

# Accessibility of Italian E-government services: the perspective of users with disabilities (PREPRINT)

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**Abstract.** The advent of the Internet has shaped our life in every field including study, work, social interaction, free time, and politics. In the sector of Public Administration (PA) and services delivered to citizens, benefits include better access to a vast amount of information, saving time, simplified services, and increased transparency. However, PA services should also be easy to use for people with disabilities, including those who interact through assistive technology. This paper offers the results of an online survey of people with disabilities accessing Italian PA services. Results from the sample highlight the need to improve service accessibility and usability, and the request for increasing their number and set of functions.

**Keywords:** Accessibility, Usability, Public Administrations, people with disabilities

## 1 Introduction

E-government involves the use of electronic communication devices, computers and the Internet to provide public services to citizens in an efficient and cost-effective way. Thanks to the Web, anyone with an Internet connection can easily access a wide choice of services 24h/day. The number of e-government services increases every day; examples are demographic certificates (such as marital status or address changes), tax payment, licensing, school enrollment, property forms, and so on. It is important for such services to be accessible to people with disabilities in order to ensure inclusive access and equity.

Both literature and accessibility experts confirm that incorporating accessibility and usability guidelines at the phase of website design can help guarantee the high efficiency and efficacy of the service, thus increasing user satisfaction. In recent years, public administrations have acknowledged this aspect, but usability and accessibility issues still prevent the effective use of e-government services by everyone. Several recent studies have noted the poor accessibility of governmental websites [10, 13, 14, 1, 3]. Unfortunately, all these studies are performed by using automatic tools,

such as aChecker (<https://achecker.ca/>) or WebAim (<https://webaim.org/>) and do not consider the actual experience of users with disabilities.

The 2011 report "Monitoring eAccessibility in Europe", funded by the European Union, indicates that only one-third of the content generated by public administrations in the EU was accessible and highlights how the adoption of WCAG 2.0 guidelines is a slow and fragmented process (<http://www.eaccessibility-monitoring.eu/>). Understanding the current difficulties of people with disabilities when interacting with e-government services is the first step in identifying where to intervene.

Older persons (age 65 years or over) in Europe represent 19.4% of the population, with an increasing trend [5]. Specifically, Italy has the highest percentage of people aged 65 or older, (i.e., 22.3 % of the total population) [5].

Prevalence of disabilities is increasing due to population aging: e.g., in developed countries studies have shown that up to 40% of people over 65 years suffer from a chronic illness or disability that limits their daily activities [8]. Considering the increasing digital process occurring in the PAs and the aging of the European population, it is urgent to implement best practices to guarantee web accessibility and usability for all, thus increasing autonomy and empowering every individual.

This paper presents a study that sheds light on Italian public administration (PA) accessibility via an online survey answered by 68 people with disabilities from Tuscany, accessing PA services in Italy. The paper is organized as follows: after the related works, the study's methodology is presented in Section 3; results and discussion follow in Sections 4 and 5 respectively, while conclusions and future work end the paper.

## 2 Related Work

Every person has the same rights and opportunities, and there should be no discrimination against people with disabilities, according to the 1948 Universal Declaration of Human Rights (UN). With the advent and growth of the internet over the last 20 years, most countries have approved laws to encourage and guarantee equal opportunities for all to access digital resources; accessibility of web sites and services is important for everyone but it is crucial for people with disabilities, since their interaction can require more time and effort. The concept of web accessibility implies that both the website and the services it contains are accessible.

The Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C) is a group of international experts who work together to develop accessibility Web standards. Among these, the Web Content Accessibility Guidelines (WCAG) has the goal of providing a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally. This standard is generally used as a reference point and adopted by several national governments to guide the eGovernment accessibility process. In this area, the European Union (EU) for instance specifically approved:

- 2010-11: ratification of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD)<sup>1</sup> by the EU in January 2011. Specifically, Article 9 concerns the duties of stakeholders in the accessibility field to ensure equal access for persons with disability.
- 2014: The European standard on accessibility requirements for public procurement of ICT products and services was adopted in February 2014<sup>2</sup>: EN 301 549 V1.1.1 (2014-02) Accessibility requirements suitable for public procurement of ICT products and services in Europe
- 2016: On 26 October 2016, the European Parliament approved the Directive (EU) 2016/2102 of the European Parliament and of the Council on the accessibility of the websites and mobile applications of public sector bodies<sup>3</sup>.

