are key attractions in the tourist industry, in which accessibility must be a basic attribute [2].

The aim of this paper is to assess the accessibility of flagship cultural attractions, that is, museums located in Krakow, a city with a rich historical heritage entered into the first UNESCO World Cultural and Natural Heritage List in 1978, for people with disabilities. Currently, Krakow is the most recognised tourist location in Poland, with visitor numbers exceeding 14 million in 2019 [8]. In 2010, Krakow was distinguished as receiving first place in the competition organised by the European Union for cities accessible for people with disabilities and older people, having been granted the Access City Award. The city earned this title thanks to efforts intended to increase the accessibility of public spaces in very difficult surroundings characterised by inaccessible infrastructure. This was achieved thanks to particular attention paid to providing access to historical sites and museums [9].

2. Literature Review

There is a link between inclusive tourism and social and economic development [10], and many authors contend that this type of tourism can bring additional social and economic benefits [11]. Some are of the opinion that accessible tourism should be analysed across a broad spectrum, as it may also relate to other groups of people with special needs (e.g., older people, pregnant women, and people travelling with small children) [12].

A review of the literature related to tourism for people with disabilities points to the growing popularity of this issue [4], but despite the multitude of publications and the variety of topics, there are few papers that address accessible tourism and people with disabilities comprehensively. A great deal of attention in the literature is paid to understanding the specific requirements of people with disabilities. Private and societal attitudes towards disability were described by Darcy and Daruwall [13]. In their research, they addressed the issue of how the needs of people with disabilities are understood by abled people. On the basis of a literature review, they pointed to key differences between the stereotypical understanding of the needs of people with disabilities and their actual needs [13].

Research into accessible tourism also involves various interrelated aspects connected to travelling, part of which is related to transport [14], and the availability of accommodation [15,16] and tourist attractions [17,18]. Descriptions of the accessibility of tourist attractions on popular tourist routes around Poland [19] and in historical cities are provided [20].

The accessibility of tourist sites and attractions in Spain is presented in works by Rucci and Porto [21] and Santana et al. [22], while Espinosa and Bonmatí developed a guide to the accessibility of museums and other sites on the UNESCO world heritage list [5]. In Poland, an analysis of the accessibility of tourist infrastructure for people with disabilities [23], as well as of sites and tourist offers in Krakow, was conducted [24].

Tourism for people with disabilities is a developing segment of the market and brings with it at least two benefits. On the one hand, it leads to social inclusion, while on the other, it increases the competitiveness of tourist destinations and yields good financial results for the tourist sector [25–28].

A very important feature of people with disabilities is also the fact that they travel during the low season, with at least one companion, and are willing to incur significant travel-related expenses [29]. One example of an analysis of local tourist offer accessibility

for people with disabilities is a paper on the accessibility of tourist offers in the Istria peninsula in Croatia [30].

The COVID-19 pandemic showed that new technologies could be used to effectively increase the accessibility of tourist attractions, especially with regard to museums in the context of people with cognitive or sensory disabilities. Smartphones with audio guides, the possibility of directly translating text into sign language, and online communication tools are just a few examples of the use of technology to increase accessibility [31]. These solutions are above all used in museums, which, due to the restrictions in place during the pandemic, were mostly closed [32,33]. However, as shown in research conducted by Gawel on Polish museums during the pandemic, despite the wealth of digital offers provided by Polish museums, visitors prefer a return to a ‘real museum’. Although numerous technological solutions that were not in use earlier have become a permanent part of museums’ activities, the reaction of visitors after the lockdown was clear: they want to enjoy traditional forms of participating in culture and, most of all, value the possibility of having personal contact with original artworks in museum galleries [34].

The impact of the COVID-19 pandemic on the cultural sector around the world has been very strong. The clash between cultural institutions and the new reality has been described as “dramatic” and been called a “culture shock” [35]. In the face of the “forced closure” of museum buildings, the Internet became the only possible channel through which to maintain the continuity of activities in the field of public collections. The transformation of many previously planned cultural events into virtual versions involved museums undergoing a digital transition and constitutes the main impact of the pandemic on museum institutions [36]. Museums used the time of closure during the pandemic to adapt the infrastructure of their buildings to the needs of visitors [37].

3. Museums and Cultural Attractions in Krakow and Their Use (Visitor Numbers)

Krakow is perceived as the most recognised Polish tourist destination, a city of culture and art like Florence or Venice. However, in the Fainstein and Judd classification, it is considered a tourist-historic city whose principal resource is historical and cultural heritage [38,39]. This perception of Krakow is also reflected in its entry into the UNESCO List of World Cultural and Natural Heritage, as well as in the selection of Krakow as the European Capital of Culture in the year 2000. It is worth adding that Krakow has also been distinguished as the UNESCO City of Literature and the European Capital of Gastronomy (in 2019).

Krakow cooperates with other European cities of similar cultural heritage potential, such as Barcelona, Edinburgh, Glasgow, Nice, Strasbourg, and Zurich (Figure 1) [40]. It occupies a very high position globally and has a wealth of activity that provides high quality of life. To the above list, we can also add other cities in Central Europe with a character similar to that of Krakow and with excellent tourist functions, such as Prague, Bratislava, and Budapest [41].

At the beginning of the 21st century, Krakow became an important centre for tourism of international standing. Its wealth and variety of cultural attractions, potential as a centre for academia, broad range of cultural events, and well-developed tourist infrastructure are all factors that shape its competitive advantage in the international tourist market [42].

Figure 2 illustrates the upward trend in the number of visitors to Krakow in the years 2010–2023. We can observe an upward trend in 2019, when there were 14 million visitors, including 3.3 million foreign tourists. The COVID-19 pandemic and the war in Ukraine have contributed to a collapse in arrivals, which, in 2023, have not yet reached 2019 levels.

