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## Impact of Web Accessibility for Customers with Disabilities on their Loyalty in Egyptian Hotels

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### Keywords

- Customers with Disabilities (CWD)
- Egyptian Hotels
- Web Content Accessibility Guidelines (WCAG) 2.0
- Web Accessibility
- Loyalty

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### Abstract

Customers with disabilities (CWD) have formed a significant and growing segment of the market. Providing accessible services resulted in several competitive advantages, as well as increased customer satisfaction and loyalty. This research aimed to explore the impact of hotel Web accessibility for customers with disabilities on their loyalty. Using a quantitative approach in this research, a web-based questionnaire was conducted for a sample consisting of 106 participants from customers with disabilities in four and five-star Egyptian hotels located in the Red Sea province (Hurghada, Marsa Alam, and the Safaga) and South Sinai province (Sharm El Sheikh). SPSS V. 22 was used to analyze data. Descriptive statistics, a one-sample T-test, and linear regression coefficients were used to analyze the research data. According to the research, Egyptian hotels do not have web accessibility. Perceivability ( $\beta = 0.983$ , Sig. = 0.000), operability ( $\beta = 0.960$ , Sig. = 0.000), understandability ( $\beta = 0.757$ , Sig. = 0.000), and robustability ( $\beta = 0.896$ , Sig. = 0.000) in web accessibility assessment criteria on the web have a significant impact on the loyalty of customers with disabilities. According to the findings of the study. In Egyptian hotels, valuable recommendations were presented to improve web accessibility and customers with disabilities' loyalty.

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## 1. Introduction

Sambhanthan and Good (2012) declared that an accessible web was a website that anyone has been able to access, regardless of economic, geographic, or physical circumstances. Sambhanthan and Good (2013) added that web accessibility could be defined as the ease of access to websites for people with disabilities from different geographic regions or having different Internet connections. Nazli and Kesici (2018) pointed out problems that people with disabilities may face while staying in a hotel, such as inaccessible airport transfers, vehicles, restaurants, rooms, parking options, and accessible websites. According to Williams and Rattray (2005), Akincilar and Dagdeviren (2014), and Khalil and Fathy (2017), many sites were not accessible to large segments of the disabled community, and not all these websites successfully turned visitors into customers, so that the hotel operations and the destination could lose a promising share of the tourist market. Sambhanthan and Good (2012) noted that poor readability and less navigable page designs were two observable issues that posed threats to accessibility, they also added that the lack of conformity with the accessibility guidelines of the World Wide Web Consortium (W3C) and the poor design process was the specific shortcomings that reduced the general accessibility. Lazar et al. (2004) noted that there were several guidelines and tools that web designers could use to make accessible websites for CWD, these guidelines included the Web Content Accessibility Guidelines (WCAG) developed by the World Wide Web Consortium. Sambhanthan and Good (2012) claimed that these guidelines aim to improve website accessibility with a strategic focus. Research shows that people with disabilities are loyal customers and go to again destinations that offer good accessible facilities (Westcott, 2004). Stumbo and Pegg (2005) indicated that a good understanding and improve the travel experience for CWD could help tourism and hospitality businesses to maintain this loyal market.

## 2. Research Aim and Objectives

The current research aimed to investigate the impact of hotel web accessibility for customers with disabilities on their loyalty. To achieve this aim, this research focused on four objectives as follows:

1. Explore the impact of perceivability in web accessibility principles on loyalty of customers with disabilities.
2. Identify the impact of operability in web accessibility principles on loyalty of customers with disabilities.
3. Clarify the impact of understandability in web accessibility principles on loyalty of customers with disabilities.
4. Highlight the impact of robustability in web accessibility principles on loyalty of customers with disabilities.

