



WEB ACCESSIBILITY

An analysis of knowledge and usage of web accessibility guidelines, among
web agencies and clients



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Abstract

Our world is more digital, and computer based than ever, from early childhood, through educations, work and in everyday life. This change affects almost everything we do but are the awareness and development of web accessibility making the same change?

There has been awareness raised in the public sector, EU has created a Web Accessibility Act that is required by law to follow. But is it really making any difference outside of the targeted sector? This study investigates the awareness, understanding and opinions among developers, companies who create the products and the clients who order the products.

The purpose of this thesis is to investigate the subject of Web Accessibility, how companies' reason about the subject.

To make an analysis of the topic of web accessibility, knowledge, usage and responsibility I reached out to both companies who develop the products and the clients who use them. The research was made with in person interviews, phone interviews and online surveys. I found it important to keep the questions neutral and let the people make their own points and experiences heard. The result became to be based only from the side of developers, web agencies. The reason of this was the lack of client/users' responses or opinion that they didn't have anything to contribute to the subject. This was a surprising but interesting outcome. The overall attitude about the topic was that the subject is important, but most are very unexperienced or even don't know any details what requirements Sweden has in the public sector or how to work with it. The question of who is responsible to make the products accessible varied a lot, but most come to the same conclusion that it is always the end client who decides if they want to pay for it or not. To reach an accessible environment we need to make sure that the information and understanding raises from both ways, for the developers to see the point of implementing it, and for the clients to see the benefits it can give their employees or customers.

Keywords

Web accessibility, Inclusive practice, WCAG, Developer, Web Agency,

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1. Abbreviations

WCAG	Web Content Accessibility Guidelines
WAI	Web Accessibility Initiative
WAD	Web Accessibility Directives
CSR	Corporate Social Responsibility
EDF	European Disability Forum
EAA	European Accessibility Act
CRPD	(UN) Convention on the Rights of Persons with Disabilities

2. Introduction

2.1 Background

Our world becomes more and more digitalized, from early childhood, thru educations, work and in everyday life. For most of us this is a matter of course, we browse the web and go to work and use the information systems without reflecting over the small details. How is this for the people who have a need for better accessibility? There is over one billion people with disabilities in the world, this degree project will be focus on accessibility in Sweden. Since January 1st, 2009 Sweden has a discrimination act that also includes some parts of digital usage. This is focused towards content used in education and work life, not systems and applications outside of that area.

The access to information, the web included is defined as a human right by the UN Convention on the Rights of persons with disabilities (CRPD, Article 9). In line with this, in 2019 the new European web accessibility directives became a law requirement in all European Union countries. And the Swedish government made the requirements include Authorities, municipalities, country councils and with some exceptions also other actors classified as public law bodies. Also, some private actors who perform public finance services. All of them needs to follow the WCAG (W3C, 2020) This became a pretty big change for the affected departments in many areas, since many didn't have any knowledge of what was included in the directive and how to implement this in their applications and systems. In the time of writing the law requirement has been ongoing for a while and most affected areas are at least somewhat familiar with the topic and changes are made or in process.

Since the WAD only focused on public sector it didn't affect the private sector, and the accessibility is limited to certain areas.

These new law requirements show that the subject is topical and is facing changes, but how outreached is the knowledge and is it implemented even when it doesn't have to be. The features available today is not enough, and many people are struggling when the access to the digital world is limited.

According to FunkaPortalen (2020) about 1.5 million people or more than a fifth of the Swedish population in the age 16 – 84, has some sort of disability. The statistic in this subject is limited because the research been made is usually focused towards certain areas of disabilities and no real strategy to collect data has been made. It doesn't either include people with temporary disabilities. Anyhow these numbers show that it is a large group who are affected in different ways when it comes to usage of the web. Since our digital usage only grows bigger it is important to ask why don't we make the knowledge and usage of web content accessibility guidelines an obvious part of our digital systems and applications.

2.2 Purpose

The purpose was to make an analysis if the inclusive practice is keeping up with the growth of our usage of digital applications, systems and technology in everyday life.

With the directives that was put into action in 2019 in mind, I wanted to see if the directives had made any differences in how people think and act around the topic. To investigate how far the information has spread and if it has created an interest to grow knowledge and develop products even when it is not a demand.

Are web agencies and clients focused on the private sector even aware that the directives and guidelines exists and what other reasons there could be for not implementing accessibility.

I also wanted to raise awareness both what accessibilities means, what categories that are included in the subject. And awareness on the topic that might not normally be discussed anywhere along the production line.

It is a complex topic when it is the private sector, where the web agencies need to stay in front to sell their products and services. And where the client's knowledge might be limited to what can be created. With time and money in mind, where and who is responsible to make the digital world accessible. It was interesting to research and see what the main viewpoint in this business was.

2.3 Problems

The research main questions are:

1. How aware about WCAG is the web agencies that work towards the private sector, are they following the guidelines as well?
2. What would be the reason that they don't implement accessibility to their product, the main challenge?
3. What are the opinions about who has the responsibility in bringing up the topic and to implement accessibility in the systems/applications?

2.4 Limitations

The focus has been on different companies, both in number of employees, and in their focus category. The importance was that they had their main category of clients in the private sector. No companies who only works in the public sector was contacted. It is only companies who has offices and are active in Sweden that has been contacted, and even if WCAG is international the focus has been towards the EU and Swedish law requirements, how they follow in the time of writing. The questions have not included any directions towards how things can be done, since that is already a well-studied topic with many sources for information. Only time that topic is discussed is in the conversation of what requirements are included in the directives and if the interviewed company has done anything specific already.

The interviews in person is only made locally in the area of Hässleholm, Scania. This was a choice based upon short time to write this degree project and to still be able to get a booked meeting with short notice. It is also limited to the subject of computer-based products and applications. What type of devices that can be used by people with accessibility needs is not

included in the study, it is limited to be mentioned in some interviews with the conclusion that the devices are the users own decision if and what they need to use or not. The focus is towards the code that makes the site accessible according to Web Content Accessibility Guidelines.

3. Theoretical background

3.1 Definition of disabilities

The Swedish government is at the time of writing doing an investigation (Regeringen, pressmeddelande, 2019) to find a better way to research statistics over people with disabilities. In this investigation it is also included to develop indicators that may form the definition of disability. The reason for this is that currently there is no official criteria for determining who is included in the category of people with disabilities.

On WHO's website they have the definition for disabilities "Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations." (WHO, 2017)

And they also highlight the fact that disabilities are more than just something that is caused by problems with body and health. "Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives. Overcoming the difficulties faced by people with disabilities requires interventions to remove environmental and social barriers." (WHO,2017)

Some examples from the site of Swedish Digital administration, where conditions needing accessibility doesn't depend on persons own disability. "

- Time pressure, irritation, threats, conflicts and other stress can cause significant difficulties when using digital systems.
- Those who are in motion in a vehicle or who carry thick mittens due to cold often have in practice a limited motor precision.
- Those who have children in their arms or running around them may have both limited motor skills and the ability to hear and to focus.
- Those who have another mother tongue sometimes have the same texting needs as a person with, for example, hearing impairment, like the one whose speakers do not work.
- Relatives and other assistants to persons with disabilities are also indirectly affected by lack of accessibility. "(DIGG, 2020)

This could be an indicator of the width of people that in some ways are affected if the Web Accessibility guidelines are implemented in an information system or application or not.

3.2 What is Web Usability?

Usability is about the user experience when using an information system, website, application. Usability can be measured against five criteria's, usually called MEELS, Memorability, Efficiency, Errors, Learnability and Satisfaction. According to Usability.gov usability is a combination of factors. They mention six different factors on their site: "Intuitive design, Ease of learning, Efficiency to use, Memorability, Error frequency, Subjective satisfaction" (usability.gov, 2020)

Many of the categories in usability and accessibility do overlap, but when testing for usability many features in accessibility rates is not included. This means that a product can have perfect rates in usability measures but fail badly in accessibility.

3.3 What is Web Accessibility?

Simply explained web accessibility is to make your application, system, site available to as many users as possible. To remove barriers that can make the usage of the application difficult or even impossible. Many of the features most developers are already familiar with since they overlap with the implementation for usability.

