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WEB ACCESSIBILITY IN THE AUSTRIAN HOTEL SECTOR

Maria Erdey-Gruz, Marie-Luise Leitner, Christine Strauss¹

Abstract

This contribution aims to provide an analysis of the current state of web accessibility in the tourism industry with the focus on the Austrian hotel sector. The results of the conducted study verify previous research, showing that tourism organizations considerably lack awareness of web accessibility. A three dimensional hotel categorization model on accessibility is introduced to encompass the complexity of accessibility in the hotel sector. This model can be used to evaluate the current state of hotel accessibility and may therefore provide a valuable tool for further benchmarking activities.

1. Introduction

Information technology captures a vital part in the life of many people as an increasing number of people are joining the digital highway. The Internet – originally based on the idea of offering equal opportunities to each and everybody – has emerged as a medium for the creation of a digital divide as it excludes certain groups of people by not providing adequate accessibility.

The purpose of this paper is to provide an analysis of the current state of web accessibility in the tourism industry, to give an overview of the current situation of web accessibility with the focus on the hotel sector in Austria in order to foster accessibility by recommendation of a three dimensional hotel categorization model on accessibility.

In section 2, a short overview on web accessibility, on its user groups, benefits, standards and regulations is given. General questions on accessible tourism in connection with Information Technology are discussed in section 3. In section 4, a study on web accessibility of Austrian hotel web pages, which constitutes the basis for the hotel categorization model and its results are presented.

2. Web Accessibility

The notion of web accessibility has existed for over a decade and generally “*means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can*

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contribute to the Web” [27]. The first general guidelines in this area have been developed by the World Wide Web Consortium (W3C) in 1999 [32] within the Web Accessible Initiative (WAI).

2.1. User groups

The W3C uses a broad definition on disability, including the following groups [26]: (i) visual disabilities (blindness, low vision, color blindness); (ii) hearing impairments (including deafness); (iii) physical and motor disabilities; (iv) speech disabilities; (v) cognitive and neurological disabilities (dyslexia and dyscalculia, attention deficit disorder, intellectual disabilities, memory impairments, mental health disabilities, seizure disorders), and (vi) multiple disabilities.

It can be estimated, that in the EU at least 50 million people, which is 10% of the population, have some type of disability [3,7]. People with impairments may be more dependent on using the Internet as the main source of information, since other sources, like printed information or personal advice, may be difficult or even impossible to access. It is difficult to assess the ratio of people with disabilities surfing the Internet² [24].

Accessible websites are also of high value for elderly people, a user group that is becoming increasingly important from an economic point of view. The world population, particularly in developed countries, is aging rapidly; the EU estimates that by 2020, 25% of the EU population will be older than 65 years [6]. There are many age-related conditions, such as vision impairments, hearing loss, motor skill diminishment, memory and processing problems that are similar to those experienced by the disabled. Moreover, elderly people tend to have a combination of multiple sensory losses and functional impairments. They often have cognitive problems, are overwhelmed with the information flood and have trouble comprehending the user interface [30]. Currently, only 10% of people older than 65 years use the Internet [6]. In the near future, this number will increase dramatically, due to two developments: (1) an increase in the Internet penetration in this age group; (2) a more internet-accustomed elderly generation.

Another user group that benefits significantly from web accessibility is the group of the mobile device users. In the age of smart phones and PDAs, these users are facing similar barriers to people with disabilities (e.g., they rarely use the mouse, they often do not or cannot load images) [31].

2.2. Usability and other benefits

A side effect of accessibility is that everybody can benefit from an accessible design of a web page, because accessible pages are standard-compliant and therefore represent high quality. Usability is an important factor for web pages, as it allows the end users to easily, effectively and efficiently use the web page for the purpose it was designed. The DIN EN ISO 9241-11 standard defines three basic criteria on which the usability of a software system is measured: effectiveness, efficiency and satisfaction [5]. Since the implementation of this standard, additional factors have been identified to promote usability, such as empowerment, enjoyment, experience, enchantment, care and socialization [21]. Accessibility represents a vital part of usability.

An often neglected benefit of accessible web pages is that they tend to achieve higher rankings in search results. A search engine is similar to a blind user, as it reads only the code, just like the

² Currently, there are no comprehensive statistics on the Internet penetration rates of the disabled.

screen reader reads it out loud for a blind user [9]. A well structured code will receive a higher value from a web-crawler and those will be ranked higher within the listed search results.