## 3. Research Hypotheses

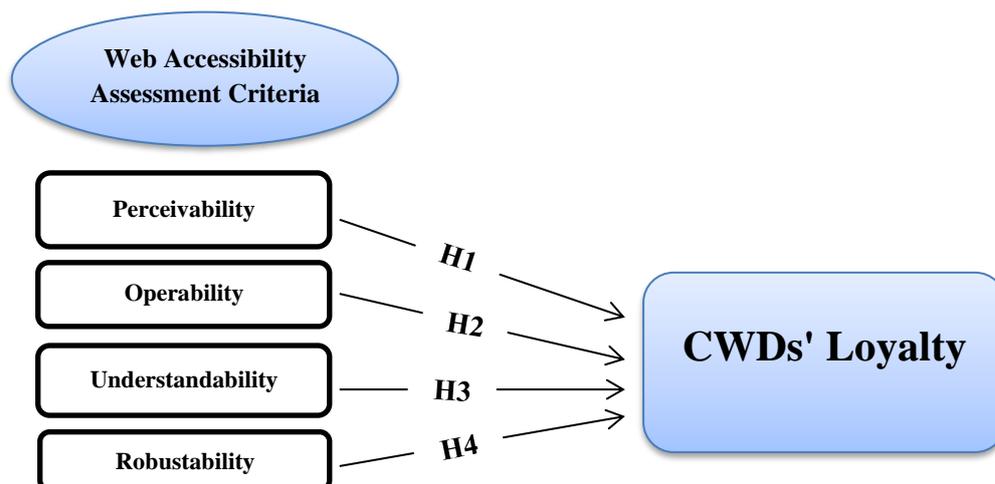
**H1:** Perceivability of web accessibility assessment criteria has no significant impact on loyalty of customers with disabilities.

**H2:** The operability of web accessibility assessment criteria has no significant impact on loyalty of customers with disabilities.

**H3:** Understandability of web accessibility assessment criteria has no significant impact on loyalty of customers with disabilities.

**H4:** Robustability of web accessibility assessment criteria has no significant impact on loyalty of customers with disabilities.

## Research Conceptual Model



**Figure 1:** Research conceptual model  
**Source:** Developed by the Researchers

## 4. Literature Review

### 4.1. Internet and Web Technology

Fossetøl (2007) and Lewthwaite (2014) indicated that Information and Communication Technology (ICT) has played a vital role for people with disabilities in improving participation in society, disability activism, and the disability movement. Areheart and Stein (2014) affirmed that people with disabilities could speak, gather, organize, and build communities through ICT, and thus increase their social participation. Harris (2010) notified that people with disabilities appreciate the increased independence when accessing ICT (computers and the Internet) devices, despite the challenges they face. Macdonald and Clayton (2013) reviewed that there were several clear economic, educational, social, and health-related advantages for the majority who have access to these devices. Kline and Ferri (2017) added that access to a computer, smartphone, or the internet impacted their lives positively.

### 4.2. Customers with Disabilities (CWD) on Web

The World Tourism Organization (UNWTO) (2013) reported that the term persons with disabilities referred to those persons with limitations or who had special needs during travel, in accommodations, and other tourist services, especially people with physical, sensory, and intellectual disabilities or other medical conditions that require special care, such as elderly people and others in need of temporary assistance. According to Xiong et al. (2009) CWD may not be able to see, hear, move, or might have difficulty trying to process some types of information, reading, and understanding text, and may not be able to use a keyboard or mouse. Paciello (2001) and Buhalis and Michopoulou (2011) agreed that the problem was that people with disabilities were not a homogeneous group and do not have the same needs, these needs must be considered when developing and offering them products and services. According to Pfenning (2002) and Ozturk et al. (2008), it couldn't be ignored that CWDs were a potentially important component of the tourism sector, opening this market could generate billions of euros for the travel industry. It was important to note that in 2005 about €96 billion was spent in Europe on travel by CWD. Grady and Ohlin (2009) mentioned that in the US, CWD spent \$13.6 billion on 31.7 million trips per year. Zsarnoczky and Istvan (2017) reported that between 2011 and 2020, the number of people with disabilities demand travel in the European 27 area increased by

1.64 percent, from 744,3 million trips to 861.9 million trips. If they could find more accurate information on accessible tourism sites, People with Disabilities (PWD) would add more than one vacation per year, traveling with more family members or friends.

