

# Accessibility of local government websites

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## ABSTRACT

Although European regulations require web accessibility of public sector bodies by June 2025, the accessibility of municipal websites remains low. This paper reports an accessibility evaluation that targeted the first 100 Romanian websites. Three accessibility checking tools were used in this study: Total Validator, Wave, and AChecker. Although the comparison with previous data from 2019 shows a slight improvement, web accessibility remains low, with few websites meeting the requirements of WCAG 2.0. Without clear regulations at the national level, meeting the demands of European regulation is problematic.

## Keywords

Web accessibility, WCAG2, accessibility checking tools, municipal websites.

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## INTRODUCTION

A Web Accessibility Directive (WAD) of the European Parliament and Council has been in force since December 2016 [6]. The directive aims to make the public web and mobile apps accessible for people with disabilities. A recent evaluation of the current status shows that only 16% of analyzed websites comply with the accessibility criteria [16]. This is consistent with the results of several studies, which show that the accessibility level of European municipalities is low [7, 12].

Poor web accessibility is a barrier limiting the access of citizens to online services. In this respect, the accessibility of local government (municipal) websites should ensure fair access to information and available services to everyone, including people with visual impairment.

In recent years, there have been relatively few accessibility studies targeting local government websites. There is no study dedicated to the accessibility of Romanian municipal websites in the last five years, although a few studies exist that marginally discuss accessibility in the context of website quality.

This work reports on the accessibility of local government (municipal) websites in Romania for visually impaired people. The evaluation was carried out on a sample of 100 websites by using three accessibility checking tools.

The next two sections present the main regulations and initiatives at international and national levels, and some related work regarding the accessibility evaluation of public websites. Then the methodology and the evaluation results are presented and discussed. The paper ends with the conclusion and intention of future work.

## WEB ACCESSIBILITY

### Web accessibility guidelines

WCAG2 defined three levels of conformance (A - lowest, AA, and AAA - highest) [22]. According to the Web Accessibility Directive, the AA level of conformance is required for the public web in Europe.

The accessibility model of WCAG2 is based on four principles: perceivable, operable, understandable, and robust, which are implemented by accessibility guidelines. For each guideline, several success criteria have been defined that guide developers to meet and evaluators to check the success criteria.

Accessibility evaluation tools are software programs or online services used to check the content against WCAG 2 techniques. There are many differences between evaluation tools concerning accessibility guidelines used, techniques tested, error classification and reporting, and supported technologies.

### International and national regulations

Several European and national regulations exist that concern web accessibility in the public sector [5,6]. The European Accessibility Act (EAA) was approved in 2019. The EAA covers a wide range of services, such as e-commerce, banking, and ticketing [4]. Since EAA should take effect starting from June 2025, member states should transpose it into national law by June 28.

A government regulation was issued in 2018 and enforced by Law 90/2019 that requires the accessibility of the public web in Romania. Then, in 2022, the Romanian Authority for Digitalization (ADR) published a norm for monitoring accessibility in the public sector [2].

## RELATED WORK

Król and Zdonek [10] analyzed the accessibility of 182 websites from a Polish region by using automated tools and questionnaires. They used five accessibility checking tools: Utilitia, Wave, Lighthouse, Opera Mobile Emulator, and FAE. They found that more than half of the websites were inaccessible for people with disabilities, and about 34% were significantly inaccessible. On the positive side, the municipalities were found to be aware of the relevance and importance of accessibility.

The study of Bai et al. [3] analyzed 342 county government websites in the US to explore the influence of various factors on web accessibility. They found that the complexity of websites and the county population density are the most important.

The work of Kous et al. [9] investigated the accessibility of 189 Slovenian websites after the adoption of the standard EN 301549 in this country and found several improvements, highlighting progress from 2017 to 2018.

Nastiti et al. [13] analyzed the web accessibility of 34 provincial governments in Indonesia using TAW and aXe tools. They found that all websites had WCAG violations, most of the perceivability principle.

Valtolina and Fratus [18] analyzed the websites of Italian municipalities using the AChecker and VaMola tools and found that although accessibility is low, many errors could be easily fixed even by non-technical users.

Recently, the work of Inal and Torkildsby [7] reported on a longitudinal study over three years on the accessibility of all Norwegian municipal websites to investigate the effect of new regulations. The evaluation used the Wave checking tool and highlighted, on the one hand, continuous improvements, but on the other hand, still low accessibility.

Another recent study [12] evaluated the accessibility of 31 local websites in the Republic of Ireland using PowerMapper's OnDemand Suite. They found that 29 websites were below PowerMapper's benchmark, and more effort is needed to comply with the requirements of the Web Accessibility Directive.