2.3. Standards and Regulations

The WAI defined three guidelines for accessible web pages [29]. The first, most common and referred to, are the Web Content Accessibility Guidelines (WCAG), which deal with the information on a web site (text, images, forms, sounds). The W3C is currently working on WCAG 2.0, which will respond to many changes and developments of both web technologies and assistive technologies that have occurred since the publication of the first version. Part of it will be the Accessible Rich Internet Application Suite (WAI ARIA) that enables web developers to create accessible dynamic web content and web applications. The second guidelines, the Authoring Tool Accessibility Guidelines (ATAG) deal with software that creates web sites (e.g., word processors, Content Management Systems, blogs, wikis). As these tools have become increasingly important with Web 2.0, their accessibility has to be ensured. Thirdly, the WAI developed guidelines on the accessibility of User Agents (e.g., web browsers, media players), the so-called User Agent Accessibility Guidelines (UAAG).

Following these guidelines shall ensure an accessible web page, even if such a page can hardly ever be simultaneously barrier-free for all groups of the disabled. At first sight, the accessibility of a webpage is invisible; inaccessibility may be noticed only when a barrier occurs. Therefore, it is particularly difficult to raise awareness of the issue. At the moment there is no widespread quality benchmark (e.g., accessibility certification) allows a website owner to promote accessibility. The WCAG logo of W3C is based on self assessment and thus may lead to misuse.

Several legal regulations have been passed in the last decade on international, EU and national level. On the international level, the most important regulations are the Rights of People with Disabilities from August 2006, the European Charter of Fundamental Rights and the European Agreement for the Protection of Human Rights and Fundamental Freedom. In Austria, on national level, Article 7 of the Austrian Federal Constitution, the Austrian Equalization Act for People with Disabilities and the Austrian E-Government Act of 2004 regulate the rights for the disabled, including the non-discriminative and equal right to access information. Although the WCAG 1.0 is a guideline, the EU considers it as de facto standard, and it is taken as reference by existing international laws [1].

The variety of these regulations show the increasing importance of accessibility, including web accessibility, but a closer look to industry applications reveals that the regulations for the time being are an insufficient mechanism to ensure general web accessibility. Though, in the following subsection we focus on a specific, economically important sector of the tourism industry, i.e., hotel sector.

3. Accessibility in Tourism

Tourism has a significant importance in the economy. In Austria, the overall turnover in tourism in 2007 reached 40 billion Euros, which represents over 16% of the gross domestic product [22]. The World Tourism Organisation defines tourists as people who *“travel to and stay in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited”* [23]. Tourism is considered as a cross-sector industry that affects communication, transport,

construction, training, human rights, etc. [1]. Figure 1 illustrates the tourism service chain, starting with information on destination, accommodation, transport and offers on services. Accommodation is one of the core businesses in tourism, anybody who is planning to stay somewhere overnight needs accommodation. In Austria 55% of the accommodation is covered by the hotel sector [8].