Krakow contains some of the most impressive examples of urban architecture in Central Europe, with more than five thousand historical sites. The most attractive tourist district in Krakow is the Old Town, with the main Market Square at its centre (the largest square of its type in Europe), which, together with the characteristic buildings that surround it, creates one of the most recognisable urban cityscapes in Poland.



Figure 1. Krakow in the city cooperation network. Arrows indicating which cities cooperate with Krakow. Source: This is where I want to live. Krakow 2030, p. 17.

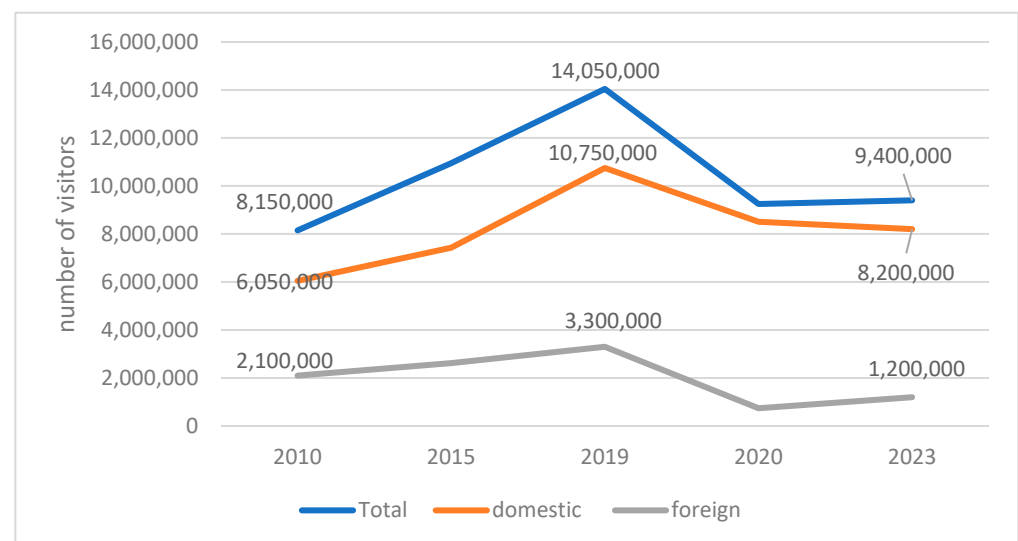


Figure 2. Number of visitors to Krakow in 2010–2023. (Source: based on the work of Borkowski [43]).

Krakow is one of the largest centres of culture in Poland and Central Europe. It is also an important museum centre [44]. Various types of museums and collections can be found here: archaeological, historical, artistic, biographical, natural, technical, literary, and specialist. In 2021, there were 51 museums and museum branches in Krakow, which were among the most highly frequented museums in Poland. In 2022, the Royal castle, with its State Art Collection, was visited by 1,785,000 people, while 1.4 million people visited the National Museum in Krakow, and 888,000 visited the Museum of Krakow. These are the flagship tourist attractions of this city [45]. It is worth noting that Krakow is continually expanding and developing its offering of museums. This is important, as one of the greatest magnets drawing tourists to Krakow is its cultural heritage, and museums are the principal component of this heritage [46].

The crisis related to the COVID-19 pandemic has also affected museums in Krakow. Figure 3 shows the attendance at selected museums in 2019, 2020, and 2022. During the pandemic, all museums noted a catastrophic drop in attendance, but in 2022, some of them,

such as the Wawel Royal Castle or the National Museum, already had higher attendance than in 2019.

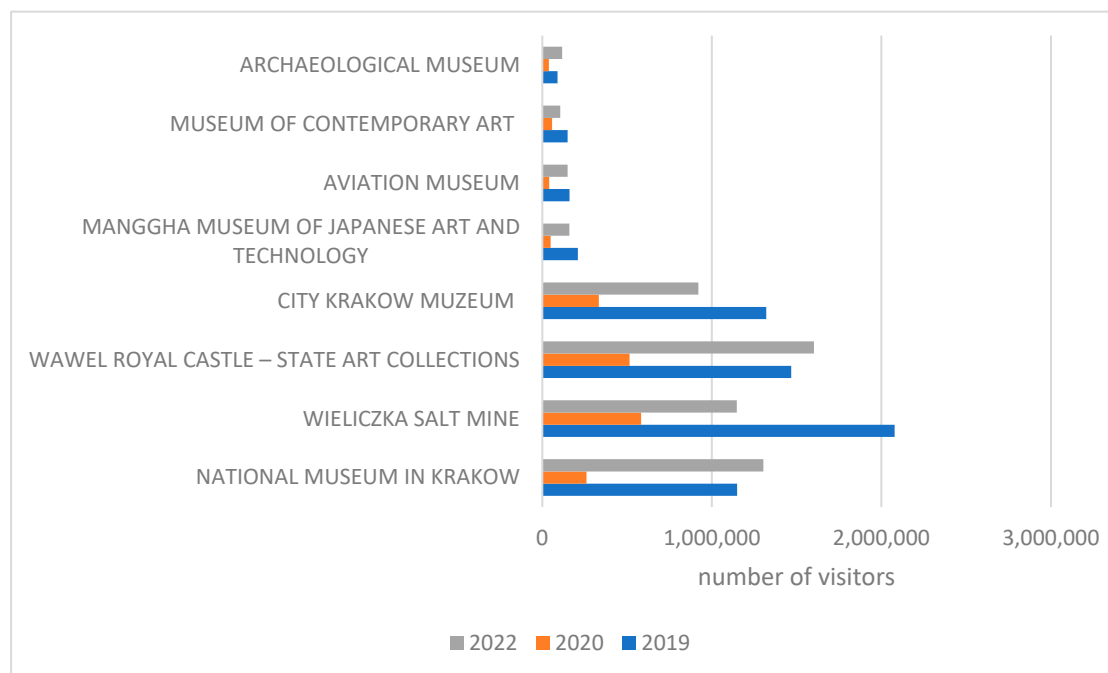


Figure 3. Number of visitors to selected Krakow museums in 2019, 2020, and 2021. (Source: own study).