This degree project is focused on the knowledge and usage of web accessibility in Sweden, not on why and how. There is plenty of websites who has information about that, and it is a large and complex subject that would need a report on its own. Developers who works with the coding will know or knows how to find the specifics needed when implementing the features for their specific area of profession.

This short summary should be viewed as an indicator of subjects to search more information from.

The Swedish Post and Telecom Authority (PTS) is using these sections of categories as a starting point when researching statistics over people with disabilities (PTS, Rev C, 2016-11-08):

- Movement & motor skills
- Read & write
- Understand
- See
- Hear
- Speak
- Concentration & memory
- Social interaction

These categories can very well be used when categorizing the sections of work for web accessibility.

It is also worth mentioning that implementing web accessibility is beneficial for people without disabilities in several ways, if a person uses older technologies, operating systems, have difficulties with the web content language, slower internet access.

3.4 W3C, World Wide Web Consortium

World Wide Web Consortium. Written as W3C is an international community. It was founded in 1994, today it includes industry experts, fulltime staff, several member organizations. The group develops international Web standards. All W3C standards are reviewed to make sure they have accessibility support. The testing's is made by Accessible Platform Architectures (APA) Working Group. On their site the definition of their work is defined as “The mission of the Accessible Platform Architectures Working Group (APA WG) is to ensure W3C specifications provide support for accessibility to people with disabilities. The group advances this mission through review of W3C specifications, development of technical support materials, collaboration with other Working Groups, and coordination of harmonized accessibility strategies within W3C.” (APA, 2020)

W3C has made their guidelines into three different categories. Below is a short explanation of the different ones:

3.4.1 WCAG, Web Content Accessibility Guidelines

This is the one this degree project mainly focusses on. These guidelines are a set of requirements that is seen as the international system of coding standards. The guidelines are being used for web content on web pages and applications. This includes mobile, multimedia, dynamic content and non-web information and communication technologies. As for the time of writing the version 2.1 is the current one being used.

Each guideline has three conformance levels: A, AA, AAA.

- Level A is the lowest level of ambition, that means that they are the requirements that has the highest importance priority. It has some impact on how to design.
- Level AA is the level the web directive Swedish Guidance for web development and the Web Accessibility Directive is recommending following (which indirectly includes level A), it is classified as the basic start level for accessibility in public sector. It has a medium level impact on design.
- Level AAA is the highest level of ambition. This level will have a high impact on design. About this level W3C has made a comment stating following “It is not recommended that Level AAA conformance be required as a general policy for entire sites because it is not possible to satisfy all Level AAA Success Criteria for some content.” (W3, conformance-reqs, 2008)

3.4.2 ATAG, Authoring Tool Accessibility Guidelines

Authoring Tool Accessibility Guidelines is the guidelines to follow when developing tools being used to produce web content. To make the authoring tools accessible to the user.

3.4.3 UAAG, User Agent Accessibility Guidelines

User Agent Accessibility Guidelines is the guidelines to follow when creating applications that renders web content. This includes applications like media players, e-readers, browsers and so on.

3.5 Make a site, system, application accessible with WCAG 2.1 Guidelines

The web directive Swedish Guidance for web development and the Web Accessibility Directive is recommending following WCAG 2.1 level AA (which indirectly includes level A), it is classified as the basic start level for accessibility in public sector. See the section topic about WCAG above for more details. On Guidance for web developments website they have a checklist that can be used to make sure all directives are implemented. I will below list the criteria for level AA, to show some of the guidelines (DIGG, 2020):

- 1.2.4 (AA) Text live broadcasts
- 1.2.5 (AA) Synthetic video recordings
- 1.3.4 (AA) Make sure all content is presented correctly regardless of screen orientation
- 1.3.5 (AA) Mark common form fields in the code
- 1.4.10 (AA) Create a flexible layout that works on an enlarged or small screen
- 1.4.11 (AA) Use enough contrasts in components and graphics
- 1.4.12 (AA) Make it possible to increase the distance between characters, lines, paragraphs and words
- 1.4.13 (AA) Popup features should be manageable and shut down by everyone
- 1.4.3 (AA) Use sufficient contrast between text and background
- 1.4.4 (AA) Make sure text can be magnified without any problems
- 1.4.5 (AA) Use text, not images, to display text
- 2.4.5 (AA) Offer users several ways to navigate
- 2.4.6 (AA) Write descriptive headings and labels
- 2.4.7 (AA) Clearly highlight which field or element is in focus
- 3.1.2 (AA) Enter language changes in the code
- 3.2.3 (AA) Be consistent in navigation, structure and design
- 3.2.4 (AA) Name functions consistently
- 3.3.3 (AA) Give suggestions on how errors can be corrected
- 3.3.4 (AA) Allows you to undo, correct or confirm important transactions
- 4.1.3 (AA) Make sure tools can present messages that are out of focus

(List from: <https://webbriktlinjer.se/wcag/> , 21-02-2020)

Level A and details on what more to consider can be found on their website. This list should only be viewed as an indication of what is included and how-to easier follow WCAG.

3.6 Web Accessibility Directives

December 2, 2016 the directive (EU) 2016/2102 was published. And it is in force since 22 December 2016, all member states had until 23 September 2018 to transpose the directive to their national law and in Sweden this was set to be required 1 January 2019. There are some exceptions stated in the 2016/2102 documents (like live-stream videos, online maps, third-party content) but as said above, the directives are transposed in the national law. This means

that the requirements for Sweden is set by the Swedish government, and this act was published 22 November 2018. The requirements have some different dates depending upon type of product.

- All new websites: September 23, 2019. Including documents, pdfs, files. Exceptions is documents made public before September 23, 2018 and not needed for active administrative procedures.
- Public sector bodies mobile applications: June 23, 2021.
- Existing websites (published before Sept 23, 2019) and media content, September 23, 2020.
- Intranet and extranets: no time limit but needs to include the directives if a comprehensive update is made.

The Web Accessibility Directive requires all public services, ICT to include web accessibility to their information systems, websites, applications and services. It is expected that they follow the requirements stated in the Harmonized European Standard EN 301 549 v2.1.2 (2018-08), it is a document tool with all information what is needed to reach WCAG 2.1, level AA on affected web content.

For Swedish public sector bodies, the Act (2018:1937) on access to digital public service is the requirements needed to be followed. It can be listed up in a few categories:

- Make sure the public sector bodies take necessary measures to implement the requirement needed for approved accessibility rate by making them operable, understandable, perceivable and robust.
- Have clear accessibility statements, a description of compliance efforts towards the directive. So, this can be shown on clear documents upon request.
- Offer a way for users to raise concerns about accessibility limitations and feedback on the subject.
- Publish a continuous accessibility report, what has been done, updates, when and how tests are done, to follow the WAD.

3.7 Swedish Discrimination Act

Sweden's Discrimination Act became active at 2009 1st January. It is based upon the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), where it in Article 9 is stated requirement to take appropriate measures to enable persons with disabilities to live independently and participate fully in all aspect of life, including information and communication technologies and systems. (UNCRPD, 2016)

In 2015, 1 January a section about inadequate accessibility was added (2008:567, Chapter 1, section 4:3) there is no direct statements about web accessibility in the law but there is a chapter including accessible information and communication. Examples given on Swedish Equality Ombudsman (DO) website is: Information in alternative formats, Access to various opportunities to contact, for example: emails, Possibility of a secluded place for conversation with a contact with authority, Alternative ways to provide tickets. (DO, 01-22-2020)

There is also a topic about software and systems in the Act “Work with Display Screen Equipment” (AFS 1998:5). Here Swedish Work Environment Authority states the rule in §10:

“Software and systems shall be suitably designed to consider the requirements of the task and the conditions of the user needs. Software should be easy to use and, if necessary, be adapted to the user's level of knowledge or experience...” “When designing and selecting software, special consideration should be paid to the ergonomic principles that apply to human ability to perceive, understand and process information. “(AFS 1998:5 §)

3.8 EAA, European Accessibility Act

Note that this act is still in progress and has a transposition period of 3 years, requirements can change, be removed or added.

The (EU) Web Accessibility Directive includes public sector, websites, intranet, extranet and mobile applications. Excluding the private sector unless they are associated with the category above. On June 7, 2019 the Office Journal of the EU published the European Accessibility Act.

EAA, will add requirements on digital accessibility within EU on producers, importers, exporters and distributors in certain areas of the products and services category.