Web Accessibility in Mind (WebAIM) (2020) classified the types of disability into four types that might cause difficulties when viewing a website as follows:

- The visual impairment included low vision, color blindness, and blindness.
- Auditory impairment involved deafness and hard of hearing.
- Cognitive impairment included learning disabilities, distractibility, and inability to remember or focus on large amounts of information.
- The motor impairment included inability to use a mouse, slow response time, limited fine motor control.

Henry (2007) pointed out that customers without disabilities also could benefit from web accessibility such as

- Older people.
- People with low literacy and people who are not fluent in the language.
- People with low-bandwidth connections to the Internet and those using older technologies.
- New and infrequent Web users.

#### **4.3. Accessibility Technologies**

According to UNWTO (2016), private companies and stakeholders in the tourism industry must provide their customers with accurate, relevant, and timely information before, during and after the trip. No doubt, ensuring accessible information is a key to successfully communicating with visitors at all stages of their journey.

Domínguez et al. (2018) added that the concept of accessibility involved social and technical dimensions. The social dimension entailed the right of a person to freedom from discrimination, which required the technical dimension, as reflected in an infrastructure that allowed the means to enjoy equal rights; therefore, lack of accessibility would lead to discrimination against people with disabilities, who would become marginalized and would see their quality of life reduced. Bailey (2011), Henry (2018), and the World Wide Web consortium (W3C) (2020) mentioned that there were two approaches for interacting with the Web:

- **Assistive Technologies (AT)** were software and hardware that help CWD to use the web.
- **Adaptive Strategies** were techniques that CWD used to improve interaction with the web, such as increasing text size, reducing mouse speed, and turning on captions.

Walshe and McMullin (2006) noted that assistive technologies were developed with the assumption that web design conforms to accessibility standards. Hong et al. (2008) assumed that the more a webpage complied with accessibility guidelines, the easier it was for assistive technologies to render the page according to the needs of users. Nicolau & Montague (2019) informed that assistive technologies were used to reduce barriers and enable people to fully benefit from all available opportunities through the Web. According to Craven and Nietzio (2007), Xiong (2008), and WebAIM (2020), there were many hardware and software products available for CWD to successfully interact with web content, which is called assistive technologies, to ensure online accessibility. Nicolau & Montague (2019) confirmed that AT fills the gap between users and systems. Inal et al. (2019) added that sometimes CWDs faced many difficulties, such as sites that were not designed with assistive technologies in mind, so they had web accessibility problems.

#### **4.4. Hotels Websites**

Gupta and Kim (2004) described a website as a coffee shop where people could find and talk to others with similar interests electronically. Jeon (2009) referred that customer could gather information about amenities, location, and nearby tourist attractions without having to call hotels by searching for hotel information online. Such services, which were available online, reduce the number of incoming calls from customers, reducing the amount of time that hotel employees spend answering phone calls. Employees could focus on serving in-house guests or any other necessary work, and hoteliers could effectively and flexibly assign labor power. O'Connor (2004) noted that there were difficulties in just setting up a website such as ensuring that the website should be accessible to visitors, reachable by search engines; and contained the requisite content to provide what customers want. Williams and Rattray (2005) added that if a website was not accessible to all customers, all those previous attributes would be useless. Mills et al. (2008) advised that an accessible website should ensure that all its pages were usable by everyone who has visited it. A successful website's attributes were accomplished by web design, graphic design, content structure, search strategies and user accessibility (O'Connor, 2004). World Wide Web Consortium (W3C) (2020) identified that an accessible website was designed to meet the needs, preferences, skills, and situations of different customers. While, Latif and Masrek (2010) described that the accessible website was like an accessible building that offered curb cuts, ramps, and elevators to allow customers with disabilities to enter and navigate through the building with ease. Also, an accessible web site offered a similar process.

