

Bringing Accessibility into the Multilingual Web Production Chain

Perceptions from the Localization Industry

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Abstract. By ultimately offering a native language web experience to end users, the localization process – understood as the adaptation of an existing website from a linguistic, cultural and technical perspective to render it multilingual, unavoidably contributes to the Web for All paradigm. However, to date, there has been little discussion about how and to what extent the localization industry is adhering to web accessibility (WA) best practices as part of their regular workflows to fully pursue that goal. This paper gives an account of the latter by reporting on the qualitative data gathered from a series of semi-structured interviews with 15 representatives of six different world-renowned language service providers (LSPs). Findings reveal that, while LSPs deal with web content and technology on a daily basis and now offer a broad spectrum of web-related services, including Digital Marketing and User Experience Design, conforming to WA requirements is not critical yet for the localization industry. We therefore explore why localization companies do not see themselves as key stakeholders in the value chain for web accessibility and we review which would be the main drivers for them to consider compliance with WA guidelines in the future.

Keywords: Web accessibility · Multilingual web · Web localization · Accountability for accessibility

1 Introduction

Over the last decades, technological advancements have not only driven an unprecedented growth in Information and Communication Technology (ICT) access, but also enabled a higher representation of languages and cultures on the Web. The emergence of localization in the 1980s as the practice of “combining language and technology to produce a product that can cross cultural and language barriers” [11] marked the beginning of a market-led international expansion of multilingual digital products. Nowadays, if you are a global business or want to go global, you need locally

consumable web content. The 2015 State of Web Localization Survey [18], conducted by one of the world leaders in the provision of localization services, revealed that 93% of more than 200 global companies surveyed translate product and services-related web pages, and that almost 40% of those enterprises need content localized weekly. The popular notion of English as the main language of business is being dismantled as studies confirm that users are more inclined to purchase products online when related information is presented in their own language, and when they know that native language support will be provided after buying [6].

Yet, for multilingual web content to promote economic and social prosperity, its access by everyone, irrespective of the person's (dis)abilities, needs to be guaranteed. The language industry, which encompasses, among other services, translation, and software and website localization, has registered the highest growth rate of all European industries in Europe in 2015, resulting in an approximate value of 20 billion € within the European Member States only [7]. We argue that, given this increasingly influencer role as specialized web content providers, professionals from the localization industry in particular should at least be familiar with general web accessibility (WA) requirements – such as those specified in the W3C Web Content Accessibility Guidelines (WCAG) 2.0 [4], in order to reach the widest possible range of users.¹ In the same vein, we contend that, in an ideal scenario, accessibility considerations should be built into the everyday practices across the full web product life-cycle [5], from conception and development, to delivery, maintenance and ultimately localization, during which content is linguistically, culturally and technically adapted to be received without any difficulty by a new target audience, whose members will most certainly include people with disabilities (PwDs).

Grounded on the above-mentioned premises, this paper seeks to shed light for the first time on the attitudes and actions of leading international companies from the localization industry regarding the implementation of WA best practices during the multilingual web production chain. By considering localization professionals as stakeholders of the web development cycle, our investigation brings a new perspective to the broader discussion initiated in the literature about who should be held accountable for creating and advocating for an accessible Web. The following section (Sect. 2) examines related work on the matter and reviews the research efforts devoted so far to support higher awareness of accessibility issues among key agents involved in the creation of multilingual websites. Section 3 describes the methodological approach adopted in our study, conducted in the form of a survey with interviews as the main data generation method. Sections 4 and 5 present and discuss our main findings, while the concluding remarks are covered in Sect. 6.

¹ Content providers' accountability for WA is being increasingly acknowledged by the international accessibility community. The new W3C WCAG Working Group's Silver Task Force is planning a major update of WCAG. In a call for stakeholders for the future version of these guidelines sent last 17th January 2017 to WebAIM's mailing list, the task force was particularly looking for more representation from QA specialists, content providers and project managers, among others. http://webaim.org/discussion/mail_thread?thread=7907 Last access: 1st February 2017.

2 Background and Motivation

2.1 Accessibility of the Multilingual Web

Up to now, investigating the implementation of accessibility in multilingual websites and its evaluation has not received too much attention in the research literature or from international bodies. The W3C, for instance, indicates that when websites have multiple versions that are independent of one another in use (for instance, a website in different languages, with different URLs), each version should be assessed for accessibility independently [32]. It could be thus assumed that in the case of highly localized websites or culturally customized websites [31], the developers of the source web product are not considered necessarily responsible for the accessibility of the target language version or the overall multilingual web product.² Similarly, in the WCAG 2.0 document, one of the few references made to accessibility conformance in a multilingual web context is the possibility of acknowledging that a website or page is only partially compliant with the guidelines when content in only one of the languages available has been checked [4]. Other than that, and apart from the work done by the W3C Internationalization (I18n)³ Activity groups to foster the Design for All principle, no official W3C document or working group explicitly addresses, to the best of our knowledge, how or by whom accessibility should be assured in multilingual websites.