In Directive (EU) 2019/882 1:2 the products and services affected by the directive is stated:

- consumer general purpose computer hardware systems and operating systems for those hardware systems
- payment terminals
- self-service terminals (banking, ticketing etc.)
- consumer terminal equipment with interactive computing capability, used for electronic communications services
- consumer terminal equipment with interactive computing capability, used for accessing audio-visual media services
- e-readers
- websites
- mobile applications
- electronic ticketing
- e-commerce
- emergency 112

It will be following the same requirements as WAD with continuous activity reports, ability for consumer to report lack of accessibility and so on. What is different for now is that the CE-verification will be used to declare accessibility.

4. Methodology

4.1 Data Collection

To find the best approach for collecting data and what type of questions that would make the interviews and answers reliable, I first contacted several different disability and accessibility organizations. I wanted to get a better understanding in how they experienced the accessibility on the screen. To see their viewpoint for different categories, like the embedded settings in operating systems, if the accessibility requirements had made a difference outside of public sector, and if they had any opinions of where the responsibility to implement accessibility should start. These answers were only used to create a better understanding of the affected users' experiences, to see if the changes made upon the time of writing was feeling like a step forward or not. I also found it important to have these aspects in mind when writing the questions for the interviews, not only from the perspective of a developer who knows about coding and developing applications. It also felt relevant to be able to have the knowledge in case of questions from the interviewed companies. The answers should not be thought of as a part of the actual analysis since the result data is not included in the final analysis.

4.2 Method for data collection

The importance of empiric data and to get reliability in the analysis made the choice to talk to a main part of the interviewed people important. It makes it easier to ask follow-up questions, and to give them freedom to speak about their reflections without interruptions in having to type all the answers. The topic can vary depending upon the experience the companies has on the topic, for this reason I found it relevant to use a semi-structured interview method, to let the person speak their mind based upon the main question. I found it important to keep the same method and ways in all interviews to make the data comparable and to keep its reliability level high. This method is something I have been educated in and been using for several of years in earlier professions. Also, if the answer lead into another question in the survey, I let them answer it instead of interrupting. The questions were also made to be able to be controlled in different directions based upon their answers and experiences in certain topics.

4.1.2 Phone interviews

It can be difficult to get the same understanding and reliable data from a phone interview as you can get in a in person interview. I had this in mind when decided that my main method to collect data would be over the phone. With my professional background as both a salesman over phone and years of experiences in customer service, I felt confident that the result would be just as reliable as if I had met the persons during the interview. I used the same technique with semi-structured interview method, to let the person feel relaxed and let them speak freely even when the answer went into another question's topic. Therefor I got answers of the same question more than once, which also confirmed that the person understood the question and the answer was reliable.

4.1.3 In person interviews

Because of the short amount of time this degree project was, it made it difficult to find time to book meetings with companies outside of the local region. Some I contacted was willing to do the interview but couldn't find time within the weeks of time for the study. Even though this area is limited in companies whose main focus is just web agency, I decided based upon the email answers, to only do in person interviews with local web agencies.

4.1.4 Online survey

For the online survey some different surveys have been used. Some companies that couldn't find time to do a phone interview answered a survey instead. These surveys were sent out on a separated link so I could keep track of the reliability in the answers and statistics. To get some more answers to use in the analysis a request was also posted in a forum directed towards women in the tech-industry and specified that it was two different surveys they could chose to answer depending upon if they fit the category of either working at a web agency or had a position at a company were they got in contact with the decision process of using a web agency's service. The anonymous survey's was carefully analyzed to see if they were reliable and had answers that was not too vague to be a part of the main analysis. This selection made the result that some answers was deselected from the degree project. It was taken into consideration what effects this would have on the main result and if it was the best option.

4.3 Ethics while research

To make the companies feel comfortable and to make sure that they knew the purpose of the interview, information of the topic, its purpose and what the data would be used for was sent in the email that was sent to reach out to the companies. This email also clearly stated that they had the option to be anonymous if that was preferable. It was also a question that was mentioned again in the start of the interview, to make sure the participants agreed to be a part of the study and that they knew that the analysis data only would be used for the stated purpose. Most people were positive to mention their names, a few wanted to be anonymous. In the end of the research I made the decision to remove all names and replace them with a figurative respondent name. It was taken in consideration if this would affect the reliability or not, the conclusion was that it still was the best, both for readability structure and privacy reasons.

4.4 Analysis method

The analysis method used get reliable and relevant data from the interviews was thematic analysis. This method was selected to easy get an overview of the data collected, to split it up in different categories and be able to code and study each result separately. Following the description of Boyatzis explanation of structured thematic analysis (Boyatzis, 2009) The categories were first based upon the survey questions and then closely studied from the perspective of the main question. After the empiric data was sorted into themes it was able to be analysed with greater perfection. It was taken into consideration that this method has weak parts and can be viewed as it has been directed towards certain results based upon subjective perspective of both the interviewed and interviewer. Therefor it was an importance to compare and relate the data to the theme of the interview and each question. To not use information from conversations that was said outside of the highlighted interview question.

5. Results

In this section a presentation of the interviewed companies and persons will be presented. It also has the results on different topics based on the answers of the respondents.

5.1 Interviews, over phone or in person

For the interviews 8 different people has been interviewed, all interviews except one was made with the person individually. In the category of client/user of system/application I only had one interview where I talked to the person, but during the conversation the person felt that the company had too little experience or opinions in the subject to be able to give relevant answers. The interview will therefore not be a part of the results.

5.2 Online survey

The respondents in category web agency/developer result for the online survey was 3 different people in the category of web agency/developer. This was after the analysis of validity, which can be read about in the methodology section. For the survey directed to clients/users it was same low respondent result as in the reach out for interviews, here three people answered all the questions and their answers will be a part of the result.

5.3 Respondents presentation

5.3.1 Respondent A – Happybits

Respondent A is a full-stack developer, who today works as a teacher. He has been an active developer since about 1994. The main work area has been as a back-end developer within .NET, but he has knowledge in several different languages. The teaching area is both within back-end and front-end.

5.3.2 Respondent B – Ping Pong

Respondent B is working as a front-end developer. She has been working at the company for about 4 years. The company works within both the public and the private sector, therefor she has been given the role to update their applications and systems to become accessible. Sha has just started to do learn more in the subject thru courses and education.

5.3.3 Respondent C – P&L Nordic AB

Respondent C is a salesman for the company and has no experiences in developing. He is the one who is in contact with the clients and has knowledge in what is in interest and what's asked for from the clients when presenting their products. The company has two products where one is fully focused towards the private sector and the other towards the public sector. The company has about 20 – 30 employees. Respondent D and Respondent E works at the same company but all of them was interviewed separately.

5.3.4 Respondent D – P&L Nordic AB

Respondent D is in charge for the company's product that is focused towards the public sector, more specific focused towards educational institutions. He has been working within

the company for 20+ years and has a good knowledge of the requests from clients and the market. He is not educated in developing himself but has knowledge and understanding of coding.

5.3.5 Respondent E – P&L Nordic AB

Respondent E is the product owner from the company's Competence and Learning Management System. She has several years of experiences working towards companies in the private sector. She doesn't have any experiences in coding but has a good knowledge of how developing a system works, and do the system testing of their products. She is also the one in contact with their clients about pros and cons in usage, therefore she also knows what is requested by their clients, and what is beneficial for the company.

5.3.6 Respondent F – RocketLabs

Respondent F is an educated software developer. He has several of years' experience working as a full-stack developer. Today he runs his own company together with Respondent G, they were both interviewed at the same time. They are 2 employees at the company. Respondent F is the one who has most contact with their clients, and the one who writes most of their front-end code. He has a very good knowledge of what web accessibility is even if their clients are based in the private sector.

5.3.7 Respondent G – RocketLabs

Respondent G works together with Respondent F at their own company. He is a full-stack developer but mostly focus on back-end parts of the code. He is as well an educated developer and has many years of experience in system developing. The interview was made in the same time as with respondent F.

5.3.8 Respondent H – BrightCom Solutions AB

Respondent H is working as a project manager and in operations at this company. He has many years experiences in the working role. The company is focused towards the private sector only, and they have about 6-15 employees. Since the company is working mainly with a product by Microsoft usability is a common topic and he also has a good knowledge of accessibility.