In December 2015 the European Accessibility Act was proposed, aimed at improving the functioning of the internal market for accessible products and services by removing barriers created by divergent legislation. However, legislation is not enough to guarantee accessibility. Indeed, Europe has had to postpone the original objective of reaching 100% PA website accessibility by 2010 to 2020.

Many studies have been carried out to evaluate the accessibility and usability of PA websites. In the following, we cite just some recent examples. In 2016, Galvez and Youngblood examined 132 state and local e-government websites in Rhode Island, using a combination of code inspection, heuristic evaluation, and automated analysis, to determine the effects of templates on accessibility, usability, and mobile readiness. The results suggested that while best-practice-based templates may be helpful in improving usability, accessibility, and mobile readiness, it is crucial for designers to receive training in these areas and crucial for governments to monitor state and local Web sites being compliant with standards [6]. In a previous work, Youngblood and Mackiewicz used e-government and corporate usability benchmarks to compare municipal government websites in Alabama. The study reveals substantial problems with municipal website usability, including accessibility. The authors highlight, and we agree, that such problems could erode a municipality's web credibility [16]. In 2015, Coelho Serra et al. presented a study on the manual evaluation of four Brazilian e-government mobile applications using WCAG 2.0. Numerous accessibility issues were detected. Results showed that many elementary accessibility problems widely known by HCI researchers were encountered extensively in the applications evaluated. This highlights the importance of furthering research in accessibility design and evaluation of mobile applications, in order to provide more inclusive access to essential applications used by all citizens, such as e-government services [4]. In 2018, Alcaraz-Quiles et al. investigated the impact of e-government implementation on the transparency, accessibility and usability of Spanish Regional Government websites, observing that the transparency of analyzed websites is inversely related to accessibil-

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<sup>1</sup> <http://ec.europa.eu/social/main.jsp?catId=1138&langId=en>

<sup>2</sup> [https://www.etsi.org/deliver/etsi\\_en/301500\\_301599/301549/01.01.01\\_60/en\\_301549v010101p.pdf](https://www.etsi.org/deliver/etsi_en/301500_301599/301549/01.01.01_60/en_301549v010101p.pdf)

<sup>3</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2016.327.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.327.01.0001.01.ENG)

ity since the information is available but could require considerable time to find it [2]. In 2015 Ismailova performed an accessibility test on 55 Kyrgyz Republic e-government websites using several automatic evaluation tools. Results showed that about 70% of government websites have accessibility errors thus requiring the application of accessibility guidelines such as WCAG [9]. In 2016, Kesswani and Kumar analyzed the accessibility of Top Universities and educational websites in the UK, Russia, China, Germany and India with respect to the WCAG 2.0. In most of these cases, despite legislation imposed by governments, educational websites follow less than 50% of the guidelines; thus, much greater effort is required to satisfy the accessibility guidelines [11]. A 2011 study investigated the accessibility of Malaysia e-government websites by using the WCAG v. 1.0. The evaluation process revealed several issues, thus the authors provided a few recommendations to further improve the usability and accessibility of e-government website [15].

Some eGovernment accessibility studies have been performed in emerging countries as well. In 2016, Adepoju et al. evaluated the accessibility and performance analysis of state government websites in Nigeria by using two online-automated tools to test for their conformance with the Web Content Accessibility Guidelines [1]. Results show that none of the websites evaluated totally conform to WCAG 2.0 standards. In 2014, Karkin and Janssen analyzed previous literature in order to develop a set of criteria used for evaluating the websites of sixteen Turkish local governments. The websites performed relatively well on traditional indicators, but not satisfactory at providing platforms for citizen engagement, responsiveness and dialogue [10]. Patra and Das in 2014 analyzed the factors that have an impact on the accessibility of e-Governance services, especially in rural India in order to improve their accessibility and to help achieve the mandate of inclusive e-Governance. [14].

Regarding the Italian situation, an analysis performed 5 years ago highlighted that many Italian institutional websites were still poorly accessible. Specifically, more than 950 pages covering the Italian administrative areas (20 regions) were automatically checked and data analyzed, showing that none were fully compliant with Italian legal requirements (Law decree n. 04/2004 and updates) [7].