4. Materials and Methods

4.1. Research Aim

The objective of this research was to assess the accessibility of museums in Krakow for people with disabilities. We aimed to show the degree to which museums are adapted to receiving visitors with limited mobility, sight and hearing impairments, and cognitive disabilities, as well as seniors, families with small children, pregnant women, and people with dietary restrictions. This research should also provide answers to the following questions: what percentage of the total number of museum visitors consists of people with particular needs, and how well are museum staff prepared to receive such people? Another aim was to assess the level of access to both digital and analogue information regarding amenities for visitors, as well as the possibility of making use of virtual tours of the museums' collections.

4.2. Research Questions

1. For which groups of people with special needs are Krakow museums prepared?
2. Are museum premises adapted for wheelchair users?
3. What equipment improving accessibility for people with particular needs is available in the museums?
4. Which groups of people with particular needs visit Krakow museums?
5. Do the museums employ people trained in how to provide assistance to people with particular needs?
6. Do the museums provide sufficient information on the accessibility of their premises for people with particular needs?
7. Do the museums' websites fulfil the requirements of digital accessibility for people with disabilities?
8. Do the museums offer virtual tours?

4.3. Research Methods and Tools

This research allows for the diagnosis of the gap in the accessibility of museum buildings and exhibitions for people with disabilities and the competence of museum staff in dealing with such people.

To obtain an answer to the questions posed above, research was conducted using the categorised interview method [47]. In this method, a carefully developed questionnaire is used for research. This study was conducted between July and September 2023 in selected Krakow museums. Museums with visitor numbers below five thousand in 2022 were excluded from the study, resulting in data being collected from 31 museums. Each of the institutions to which the request to complete the questionnaire was addressed authorized an employee to do so, who was usually the accessibility coordinator.

The interviews were conducted with people responsible for the museums' accessibility for people with particular needs, and the CAPI (Computer Assisted Personal Interview) technique was used. The research tool was a standardised questionnaire containing 24 multiple choice and open questions. An electronic version of the questionnaire was prepared using the Forms application and sent as a link to museum staff responsible for museum accessibility for people with disabilities.

To evaluate the statistical significance of the differences in the degree to which museums and facilities were adapted for people with disabilities, a significance test for two fractions was used (Mann–Whitney U Test) for the so-called top (flagship) museums, where the number of visitors in 2022 amounted to over 100 thousand (13 museums), and for museums with an attendance of fewer than 100 thousand people (18 museums).

The Mann–Whitney U test is used for analysing non-parametric data (usually ordinal data) and should be considered when using ranking data or data that deviate from acceptable distribution patterns or when there are noticeable differences in the number of subjects in two comparison groups [48].

The answers to the questions made it possible to assess the adaptation of each of the museums in question to receiving visitors in wheelchairs, blind people, those with sight and hearing impairments, and people with cognitive disabilities, as well as seniors, families with prams, pregnant women, and people with dietary restrictions. The types of technical amenities in place were also taken into consideration, as well as signage and access to analogue and digital information.

A separate study analysed the museums' websites with regard to their functionality for people with disabilities and the possibility of virtual tours. In addition, we verified whether the museums' websites fulfilled the requirements of digital accessibility in terms of the following aspects:

- Operability (ease of finding content and functions irrespective of the means of navigation, e.g., using only a keyboard or only a mouse);
- Robustness (with programmes used by people with disabilities);
- Perceivability (the possibility of perceiving content via the user's available senses of sight, hearing, or touch, e.g., via audio descriptions);
- Understandability (texts are written in simple language without containing difficult phrases);
- Whether a museum has a website.

This research was conducted using TAW Accessibility Checker software. This tool is used to automatically test the accessibility of websites and focuses directly on the standards of the World Content Accessibility Guidelines (WCAG 2.1) in identifying problems with regard to operability, robustness, perceivability, and understandability. Although it is an automated solution, TAW conducts compliance analysis on two levels: automatic and manual. Reports on the analysis of individual websites group errors into three segments: problems (clearly identified by the software), warnings (identified by the software but tagged for manual verification), and unchecked (outside the reach of the software and tagged for manual verification) [49]. Methodological limitations are also associated with TAW Accessibility Checker software. The tool's analysis of web accessibility is limited

to a website's home page, so its compliance status does not represent the entire site. The software also points out potential errors that cannot be verified automatically via the recommendation of a manual check, which yields more accurate analysis results.

5. Results

Analysis of the questionnaires provided answers to the previously formulated research questions. The first related to identifying the groups of people with disabilities for whom Krakow museums are accessible. As shown in Figure 4, Krakow museums are relatively the best prepared for receiving people with physical disabilities, as 87% of the museums declared they were accessible to this group of people. A high percentage of museums are accessible for seniors (80%). The museums are less well adapted to the needs of people with sight impairments and blind people (74%) and those of people with hearing impairments and deafness (73%). A similar percentage (71%) of museums were accessible to families with prams and children. The lowest number of museums declared that they were accessible to pregnant women (58%).