#### **4.5. Web Accessibility**

Henry (2018) referred to web accessibility as websites, tools, and technologies were designed and developed to customers with disabilities' use. Abou-Zahra & Brewer (2019) added that web accessibility was understanding the diverse needs of users and translating them into specific requirements for designers and developers of websites, tools, and technologies. According to W3C (2020), people with disabilities should be able to perceive, understand, navigate and interact with websites, as well as upload content, due to good website design, the Web is mainly designed for all people, regardless of their hardware, software, language, location, or ability; to verify this goal, there was a set of Web Content Accessibility Guidelines (WCAG) set up to help organizations understand the accessibility for the web and the standards that should be involved. Abou-Zahra and Brewer (2019) stated that the World Wide Web is a technical standard that defined the protocols and forms needed for web function. It also constituted the backbone of web accessibility. Spina (2019) informed that web accessibility standards were dynamic and failed to develop enough to stay up to date with quick-growing online abilities, new use cases, and new technologies. In addition to meet the customers with various disabilities, additional work has been frequently required to ensure that all customers had access to the Web content. According to Xiong (2008) there were mainly two sets of standards as Section 508 from the Federal Government and Web Content Accessibility Guidelines (WCAG) from World Wide Web consortium (W3C). Brunsson et al. (2012) informed that standards were voluntary in general and did not rest on the authority but on their perceived legality and relation to the pressure exerted by third parties (in some instances). However, they could be implemented or incorporated within domestic legal frameworks by legislative provisions.

Sambhanthan and Good (2012) claimed that guidelines aim to improve websites accessibility with a strategic focus. WCAG 2.0 was built around four principles

(perceivable, operable, understandable, and robust) for making web content accessible for all: (1) Content must be made available to users in a format they could perceive with at least one of their senses (i.e., sight, hearing, touch). (2) The content must be presented in a way that users could interact with or operate on it with standard or adaptive devices. (3) Content must be presented in a way that users could understand or comprehend. (4) Content must be presented using technologies and interfaces robust enough to allow disability access, whether natively or through alternative technologies and interfaces. WCAG 2.0 established several layers of guidance. All these layers of guidance worked together to provide a reference on how to make content more accessible (W3C, 2020):

- **Principles:** There were four principles at the top which provided with web accessibility foundation: perceivable, operable, understandable, and robust.
- **Guidelines:** A total of 12 guidelines under the principles provided the basic goals that authors should work towards to make content more accessible to users with different disabilities. These guidelines were not testable but provided the framework and overall objectives to help the authors understand the success criteria and better implement the techniques.
- **Success Criteria:** For each guideline, testable success criteria were provided to allow WCAG 2.0 to be used where requirements and conformance testing were necessary such as in design specification, purchasing, regulation, and contractual agreements. To meet the needs of different groups and different situations, three levels of conformance were defined: A (lowest), AA, and AAA (highest).
- **Sufficient and Advisory Techniques:** For each of the guidelines and success criteria in the WCAG 2.0 document itself, the working group has also documented a wide variety of techniques. The techniques were informative and divided into two categories: those that were sufficient for meeting the success criteria and those that were advisory. The advisory techniques went beyond what was required by the individual success criteria and allowed authors to better address the guidelines. Some advisory techniques addressed accessibility barriers that were not covered by the testable success criteria. Where common failures were known, these were also documented.