Most accessibility studies were carried out using automatic measurements of accessibility, thus representing an approximation since some criteria require human inspection to be verified. Martínez et al., comparing results of automatic vs manual evaluation of web accessibility, showed that only 73% of the manually checked results were correctly predicted by automatic evaluation tools [12]. Furthermore, human inspection is usually done by accessibility experts and not by users.

Considering that eGovernment websites and services evolve quickly, that automatic evaluation of web accessibility is an approximation, and wishing to understand the point of view of users, our study aims to complement related studies investigating the current degree of accessibility of Italian e-government websites as experienced/perceived by users with disabilities.

### **3 Methodology**

#### **3.1 Description**

An online survey was created using Google Form, a component of Google Drive. Google Form allows one to automatically aggregate collected data, presenting them in graphics. Moreover, it offers a good degree of accessibility, especially for individuals using a screen reader. A long survey would be very demanding in terms of cognitive effort and time required, thus discouraging people who interact via assistive technology, so the questionnaire is short. As the main objective of this study is to understand the accessibility of services provided by PAs, we focused on the access to a service, the service's completion and the interaction.

The largest and most important organizations of persons with disabilities (visual, motor, hearing, intellectual and autism) were contacted by phone, asking the coordinator or the president's secretary to distribute the questionnaire's address to their associates.

#### **3.2 The survey**

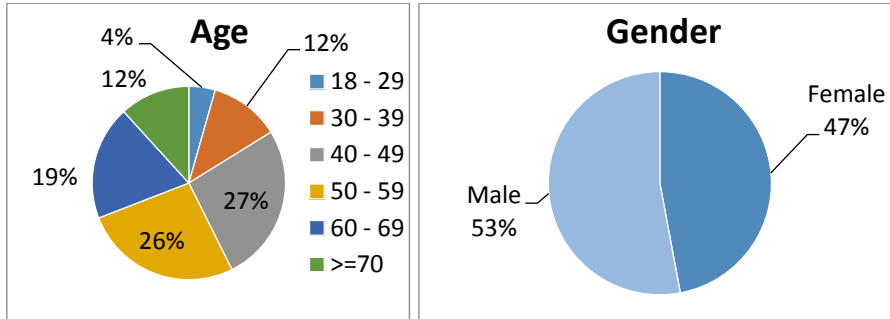
The questionnaire was in Italian since the survey was conducted in Italy. There were ten questions, nine being closed questions and the last a text box for suggestions. The first four questions characterize the sample while the last six investigate the participants' usability experience with online PA services.

The questionnaire's content and language were assessed by two accessibility experts and modified according to the provided suggestions. Next, the online version was checked by a totally blind person who verified its accessibility via screen reader.

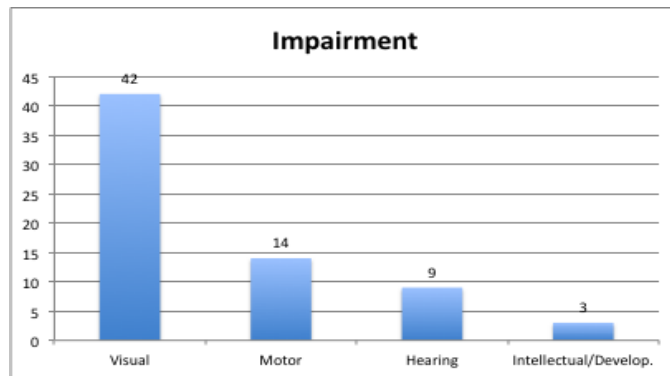
#### **3.3 Participants**

A total of 68 people filled out the questionnaire. The sample is not very large, it is not easy to involve people with disabilities without rewards, but it is quite varied and could provide an initial set of issues to further investigate in the future. The age distribution is shown in Fig. 1, left. Only the age range 18-29 years is under-represented. However, due to their youth, these users probably use PA services less and have fewer problems interacting with mobile devices/assistive technology than do older participants. Regarding gender, the sample is well-distributed with 53% male and 47% female, as shown in Fig. 1, right.

Most participants were visually impaired but all the main disabilities are present, although intellectual/developmental disability is under-represented. This is probably due to the difficulties they encounter in autonomously accessing online services, which generally require complex interaction.