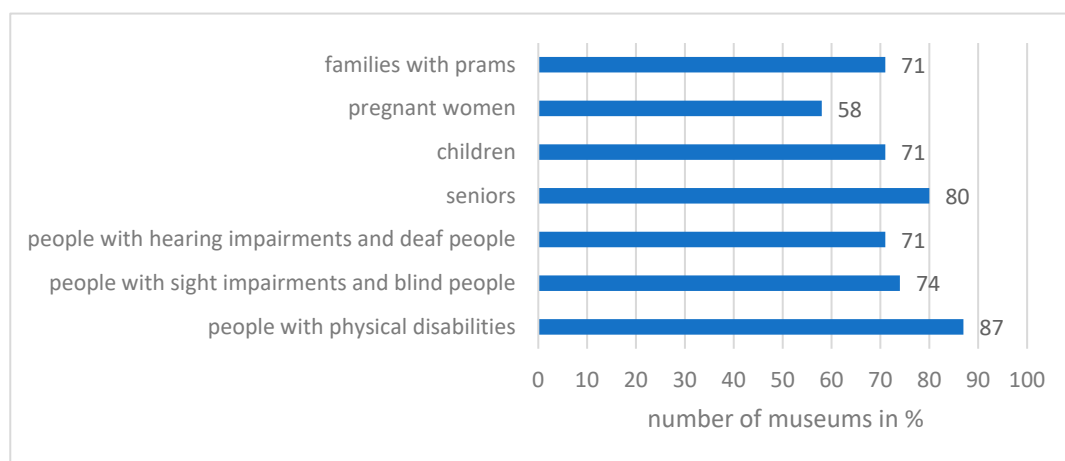


Figure 4. Degree of adaptation of Krakow museums for groups of people with particular needs or disabilities.

It is worth noting that four museums belonging to the so-called flagship museums are also adapted for people with intellectual disabilities, highly sensitive people, and people within the autism spectrum; they have sensory baskets for such visitors and “quiet hours”. In the case of smaller museums, only one declared that it had facilities for people with intellectual disabilities and ASD.

The analysis of the results of the study shows that museums with higher attendance do not differ from museums with a smaller number of visitors in terms of their adaptation to groups of people with various disabilities. Differences in responses to the benefit of flagship museums in this context were statistically significant at the $p = 0.05$ level of significance only in the case of adapting them for people with physical disabilities ($U = 1.82$); in other cases, no statistically significant differences were found between museums with higher and lower attendance, for which the following results were obtained: families with prams ($U = 0.47$), pregnant women ($U = 0.33$), children ($U = 0.77$), seniors ($U = -0.53$), hearing and deaf people ($U = 1.42$), and visually impaired and blind people ($U = 1.12$).

In terms of the answers to question 2, as to whether museum premises were adapted for wheelchair users, the responses indicated that this was a considerable spatial challenge (sometimes due to the historical nature of the museum's architecture), as well as an organisational and financial challenge, with only 9% of the museums reporting that such needs were met (Figure 5).

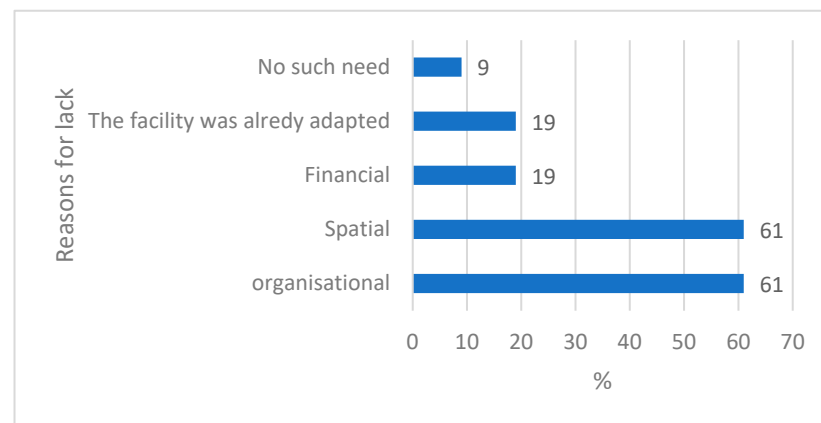


Figure 5. Reasons for lack of adaptation of museums for people with disabilities (in %).

A separate problem is access for people with disabilities to dedicated parking spaces, with only 52% of the museums providing such access combined with entry to the museum via curb-free pavements and ramps or inclines. Adapting premises for wheelchair users required special modifications to buildings at a later date (50% of answers). The majority of museum managers considered not adapting premises to the needs of wheelchair users to be a form of discrimination (81%), with only 19% holding the opposite opinion. In general, this provision was not confirmed by the managers of museums located in historical buildings, whose adaptation to the needs of people with physical disabilities was limited or impossible.

In answer to question 3, 'What equipment improving accessibility for people with particular needs is available in the museums?', the responses indicated an appropriate width of museum doors (70%), the provision of lifts (66%), and correctly designed communication routes within the premises (43%). In the majority of the museums, an induction loop has been installed for deaf people (57%). One in three museums had amenities for blind people in the form of descriptions in Braille, as well as inclines and access ramps for people with limited physical ability (36%), lowered counters in reception/ticket offices (33%), platforms/hoists (20%), and automatic doors (20%). Only 10% of the museums did not have any of these amenities (Figure 6).