#### **4.6. Customers with Disabilities' Loyalty**

Zeithaml et al. (2002) notified that customer loyalty (CL) could be identified as customers' behavior or attitude towards a product or service. Aminu (2012) added that customer loyalty has become one of the main objectives in all sectors, especially in tourism due to the higher level of expectations, more than other industries. Tarasietal et al. (2013) affirmed that high customer satisfaction first led to customer retention, market share, loyalty, and higher property profits. Martínez (2015) reviewed that loyal customer tended to buy more, spend a larger share of their income at the property, and tend to be less price-sensitive than other customers. Additionally, loyal customers buy more than nonloyal customers with high visit frequency. Zhang et al. (2018), Tseng et al. (2018) and Shamah et al. (2018) agreed that customer's loyalty was an effective commercial result and generated other relevant results, such as: repeated purchases, positive word of mouth, and willingness of customers to pay higher prices. Franco (1999) stated that the accessibility was an indicator of quality based on a set of international standards which facilitated use by a wider range of customers, increasing the customers' satisfaction, and therefore their loyalty. Westcott (2004) noted that customers with disabilities were loyal customers of hotels that provided good accessibility. McLellan (2011) mentioned that designing web for diversity increased CWD' number and level of involvement. Improving strategies for internet marketing

in the hospitality industry required understanding how customers have viewed new technology. Researchers have focused on defining aspects that affected the conduct of online purchases and creating e-loyalty to websites and e-services provided by accommodation facilities (Semerádová and Vávrová, 2016). Chuang et al. (2016) agreed with Simeon (1999), Kim and Stoel (2004), Victorino et al. (2005), and Obal and Kunz (2013) that expectations of customers changed as the type of customer, since the expectations of CWD from the hospitality industry was a less studied research area, an assessment was carried through the content of lodging website, which played a significant role in strategic positioning of firms, customer dependency, customer loyalty and customer satisfaction. Westcott (2004) and Ozturk et al. (2008) agreed that CWDs were loyal customers and often returned to premises that provided good accessibility. Domínguez et al. (2018) noted that offering accessible tourism services gave rise to several competitive advantages and increased the satisfaction of customers and therefore, their loyalty.

## **5. Methodology**

This study involved a quantitative approach. a web-based questionnaire conducted on a sample of customers with disabilities (106 participants), in four and five-star hotels in Red Sea province (Hurghada, Marsa Alam, and Safaga) and South Sinai province (Sharm El Sheikh). Lack of CWDs in Egyptian hotels constituted a constraint faced the researcher through collecting the data. So, the researcher was directed the online survey to the following resources to obtain the targeted sample: the reservation department in targeted hotel regions, the different Facebook groups for persons with disabilities around the world, foundations and institutions concerned with persons with disabilities, through travel and tourism websites such as trip advisor, and through personal communication with number of tour guides. The questionnaire was divided into four main sections. Section one, involved the personal data of the respondents (gender, age, type of disability, and nationality). Section 2 included hotel data (hotel grade, hotel regions, and how often CWD visit a hotel website before visiting the hotel in Egypt). Section three was designed to gather CWD disagreement or agreement levels about web accessibility assessment criteria after visiting the hotel website. It was designed based on Web Content Accessibility Guidelines (WCAG) 2.0 requirements as shown in table 5. It consisted of eighteen statements that were measured using the five-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Part four was directed to CWD to know the extension of disagreement or agreement about loyalty after visiting the hotel website. This part was designed based on the loyalty scale (Zeithaml et al., 1996). This scale has also been widely used by many researchers in tourism and hospitality context. The researchers added only one item on scale as a modification to be appropriate for the CWD questionnaire respondents and the nature of the research. This part involved six statements that were measured by the five-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. These statements are shown in table 7. To collect data from a representative sample, the researchers used the purposive sampling method as a sampling technique. According to Neuman (2014), purposive sampling is a nonrandom sample. Through it, the researchers could depend on a lot of methods to find all probable cases of a highly specific and difficult-to-reach. Purposive sampling allowed researchers to choose which elements would help him or her to answer the research questions and achieve the research's goals. The G\*Power version 3 was used to determine the appropriate sample size for the study. In statistical power analysis, Cohen (2013) discovered that the correlations between the following four variables are used: sample size (N), significance level ( $\alpha$ ), effect size ( $F^2$ ), and statistical power