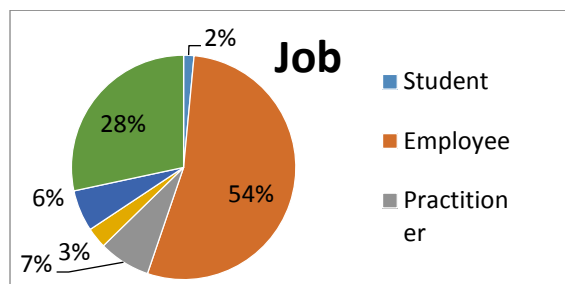


**Fig. 1.** The sample characterization: age and gender



**Fig. 2.** Sample characterization: Disabilities. Most of the participants are visually impaired, followed by motor-impaired people.

Figure 3 shows the distribution of participants by job. More than half of participants (54%) are employees of a PA; Italian law requires PA offices to recruit a percentage of people with disabilities. Nineteen participants (i.e., 28% of the sample) are retired since Italian law allows people with disabilities to retire earlier. One participant is a student. Five people (i.e., 7% of the sample) are practitioners. Two housewives (3%) and four unemployed people (6%) complete the sample.



**Fig. 3.** Sample characterization: Job

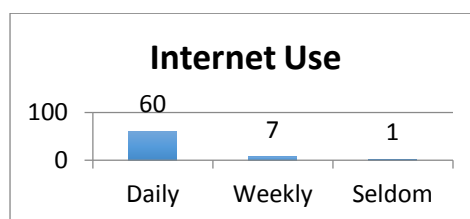
## 4 Results

### 4.1 Evaluating Online PA Services

The main objective of this study was to understand the accessibility of eGovernment services as perceived by participants, in terms of ability to

- Access PA services
- Complete the services
- Evaluate the interaction.

Concerning the frequency of Internet use, most participants use Internet daily, seven users weekly and only one seldom (Fig. 4). This reflects the importance of the Internet for people with disabilities, not only for working and studying but also for participating in social life and carrying out everyday tasks (e.g., booking hotels and holidays, buying products, contacting friends, organizing meetings, and so on). For instance, many PA services, if fully accessible via Web, can be performed remotely and autonomously, avoiding the need for the help from accompanying persons in order to arrive at the office and fill out paper forms -- a great leap in personal autonomy.



**Fig. 4.** Participants' Internet use

As reported in Fig. 5, the sample users consult many PA services in different areas. Health, Local Administration, Job services and tax are the most frequently requested. In Italy the process of digitalization of PA services is quite fragmented but in recent years much has been done to fulfill e-government aims. People can access information on medical tests performed in public health structures and more generally on the electronic health records; many taxes can be paid online and the National Institute for Social Security offers many services such as checking the current pension situation, management of insurance against accidents at work, training offered to employees of public administration, etc.