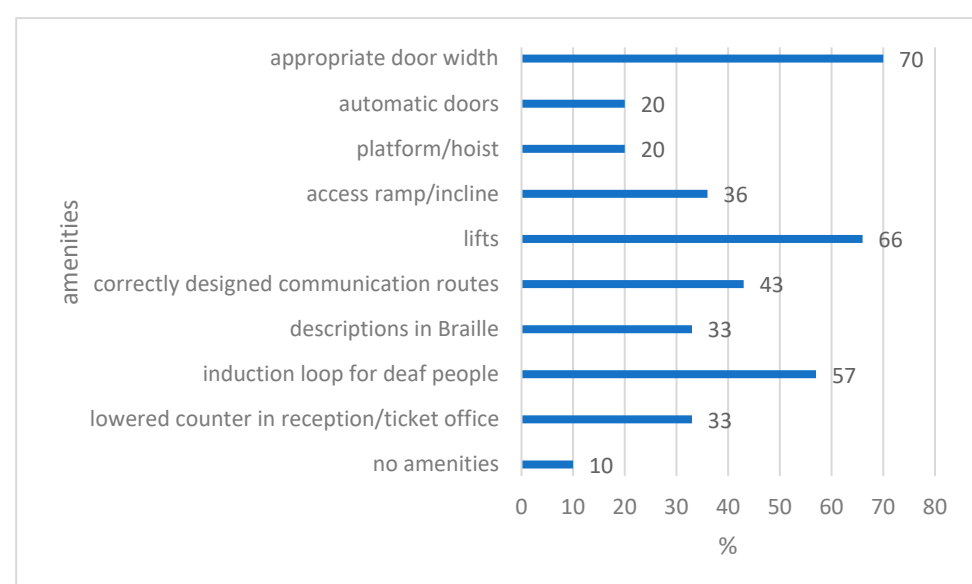


Figure 6. Amenities in Krakow museums for people with disabilities (in % of museums).

It is worth drawing attention to the high degree of adaptation of toilet facilities for the needs of people with disabilities, with as many as 87% of museums declaring that their bathrooms met such standards.

In the case of facilities for people with disabilities, no statistically significant differences were found between the museums with higher and lower attendance, corresponding to the following results: lowered counters at the reception/ticket office ($U = 0.53$), induction loop ($U = 1.24$), Braille descriptions ($U = 1.05$), proper profile of communication routes ($U = 0.09$), elevators ($U = 0.33$), access ramp/ramp ($U = 1.47$), platform/lift ($U = 0.53$), wide doors ($U = 0.15$), and lack of amenities ($U = 1.54$). Only the answer concerning the possession of automatically opening doors via objects turned out to be statistically significant at the significance level of $p = 0.05$ ($U = 2.2$), to the benefit of flagship museums.

Improvements in accessibility for people with particular needs were possible thanks to the presence of technical solutions in the museums, as illustrated in Table 1. The communication routes, lifts and toilets, flat surfaces, and lack of doorsteps make the majority of Krakow museums accessible for wheelchair users and those with children's prams. Half of the museums had appropriate pictograms and warning signs, while one in four had descriptions in Braille. Audio signals for blind people were only found in four museums. The majority of the museums (97%) have public spaces that are adapted for joint use by both people with particular needs and those without.

Table 1. Amenities improving accessibility in Krakow museums.

No.	Amenities	%
1.	Lifts, including those with Braille and an induction loop	42
2.	Lifts for wheelchairs	61
3.	Inclines with handrails for use by those with children's prams and in wheelchairs	22.5
4.	Toilets accessible by wheelchair users	71
5.	No doorsteps, and flat surfaces	61
6.	Descriptions in Braille	26
7.	Pictograms and warning signs	48.5
8.	Audio signals	13

In answer to the question about which groups of people with particular needs or disabilities visit Krakow museums, it was indicated that all of the groups analysed are represented to differing degrees (Table 2). In total, 81% of the museums confirmed the presence of physically disabled tourists, while 78% reported visits by seniors. The majority of the museums (71%) reported the presence of people with sight and hearing impairments, with a lower percentage confirming the presence of small children (42%) and people with dietary restrictions.

Table 2. Presence of tourists with disabilities in Krakow museums.

No.	Type of Disability or Particular Need	%
1.	People with physical disabilities	81
2.	People with sight impairments	71
3.	People with hearing impairments	68
4.	People with cognitive disabilities	71
5.	Seniors	78
6.	Families with prams	68
7.	Pregnant women	71
8.	Small children	42
9.	People with dietary restrictions	26

Figure 7 illustrates the main visitor segments reported by museum managers. The segment of adults who visited museums in an organized form (over 70% of responses) or on their own (61%) clearly dominates. The second segment is young people who visit museums in groups (68% of museums) and, to a lesser extent, individually (almost 38%). Also noteworthy is the segment of organized groups of seniors (almost 60%) and individual senior guests (45%). A significant percentage of museums indicated groups of students and parents with school-age children as an important segment of visitors. More than half of Krakow museums indicated parents with small children as an important group.