Aside from these theoretical insights, only a small number of studies have provided empirical evidence about accessibility challenges that may be directly associated with the multilingual Web or how typical tasks conducted by localization professionals may have an impact on the overall accessibility level reached in the multilingual web content they produce. An exploratory study revealed that the major multilingual browsing difficulties encountered by screen reader users were related to problematic language selectors featuring flag images and the existence of untranslated content, both of which could have been easily solved during the localization process [26]. More specifically, several studies have demonstrated that the translation of text alternatives for images, critical for ensuring non-visual access to web content, receives scant attention during localization [12, 27] and that, unless they receive training on accessibility or use WA evaluation tools, translators fail to produce appropriate alt texts when these are not provided in the source web document they are dealing with [28, 29]. Interestingly enough, findings from a survey targeting international web accessibility experts suggest that localization professionals are considered to be as responsible as web developers, designers and webmasters for assuring web content accessibility [20], a topic that will be further developed throughout the following sections of this paper.

² For the purposes of this paper, 'target website' is understood as the new web language version (e.g. French) resulting from the localization of the original website (e.g. English), while 'multilingual web product' or 'localized website' refers to a website available in at least two or more languages or 'locales' (i.e. country/region).

³ <https://www.w3.org/International/core/Overview> Last access: 7th February 2017.

2.2 Accountability for Web Accessibility

After so many years since the publication of the first WCAG (version 1.0) back in 1999 [15] and despite multiple measures being taken at a national and international level to pass regulations that demand both public and private sector organizations to render web content accessible, the literature shows that very few websites are fully compliant [13, 14, 19]. In an attempt to understand why this is still the case, numerous studies have documented the practices and perceptions of different web professionals in relation to WA implementation.

Lazar et al. [16] reported on the data collected from 175 webmasters through an international survey aimed at understanding their knowledge of accessibility issues and the reasons for their actions related to WA. Thirty-six per cent (36%, $N = 63$) of the respondents indicated that they were not familiar with W3C accessibility standards, while 47 webmasters (30%) acknowledged that they had never created accessible websites. The Disability Rights Commission (DRC) in the UK conducted interviews with 25 website developers and found that only 9% claimed any sort of accessibility expertise [8]. Petrie et al. [23] carried out interviews with 47 professionals from three key groups of stakeholders in the value chain for WA: website commissioners ($N = 26$), web developers ($N = 7$) and web accessibility experts ($N = 14$). Here, we are interested in the results concerning the first group, as the findings reported from the other two deal with WA assessment issues. From the 26 web commissioners surveyed, only 11.5% spontaneously mentioned disabled and older people as potential audiences for their websites, which means, according to the authors, that accessibility is often omitted from their agenda. Finally, we deem it relevant to mention the results from the survey carried out by Putnam et al. [24], who collected data about how 185 user experience (UX) and human-computer interaction (HCI) professionals considered accessibility and found that 11% ($N = 21$) of the respondents attributed no importance to accessibility issues in their work.

Two major conclusions could be derived from the data collected through these questionnaires and interviews. On one hand, their findings suggest that there is still a widespread lack of awareness about WA-related issues among website commissioners, clients and web professionals. On the other hand, these studies confirm what we have observed in the previous sub-section: that up to now, scarce attention has been paid to accessibility considerations in the context of the multilingual Web. In these surveys, the focus was mostly placed on the early stages of web content development or its later maintenance (by webmasters), but no reference was made to the implementation of accessibility features in a potential localization phase, nor were localization professionals ever considered as stakeholders of the web production cycle.

The study described below is motivated by the lack of common agreement on who the key agents are in the value chain for WA, particularly in the context of the multilingual Web, and by the need to further investigate whether awareness about web accessibility among the web localization community is still low. In addition, it expands on previous work by involving other important actors participating in the multilingual web lifecycle other than translators.

3 Method

The overall goal of our study was to understand whether accessibility-related considerations are being taken into account in typical web localization workflows nowadays. Given the relative novelty of the topic in our field, the study did not set out to gather extensive quantitative data; instead, we were interested in learning about the general sentiment of the localization industry with regard to the implementation of WA best practices. More specifically, through the use of interviews as our main data elicitation instrument (see Sect. 3.1), we aimed at answering the following primary and secondary research questions:

- R1. *Is conformance to WA requirements, as per WCAG 2.0, a standard practice in web localization projects?*
 - If so:
 - R1.1. *Why did localization companies decide to introduce WA best practices in localization projects?*
 - If not:
 - R1.2. *Why are localization companies not considering WA in localization projects?*
 - R1.3. *What would drive localization companies to consider WA in localization projects?*

3.1 Interview Design

In order to allow for a certain degree of flexibility during the data collection process, it was agreed to administer the survey in the form of semi-structured interviews. Questions focusing on web accessibility were only introduced in the second half of the interview, after discussing other topics which, based on our previous knowledge about localization practice, we assumed interviewees would be more comfortable with and were still relevant for the purpose of our research. Concretely, the interview schedule⁴ was determined by three main axes: (i) how are translation and engineering tasks distributed across localization workflows; (ii) the existence of web localization quality assurance (QA) procedures, with a primary focus on end user needs; and (iii) personal perceptions about the implementation of web accessibility best practices during the web localization process. While the two first topics (i, ii) might be referred to when discussing the study findings, this paper places a stronger emphasis on the evidence found related to topic (iii).

3.2 Participants

Recruitment. Our study aimed at surveying world-leading language service providers (LSPs). The rationale behind that decision was that multilingual vendors have large

⁴ The pre-defined set of questions used as primary guidance during the interviews is available for reference at <https://goo.gl/YNySLU> Last access: 7th February 2017.

teams with a wide variety of skills who we assumed would be knowledgeable about the different stages and technologies involved in the localization process.