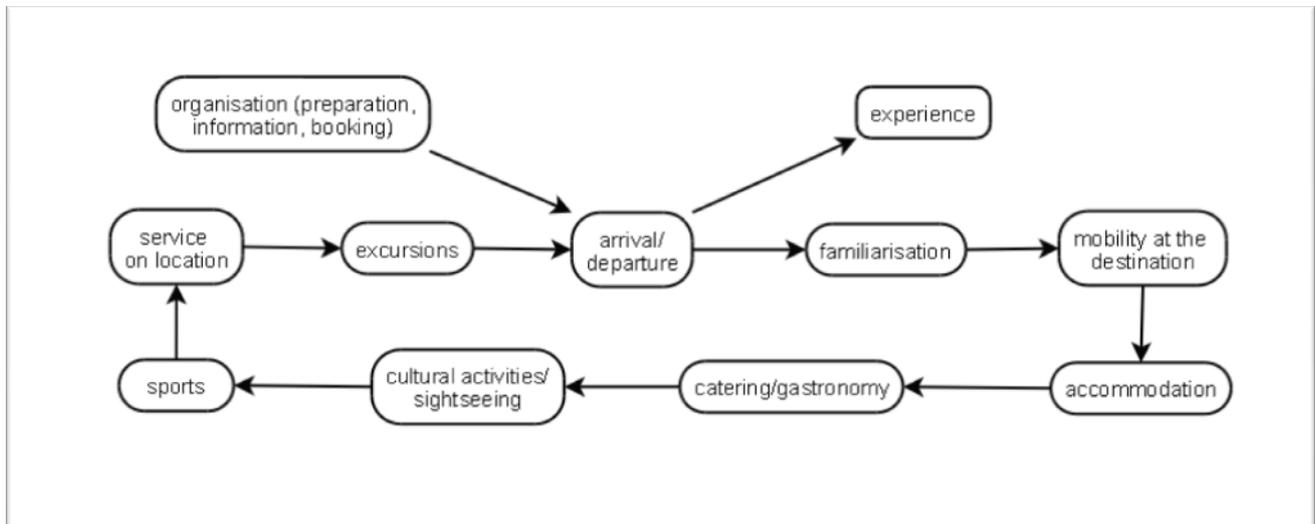


Figure 1: Tourism service chain (based on [14])

Since the purchase and consumption of mostly invisible goods are often separated in time, tourism is particularly suited to Information Technology [36] and was among the early adopters of the Internet technology [34]. According to Harvest Digital, the Internet is the top information source used by European outbound travellers [22]. Over half of the European Internet users (108.6 million) have visited a travel related website in March 2006. Marcussen estimates the European online travel market for 2007 for 49.4 billion Euros, 17% of which was spent in the hotel sector [13].

In the hotel sector, electronic distribution channels are increasingly gaining in importance [17]. 89% of the companies in the accommodation sector with 10 or more persons employed own a web page and 39% of them receive booking through the Internet. However, they are still behind the economic average in relation to the integrated e-business solutions implemented [11]. A study by J.D. Power and Associates from 2007 showed that almost half of the hotel guests use online booking systems, which is a 34% increase since 2005. The hotel branded websites are increasing their share from general travel and booking sites, with only one in four guests choosing general booking web sites [10]. Tourism related travel sites, such as airline and booking sites also generate high number of direct visits to hotel web pages.

The main concept behind accessible tourism is the idea that *“everybody – regardless of whether they have any disabilities – should be able to travel to the country, within the country and to whatever place, attraction or event they should wish to visit”* [16]. The target group for accessible tourism is similar to the one of web accessibility, though according to the World Health Organization the term *“activity limitation”* should be used instead of *“disability”* [33]. Additionally, families with young children enjoy the advantages of accessibility. People with reduced mobility represent 40% of the population, including those 10% of people with disabilities (cf. section 2.1). Therefore, accessibility in tourism is essential for 10% of the population, necessary for 40% and convenient for 100% [1].

Based on previous research, it is assumed that 70% of the target group has the financial and physical condition to travel [15]. A recent fundamental study on the economic impact of accessible tourism in Germany has shown that more than half of the people with disabilities have been travelling, but a third of them have already renounced their travel due to inadequate conditions. However half of the people with activity limitations would travel more if the circumstances were more favourable [15].

In accessible tourism, a special emphasis is placed on the accessibility of information as it constitutes a prerequisite for travelling. Disabled people are forced to plan their trips much longer ahead and with more attention to detail and would use the Internet to gather information to a larger extent than other travellers [19]. Moreover, the information requirement on accessibility rises with increasing accessibility requirements. However, currently the amount of information content is reciprocal to the level of the accessibility requirement [2]. Unfortunately, tourism stakeholders tend to ignore customers with disabilities and do not recognize their market potential. A three country hotel analysis (UK, USA and Australia) showed that only 12% of the hotels passed even Priority checkpoints 1 of the WCAG [34]. Another study on the German and UK tourist information sites showed that only 20% complied with Priority 1 checkpoints, and merely 3% with Priority 2 checkpoints [35]. This underlines that although both web accessibility and accessible tourism have become a matter of concern in research and legislation, in reality web accessibility in tourism and especially in the hotel sector is still in its infancy. The main reason for this is the lack of awareness, understanding and/or an ignorance of the problem [15, 18, 34, 35].