## EVALUATION RESULTS

### Method and tool

The evaluation was carried out in March-April 2025. The sample includes the first 100 Romanian municipal websites by the number of inhabitants. The total population of these towns is 8088 thousand inhabitants, representing 81% of Romania's total urban population.

For each website, only the home page was checked for two reasons. First, using more than one page may conflate the number of errors since the header and menus may repeat on each page. Second, websites have a different information architecture, thus making it difficult to select a second web page with similar content.

The accessibility evaluation was done by using accessibility checking tools. Several checking tools are available, each one having strengths and weaknesses [8, 14]. In this study, three tools have been selected: Total Validator [15], AChecker [1], and Wave [19]. WCAG 2A and WCAG 2AA levels have been considered. The accessibility errors have been analyzed and discussed on the conformance level, accessibility principle, and guideline.

Several comparisons have been carried out. The first is between the results obtained with each tool. The second is between the results obtained in 2019 and 2025 by conformance level and accessibility principle. The third is a comparison over time with previous results from 2015 and 2019.

### Summary of results

A grouping of websites based on the total number of errors is presented in Table 1. According to the results obtained with Wave, only two websites have no errors, and 19 websites have more than 100 errors. Overall, Wave and

Total Validator detected more websites that don't comply with WCAG 2 than AChecker.

Table 1. Websites by the number of WCAG 2 errors

Err range	TV	W	AC
none	5	2	17
1-10	10	16	13
11-20	12	12	10
21-50	48	27	25
51-100	13	24	20
>100	12	19	15
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

A summary of validation results detected by each tool is presented in Table 2. The total number of WCAG2 errors varies from 0 to 1076.

Table 2. Summary of WCAG 2 errors

Categories	Errors	M	SD
Total Validator	6457	64.57	119.14
Wave	6929	69.29	108.94
AChecker	5572	55.72	114.22

Averaging data obtained with all tools results in a total of 6319 errors, out of which 3610 (M=36.10, SD=58.38) are WCAG 2A and 2709 (M=27.09, SD=47.15) WCAG2AA.

### Total Validator results

The accessibility check with Total Validator resulted in 6457 errors (M=64.55, SD=119.14), out of which 5902 are level A. Most frequent accessibility issues are presented in Table 3.

Table 3. Errors detected by Total Validator

Guideline	No.	Err	% level	% total
alternative text	66	914	15.49%	14.16%
labels	68	333	5.64%	5.16%
headings	79	773	13.10%	11.97%
link description	89	1894	32.09%	29.33%
duplicate IDs	41	1501	25.43%	23.25%
Other A errors		487	8.25%	7.54%
Total A	94	5902	100%	91.40%
distinguishable	17	254	45.77%	3.93%
headings	29	301	54.23%	4.66%
other AA errors		0	0.00%	0.00%
Total AA	39	555	100%	8.60%
<b>TOTAL</b>		<b>6457</b>		

Lack of link description was detected in 89 websites, and lack of a text alternative for an image was detected in 66 websites. Together, these two level A violations account for 42.49% of the total number of errors. Duplicate ID attributes were found in 41 websites, which account for 23.25% of the total number of errors.

### Wave results

The accessibility check with Wave resulted in 6457 errors (M=64.55, SD=119.14), out of which 5902 are level A. Most frequent accessibility issues are presented in Table 4.

Lack of link description was detected in 78 websites, and lack of a text alternative for an image was detected in 53

websites. Together, these two level A violations account for 34.81% of the total number of errors. Low contrast (level AA) was detected in 92 websites and accounted for 59.40% of the total number of errors.

Table 4. Errors detected by Wave

Guideline	No.	Err	% level	% total
alternative text	53	502	17.90%	7.24%
labels	66	209	7.45%	3.02%
headings	17	38	1.36%	0.55%
link description	78	1910	68.12%	27.57%
duplicate IDs	2	5	0.18%	0.07%
Other A errors		140	4.99%	2.02%
Total A	96	2804	100%	40.47%
distinguishable	92	4116	99.78%	59.40%
headings	4	9	0.22%	0.13%
other AA errors		0	0.00%	0.00%
Total AA	92	4125	100%	59.53%
<b>TOTAL</b>		<b>6929</b>		

#### A-Checker results

The accessibility check with AChecker resulted in 6457 errors ( $M=64.55$ ,  $SD=119.14$ ), out of which 5902 are level A. Most frequent accessibility issues are presented in Table 5.