For the first stage of the recruitment process, we therefore followed a purposive sampling approach, where personal contacts at eight potential participant companies were contacted by e-mail and provided with a brief introduction to our study, including (i) the main objective, (ii) the expected time commitment for participants and (iii) the benefits – both at a company and individual level – of taking part in the study. The only criterion that potential participants should meet was to have extensive experience in dealing with web localization projects. Within the broad spectrum of localization professionals' roles, we were particularly interested in hearing the views of, but not limited to, Chief Technical Officers (CTOs), QA specialists, localization project managers, account managers and localization engineers.

Since we did not want to explicitly alert companies to the fact that our study was focusing on web accessibility in particular, the invitation to participate referred to it as an investigation that sought to understand to what extent the needs of web end users were taken into account in localization workflows and to identify potentials for improvement in this regard. From the eight companies contacted, six replied positively to our call. The second stage of the recruitment process was as follows: based on the information provided, the company representatives suggested a list of employees we could follow up with for the interviews (see Sect. 3.3). The recruitment phase followed then an iterative process per company, where upon completion of interviews, some participants proposed that we contact other colleagues who they believed could provide further insights about the topics covered. We adopted this approach until reaching a saturation point in terms of the data collected and the availability of participants willing to be interviewed, a factor that also added a random element to the final sample [30].

Profile. A total of six companies (AlphaCRC, Lionbridge, SDL, Star, Vistatec and Welocalize) and 15 employees participated in the study. All LSPs gave their consent for their names to be disclosed and linked to the data gathered but one, who requested that anonymity had to be preserved when presenting the findings from that company. Code names will therefore be used (i.e. LSP01, LSP02, LSP03, LSP04, LSP05 and LSP06) when referring to localization companies hereinafter. Note that the numbers do not correspond to the alphabetical order in which they were presented above. Similarly, for the sake of confidentiality, it was agreed that we would not reveal the exact title (as stated during the interviews) held by interviewees at their companies. Instead, we will specify their area of expertise and the level of management of their position.

Table 1 offers an overview of the interviewees' demographic data. Participants (6 female, 9 male) included representatives from seven different nationalities: Ireland (N = 8), France (N = 2), Brazil (N = 1), Germany (N = 1), Italy (N = 1), the Netherlands (N = 1) and Spain (N = 1); and they all had more than five years of experience in the localization industry: >5 <10 years (N = 1), >10 <15 years (N = 5), >15 <20 years (N = 3), >20 years (N = 6). The predominant daily responsibilities of the participants interviewed revolved around four main areas:

- Engineering (N = 3): Localization engineers bridge the gap between translators and developers [10]. Their work involves dealing with the development environment of a product, extracting all the localizable content and analyzing the source files in

Table 1. Interviewee profiles per company

Company	#	Management level ^a	Area	Gender	Experience
LSP01	P01	Top	Technology	Male	>20 years
LSP02	P02	Middle	Technology	Male	>10 <15 ears
LSP03	P03	Top	Management	Male	>20 years
LSP04	P04	Middle	Engineering	Male	>20 years
	P05	Low	Engineering	Male	>10 <15 years
	P06	Middle	Marketing	Male	>10 <15 years
	P07	Middle	Marketing	Male	>20 years
LSP05	P08	Middle	Management	Female	>15 <20 years
	P09	Middle	Technology	Male	>15 <20 years
	P10	Low	Management	Female	>15 <20 years
	P11	Low	Management	Female	>20 years
	P12	Middle	Engineering	Male	>10 <15 years
LSP06	P13	Low	Management	Female	>5 <10 years
	P14	Middle	Marketing	Female	>20 years
	P15	Low	Management	Female	>10 <15 years

^aIn general terms, *Top level* (administrative management) refers to chief executives and managing directors; *Middle level* (executory management) consists of branch managers and departmental managers; *Low level* (supervisory/operative management) covers executives who deal with personal oversight and direction of operative employees [21].

order to take an informed decision regarding the workflow to be adopted. They also offer technical support to the localization team during the translation process and ensure that the product is delivered back to clients as per their requirements.

- Management (N = 6): This category comprises interviewees who have mainly a managerial position; i.e. while they are fully aware of the processes followed and resources used in different localization workflows, they are neither directly involved with content manipulation tasks nor in close contact with clients.
- Marketing (N = 3): Apart from keeping an eye on the recent trends of the marketplace around content globalization and localization, participants who fall under this category are in charge of presenting clients with the company’s service portfolio, attending to their needs and liaising with operational teams.
- Technology (N = 3): This fourth category covers LSP employees who are experts in the technology implemented in localization projects, which can range from Global Management Systems (GMS) and Translation Management Systems (TMS) to Computer Assisted Translation (CAT) tools (Table 1).

3.3 Procedure

Upon agreement to take part in the study, interviewees were sent (i) a plain language statement and (ii) an informed consent form. The documents, approved by our

institution's Research Ethics Committee, informed participants about the study procedure and gave assurances about data confidentiality and anonymity.

The data collection process took place during the last quarter of 2016. While our preference was to conduct face-to-face interviews, 5 out of 15 were carried out online using a web conferencing software program (Adobe Connect) or a voice-over-IP service (Skype) due to schedule incompatibilities or the remote location of the interviewee. Participants who were interviewed in a virtual environment were encouraged to use a video camera to compensate for the limitations of an internet-mediated discussion.