5.3.9 Respondent I – Anonymous consult

Respondent I, is working for a company as an IT-consultant. He has 20+ years' experience as a software developer. He only works towards the private sector and the company he is hired by has 100+ employees. Even if he mostly works within back-end he has plenty of knowledge about front-end.

5.3.10 Respondent J – Anonymous consult

Respondent J is hired as a Management consultant but has a background as a system developer. The company she works at today has 80-90 employees. She is involved in the contact with clients and have a knowledge of their requests when ordering a product.

5.3.11 Respondent K – Survey Respondent Web Agency

Respondent K works as a software tester. She has been working for this company with 100+ employees between 0-5 years. The company has a customer base in both public and private sector.

5.3.12 Respondent L – Survey Respondent Web Agency

Respondent L is a UX-designer, she works as a consultant for a company with 100+ employees and been working there for 0 – 5 years.

5.3.13 Respondent M – Survey Respondent Web Agency

Respondent M is working in the area of admin, operations and is a tester. The company she works for has 100+ employees and she has been there for about 0 – 5 years. They are focused towards both public and private sector.

5.3.14 Respondent N – Survey Respondent Client/User

Respondent N works in the area of marketing. She has been working in this company with 100+ employees for 0 – 5 years. The company has their customer base in the private sector.

5.3.15 Respondent O – Survey Respondent Client/User

Respondent O is working with operations at a company with 100+ employees. She has been working for the company for 6-11 years. The company has their customer base in the private sector. They use both Information systems and public websites in their work.

5.3.16 Respondent P – Survey Respondent Client/User

Respondent P is working in the area of IT at a company with 100+ employees. She has been working there for 0 – 5 years. The company is focused towards the private sector and uses both information system and public websites in their work.

5.4 Themes identified

In this part I will list the answers from the respondents based upon the themes found during the interviews. I based the themes upon both the interview questions and their answers. Some answers varied a lot and some questions were given no direct answer by some respondent therefore the answers in the themes might vary in numbers of responses.

5.4.1 Awareness of what accessibility is

5.4.2 Efficiency in the embedded settings in operating systems

In this theme I have included both answers from the question if they knew what WCAG is and the answers about what they thought was included as for accessibility. And then the conclusion if the operating systems embedded settings is enough to cover the accessibility needs. For the client-based survey no responses were given on this topic.

A 5.4.1 Respondent A did not know what WCAG was. He knew about accessibility. He explained that when he teaches his classes, they go thru the features to implement the common things like alt="..." in HTML code. He didn't think any code in the backend part was affected when using inclusive practice.

A 5.4.2 Answer: He thought they would be good enough if they system, application also had the basic front-end features.

B 5.4.1 Respondent B knew about WCAG and their company has been working with it in focus since the WAI became a requirement. She has been taking courses in the subject. Although she stated it like this "I am still learning and now it is only small parts of

understanding. We still need to figure out what fully is included in WCAG since we need to have it implemented in one of our products before December 2020” She was clear with the requirements and date of changes in the public sector.

B 5.4.2 Answer: “It is good for visual accessibility, but I haven’t looked into more than those settings” She also mention that it is probably not enough in any area.

C 5.4.1 Respondent C was aware of the topic of web accessibility. But he said he didn’t know much more behind the topic of enlarging text, listen functions and color contrasts. He had heard of WCAG, the reason for this is that the company has two products and one is for e-learning and the client base includes public sector.

C 5.4.2 Answer: He didn’t think it was enough. But he said that his first thought of the question was that it is probably good for most since it is settings built by such large companies with awareness. But there is more to the area.

D 5.4.1 Respondent D knew what WCAG is, he is working with managing the product mentioned by Respondent C. They have included some guidelines in the product, mostly it has been after requests from the clients. Like color contrast, clear icons and listen functions. He was not aware of what more was included in the WCAG or what is included as accessibility.

D 5.4.2 Answer: He thought the settings was in a level where they would meet most needs. But expanding the level of needs, it would be more needed.

E 5.4.1 Respondent E had never heard of WCAG. She didn’t really feel that she knew what was needed for accessibility. She was mentioning that she thought that accessibility was for people with very high demand of needs. And therefor they would be using specific devices to get accessibility on an application or in a system. Although she mentioned that they have implemented color contrast and clear icons for usability. But never seen it as a part of accessibility.

E 5.4.2 Answer: She thought the embedded settings probably was enough. But also stated that she has very little knowledge of what settings are available.

F 5.4.1 Respondent F knew very well what WCAG is and he had a good knowledge of what was included. He said that he don’t know the details and not all requirements but a good overview of the topic. He is also very clear in his dialog about accessibility, that he knows most of the sections of categories that one should include when using inclusive practice. Even if their customer base is in the private sector, he is aware of the requirements and what has happened along the way in the public sector.

F 5.4.2 Answer: He answered this with a clear no. “If it was enough, we wouldn’t have the need of WCAG and the settings is too basic to meet the different needs”

G 5.4.1 Respondent G knew about WCAG. He didn’t mention much of the topic since this interview was made along with respondent F. They both stated details of accessibility and awareness, although more detailed awareness was responded by his colleague.

G 5.4.2 Answer: He thought they would be good to a certain degree but far from enough.

H 5.4.1 Respondent H knew about WCAG. In his answers he shows knowledge of the differences between usability and accessibility: “Design and layout for usability is a standard discussion with all customers but specific web accessibility has not been a topic”

H 5.4.2 Answer: He made this comment: “The basics are there, but a general system cannot really cover all kind of needs, certain specifics needs to review in more general detail most often”.

I 5.4.1 Respondent I knew about WCAG but was fast to state it like this “WCAG is not more familiar than something that I have come across while searching for something within the category on the web.” And, on the topic of accessibility: “The basics for front-end coding is familiar but that something more and what needed than that is not something I even thought of”

I 5.4.2 Answer: “Probably for most needs, if the system or application used has good development in the front-end code”

J 5.4.1 Respondent J Had heard of WCAG in earlier career but didn’t knew any details. She mentions that she knows some clients where they have done requests that could fit in to the category: “We had clients who asked for the ability to put in scripts together with media content and the request to have a bit bigger design on radio buttons for easier reachability”.

J 5.4.2 Answer: She wasn’t sure what to answer but thought it could be more needed for some users.

K 5.4.1 Respondent K was aware of WCAG. She knew what it was and why it is being used. She didn’t know what really was included in the category of accessibility since they don’t use it at all in the company.

K 5.4.2 Answer: She thought the embedded settings would be enough.

L 5.4.1 Respondent L knows about WCAG. She works with some of the guidelines and is aware what is included. This was a survey respondent and answers on other questions gives information that she is clear about accessibility and usability, and the different categories included.

L 5.4.2 Answer: It is not enough. “It is both bad with displacement of stuff when increasing text size. Plus, the colors for color-impaired are not always in focus”

M 5.4.1 Respondent M was not aware of WCAG, but aware of some accessibility categories: “We don’t implement it peer see but users will contact us with issues, meaning we have an awareness”.

M 5.4.2 Answer: Didn’t think the settings would be enough. It is more needed to meet the needs.

N 5.4.1 Respondent N Knows about WCAG, they use it in their public website. Her comment about how aware they are on the topic: “To some extent. It is not a priority”.

O 5.4.1 Respondent O has heard about WCAG, but don’t know what it is. She doesn’t know what would be needed for accessibility, it is not a topic that the company have discussed.

P 5.4.1 Respondent P Don't know about WCAG. But she knows about accessibility to the basic degree of easy usability, like colours, listening options and alt text on images.

5.4.3 Products developed at the company

5.4.4 Product testing

The respondent's area of what type of product they develop varies a bit and this also makes the answers on testing different. In this section their answers of what type of product, if they have customer base in both public and private sector and if they are testing the products are included.

A 5.4.3 Respondent A is working as a teacher, so it is no specific applications involved. He teaches both back-end and front-end based courses. He mentions that they are developing different types of applications to learn the coding and thinking how to create applications towards all kind of clients.

A 5.4.4 The testing's done is just the basics to learn to step thru code and to add alt tags to HTML

B 5.4.3 Respondent B has two types of products. Both are LMS and CMS systems. The content varies a bit depending upon the client who uses it. For their oldest system most clients are based in the public sector of educational institutes. The new system is focused towards private sector. The products are mostly pre-built so clients by the whole.