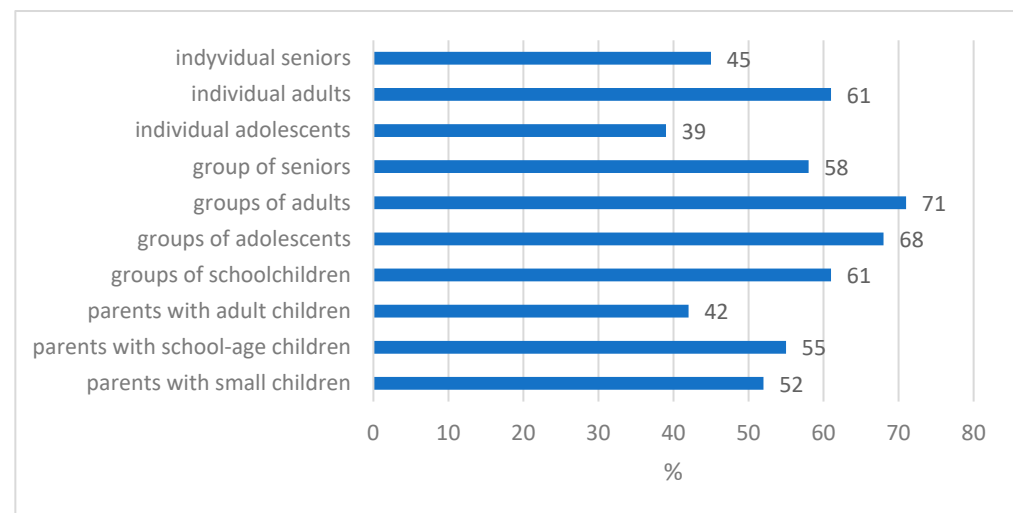


Figure 7. Responses to the question about the principal groups of clients visiting Krakow museums (in %).

In response to the question regarding the total number of museum visitors with limited mobility and those with particular needs, including people with sight, hearing, and cognitive impairments; seniors; families; pregnant women; and small children, the majority of managers estimated this proportion to be around 10%. The highest estimates were for people with physical disabilities, while, in general, no participation was found regarding people with dietary restrictions.

Question 6 referred to museums employing people trained in providing assistance to people with particular needs. Almost all of the museums employ such people (97%), with only three museums not having such members of staff. In addition, museum staff were trained in providing assistance to people with particular needs, with 30% of the museums having half of their staff trained in this regard.

The interviews revealed that the museums provide sufficient information on their websites regarding the accessibility of their premises for people with particular needs, as confirmed by 97% of museum managers, while guide dogs and other support animals are permitted in 87% of the museums.

The museum websites were analysed in terms of their functionality for disabled users as well as regarding the option to take virtual tours. In response to the needs of people with disabilities, Polish law has introduced the concept of so-called digital accessibility. This is one of the most important features of websites, mobile applications, and other digital solutions, and it is intended to aid people with varying degrees of hearing, movement, sight, and cognitive abilities in the use of such solutions. According to the requirements, all public entities, including museums, must ensure digital accessibility on their websites and mobile applications so that they fulfil the principles of perceivability, functionality, comprehensibility, and compatibility [50].

According to the Bill of 4th April 2019 on the digital accessibility of the websites and mobile applications of public entities, museums are obliged to possess a so-called declaration of accessibility, which describes the accessibility of their premises for people with disabilities. This declaration informs such people of the solutions, but also the problems, that they may encounter on the corresponding website and mobile application and in the buildings themselves. The declaration of accessibility must fulfil specific content and technical requirements and should be available in every language in which content is provided on the website. In situations where a website is not available, a museum must still have a fully available declaration. The declaration of accessibility should be updated every year (by the end of March) and after every redesign or update of the website or application.

Museums are obliged to adapt their websites and mobile applications in accordance with WCAG guidelines. Their structure is based on four principles:

Perceivability, i.e., the ability to use a website or app using the senses available to users.

Operability, i.e., the ability to find and use content and functions regardless of the means of navigation (e.g., using only a keyboard or only a mouse).

Understandability, i.e., the clarity of the expression of both the content and the way the website or application works achieved, e.g., through the use of simple language or explanations of abbreviations and acronyms.

Robust, i.e., adapting the content and features of websites and applications so that they work properly for a wide variety of additional user programs (e.g., web browsers and screen readers for the blind).

Analysis of the museums' websites in terms of their accessibility for people with disabilities (Table 3) revealed that they are best prepared in terms of compatibility and comprehensibility. These elements displayed the lowest number of errors (475 and 745, respectively). The greatest problem in the declaration of accessibility was found to be the perceivability of websites (3683), followed by their functionality (1695).

The assessment of individual museums also revealed a certain key disproportion. In summary, the best-prepared museums in terms of the website's declaration of accessibility, that is, those with the fewest problems, are Wawel Royal Castle (99), Galicja Jewish Museum (110), and the Photography History Museum (112). Meanwhile, the largest number of problems, both those clearly identified by the software as well as those indicated as warnings and those tagged for manual verification, were found at the Home Army Museum (3141), which stood out considerably from the remaining museums.

In the analysis of the accessibility of museums for people with disabilities, given the current ubiquitous access to various types of technical and multimedia solutions, the possibility of participating in virtual tours cannot be ignored. Virtual tourism involves the computer-based presentation of actual places, in which the geometrical properties of places are presented to the user in such a way that they acquire an impression of actually being present in the places in question. Virtual tourism cannot exist without virtual reality and space, wherein computer technology is used to create the effect of a three-dimensional world in which objects give the impression of being spatially and physically present [51]. A virtual tour is a simulation of an actual place in which the user can move about freely; it is a digital solution that mimics any place or space in three dimensions.

Virtual tours of museums bring great cognitive and educational benefits in terms of faithfully providing users with experiences of visiting museums using one or several of their five senses [52]. However, in the museums in question, this is not a popular method of presenting collections, and among the 15 museums analysed, only 7 offer such an option (Table 3).

Table 3. Assessment of the declaration of the accessibility of the museums' websites, where the number of problems was identified according to the TAW Accessibility Checker (as of 15 October 2023).