At the beginning of each session, interviewees were asked to state their position at the company and summarize their background and experience in the localization industry. Through the interview, prompts and probes were used when needed to elicit more elaborated responses from the interviewees, and new questions were introduced depending on their expertise on the topic being discussed. Once the interview transcripts were completed, they were sent out for member checking via a secure file sharing service. Interviewees were given a specific timeframe to acknowledge receipt of the document and provide feedback. Additionally, they were informed that, if no response was received within that period of time, we would understand that they fully approved the interview transcription. Six out of the 15 participants validated their transcripts, requesting only minor changes, such as the correction of misheard words or the deletion of orality markers (e.g. "you know", "I mean") for readability purposes.

Participant companies were offered a symbolic financial compensation of 10€ per hour per participant employee, while individual interviewees were presented with an Amazon gift voucher worth 15€. The majority requested that this compensation was donated to a charity of their choice. In addition, at the end of the study, we offered a free one-hour webinar to all participant companies about end user-focused best practices – including WA recommendations – that could be implemented during the web localization process. All participants received the recording of the webinar, including those who could not attend.

3.4 Data Analysis

Thematic analysis was the method chosen to identify, analyze and report patterns within the data collected [3]. This analytical approach, which has been widely used in prior web accessibility-related work [1, 20], consists of six stages: 1. Familiarizing yourself with the data, 2. Generating initial codes, 3. Searching for themes, 4. Reviewing themes, 5. Defining and naming themes and 6. Producing the report [3]. The ultimate goal of this type of analysis is to contextualize and make connections between the themes identified to build a coherent argument supported by data [2]. Phase 1 involved listening to the recorded interviews and rereading the transcripts while writing down potential themes related to our research questions that could be further explored during the actual coding stages. Phases 2–5 were conducted using Nvivo 10 software by QSR with a view to ensuring a high level of consistency and robustness during data coding.

Analysis was a recursive process, during which two main approaches were adopted with regard to the level of themes identified: semantic and latent [3]. First, we followed

a semantic approach, where we were not looking for anything beyond what a participant had said (descriptive content). This was particularly helpful towards finding an answer to our main research question (R1). Second, the thematic analysis moved to a latent level, where we examined the underlying ideas, assumptions, and conceptualizations captured in an attempt to theorize the significance of the patterns found, as well as their implications in relation to prior work [3]. This interpretative phase served to investigate the secondary research questions set forth at the beginning of Sect. 3. For research reliability purposes, a second coder was asked to review a sample of the coded transcripts against the coding scheme defined by the first coder. Although a full second blind coding process would have been desirable, it has been argued that having a small percentage of the data recoded can still provide a good indication of how reliable the coding has been [30]. Given that we adopted a deductive approach, coding for specific research questions and driven by the researchers' theoretical interest in the area, a considerable high level of agreement was reached, with discussions between the two coders leading mainly to the creation of broader sub-themes, as a result of certain categories being merged.

4 Findings

From a general perspective, evidence gathered from the interviews held with different LSP representatives suggests a low level of penetration of web accessibility in the localization industry. Only one of the six participant companies (LSP05) acknowledged having deliberately considered web accessibility in several projects in the past, although this was offered just as an isolated service at their localization testing facilities and not as an integrated solution in regular localization workflows. Given that the practices of LSP05 concerning WA proved to be an exceptional case, we will briefly report on the general findings related to this particular company before presenting the main themes and sub-themes identified overall in relation to our research questions.

While accessibility-related services are now featured within the portfolio of the aforementioned company, employees outside the testing team (N = 4 out of 5) showed a lack of awareness about accessibility issues. When the interviewer brought up the topic, explaining key related concepts and showing examples, participants reacted positively and, although uncertain about the company's offering in that regard, appeared to see a relevant connection between WA and the activities conducted by other teams: *"I think... I must check in the company who is doing this, like... I'm assuming it is done but... yeah, it's very interesting"* (P08); *"I believe it's been done at some point, but no, I haven't come across it myself [...] They [testing lab] really look at the larger things and they would probably be the guys who would do more of the things you're talking about"* (P11).

The head of the testing team pointed out that, indeed, they had been offering WA assessment and implementation since the second half of 2016, but they had not yet defined standard practices: *"We're just in the beginning, so we only have done a few of those and we're still fine tuning our process, and documenting as we go in terms of procedures, so that we can replicate them and further educate the client, and ourselves too"* (P12). In addition, it was noted that, at that point in time, WA advice (mainly

through user testing methods) was just offered as an ad-hoc service, upon client request. *“Only a few clients have approached us yet, and with those clients... we’re helping them. We are a solutions company” (P12)*. According to LSP05’s testimony, the most common scenario was that clients would have created accessible web source products (often the English version) and, once the localization process was completed, they would decide to check the new language versions for accessibility as well: *“But that’s just started, so I think this’ll be just the beginning of helping people in other countries besides English [native speakers] to be able to use those websites” (P12)*.

In the following sub-sections, which cover the themes found in our data set, we will further document the current position of LSP05 with regard to web accessibility in conjunction with the insights gathered from the other five participant companies.

4.1 Knowledge of WA

This theme aimed at capturing all possible indicators of (conscious and unconscious) knowledge of web accessibility, including reference to end users, preferred techniques, standards, legislation or related technology for content authoring, access or evaluation.