B 5.4.4 They have started to test their product directed towards public sector they have started to do accessibility testing's. She comments it: "I do testing's in the areas I can come up with but don't have any routines yet. This is planned to be a permanent task, to test so our product lives up to the WCAG" There is no people with accessibility needs included in testing, but she is very positive to the thought of doing so, this is something she has been considering before it was mentioned in the interview.

D 5.4.3 Respondent D has products in both public and private, but the product included in this interview is their product used by educational institutes, therefor even if some clients are private companies they are included in the public sector.

D 5.4.4 They only do basic testing's, and nothing based upon accessibility in mind. No people with accessibility needs are involved.

E 5.4.3 Respondent E is working with product with a customer base in the private sector, at the same company as respondent D. This product is in the category of Competence and Learning Management System but not including educational institutes.

E 5.4.4 They don't do accessibility testing.

F, G 5.4.3 Respondent F & Respondent G works with clients in the private sector only, but the products vary. They base the work on the requests from clients, everything from websites, applications to information systems.

F, G 5.4.4 They don't do accessibility testing.

H 5.4.3 Respondent H work with pre-built Microsoft systems. So, most features are already embedded by the creator. All their clients are based in the private sector.

H 5.4.4 They don't do accessibility testing.

I 5.4.3 Respondent I work with websites and mobile applications with e-commerce, the clients are based in the private sector.

I 5.4.4 They have employees who works with testing only. He is a bit unsure if it involves accessibility. But knows that no people with accessibility needs are involved.

J 5.4.3 Respondent J works with different type of products, their main skill is e-commerce and information systems. The clients are in private sector.

J 5.4.4 They have tester as employees. They do test for accessibility to a certain degree. Mostly based upon requests from clients.

K 5.4.3 Respondent K customer base in both public and private sector. She works as a software tester for all their products.

K 5.4.4 They do test to measure accessibility rate. No people with accessibility needs are involved.

L 5.4.3 Respondent L works as a consultant and workplace varies in both public and private sector. Also, the type of products varies, so her answer about testing is based upon the workplace she is at in the time of writing.

L 5.4.4 They don't do accessibility testing.

M 5.4.3 Respondent M is working with information systems and have client in both sectors.

M 5.4.4 They don't do specific accessibility testing unless their clients ask for it.

N 5.4.3 Respondent N uses a system they ordered to be used as a website towards customers. It is in the category of marketing.

N 5.4.4 No testing to measure accessibility rate was made when they ordered the product.

O 5.4.3 Respondent O uses both information system and a website in her work.

O 5.4.4 She is not aware of the topic of measuring accessibility rate for computer products.

P 5.4.3 Respondent P uses both information system and a public website at her work.

P 5.4.4 She knows that they have done some testing on the public website but not sure at what rate. And no people with accessibility needs was involved.

5.4.5 Challenges within the company

5.4.6 Interactions with clients

In this section the answers from questions about what the main challenge for the company would be if they would be starting / was when started working with web accessibility. The clients survey was not getting this question, therefor no client answers are in the results. It

also includes answers about their interaction and dialogs with clients (and web agencies) if they had there are any dialogs about web accessibility.

A 5.4.5 Respondent A is not having any contact with clients, but he answered the question in what would be the challenge for him as a teacher to include more accessibility in his courses. As said above he was not aware of WCAG and the law requirements but during our conversation he asked me to send information material and links that I found useful, this so he could read upon the topic. He was positive and already talked about how to use this in his front-end classes in the future. The challenge he thought was the main one was knowledge, that he needed to educate himself to educate others.

A 5.4.6 In his conversations with students no one had ever asked about web accessibility beyond the topic of basic HTML standards.

B 5.4.5 Respondent B thought their main challenge was to get a full overview in the accessibility guidelines, how to get routines in everything. That it was difficult to find a good way to get information, information that is easy to work with. Another thing she said is that one of her goals was that she hopes to be able to get the other developers to see the positive and how useful these accessibility features are.

B 5.4.6 Before the requirements in public sector she had never had any dialog with clients about the topic more than the basics of text to speech and languages selection. Nowadays the clients in the public sector asks about accessibility features and if their products are meeting the standards. No dialogs or changes of awareness has been noticed in the private sector.

C 5.4.5 Respondent C thought there would be a couple of different challenges. First to get the developers and other involved to understand the benefits of implementing accessibility. Then to invest time and money when you can't really tell if it would create more sales.

C 5.4.6 In the dialogs with clients it was less than 1% over the time he had been working here the question about accessibility had come up.

D 5.4.5 Respondent D thought the main challenge would be to create the knowledge in what is needed to be implemented to meet accessibility standards.

D 5.4.6 He didn't think that any new knowledge was showing when having a dialog with clients. The only time the topic of accessibility had come up was to make icons easier to read, otherwise it was more so focus on usability only.

E 5.4.5 Respondent E thought the main challenge would be to create an understanding what accessibility is, what is needed to not only include usability. She couldn't really come up with something specific, as she stated "*I have too little knowledge in the subject to truly tell what it means*"

E 5.4.6 She has almost daily dialogs with clients, but accessibility has never come up as request from the clients. And the company has never thought of bringing up the topic themselves.

F 5.4.5 Respondent F & Respondent G said already early in the interview that the main problem they had within the category of accessibility was to get clients to understand that it would increase the cost of the application. They work with many smaller clients and their resources might be limited therefor it is difficult to explain why it is a feature to invest in. He

was confident to say that even if they don't have the full knowledge of WCAG, it is not so much challenge. If they need it, they will take the time to learn it.

F 5.4.6 When he is having a dialog with clients, he always brings up the topic and ask them if they thought of implementing accessibility. *"For me it is an obvious question to ask, and if I see something in their ideas that could cause problems for users I make suggestions and clearly explains why"* the example he gives is a client's idea with a site with lots of bright colors, and blinking features. A design like that would cause problem for both motion sensitivity and color blinds. Another thing he brings up is that since they bring up the topic the clients asks about it. Most of the time they are positive and curious, but when realizing that it will increase the cost they decline. Here both Respondent F and respondent G makes a clear explanation that it is most of the time not that the clients are negative to the topic, but many of them are small clients, maybe just startups, therefor the budget in limited. And the clients many times mention that it is a feature they will keep in mind for next update, when they are stabile on their market.

H 5.4.5 Respondent H says that the main challenge for the company if they would implement WCAG is the fact that they work with ERP-systems that involves lots of fields, tick boxes and buttons. It would be a challenge to adapt to people with viewing disabilities.

H 5.4.6 He couldn't think of any time where a client had asked about accessibility. On the question if they ask clients about accessibility he answers: *"Design and layout for usability is a standard discussion with all customers but specific web accessibility has not been a topic"*

I 5.4.5 Respondent I thought the main challenge would be knowledge overall, he couldn't see that many employees in any department had knowledge on the topic.

I 5.4.6 He had no knowledge what conversations was made with clients but said, since they not really get any requests in the developing section, he doubted that the subject was mentioned.

J 5.4.5 Respondent J main challenge was to get a full overview of the WCAG, since they did work with some accessibility today it was not seen as a big challenge.

J 5.4.6 The company itself didn't bring up accessibility in the dialogs with clients but clients sometimes requested some features that they wanted. But most of the time WCAG was not mentioned, more so some small features.

K 5.4.5 Respondent K thought the challenge was to really understand the needs of accessibility was the main challenge. Both to get the company to understand the needs and to understand the criteria's in WCAG.

K 5.4.6 respondent K did not have any interactions with clients and had no answer on this question. But she has noticed that there is more awareness when it comes to web accessibility since the law requirements became active.

L 5.4.5 Respondent L thought the main challenge was to get the company to understand the need to invest in software to be able to create products that meets the criteria for full accessibility rate.

L 5.4.6 respondent L works in the area of UX-design, and she is having dialogs with clients about accessibility in the design of their products. She also said that it not unfamiliar that clients ask about the subject. It is a common topic in her work.

M 5.4.5 Respondent M Says that the company faces a few different challenges. First is that everyone has different viewpoint of the topic. Then they use some old legacy templates, and some software they use are from suppliers. That will limit their options. As she states it *“The main challenge is the hurdles”*

M 5.4.6 When they have a dialog with the clients they do talk about usability and certain areas is included in accessibility, but the term accessibility is not used. She is not the one interacting with the clients, but they do get requests for implementations thru the specifier.