Table 5. Errors detected by AChecker

Guideline	No.	Err	% level	% total
alternative text	82	959	45.15%	17.21%
labels	52	134	6.31%	2.40%
headings	0	0	0.00%	0.00%
link description	66	849	39.97%	15.24%
duplicate IDs	26	26	1.22%	0.47%
Other A errors		156	7.34%	2.80%
<b>Total A</b>	<b>83</b>	<b>2124</b>	<b>100%</b>	<b>38.12%</b>
distinguishable	63	2473	71.72%	44.38%
headings	45	975	28.28%	17.50%
other AA errors		1805	52.35%	32.39%
<b>Total AA</b>	<b>70</b>	<b>3448</b>	<b>100%</b>	<b>61.88%</b>
<b>TOTAL</b>		<b>5572</b>		

Lack of link description was detected in 82 websites, and lack of a text alternative for an image was detected in 66 websites. Together, these two level A violations account for 32.45% of the total number of errors. Distinguishable content (contrast, resize text) errors were found in 63 websites and accounted for 44.38% of the total number of errors.

#### Comparison of results

There are many significant differences in the number of errors detected by each tool. First of all, Total Validator detected 5902 violations of the level A compliance, much more than Wave (2804) and AChecker (2124). Conversely, the number of level AA violations is much smaller. The main difference lies in the errors related to the use of headings, which are considered level A errors by Total Validator.

Other differences are related to the different techniques used by each tool to check the success criteria. As can be seen in the three previous tables, Total Validator detected a similar number of lack of text alternatives and wrong headings nesting (although on different compliance levels). On the other hand, Wave detected many more issues related to making the content distinguishable.

#### Comparison with previous data

First, a comparison with the number of WCAG2 errors detected by the Total Validator tool in 2019 is presented in Table 5. Only the results of the first 100 websites from 2019 have been considered. Web accessibility is better in 2025, as regards both conformance levels.

Table 6. Comparison by the number of errors (N=100)

Accessibility principle	2019		2025	
	A	AA	A	AA
1. Perceivable	3823	1230	2319	254
2. Operable	2136	69	1982	301
3. Understandable	53		72	
4. Robust	390		1529	
<b>Total</b>	<b>6402</b>	<b>1299</b>	<b>5902</b>	<b>555</b>

Then, a comparison with the data from 2015 (N=60) and 2019 (N=186) is presented in Table 7. Since the sample size is different, the percentage of websites in a given range of errors has been computed.

Table 7. Comparison by range of level A errors (%)

Err. range	2015	2019	2025
none	0	0	6.00
1-10	13.33	13.44	11.00
11-20	8.33	21.51	16.00
21-50	31.67	32.26	46.00
51-100	28.33	20.43	11.00
Over 100	18.33	12.37	10.00
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

As can be noticed, there are a few improvements in 2025 since the percentage of websites having up to 20 errors and over 50 errors is lower than in 2019.

#### Discussion

Overall, this study confirms the low accessibility of municipal websites. There has been little progress in the last decade. The most frequent accessibility errors are the lack of a text description for a link, the lack of a text alternative for non-text content, low distinguishability of text, the lack of labels for controls, and improper ordering of headings.

Although web accessibility mainly targets users with visual impairment, many accessibility issues are also usability issues that affect all users. An alternative text for an image that a sighted user sees on mouse over is a good practice, letting them know, for example, which building is in a photo. Also, adding a meaningful text description to a link helps navigation. Indistinguishable content due to a low contrast or small font size is also affecting older users [10].

As mentioned in the literature, several factors contribute to a low level of accessibility that are related to the lack of regulations, limited budget, and the quality management at both the municipality and the developer's level [15, 19].

As regards the accessibility checking tools, the large differences between results confirm that relying on only one tool is not enough, as shown in other studies [8, 14].

This study has the inherent limitations of the automated accessibility checking [18], although this is a reasonable approach for a large-scale evaluation. The second limitation is that only the homepage has been checked for conformance with WCAG 2. A third limitation lies in the sample size, which does not include all the municipal websites.

## CONCLUSION AND FUTURE WORK

As regards the current status, the accessibility of municipal websites is still low, with many errors that violate the WCAG2 guidelines. As regards the evolution in time, there has been little progress since 2019. Without a clear accessibility policy on web services procurement at the national and local government levels, the situation will not change, and meeting the demands of the European Accessibility Act is quite problematic.

This study highlighted several aspects that should be considered in future work. One is the fact that the home page does not always reflect the conformance level of a website, which suggests finding a second webpage that is relevant for comparison. The second is the comparison of results obtained with each tool, which suggests using at least two accessibility checkers and enlarging the sample by including the websites of small municipalities.

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