General Awareness about WA. As mentioned earlier, we observed a generally low level of awareness about WA issues among interviewees. Nine out of 15 participants explicitly acknowledged that they had not previously heard about accessibility best practices or the existence of WCAG 2.0. Except for participant P12 from LSP05, most of the other interviewees showed a superficial understanding of the subject. For instance, with reference to WCAG 2.0, participant P01 (LSP01) said: *“I’m not going to tell you what the details are or anything, but I know they exist alright.”* The case of LSP04 was particularly noteworthy. Whereas, contrary to LSP05, the former is not currently offering WA-related services, two of the interviewees seemed more confident than other participants regarding their knowledge of WA. For example, when talking about WA best practices in general, participant P04 said: *“Yeah, all tags and all that kind of stuff, we know all that”*, while P05 added: *“I’m well aware of it, because I did a graphics and web design course last year, so I know it’s there.”* Yet, they were not familiar with the web accessibility principles and guidelines per se, as defined by the W3C.

No mention of accessibility-related laws or regulations was made by any interviewee, except for a vague reference by P05: *“I’m not too sure, but I think in America... I don’t if it’s the law or something, but you must design things based on special guidelines.”* Similarly, few references were made to user agents (or their main functionalities) used by people with disabilities, apart from text-only browsers and screen readers. Interestingly enough, PwDs were spontaneously brought up by different participants only when referring to digital marketing and responsive design techniques. For instance, P07 argued: *“So for the visually impaired, it’s very easy to go onto a website here [pointing at smartphone] and to increase the size if that page is responsive enough, and you’ve actually set it correctly and programmed it correctly.”* Finally, there were a few spontaneous references to WA best practices, including the use of simple language, audio description and audio CAPTCHAs. Paradoxically, translation as a form of accessibility in itself was only suggested by one participant (P03).

Awareness about Concrete WA Examples. Taking into account the results of previous studies in localization and WA (see Sect. 2.1), we often referred to the use of alt texts (WCAG 2.0, SC 1.1.1) as an example of a WA recommended technique. It was also assumed that, being one of the basic WA guidelines, interviewees would easily understand it. Only four out of 15 participants explicitly acknowledged knowing the purpose of text alternatives in the context of accessibility. In the same vein, less than half of the interviewees were absolutely sure that alt texts were regularly translated in localization projects. When being prompted with the scenario of a source alt text being inappropriate (e.g. `alt="image1.gif"`), three companies suggested that they would flag those to the client. However, in the hypothetical case of an image not having an alt text in the source, two companies argued that they would not take any action. For instance, participant P14 (LSP06) said: *"We don't add on the source. We... as I said we mirror it, we replicate it. So if there's no alt text in the source, we not... we... nobody's going to think to say "hang on, there's no alt text here, we should have one in the translation". It's not really part of our service, if you see what I mean. It could be, but it would be too anecdotal."* When the example of having unmeaningful link titles was brought to the discussion (WCAG 2.0, SC 2.4.4), similar reactions were observed, although awareness about this bad practice being related to accessibility was even lower.

Awareness about WA as a Service. The pattern observed in LSP05 with regard to the uncertainty of employees as to whether WA had been considered in previous localization projects or offered as an additional service was maintained across the other five companies. For instance, P02 (LSP02) said: *"Let me ask about that... Especially in the special needs area because that's one thing I would be interested in finding out, what kind of work we've done in that space, you know"*. One interviewee (P04) from LSP04 suggested that, even if they were not doing it at present, they would have the resources to do it: *"Oh yes, oh no, we're very aware! You know, we can spot this stuff, we tell you this is, you know, best practice."* Curiously enough, two companies seemed to be devoting efforts to have accessibility compliant websites themselves.

Blurred Boundaries in Relation to WA Best Practices. When accessibility was introduced into the conversation, four companies (LSP03–LSP06) repeatedly made reference to the overlap between or similarity of the WA best practices being discussed and other technical recommendations for the Web that they had implemented in previous projects. These were particularly focusing on digital marketing and user experience design techniques. Supporting findability of web content appears to be a key trend in the localization industry, which is paying growing attention to SEO. In fact, all four companies agreed that the main reason for looking at, for example, the quality of alt texts, was for SEO purposes. The following excerpt serves to illustrate this observation: *"Because if you tripped and fell over SEO, the first thing they'll tell you is alt tags. [...] And a lot of those features [page title, headings, alt texts] are engrained in accessibility. So, from that service side of things, we wouldn't consider it accessibility, we'd consider it searchability and indexibility" (P06)*. Web visual design was also considered a relevant topic to be discussed with localization clients and believed to share interests with accessibility. In this context, participant P04 mentioned: *"You know, for example, if the text has too lower contrast, you know... it's real marketing."*

Responsiveness was another recurrent subject when sharing perceptions around WA best practices. Finally, some participants believed that there was a relationship between accessibility issues being solved now thanks to the importance attributed to page load speed: *“Sliders, yeah. That is a classic example; they were all the rage for about two years, the slider bars and then gone! Get rid of them! Because they take a few extra seconds. Because of Google again. Google is ranking you by speed”* (P03).

4.2 Accountability for Multilingual Web Accessibility (MWA)

The rule-for-inclusion for this theme was covering any potential references made by localization industry representatives, either explicitly or implicitly, to their role (or that of others) in the achievement of an accessible multilingual Web.