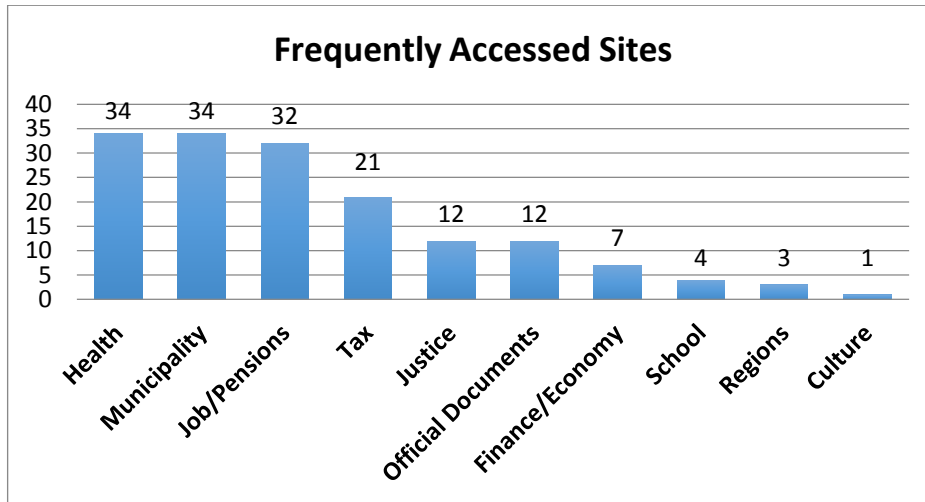


Fig. 5. Frequently accessed PA services

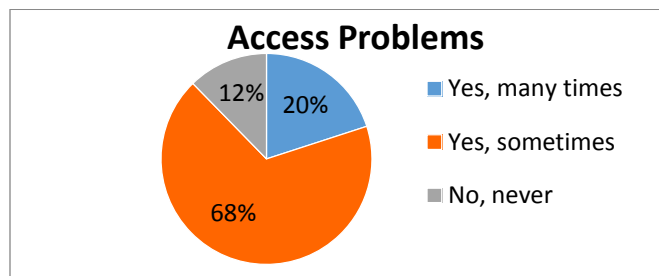


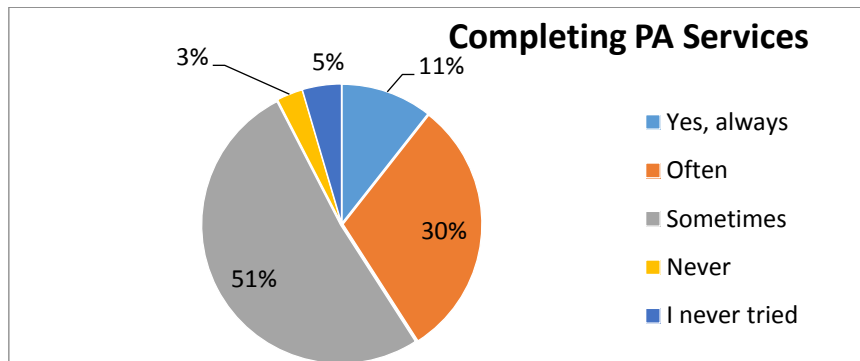
Fig. 6. Frequency of problems detected when accessing online PA services

Regarding accessibility issues encountered by the sample, a first point concerns the participants' experience in accessing the online PA services. In order to better understand collected data, one should bear in mind that unskilled people having problems accessing online services often blame the failure on themselves – as unable to act correctly in a digital environment -- instead of considering the cause as due to poor usability design.

Most users (88%) declared they have experienced some issues: 68% of participants had problems sometimes and 20% many times, as shown in Fig. 6. Concerning the ability to successfully complete a PA service, which reflects the effectiveness of the service, 11% of participants declared they were always able to successfully complete it, while for 30% it was only “often”. More than half of the sample (i.e., 51%) was successful only “sometimes”, and two participants “never” (Fig. 7). Despite the small sample, these are very bad results and Italian PAs should improve their services to better guarantee web accessibility and usability for all. A very frequent issue encountered was related to the difficulty of finding the information or service the user was looking for. For this kind of issue, a more usable reorganization and presentation of



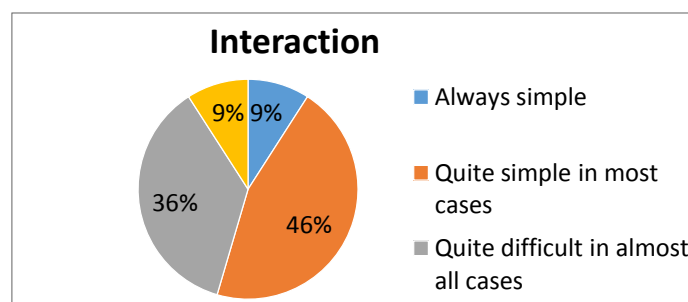
web content could be beneficial to improving user orientation and usability on the whole.



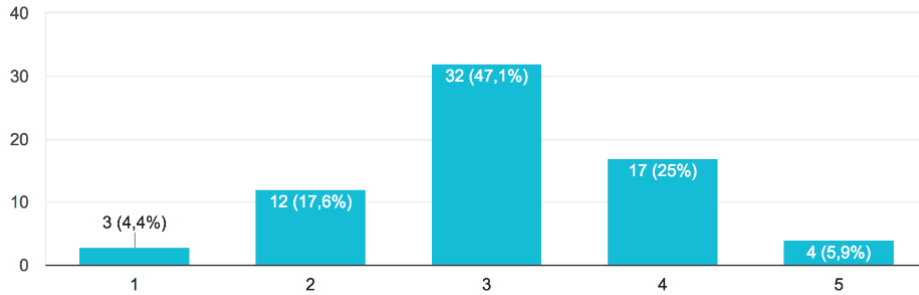
**Fig. 7.** Completing online PA Services