N, O, P 5.4.6 Neither of them has never gotten the question from a client and the company don´t bring it up as a topic.

5.4.7 Thoughts and attitude of requirements

5.4.8 Benefits for the company

Below are the answers from the respondents on the topic of requirements. I asked the question if it just like the change for the public sector should be required by law to add accessibility to all information systems and web applications as well.

Secondly, I asked if their company would be ready for it if the requirements was set to include their company. And if they could see any benefits for the company if they started adding web accessibility to their products.

A 5.4.7 Respondent A He could see that it would be a good thing to a certain degree but not for all web content. It should more so be a choice if the client wants to add it, but information should always be given that their choice might affect customers, employees and so on.

A 5.4.8 In his work as a teacher he didn´t feel ready to be able to educate in the subject. But as mentioned above he was curious and wanted to learn so he could add it to his courses. *“If we don´t teach in the subject, new developers won´t learn either. It is a responsibility on all levels in the chain”*

B 5.4.7 Respondent B didn´t think it should be a requirement by law for private sector but that all companies should somehow get information about it. To highlight the positive effects, it can create for the clients themselves, especially systems/sites that are directed towards most people.

B 5.4.8 Since they already are affected by the new requirements, she felt that they were ready for. That of course they would implement the guidelines there as well, there was no other options for it. The benefits she could think of was at this time the fact that they have started with the work already, therefor they have good knowledge and can attract a customer base that is looking for a product and company who has the skills needed.

C 5.4.7 Respondent C thought is should be more requirements in the private sector as well. *“We need to work with the thought that it is humans who will use our program/product. Since we all are different one thing won´t be good for all”*

C 5.4.8 He could not see that the company would be ready for such requirements and thought it could be a long way to become beneficial for the company. This for the reason of time and money needed to be invested. But could also see a value in having it as a sales argument, especially if the requirements included their client category.

D 5.4.7 Respondent D couldn't see that it would be a good thing to add requirements for the private sector. Mostly because it didn't seem to exist any interest for it, but if the clients were more interested, he couldn't see a problem with it either.

D 5.4.8 The company had skills to be able to learn what they needed to; it is not there today but if it was required it would be calculated into the work process. To have knowledge he could see as a benefit since it makes it easier if they get requests about it, but he could not see that it would increase sales and clients for the company.

E 5.4.7 Respondent E did not think it should be a requirement but stated it like this *"in the best of world's it should be obvious that all systems and applications had it. But reality is different"* That it could be a option to build a mobile application that was accessible but not to rebuild the main product to follow the WCAG.

E 5.4.8 They would not be ready for it, the knowledge is not there. She couldn't really see what the benefits would be.

F, G 5.4.7 Respondent F and Respondent G. Respondent F's first answer was yes; it should be required. Then respondent F and respondent G started to discuss the topic and responded G mentioned that it could be a limitation for smaller applications. Like if someone sits a makes a website as a hobby that is not really directed towards big crowds, or startups with small budgets. It could cause a limitation in who can create or order a system/site/application. They both agreed on that, but respondent F also stated that people should get the awareness that they leave out potential customers, employees etc. if they don't add web accessibility. And that some basics should be required, it wouldn't make that much difference in investments for web agencies and not that high increase for a client.

F, G 5.4.8 Respondent F said that they would be ready for it. Not that they might have all knowledge now, but they are more than willing to learn what's needed. The conversation went on to different benefits it can have for the company. They could see a couple of different benefits in attracting new clients, a good marketing tool, and make them faster in the process of developing products when requests come up.

H 5.4.7 Respondent H thinks it should be the same requirement in all sectors. *"To empower people with disabilities in all businesses it should be a mandatory rule"*

He also comment on the topic from a wider perspective: *"Accessibility is on a general level hard to enforce in just one market, the major problem here is the point that most corporate systems are international and to get a change for just one small market would be next to impossible. To do it on an international scale or for say G20-countries could have a very different impact, however, to march that one through would not be easy..."*

H 5.4.8 He didn't think the company would be ready for it. This since they don't develop the core of the interface. To adapt the product for one market would be a major challenge.

I 5.4.7 Respondent I Didn't think it should be required but also said that the answer is mostly based upon his own lack of knowledge. After this interview he can see that some categories in the private sector should be included.

I 5.4.8 He did not think the company would be ready, but they would be able to adapt quick. In a broader perspective he could see that it could be beneficial for the company but not as for today.

J 5.4.7 Respondent J Thought it should include all sectors, no differences should be made. *"It is a question about humans, about growth in our digital process. If we want to move forward, we need to include everyone."*

J 5.4.8 The company would be ready for it, they have the resources if needed. She personally could see several benefits, increased demand of their products, marketing reasons, more welcomed work environment.

K 5.4.7 Respondent K thought it should be the same requirements for everyone.

K 5.4.8 She couldn't really tell if they would be ready for it since she only works and have insight in a small department of the company.

L 5.4.7 Respondent L thinks the requirements should include the private sector as well.

L 5.4.8 The company would not be ready for it. She is trying to get more inclusive practice into the work and mention that it would be nice with better checklists for WCAG and better selling arguments stated. This to use both within the company, to increase the beneficial understanding and same towards clients.

M 5.4.7 Respondent M don't think it should be a requirement. *"The law concerning public sector is to make available stuff to the general public. Privately owned companies will have internal services available in web browsers which would be seriously hurt unless there was an exception to the regulations"*

M 5.4.8 She is not sure if they would be ready for it, this since she is working as a consultant and doesn't have insight in the whole company. She could not see benefits to it. A continued statement from the quote above *"In certain cases having a high entry level, ensures that only qualified users can use the service. It can of course be regulated with a password as well. I'm on the fence."*

N 5.4.7 Respondent N Don't think private sector should have the same requirements.

N 5.4.8 Was unsure if they would be ready for it. And mention that lack of knowledge makes it difficult to see benefits.

O 5.4.7 Respondent O Don't think it should be any requirement in the private sector.

O 5.4.8 The company would be ready for it, they have the knowledge or knows how to get knowledge needed.

6. Analysis

Below follows the analysis made from the empiric data, the analysis is categorized based upon the different research questions. To get a controlled overview of the data in each theme and how they relate to the main research question they are listed in different sub-categories.

6.1 Research question 1, Awareness

How aware about WCAG is the web agencies that work towards the private sector, are they following the guidelines as well?

6.1.1 Thoughts of usability vs accessibility

Here we investigate the respondent's knowledge about usability and accessibility. First analyze is to investigate the answers about WCAG, and what is seen as accessibility.

Secondly the different opinions about embedded operating system settings, and if it confirms the understanding of accessibility.

In this topic four companies clearly stands out from the rest with their answers. Respondent B, respondent F & G, respondent H and respondent L.

Respondent B is doing daily work on the topic, been taking extra courses to gain more knowledge. It is a priority since the company work towards educational institutes.

Respondent F & G knew about WCAG, its inception and changes happening in Swedish law. They also have dialogs about specific accessibility with their clients, this even if their clients are not affected by the law requirements.

Respondent H is working with pre-built Microsoft systems. Microsoft is using accessibility embedded in their products to a certain degree. Usability was an obvious topic in their everyday work.

Respondent L works with UX-design and they use WCAG in their work.

What more clearly stands out with the answers from the respondents above is that their answers separate the topics of usability and accessibility. The awareness that several different categories and not always the most common accessibility needs are included to meet the accessibility standards. All the respondent goes beyond the HTML alt tags, text to speech, and color adjustment topic.

With knowledge about WCAG it is more respondents than not who have heard about it, only five respondents had never heard of it. What could not be answered was that WCAG was specific guidelines, the same respondent's knowledge reached to know that it was about web accessibility.

The awareness of what is included in the embedded settings of an operating system was low, most could mention enlarging text and color settings. And here the answers give the response of similar thinking for most respondents, that the settings would be enough. Four respondents were saying directly that it is not enough, and they stated why. The majority had the impression that it was enough, but some also added after their response that probably was

more needed. About the later response it is needed to take into consideration that they knew the topic for the interview and degree project. The question if they knew what WCAG was, was asked before this question and no indication of what more was needed was made. Therefore it can't be seen as completely reliable data. During the interviews on this question it was also where the respondents used accessibility to describe easy usage of systems and applications, therefore showing lack of knowledge between usability and accessibility.