Accountability for Accessibility in Past Projects. As indicated earlier, when participants were asked whether accessibility had been taken into account in any of their localization projects, the majority of responses were in line with that of participant P01: *“I don’t think we’ve ever taken that conscious decision.”* Throughout the course of the interview, different arguments, not necessarily mutually exclusive, were provided to justify that lack of action.

Client-Related Reasons. Almost all interviewees (N = 14 out of 15) highlighted that interest for accessibility needed to stem from the client in one way or another. Their technical maturity, both in terms of accessibility and localization awareness, was considered determinant: *“You know, if it’s badly done, OK, somebody maybe will highlight that, I don’t know, possibly, but if they’re not on board with changing it at source, there isn’t a whole lot we can do”* (P09). Similarly, some agreed that WA was not on their agenda simply because the client did not ask for it. Participant P06 argued that customers still see the localization industry from a traditional point of view, where the main focus is on translation, and therefore they would not think that LSPs can offer that type of service. Those interviewees who demonstrated awareness about the topic felt powerless, as they believed that ultimately WA implementation had to be a client-driven decision: *“Because for us, you see, the hard part for us is that we can’t.... we are aware of this space, right? but we cannot apply something to the customers [...] It’s not our call”* (P03). The concept of responsibility also emerged, grounded in the fact that accessibility is something that needs to be first considered in the source. Some indicated that a client’s accountability was also linked to technology-related decisions. Participant P07, for instance, pointed out: *“They should configure a CMS to be able to satisfy the requirements of the visually, aurally impaired, or people who can’t speak, so the technology can adapt and work towards them.”*

Vendor-Founded Reasons. However, numerous limitations were also put forward from the LSP side, showing – at least implicitly – a certain level of self-perceived accountability. Up to eight participants from four companies mentioned fidelity to the source as their main argument for not implementing WA best practices in localization. For instance: *“Because in the end, all we do when we localize, is to respect the same pattern as the source”* (P14). Yet, interviewees did not show any signs of awareness

regarding the level of accessibility achieved in the source websites they work with. Also, this contrasts with the above-mentioned importance increasingly paid to SEO and other practices that were not traditionally part of the localization process. Apart from a few mentions of budget and time constraints as impediments to WA implementation, other sub-themes found in relation to the localization professionals' role as potential accessibility stakeholders were the following: on one hand, it was interesting to observe that there were contrasted opinions with regard to the market size represented by PwDs. While four participants believed that, given that they were a small market, WA was not an urgent need; for instance *"We don't have optimization techniques for websites that are designed for the visually impaired because they're quite the edge case"* (P11), others showed interest in reaching that community: *"But if we have discussions with the sales people, with the client, and the client is actually in the need of these, which most people should be, right? It's a big part of the community"* (P12). On the other hand, some interviewees attributed a higher importance to customer satisfaction than to the needs of the widest possible range of users. For instance, participant P04 argued: *"The absolute bottom line is: you give me an XML, I give you back an XML, you know? If I can get SEO into it, great, you know? But working for, you know, in an accessibility kind of way, couldn't care less. Happy customer, a customer's got back his French file, we're done, you know?"* (P04).

Reliance on Other Factors Positively Influencing WA. Another interesting pattern observed was the overreliance and trust placed on certain components of web localization workflows with regard to the achievement of accessible websites. Eight interviewees stated that they trusted technology in that regard, arguing that it prevents them from making errors that can lead to accessibility barriers (e.g. extraction of alt texts for translation) or that good authoring tools owned by clients support accessibility. Additionally, with regard to accessibility concerns involving textual content, half of the interviewees were confident that translators would be familiar with them. For instance, some suggested that they would flag problematic content, such as inappropriate alt texts or unmeaningful links or page titles. Finally, three companies manifested their conviction that clients most probably were taking accessibility considerations into account and that, if so, those best practices would be transferred automatically during localization. In this regard, participant P04 added: *"I would have thought that if the rules had been followed in the English, and we do our job on the linguistic side and on the functional side, then the accessibility rules, in theory, will have been followed as well."*

Perceived Responsibility for MWA in Particular. When asked directly about who should be held accountable for making multilingual websites accessible, all LSPs agreed that they could not be ultimately responsible for it, given that the product was owned by a client. Those offering integrated web solutions, from content authoring to localization, like LSP05, argued that their position would be different if they were in charge of the development process as well: *"Now, if it's a case that you're building a language website from scratch, like if they came to us for that kind of service, which is development, that's a different story"* (P09). At the same time, there was a general agreement among the six participant companies with regard to their role as service providers. All fifteen interviewees suggested that they should be able to discuss accessibility considerations with the client and offer advice in that regard, especially upon their first contact

with the company. For example, participant P13 said: *“It is important to have this kind of sensibility, because it means in the moment that they ask for this service, or at least they are aware of [it], it is important to be able to provide it.”*

Personal Attitudes towards WA. For at least 10 interviewees, web accessibility was a completely new topic. In general, the subject was positively received by everyone, with many participants considering it an interesting matter: *“it’s a fascinating area, actually”* (P02); *“I think there are things we can learn from it”* (P11). In many cases, discussions served to boost curiosity and expand awareness within the company and prospective clients; for instance, participant P14 stated: *“Now I’m going to look up what these rules are, for accessibility, and share that with our sales people and say “look, this is another conversation that we can have about website localization with our clients.”* Five participants were more doubtful about the real importance of accessibility nowadays, especially due to technological advances and recent digital trends – *“OK, accessibility isn’t going away, but people are more interested in it because of the other features of it. And that’s general user experience, general searchability, indexability”* (P06) – or disliked the idea of giving a special treatment to PwDs: *“I am a believer that if you do it well, I should not have an accessibility... there is no special, I don’t do anything special for anybody”* (P03).