Regarding the simplicity of user interaction, most participants evaluated the interaction as simple (46% as “Quite simple in most cases” and 9% as “Always simple”) but considerable difficulties were still encountered by 45% participants: 9% of them judged the interaction as “Always difficult” and 36% as “Quite difficult in most cases” (see Fig. 8). The majority of the sample found the interaction easy but 45% of the users encountering difficulties is however a very high percentage and again it suggests the need to revise and simplify PA websites and services to improve their usability.

Aiming to verify user satisfaction, one of the main usability issues, we proposed the explicit question “Are you satisfied with your interaction with PA websites?” The answer was rated on a 5-item Likert scale (1 = Completely unsatisfied to 5 = Completely satisfied). Figure 9 shows that most participants were in the middle with 47.1%, not satisfied users were 22% (with 4.4% very unsatisfied) and satisfied users were 31% (with only 5.9% very satisfied). In this case, data might not represent the real picture of the user satisfaction, because as previously mentioned, unskilled people having problems accessing online services often blame the failure on themselves instead of considering the cause as due to poor usability design.



**Fig. 8.** Interaction in accessing online PA Services



**Fig. 9.** User satisfaction when accessing online PA Services

Many users' suggestions have been collected regarding what online PA services need to be improved. Most users ask for increased service usability, e.g., the interaction's simplicity (62.1%), or adding new services (22.7%). Additional requests include:

- Make it easier to find what you are looking for
- Improve interface usability, simplifying complex interfaces, structuring better content and main information, etc.
- Add an online real-time customer care service, a chat service (textual, and better still with sign language translation) for assistance/help
- Improve video accessibility using a sign language interpreter (SLI) or subtitling.

The last points are related to the need to increase/strengthen the communication channels with the PAs. The user sample thus highlighted a high degree of citizen engagement; indeed, citizen engagement can be measured in terms of gathering proposals for improving public services, citizen satisfaction questionnaires, live broadcasting, direct communication addresses by the city Mayor/Coordinators and connection to social network groups [10].

The main limitation of this study is the low cardinality of the sample. Although it is not possible to generalize findings, since 68 individuals is not representative of the Italian population with disabilities, it can offer an overview of some of the problems detected. The questionnaire did not require evaluating specific websites or services: users answered according to their experience with e-government services so no comparison could be made. Despite this, the Italian PA services are very different and range from delivering information to exploiting dynamic social, health, educational or economic services. In this sense, the results can represent a subjective evaluation of Italian e-government quality. Furthermore, the under-representation of citizens aged 18-29 could be also a problem and can cause bias, since this age group is more likely to use technology. For future work, we plan to organize a future study to increase the sample (to reach more than 500 users) and to contact the Student Services of the Italian universities to reach out to students with disabilities (age 19 -25 or over).

## 5 Conclusion

This study attempts to better understand the experience of people with disabilities when accessing online PA services. In countries such as Italy, the main social services such as hospitals, schools and municipalities are part of the PA, and online procedures are increasing day by day. If the accessibility of such services is inadequate, equal opportunities would not be guaranteed for everyone and there would be a risk of cutting off people with disability from the advantages of the Digital Age.

Results seems to confirm previous studies highlighting that usability is still neglected in the design of online PA services for citizens. Studies on usability of PA websites conducted in Europe [13], Turkey [10], India [14], Nigeria [1], and Saudi Arabia [3], showed the need to further improve the accessibility and usability of PA services.

Great effort is necessary to increase accessibility and usability of governmental web sites and applications. To this aim, a multi-stakeholder approach is needed: simple authoring tools helping website creators to create accessible websites, the availability of accessible but pleasant and rich templates for popular Content Management Systems, translating examples and reusable portions of code published by the WAI group of the W3C into every language (most resources are in English, creating linguist barriers), and legislative and economic actions of governments are all necessary components. Finally, the involvement of users with disabilities in the design and test of PA websites and services should be encouraged to become a best practice. We hope a multi-stakeholder approach will favor access for all, according to Tim Berners-Lee, W3C Director and inventor of the World Wide Web, who said: "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect".

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