6.1.2 Noticeable differences since the inception of WAD

The analysis of this topic was one-way, no one had noticed any direct differences since the inception of Web Accessibility Directives. The only thing mentioned was the ones with clients affected in the public sector, there had been a few dialogs if their products were following it. No following up on the topic and nothing else noticeable. One respondent mentioned that she thought it was a bit more awareness but during analysis of her other answers nothing shows any indications what the awareness would be and how it has shown.

6.1.2 Differences in customer base

This study was made with the decision to only contact companies that had their main customer base in the private sector. Some of them had customer base in both sectors. This makes a difference in their awareness to some points but not a clear difference. The only thing that would be different is that they had heard of WCAG but no major difference in detailed awareness even if some are working with clients in the public sector, clients who need to have web accessibility by WAD-law.

6.2 Research question 2, Reason

What is the main challenge about accessibility, the reason that they don't implement accessibility to their product?

Three factors were found to be the main challenges and reasons for not implementing accessibility.

6.2.1 Requests and dialog with clients

This might not be a main challenge at first, but it shows in the analysis of the respondents' answers how dialogs about accessibility in nowhere to be found. Respondent F and respondent L are the only two who bring up the information about web accessibility in their dialogs with clients. Both respondents respond relaxed and confident to the questions about client interactions, they are more used to the topic than the other respondents.

Respondent B who is working with web accessibility does have some conversations on the topic, it is clients from the public sector. She also mentions that the clients they have from private sector that is not affected by WAD has not mentioned anything about accessibility.

The overall impression from the respondents shows that it is no dialogs either from web agencies to clients or the opposite way.

6.2.2 Knowledge at the company

The knowledge about web accessibility is beyond low level for most respondents. It is without a doubt the main reason why web accessibility is not implemented. Knowledge within the agencies themselves, knowledge from clients, and knowledge of involved areas. The primary answer was to understand the need and/or understand what is included in WCAG. One finding in the answers is also the knowledge what accessibility needs is, it is a vague level of understanding shown. The primary topic mentioned is visibility, and this is on a basic level of features that easily can be seen on the screen. For example, a speaker button for text to speech feature, or change of screen light/color. One other feature is mentioned by three respondents, clear icons with both color and symbols to make buttons accessible for color-impaired. With this unawareness of how lack of accessibility affects people with needs it is also primary to mention the lack of knowledge of how many individuals that daily are affected and in need of web accessibility, in workplaces, in society, and in most everyday life tasks.

Respondent B is mentioning that she is taking courses to learn how to think, test accessibility rates and so on. She is the only one mentioning actual initiative to develop knowledge on the topic.

Respondent L and respondent M has knowledge and it is noticeable in their thoughts of main challenges, both gives specific details in software they use.

6.2.3 Economic factors

The factor that the private sector is based upon economic benefits and growth can't be excluded from the facts, it is a different market than the public sector.

Only three respondents could see that it would be a benefit for the company to follow the guidelines and work with web accessibility. These three respondents are also the ones included in the category of higher knowledge. They could see the benefits in increase demand of product, a marketing tool, and a more welcomed/including work environment. The last benefit was based upon both inclusive for clients who use the product and that knowledge and work with accessibility creates an understanding for colleagues' differences. For these respondents who could see benefits but not implementing it they mention different reasons. Also, here it connects with economic factors: Respondent F always has the dialog with the clients, and the reason they decline the option is the price differences. They are themselves a small company and many clients are on lower budgets. Therefore it is not a priority. Although worth mentioning that clients who gets information about web accessibility is positive to the subject itself and can consider adding it to their product later when they have a budget for it.

The other respondents did not have the impression that including web accessibility to their products would be any economic benefit for their company. It was mentioned in most of those answers that their impression that estimated price on implementing these features would significantly increase expenses for the company. There is a clear connection between the lack of knowledge and the opinion that web accessibility is not an important priority.

6.3 Research question 3, Responsibility

What are the opinions about who has the responsibility in bringing up the topic and to implement accessibility in the systems/applications?

In this section the analysis is about the respondent's attitude towards the responsibility of develop and using information systems, websites and applications. These questions were asked with focus on both the already existing WAD and upcoming EAA. It was also asked as a sub-question if they thought that a user of a website or an employee at a company using an information system would reach out and interact to the one in charge about their accessibility problems (no matter of levels or visibility of disability) with the website/system/application.

6.3.1 Users own responsibility

A side-note about this analysis theme is that it is not included in the research as a specific question, therefore the answers are not stated in the result above as an identified theme. This can affect the reliability of this specific 6.3.1 section. The reason of including it in the analysis themes is since it was mentioned in almost all interviews to a certain degree.

The thought mentioned was that there was an impression that assistive technologies and adaptive strategies is the same as web accessibility. That the devices and strategies is the person with accessibility needs own responsibility. This would be correct to a certain degree; it is not something included in WCAG. The individual with needs for specific approaches like devices or strategies to interacting with web must take the responsibility to install or set up that part. What was a common misinterpretation was that this would be enough and erase the barriers that could be at usage of web content.

6.3.2 Attitude about taking responsibility

The overall opinion was found to be that responsibility was not needed to be taken by web agencies unless the clients requested it. Neither in educate employees, at the workplaces, calculate it in company's budget, or to increase knowledge in the industry by dialogs with clients.

What was responsibility varied, those with higher level of knowledge showed more willingness to work towards increase of implementation in products and interactions both within the company and with clients. Respondent B said that one goal was to along the way of her own increase of knowledge she also had the goal to increase the knowledge and understanding of the need to her colleagues.

Respondent A who had no knowledge before the interview, had a positive attitude as his role as a teacher, *"If we don't teach in the subject, new developers won't learn. It is a responsibility on all levels in the chain"*

Respondent L was trying to educate the company about inclusive practice, to give the knowledge and understanding of why it is needed and worth the investment.

Those who was used to accessibility dialogs with the clients had the opinion that it was their responsibility to the degree of giving the information and discuss the topic, to take the responsibility to as high level that they could from their side.

The respondents with less knowledge showed less or no indications of wanting to make changes in their way of working. It was mentioned if clients don't ask for it, there is no need to bring up the topic. Even with information from the interview, that to follow WCAG their products would be easier to use for people with temporary and permanent accessibility needs, the opinion was that it is not a priority. This includes respondents with clients in the public sector, that the responsibility is on the clients to request the features that are required by law according to EAA.

6.3.3 Requirements by law

It was more respondent who didn't have the opinion that a law like EAA should be required in the private sector as well. 9 thought it should not exist 6 thought it should. It was not the factor of knowledge that was the obvious reason of the result as in analysis above. Although the majority of respondent with knowledge thought it should be required. The reasons for their opinions varied in certain directions. Some thought it would only cause problems, economical limitations, too much work for web agencies to adapt and lack of interest from clients, was mentioned as reasons.

For the opinion that it should be a requirement by law the respondents had one common factor, they could see that using inclusive practice could be beneficial for the company in some way.

Respondent C thought it would be a long way to be beneficial for the company, but his response about requirements was: *"We need to work with the thought that it is humans who will use our program/product. Since we all are different one thing won't be good for all"*

Respondent H's opinion about requirement he said like this: *"To empower people with disabilities in all businesses it should be a mandatory rule"*

7. Discussion

7.1 Findings

Before starting this degree project and research on the topic I had knowledge in this topic on different levels, already knowing about WCAG, its establishment and usage. With an educational background including assistive devices and disabilities, and years in the business with technology such as mobile devices, tv and other media, where many customer service conversations has been done; I had a at least basic knowledge of what kind of web accessibility limits people can face in their everyday life. Therefor this empiric investigation and analysis was made both to see if the industry of web content developing and usage had knowledge and awareness of accessibility and how they adapted to inclusive practice.

This analysis was at first thought to include more perspectives from the clients and users of web content, since there was such a low response rate I chose to include only three of them. It can be analyzed in different ways, but I chose to not analyze it more than from the perspective of the agency's interviews. This could, as mentioned in the method findings below, be a topic to investigate closer in a further research on the topic.