4.3 Perspectives on WA Conformance in Localization

Under this third core theme, we sought to document the perceptions of the localization industry in relation to the future introduction of WA considerations in localization workflows as standard practice. Three main sub-themes were identified: (i) their potential motivations to do it, (ii) the obstacles they foresee and (iii) what would help them in that endeavor.

Drivers. All six companies agreed that web accessibility implementation and assessment practices could be established as another service offered by the localization industry. The main driver for them would simply be clients asking for it. Additionally, representatives from the six LSPs argued that they would care more about WA compliance if this would prove to be of added value for clients; for instance, positively affecting their image in terms of marketing or leading to increased sales. Eight employees from three different companies suggested that one of their main motivations for introducing WA in their workflows would be the related financial benefits. For example, participant P07 indicated: *“You can turn it into a driver of your clients who are willing to spend cash, because at the end of the day it’s all about the money, let’s be honest, business is business.”* Similarly, participant P09 added: *“I think if it was a... as a company, I think if it was a service, that we’re going to make money out of it, I think definitely, we’d probably invest a lot more into that.”* We also observed that most LSPs believed that a higher ROI would be the main motivation for clients as well: *“I guarantee you, if you were to do these five tricks, your click through’s etc. you know? That’s a sound bite that’s worth something to [LSP04] because it’s worth something to the customer; because the customer is thinking ‘I do this, I got ROI.’ It’s all about returning investment.”*

Five participants thought that it would be reasonable to promote accessibility compliance among clients whose customers include mainly people with special needs. For instance, participant P07 said: *"So we can inform that customer, 'hey Mr. Customer your business needs need to change. Because 60% are on mobile, as an example, and of that 40% of those are visually impaired or need to have text to speech capabilities or whatever,' see? "* Interestingly enough, four interviewees considered that positive societal impact would not be enough: *"So even though this can be considered a topic for the greater good, [laughter], in reality it is already a very competitive industry, the localization industry. So it's going to be tricky to do this without any form of financial gain"* (P15). In the same vein, two LSPs argued that another driver would be differentiation in order to get competitive advantage. The following three additional motivations were also highlighted during the interviews: personal needs due to ageing (N = 3), the existence of good technology support during implementation (N = 3) and if the law requests it (N = 1).

Constraints. Some participants spontaneously mentioned a number of factors that could prevent them from establishing conformance to accessibility requirements as a standard practice in the industry. Four interviewees pointed to potential restrictions due to clients' budgets: *"Like, we make recommendations, but it depends on their budgets and how they are willing to this"* (P10). Similarly, clients' maturity was suggested as a potential obstacle. In this sense, participant P12 argued: *"Not every client is ready for this, and like I said, then there is maturity... Clients are going through a journey and first they need basics and then the next time they need something else. Throughout that journey, they mature to maybe something like this."* Also, three participants highlighted that reaching accessibility in the localized website would be very challenging if the source was not accessible, at least at the minimum level, and that providing further accessibility support only in the target website would cause roadblocks in the localization workflow. Technology dependency was referred to by two interviewees. One of them said: *"The CMS that they [the clients]'re using, the templates that they're using within the CMS, the way... those are the things that drive the content that you're going to produce"* (P10). Other obstacles mentioned were lack of managerial support (N = 1) and time constraints (N = 1).

Needs. Technology support was considered key to facilitate better accessibility-related services by five out of the six LSPs. The following comment from participant P04 serves to illustrate this point: *"If you could come up with a button to press and it goes 'oh, disaster, you know, this is really, really bad,' then I'd take that to the customer."* Three interviewees mentioned the need for a higher level of awareness across the different agents involved in a localization project. For instance, P07 suggested: *"I would say that we should have a bit of inputting towards it, to make sure that the customer is taking full advantage of all the opportunities they have in whatever product they're creating, be it web, be it anything else, right? To do that, you would need to educate the sales teams, initially, to make sure that customer is targeting the right audience"*. Other desired help included getting more facts and figures about PwDs (N = 3) and having a dedicated team specialized in accessibility (N = 1).

5 Discussion

The data collected throughout the interview confirmed that the localization industry has expanded its service coverage beyond mere translation to satisfy new digital market needs, offering now from full content authoring, to multilingual copywriting and SEO, to CMS customization and web management. Some of the LSPs interviewed even acknowledged that around 80% of the content they were localizing nowadays was ultimately published on the Web. Still, just one of the participant companies (LSP05) proved to have considered accessibility in past projects, yet only upon client request. This finding suggests that conformance to WA requirements is not yet a standard practice in web localization projects, thus providing a negative answer to our main research question. While representatives from another two companies showed some understanding of accessibility issues, our study reveals that awareness is still low within the localization community, as was the case more than ten years ago [22].