In Austria, the following options are available for people with disabilities who search online for hotels that can accommodate their needs:

- (i) Hotel web page;
- (ii) Travel and booking platforms: they generally do not provide information on accessibility beyond wheelchair accessibility. The largest platform in Austria is “Tiscover” which offers only a limited search possibility on accessibility. Furthermore, the web page itself is not accessible.
- (iii) Information platforms for people with disabilities: they contain a database on accessible hotels and are maintained by interest groups, non profit organizations or private persons. To be listed, a hotel has to provide detailed information on hotel accessibility. The platforms offer an advanced search option with the possibility to conduct tailored search queries. Basically none of these platforms include the information if the hotel’s web page is accessible. However, although providing valuable information, many of these platforms also lack basic web accessibility criteria.
- (iv) Designated sites of the regional tourist information systems: they work on a principle similar to the information platform, collecting accessible accommodation regionally.

In cases where no direct booking is offered on a platform, one can decide to contact the selected hotel by phone or e-mail. However, this causes a media disruption; the guest is forced to change media in an information process. Choosing to go directly to the hotel web page is most of the time not a solution since the web pages rarely meet even the minimum requirements of web accessibility.

4. Evaluation and results

4.1. Evaluation method

Our method used an evaluation framework which itself applies a three-step hierarchical approach. The approach of selecting the web pages for inspection was based on the hypothesis that those

hotels that have shown a minimum awareness of the accessibility issue would most likely have accessible web pages. Figure 2 shows the evaluation framework for the process which was divided into three steps: (1) selection of the hotels; (2) automated tests; (3) manual tests.

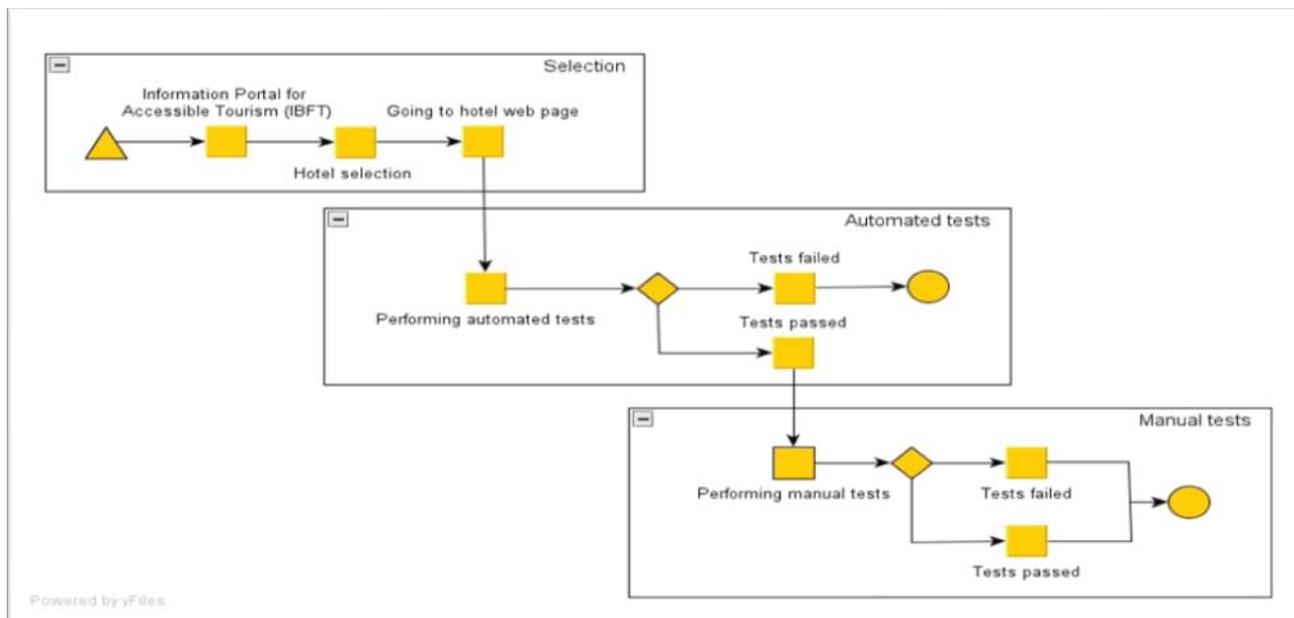


Figure 2: Evaluation framework

Selection process: the set of hotels was taken from one of the Austria’s largest portals on accessible tourism, the Information Portal for Accessible Tourism (IBFT). IBFT, among others, collects information on accessible hotels and also provides links to other similar information portals, including regional tourist information portals. We have examined whether the Austrian hotels listed on IBFT have met the basic conditions on web accessibility.