Museum Name	O	R	P	U	Total	Virtual Tours
National Museum in Krakow (https://mnk.pl/ accessed on 15 December 2023)	43	18	54	56	171	yes
Wawel Royal Castle State Art Collection https://wawel.krakow.pl/ accessed on 15 December 2023	37	1	48	13	99	yes
Tourist Trail and Saltworks Museum in Wieliczka https://muzeum.wieliczka.pl/ accessed on 15 December 2023	121	9	558	38	726	yes
Krakow (Historical) Museum https://muzeumkrakowa.pl/ accessed on 15 December 2023	47	1	94	18	160	no
Manggha Museum of Japanese Art and Technology https://manggha.pl/ accessed on 15 December 2023	48	2	68	20	138	yes
Aviation Museum https://muzeumlotnictwa.pl/ accessed on 15 December 2023	47	1	79	6	133	yes
Mocak Museum of Contemporary Art in Krakow https://www.mocak.pl/ accessed on 15 December 2023	69	1	97	20	187	no
Krakow Archaeological Museum https://ma.krakow.pl/ accessed on 15 December 2023	39	1	87	6	133	yes
Museum of Municipal Engineering in Krakow https://www.mit.krakow.pl/ accessed on 15 December 2023	101	1	148	25	275	no
Galicja Jewish Museum https://galiciajewishmuseum.org/ accessed on 15 December 2023	56	1	47	6	110	no
Museum of the Jagiellonian University https://maius.uj.edu.pl/ accessed on 15 December 2023	115	2	136	12	265	no
Walery Rzewuski Photography History Museum in Krakow https://mufo.krakow.pl/ accessed on 15 December 2023	51	1	40	20	112	yes
General Emil Fieldorf Home Army Museum in Krakow https://muzeum-ak.pl/ accessed on 15 December 2023	633	429	1637	442	3141	no
Seweryn Udziela Ethnographic Museum https://etnomuzeum.eu/ accessed on 15 December 2023	140	3	99	35	277	no
Museum of St. John Paul ii the Great https://mjanpawel2.pl/ accessed on 15 December 2023	148	4	491	28	671	no
Totals	1695	475	3683	745		

O—operability, R—robustness, P—perceivability, and U—understandability.

6. Discussion

Currently, more than a billion people around the world suffer from some type of disability. Ensuring that everyone has access to spaces, communities, areas, hospitality, services, food, pathways, and mobility is a pillar of sustainability. The number of people with disabilities and the senior population are growing rapidly around the world. In Poland, in 2022, seniors made up 25% of the population, and their number in 2050 is forecast to be 40%, while people with disabilities account for 14% of the population [53]. These two groups will form the dominant segment of the tourism market in the coming decades. The use of tourist services by these people requires the hosts of tourist destinations and tour operators to adapt to their special needs by means of transport, information, and tourist infrastructure, enabling the exploitation of the value of the natural environment and cultural heritage (including museums), as well as by ensuring that staff are appropriately prepared to serve tourists with various types of restrictions. With regard to existing museums, this means that it is necessary to obtain funds for the adaptation of buildings

and exhibitions. On the other hand, new attractions, including museum facilities, must be built in accordance with the “design for all” principle. An example of such an approach is the model design of the Museum of Contemporary Art in Krakow. This building was awarded in the “Krakow without barriers” competition for its clear layout of pedestrian routes, taking into account the access of people with disabilities to the full utility program.

Cultural tourism is key to the development of tourism in general around the world, especially in Europe. An ever-greater number of people are travelling for cultural reasons, and they are particularly interested in cultural heritage. Cultural tourism brings huge opportunities and is a growing trend. Around 40% of all tourists in the world can be considered cultural tourists, and culture is also one of the most important motivations for European tourists [54]. Museums can be defined as one of the most important cultural attractions that serve to satisfy the cognitive and emotional needs of cultural tourists. As such, they serve a key social function. In this context, they should be accessible to all groups of people [55].

Currently, there is observable interest in social inclusion, defined as the process of creating the opportunities and resources necessary for people at risk of poverty and social exclusion to participate to some extent in economic, social, and cultural life wherever possible, including people with disabilities [56]. Social inclusion also involves social integration, which manifests itself on many levels—educational, professional, recreational, and regarding tourism—and assists in the individual development of people with disabilities. In line with this process are the activities of Krakow museums centred on making it possible for people with disabilities to use museum resources at a level on a par with that of other visitors. Our research results confirm that the majority of visitors of museums are adults (individuals and groups), with seniors in second place (visiting in groups and individually), ahead of adolescents and other museum visitor segments. People with disabilities constitute around 10% of museum visitors, and queries about the possibility for such people to view museum exhibitions occur sporadically (once a month). This is confirmed by the results of research conducted among students with disabilities from various Krakow educational institutions, who make use of ‘museums, theatres, exhibitions and cinemas’ relatively seldom (only 3% declared that such visits occurred once per month) [24].

It is worth noting that museums with higher attendance have more amenities for people with physical disabilities, e.g., automatically opening doors. This seems to be due to the fact that adapting a space for people with mobility impairments is more difficult architecturally and more expensive than in the case of other disabilities. A common reason why museums with a smaller number of visitors lack adaptations for people with disabilities is also the fact that they are located in small buildings of a historic character, where, for technical and legal reasons, it is not possible to make changes to the structure of the interior and surroundings of the building.

The analysed Krakow museums are best prepared to receive people with physical disabilities and seniors, while they are less well prepared for people with sight impairments and blind people or people with hearing impairments and deaf people. A similar level of accessibility was seen for families with prams and children.

The studied museums have taken action to improve their accessibility for people with particular needs. For people with physical disabilities, it is vital that museums ensure there are suitably wide doors and functioning lifts as well as correctly designed communication routes. Other important features for people with limited mobility are inclines and ramps, lowered counters in reception/ticket offices, platforms and hoists, and automatic doors. The majority of the museums have induction loops installed for people with hearing impairments. One three museums have amenities for blind people in the form of descriptions in Braille. Only 10% of the museums do not have any of these amenities.