5.1 Current Scenario Regarding WA Compliance in the Localization Industry

With regard to research question R1.2, the results presented in the previous section indicate that the position of localization companies in relation to the implementation of WA best practices is influenced by three main factors: technology, client dependency and the evolving nature of the industry itself.

Influence of Technology. A recurrent aspect mentioned throughout all interviews was the considerable impact of technology on both accessibility and localization. Regarding the former, the idea of “accessibility as a side effect”, already described in prior work [25], was referred to by many participants, who were convinced that the evolution of web technology, authoring tools and user agents have had a positive impact on accessibility. Some companies indicated that their recent interest in SEO could be having a similar effect. Conversely, we observed that the increased attention paid to this and other aspects of digital marketing and user experience design, such as findability and responsiveness, was sometimes leading to undesired bad practices in terms of accessibility (e.g. using alt text only for searchability purposes). We believe that this is probably rooted in their lack of advanced knowledge about WA and that it could be solved by providing appropriate training. In addition, LSPs seem to strongly rely on authoring and localization tools when it comes to accessibility support. However, in relation to text content extraction, prior studies have concluded that good results should not be taken for granted, particularly in the case of alt texts [26, 27]. While technology helps with accessibility, awareness about the needs of end users and the technical requirements needed to meet them is crucial.

Strong Client Dependency. Although accessibility has been widely accepted as an interesting and necessary practice, client-related roadblocks were continuously mentioned by all six companies. This is in line with findings from previous studies with other web professionals, where lack of client support was one of the main obstacles to accessibility conformance [16, 24]. More concretely, localization industry

representatives agreed that multilingual web accessibility was ultimately the client's responsibility. In the same vein, a common concern among participants was the fact that localization practitioners are strongly dependent on the quality of the source content they have been asked to localize, as well as on the technology used by the client (CMS, specific style templates) to deploy the final product. Similarly, it has been pointed out that, as partners and advisors, LSPs could offer better support in terms of accessibility, although awareness should be spread across all teams participating in the localization process.

Ever-Changing LSP Identity. The limitations highlighted above in terms of fidelity to the source and restricted content ownership represent one of the traditional challenges that the localization industry has experienced since its inception. Nonetheless, recent trends with regard to the wider range of web-related services offered seem to have provided the industry with a higher level of empowerment to effect change. In this sense, it is worth noting that we often observed opposing stances within the course of the interviews. At the beginning, most LSPs insisted on their role as a "one-stop shop" for the client in terms of web services, where it was possible to request anything from content authoring to full multilingual website deployment. However, it was surprising to see that, as the discussion moved into accessibility matters, confidence decreased and a more traditional position in relation to localization services (i.e. stronger focus on linguistic and cultural aspects) was adopted. This is probably due to the fact that the industry is still in the process of positioning itself as a full solution web service provider. Similarly, it could be motivated by the lack of WA awareness and thus fear of rejection or self-exposure. In any case, we believe that, if localization companies are to consolidate their current service offering, their maturity on WA matters should be higher.

5.2 On the Future of WA Compliance in the Localization Industry

The answer to our last research question (R1.3) was presented in Sect. 4.3. The study showed that, for LSPs to introduce accessibility in their service portfolio, they insist that there should be a business case for it and that it should bring added value for both clients and the LSPs themselves. The financial aspect, together with a desire for differentiation, was a strong motivation, suggesting that web accessibility penetration into industrial settings is still an important challenge. This finding contrasts with the results presented in Yesilada et al. [33], where designing better products, inclusion and social issues were the main drivers for the HCI community. We hypothesize that this could be due to the fact that price pressure and competition are prevailing trends in the language industry [17].

6 Concluding Remarks

Contrary to considering it as a merely business-driven activity to reach international markets, as was the case when it emerged in the 1980s [9], we see localization as a process where the context of reception and the end user play a critical role. We believe that difficulties encountered by users when browsing a localized web product can be

associated not only with problems in terms of linguistic and cultural adequacy, but also with functionality-related obstacles that the commissioner of the task failed to identify in the source and/or that the localization team could not amend in the final target or multilingual product, such as those caused by accessibility barriers.

The study presented in this paper has brought localization professionals to the forefront of the discussions about the stakeholders in the value chain for accessibility. We have shown that, although WA is not part of their main agenda, LSPs have the potential in terms of human and technical resources to act as key drivers of change in the MWA context. In addition, the study contributed to increasing awareness about accessibility among the localization community.

The generalizability of the results presented in this paper is limited by the number of participants who took part in the study (companies and employees). Similarly, the adoption of a mixed methods approach, such as combining the interview data with observations in the workplace, would have reinforced the overall validity of our findings. Notwithstanding these limitations, we are confident to have offered relevant insights into the current perceptions of the localization industry in relation to web accessibility, which can serve to inform future research work.

As a first step in that direction, a more fine-grained analysis of the data collected could be carried out in order to (i) observe whether any discrepancies emerge when comparing data from interviewees with different backgrounds, and (ii) provide a thorough account of the particularities of current localization workflows. It is equally worth noting that four additional interviews were held with representatives of one of the clients of LSP06. We plan to contrast the data from both parties to investigate whether each other's expectations in terms of accessibility accountability are being met. In the long term, we expect that the identification of accessibility flaws within the localization workflows analyzed will ultimately lead to scientific evidence-driven recommendations for localization practitioners on how to integrate the implementation of accessibility standards in the production of multilingual web content in a seamless way.

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