Automated tests: There have been many methods developed on examining the accessibility of a web page, like automated and manual checks of the WCAG Priority points, user testing, the Unified Web Evaluation Methodology and many more [25]. Most of these checks require a long time and professional examination. For the purpose of this research we have chosen to use the Preliminary Review of the W3C [28], which offers a quick way to identify some basic accessibility problems. It does not check for all problems, therefore it is not suited for a conformity check of the Web Accessibility Guidelines, but it gives a good overview if a web page is generally suited to be accessible. After selecting a representative page sample first on each web site the following two steps were performed, which can be done with automatic tools: (i) standard code validation; (ii) use of automated web accessibility evaluation tools. These tests are an absolute must to be passed for an accessible webpage. For the tests the online software Total Validator v.3.5.0, recommended by W3C, was used [25].

Manual tests: Web pages that passed the automated tests were tested with the following manual tests: (i) Page examination using graphical browsers: Firefox 3.0 with Web Developer Plug-in was used to perform the following test: disabling images, checking for alt text; turning off sound; changing font sizes; testing with different resolutions; changing the display color for gray scale; navigating without the mouse; (ii) Page examination using specialized browsers: the Lynx browser was used to examine if the information was displayed correctly on a text-only browser. Additionally, each website was screened for information on hotel accessibility.

4.2. Results

The results of the evaluation (cf. table 1) were not surprising in the light of similar previously conducted studies [34, 35]. 90% of the web pages failed the automated tests, 80% failed both automated tests with more than a couple of errors. This indicates a basic ignorance of accessibility, since these tests can easily be run by everyone, without any special expertise.

| | |
|--|----------|
| Total number of pages checked | 50 |
| Total number of pages that failed automated tests | 44 |
| Total number of pages that failed manual tests | 4 |
| Total number of pages that passed all tests | 2 |

Table 1: Numerical results

Many pages use rich Internet applications (i.e., Flash and JavaScript) that would have to meet special accessibility criteria. If a web page contains JavaScript in the code it is considered as failed, since the activation of JavaScript turns off some links. Another problem group was web pages that use flash animations in the major part of their web page. Screen readers, just like automated accessibility software, are not able to comprehend and handle the information within the animation, hence these web pages cannot be considered accessible. Three web pages were using frames, without the adequate accessible frame information. Frames are not preferred because screen readers do not sense changing between frames, unless they are labeled. Four out of the six web pages that have passed the automated tests had failed the manual test. All four had problems displaying symbols and umlaut letters in the Lynx text browser, which makes the content unreadable.

As a result, only 2 out of 50 evaluated web pages passed both automated and manual tests. Even though this does not mean that these web pages are accessible; only that they meet the basic requirements of accessibility. Additionally, only 10% of the web pages indicate any information on the accessibility of the hotel (cf. section 4.3).

4.3. A hotel categorization model on accessibility

Similarly to other sectors in tourism [2,15,18], accessibility in the hotel sector is a complex issue, an accessible web page is not sufficient. In order to really meet the needs of people with disabilities the hotel itself has to be accessible and the guests have to be informed about the accessibility of the hotel. These factors can be combined in a three dimensional model, each dimension contributing to the creation of a new valuable asset.