It should be noted that there have been considerable improvements in the accessibility of Krakow museums for people with disabilities. The results of research from 1994 [57] revealed that access to museums for people with disabilities (in this case, people with musculoskeletal dysfunction) was limited in the majority of cases to the ground floor,

sometimes even only to certain rooms. In comparison, it can be observed that particular care is now taken to ensure that museums are fully accessible to various groups of people with particular needs.

The digitalisation of Krakow museums is not at an advanced stage. The websites of the museums studied are assessed positively in terms of their compatibility and comprehensibility with regard to their accessibility for people with disabilities. The greatest problem in the declaration of accessibility that the museums were required to present concerned the perceivability and functionality of the websites. In research conducted on the websites of 30 museums in Bulgaria, it was found that the majority of the analysed websites were below average in this regard and did not provide a satisfactory level of digital accessibility [58]. Research on museums in Portugal indicated similar problems with the assessment of website perceivability and functionality, although the 576 Portuguese museum websites studied had higher levels than other tourist entities [59].

The problem regarding the use of internet applications by Polish museums (including two in Krakow) during the COVID-19 pandemic was analysed by Gawel [34], indicating the frequent use of applications such as Facebook, Instagram, YouTube, and Tik-Tok for communicating with potential visitors and, above all, promoting the museum as a tourist product. For example, the National Museum in Krakow has 103,000 followers on Facebook, 30,000 members on Instagram, and 1890 subscribers on YouTube. Similarly, Wawel Royal Castle has 140,000 followers on Facebook, 10,000 on Instagram, and over 3000 subscribers on YouTube. Neither of these two flagship Krakow museums use the Tik-Tok application, which is highly popular among young people [34].

Cóndor-Herrera et al. pointed out that virtual tours available on physical property websites can be important tools for assessing levels of accessibility for people with physical disabilities, such as wheelchair users. However, it is important to use appropriate, modern technologies to obtain high-quality digital replicas of physical environments [60].

The decided majority of the museums employ staff for assisting clients with special needs, suggesting the need to suitably train staff. Unfortunately, the majority of tourism study programmes do not include subjects related to the accessibility of tourist attractions [12].

7. Conclusions

This research indicates that Krakow museums are well prepared for receiving people with physical disabilities and seniors but are less well prepared for receiving people with sight impairments and blind people or people with hearing impairments and deaf people. The visitors of the museums included in this study were predominantly adults, adolescents, and seniors. People with disabilities constitute around 10% of all visitors.

The majority of museum managers consider the existence of premises unadapted for wheelchair users to be a form of discrimination, but for many museums, especially those corresponding to historical buildings, adapting the premises to the needs of such people is a significant technical and financial challenge. For example, only half of the museums have access to dedicated parking spaces. As far as is possible, museums install technical amenities providing access to their premises, especially their exhibitions. These amenities include, above all, doors of suitable width, lifts, correctly designed communication routes, induction loops for those with hearing impairments, and descriptions in Braille. The public spaces in the majority of the museums are adapted for shared use by both people with particular needs and those without. The museums also declare that they employ people trained in providing assistance to people with particular needs.

It is worth noting that museums with higher attendance have more facilities for groups with different disabilities, so an obvious consequence of this is more diverse types of customers visiting said museums.

A common reason why museums with a smaller number of visitors lack adaptations for people with disabilities is the fact that they are small buildings of a historic character,

where, for technical and legal reasons, it is not possible to make changes to the structure of the interior and surroundings of the building.

Analysis of the museums' digital accessibility showed that their websites were best prepared from the point of view of compatibility and comprehensibility. The greatest problem in meeting the conditions of the declaration of accessibility was found to be the perceivability and functionality of the websites. Unfortunately, only one of the museums studied uses virtual tours as a convenient form of making collections available to people with disabilities. During the COVID-19 pandemic, this method of visiting was often the only way to view museum collections.

Another issue that could be the subject of future research is the assessment of the possibility for value co-creation, that is, providing experiences through the participation and interaction of people with disabilities. Experience consumption depends on the involvement of both providers (museum managers) and consumers (tourists) [61].

This research demonstrates the significant importance of new technologies for accessible tourism. These can be used to remove physical barriers and improve the sharing of information and as tools for providing tourist experiences, e.g., augmented reality (AR) and virtual reality (VR) [62].

The activities undertaken by Krakow museums are part of the pillars of sustainable tourism [63]. Their purpose is to create equal access to cultural heritage resources, such as museums, for all people, regardless of their physical and mental capabilities. Thus, the offering of museums accounting for people with disabilities strengthens the position of this city, which is distinguished by the Access City Award. Krakow is one of the few cities in Europe that has developed and actively implements a sustainable tourism policy. Access to cultural heritage resources for all stakeholders is included in the strategic objectives of this document [64].

8. Theoretical and Practical Significance of the Research

The assessment of the accessibility of museums for people with disabilities presented in this article contributes to knowledge of the issues surrounding access to heritage for people with special needs. The research results are therefore in line with the phenomenon of social inclusion and inclusive tourism.

The actions described above, whose purpose is to make museums accessible to various groups of people with disabilities, as well as the technical, organisational, and informational amenities provided, can be used by museum managers as a case study of good practice.

The results of our research point to the need to conduct further analyses in order to identify barriers to the development of accessibility at tourist attractions and to seek solutions for learning and disseminating good practices.

9. Limitations

This research was limited to one type of attraction, that is, museums, and only one city. Also, this research included Krakow museums with more than 5000 visitors per year. To obtain a fuller picture of museum accessibility, it would be worth continuing this research for museums of various sizes and in various locations. This should include the context of the social surroundings, especially the attitudes of museum managers and tourism providers towards the problems of accessibility to cultural heritage for people with disabilities.

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