Below follows a discussion of findings in the analysis, my thoughts and some opinions about the findings and conclusions of the research questions.

Research question 1, Awareness

How aware about WCAG is the web agencies that work towards the private sector, are they following the guidelines as well?

Only one respondent says that they are following WCAG, or more correct they will have the A and AA level in one of their main products before December 23rd when the time limit is set by WAD. They are also the only respondent who actively works with web accessibility with the perspective of accessibility. Some others mention that they work with web accessibility to a certain degree but not accessibility as the priority. It is surprising to find such unawareness in this industry, not only unawareness about disability and accessibility. It is obvious that there is unawareness of what is happening with new laws, new features in different coding languages, topics that are highly relevant for the industry they work within. My thought was that the knowledge would be on a higher level, at least to the degree of realization that if a new law is implemented on this topic it is since the topic affects a big group of people. It is not surprising to not know all the details or specifics, after all it is a complex topic. WCAG and WAD has been a major topic within the public sector for at least a year in the time of writing, I ask myself how and what is the reason that it hasn't reach out to private sector more. To learn new things, be up to date, bring efficiency to work routines, is such a priority in this industry, this seems to have an invisible line to not reach beyond the specific work area of the companies. One of the respondent companies who don't have any clients affected or comes across the topic in their work area, is one who has most knowledge. They are the smallest company in the research, still the ones who always takes the dialog with their clients.

Research question 2, Reason

What is the main challenge about accessibility, the reason that they don't implement accessibility to their product?

The results from this part of the analysis is not surprising, the answers were along the way of expected. After reading the result of the analysis over and over, my opinion and realization that the main challenge is understanding. Not knowledge, dialogs and economic at first. Understanding is the missing connection of why most respondents is not working with web accessibility.

The private sector is different from public sector in many ways. Economic factors are what controls the market. It is obvious that if one can't see benefits with invest time and money towards web accessibility, it is difficult to understand the point of it. For smaller companies

the resources are lower and can cause limitations. For bigger companies there might be investors, and a need to explain what economical and marketing benefits there is investing in this category. And for products built upon client's requests, the main challenge is of course to transfer the understanding to the clients and why they should invest in it.

To gain understanding knowledge is needed. Knowledge both in how large the category of accessibility needs is, knowledge how WCAG is developed into the products. Like respondent B mentioned, she had taking a course to understand how to think regarding the web content.

In the answers from the respondents who has a bit knowledge on the topic there is still a somewhat lack of understanding showing. The more knowledge the respondents have shown, their understanding and opinion changes in the thought of how much time and money that is needed to be invested. One other aspect that must be mentioned is the differences in products the agencies develops, if they offer a pre-built information system or similar it is more difficulties to rebuild the software than if the agency develops new websites or applications.

Research question 3, Responsibility

What are the opinions about who has the responsibility in bringing up the topic and to implement accessibility in the systems/applications?

The findings in this question was somewhat surprising. The knowledge was one of the factors I think made the analysis about responsibility show the result it did. Since many had the idea that assistive technology would be enough and was what is needed for web accessibility. The person with accessibility needs has the responsibility to handle the part to get the devices needed, for everyday life, school and workplace. These devices are in another category than what's included in the main degree project, and during the interviews it was said that this is assumed to already been thought of before the needs of accessibility is rated.

It is surprising that so many don't even reflect over the topic and think there is no responsibility to take unless the request is made directly in the dialog about specific product. It is of course no doubt that the agencies can't take the final decision in this question, it is a matter if clients are willing to invest in it or not. I asked the question in the interviews if the respondents thought a person with accessibility needs would speak up and make an input if they found something difficult to achieve because of accessibility, or more so lack of it. Here shopping on a website, using an information system at work, and taking an online education was mentioned as examples. The answers were "probably no" from all respondents, some with an input to the first statement.

1.5 million people in age 16 – 84 have some sort of accessibility needs, to leave out 1.5 million people in calculations towards benefits of implementing web accessibility might be a loss in investment towards attracting new clients and make the agency's product stand out from the competitors, a socio-economic waste to not use inclusive practice. It shows understanding, humanity and good CSR (Corporate Social Responsibility). Although, to include all the private sector in EAA, could just like respondents mentioned be a direct damage to the industry, especially the smaller companies.

I would think of the old saying; *Great oaks from little acorn grows*. That responsibility would be needed to be taken from all directions, companies educate employees, employees' dialog at workplaces, investments be made from both parts, and most important seems to be dialogs. To reach out and create knowledge and understanding the topic needs to be made less invisible.

Respondent F who has the dialog with all new clients and said that he felt that he did what he could in his end. What that company also had which stood out from most part of the others was the attitude that accessibility is nothing unknown and he was ready to invest time in knowledge and development if the clients wanted it. This was a surprising find in some ways since they are as mentioned in analysis the smallest company interviewed.

Respondent C's comment about law requirements shows a starting point towards responsibility: *"We need to work with the thought that it is humans who will use our program/product. Since we all are different one thing won't be good for all"*

Respondent H comment is another point I can see being a benefit, if more people can be included at a workplace, we can create a more efficient market. *"To empower people with disabilities in all businesses it should be a mandatory rule"*.

7.2 Method

The methods used to investigate and collect data felt afterwards to have been a good choice. To do semi-structured interviews in a way that I already used for years in profession and feel relaxed with made it easier to find ways to structure the questions. Although I felt after the first interview that I should have had a bit of different structure on the order of questions. But since I wanted all interviews to follow the same pattern it was left to be the same way. It was of importance that the data was reliable and kept its validity.

With the time limit and knowledge of a stressed industry I had to make the decision of keeping the in-person interviews to local area only. This I think could be expanded in future researches for even higher reliability of data when it is possible to read the person's body language in a different way. It is to keep in mind that it can also affect in the opposite direction if the person isn't comfortable with direct conversations. Over the phone a person can sit where they prefer and feel relaxed in their own environment. The surveys that was sent out could have gotten a better response rate and maybe gotten a bigger variety of respondents, this was also a decision with time limit in mind but also a decision from the perspective of reliability, to know a bit what background the respondents had in matter of profession. The analysis was carefully done, and many survey answers was deselected for the reason of unclear or irrelevant answers. The lack of respondent to emails from the client base side was a concern, maybe I used the wrong method to reach out to that category or could it be the opinions of irrelevant topic that made this result. It is a topic that could be investigated further to find how to approach with better result.

8. Conclusion

In this study factors about web agencies knowledge and usage, main challenges and opinions about responsibility of web accessibility, is investigated. Overall 16 respondents are interviewed about their work routines, opinions and awareness.

The study has three main questions. Below are the conclusions from findings and discussion for each question.

How aware about WCAG is the web agencies that work towards the private sector, are they following the guidelines as well?

Few respondents had knowledge of what WCAG is more than heard about it and less than half knew some details about it. Only two respondents use it in their work.

The majority is not following the guidelines or directives at all.

To know the difference between usability and accessibility was surprisingly not very common. The awareness about the differences was higher among the respondents who had knowledge about WCAG.

The WAD has not raised more dialogs since it became a requirement, not in the private sector and not among agencies who has clients in the public sector.

What would be the reason that they don't implement accessibility to their product, the main challenge?

In the discussion chapter it was concluded that understanding is the main challenge. This based upon the fact that the respondents couldn't understand the need about accessibility and dialogs about accessibility to develop understanding was not done. To get understanding more knowledge needs to be a priority. Knowledge is below low level, only the most basic and visible features of WCAG was mentioned.

The private sector is based upon economic factors and this controls the decisions about priority topics. Web accessibility is shown to not be a priority. This since economical benefits can't be seen.

What are the opinions about who has the responsibility in bringing up the topic and to implement accessibility in the systems/applications?

With higher knowledge the more positivity and willingness to work towards an increase of implementation in products and interactions both within the company and with clients was shown.

The respondents with less knowledge showed less or no indications of wanting to make changes in their way of working. It was mentioned if clients don't ask for it, there is no need to bring up the topic.

The opinions about European Accessibility Act was doubtful, too much work, not a priority was things mentioned. The ones who thought the EAA was a good thing mentioned the view from perspective of inclusive practice. The overall conclusion about responsibility was that economics makes the decisions. If a client request to add web accessibility and are positive to invest in it, it can be done.

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