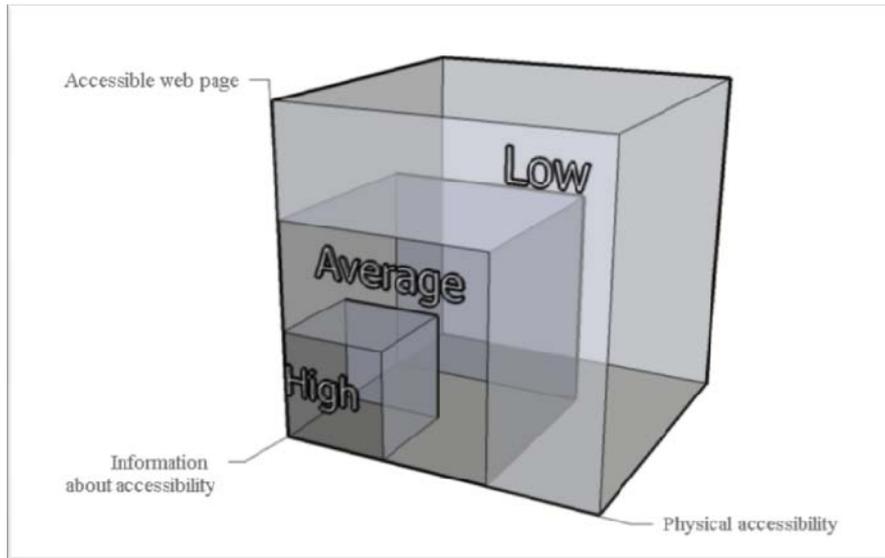


Figure 3: A hotel categorization model on accessibility

Figure 3 shows the hotel categorization model on accessibility, where the three axes are:

- (1) *Physical accessibility of the hotel* (x-axis): it is indispensable that the hotel itself is accessible for people with disabilities. Diverse disabilities require different solutions, but minimum requirements should be met by each hotel;
- (2) *Accessible hotel web page* (y-axis): the web page of the hotel should be accessible for all;
- (3) *Providing information about the hotel accessibility* (z-axis): information on the level of accessibility of the hotel has to be displayed on the web page.

Using a mathematical approach the three dimensions create a so called maximum norm (l_p -norm, where $p = \infty$). Let x_1, x_2, x_3 measure the coordinates of any point in the cube, where $(0,0,0)$ is the best possible and the $(1,1,1)$ the worst possible performance.

$$\| (x_1, x_2, x_3) \|_{\max} = \max (x_1, x_2, x_3)$$

This approach states that given any three coordinates in a cube the value of the norm will be the maximum of the three coordinates. In this case, from the three factors, the overall value of the accessible hotel will be defined by the ‘weakest link’, the factors that perform the poorest. Even if a hotel is physically accessible, it cannot provide full accessibility until it informs his guest about it in a way that is accessible for all. The advantage of this approach is that based on the three factors a value is assigned to each hotel, ensuring comparability and therefore benchmarking. Even with a simple method of assigning three categories (low, average, high) to each dimension it is possible to give a fairly good assessment of the accessibility of some hotels. A more precise analysis of the factors (continuous value in each factor) may provide a comprehensive approach to the issue. Only if all three criteria are met on high level a hotel can be considered accessible.

The evaluation introduced in section 4 considers only one of the three dimensions (accessible webpage) of the categorization model (cf. figure 3), given that a comprehensive study on physical accessibility of these hotels is out of the scope of this study. Therefore, the categorization model was not applied on the examined hotels. However, hotels that failed the automated or manual tests

would definitely receive a low overall rating, since the overall value cannot be higher than the weakest single factor.

5. Conclusion and further research

From an organizational perspective, people with disabilities represent a significant consumer group that is currently excluded from online activities and therefore represents an unexploited market potential. Those few studies that have been conducted in the area of web accessibility in tourism show a considerable lack of awareness of organizations on this issue [cf. 15, 18, 34, 35]. Moreover, hardly any studies on economic impacts of web accessibility have been carried out so far. This research gap is currently being explored by an initial pilot study which uses exploratory case study research in order to determine an organization's motivation for web accessibility implementation and the resulting business and economic benefits [12].

The introduced hotel categorization model on accessibility can be used to evaluate the current state of hotel accessibility and may therefore provide a valuable tool for further benchmarking activities. Furthermore, a sophisticated weighting system of the dimensions may be devised for further refinement of the assessment. In addition, the model indicates possible ways of improvement for the evaluated hotels.

Moreover, this contribution implies that an increase in the awareness of web accessibility is an indispensable prerequisite for a future amelioration of the status quo of web accessibility in the tourism sector. Decision makers have to be aware of the issue, have to be informed about the needs of people with disabilities and the potential market they represent. Moreover, the government may on the one hand enforce existing regulations more effectively; on the other hand provide financial support for implementing accessible web presence.

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