(1 - β). According to Faul et al. (2007) and Cohen (2013), lead to the detection of the fourth missing variable in statistical models. The sample size was calculated three times by identifying the effect size (F<sup>2</sup>) as small, medium, and large. The sample size was calculated as follows: when the effect size F<sup>2</sup> = 0.02 (small), the sample size was 403; when F<sup>2</sup> = 0.15 (medium), the sample size was 82; and when the F<sup>2</sup> = 0.35 (large) the sample size was 37. Regarding the above results from the G\*Power program for the appropriate sample size and in line with critical issues related to cost and time. The sample size was determined using the medium effect size (F<sup>2</sup>=0.15), which was appropriate for the study population. As a result, the minimum sample size was 82. Out of 700 online questionnaires distributed to the research population, only 82 forms were returned. They were all valid forms.

**5.1. Validity of the research**

The questionnaire was validated using the peer review technique, which involved a panel of experts in the fields of hospitality management and information and communication technology discussing and reviewing the research method. Face validity was also used in this study to ensure the validity of data collection instrument. Each research objective was matched with its hypothesis using this method. Factor analysis was also used to improve the component strength (See tables No. 4 and 6).

**5.2. Reliability of the Research**

The Cronbach's Alpha test was used to ensure the questionnaire's reliability. For all scale items, the Cronbach's Alpha coefficient was calculated and found to be 0.880. Cronbach's level of more than 0.8, according to Gliem and Gliem (2003), is good for reliability. Furthermore, a Cronbach's Alpha of more than 0.7 is considered reliable (Rady et al., 2021). As shown in Table 1, the overall quality of the items was good.

**Table (1): Reliability Analysis of the Research Variables.**

The Axes	No. of statements	Alpha Coefficient
Perceivability of web accessibility assessment criteria.	5	0.922
Operability of web accessibility assessment criteria.	5	0.854
Understandability of web accessibility assessment criteria.	3	0.790
Rubostability of web accessibility assessment criteria.	5	0.849
Customers with disabilities' loyalty	6	0.983
<b>The Overall Cronbach's Alpha</b>	<b>24</b>	<b>0.880</b>

**6. Results and Discussion**

**Table 2: The Sample Characteristics Statistics**

Variable	Response	Frequency	Percent	Rank
<b>Gender</b>	Male	65	61.3	1
	Female	41	38.7	2
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>
<b>Age</b>	Less than 20 years	7	6.6	4
	More than 20 - 40 years	60	56.6	1
	More than 40 - 60 years	24	22.6	2
	Over 60 years	15	14.2	3
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>
<b>Type of Disability</b>	Visual Disability	22	20.8	3
	Auditory Disability	39	36.8	1
	Physical Disability	17	16.0	4

	Cognitive Disability	28	26.4	2
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>
<b>Nationality</b>	Egyptians	20	18.9	2
	Arabs	10	9.4	3
	Foreigners	76	71.7	1
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>

According to sex, the results in table 2 showed that the percentage of men (61.3%) in the investigated sample. It could be seen from Table 2 that the majority of the respondents were between 20 and 40 years old (56.6%), and those who were less than 20 years constituted only 6.6%. Most of the respondents had an auditory disability (36.8%), and 16% of them had a physical disability. According to the nationalities of the respondents, 71.7% were foreigners and only 9.4% were Arabs.

**Table 3: The Hotel Profile Data**

Variable	Response	Frequency	Percent	Rank
<b>Hotel Region</b>	Sharm El Sheikh	31	29.2	<b>2</b>
	Hurghada	41	38.7	<b>1</b>
	Marsa Alam	22	20.8	<b>3</b>
	Safaga	12	11.3	<b>4</b>
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>
<b>Hotel Grade</b>	Four Star	45	42.5	<b>2</b>
	Five Star	61	57.5	<b>1</b>
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>
<b>How often do CWD visit a hotel website before visiting a hotel in Egypt?</b>	Never	1	0.9	<b>5</b>
	Rarely	12	11.3	<b>4</b>
	Sometimes	31	29.2	<b>2</b>
	Often	26	24.5	<b>3</b>
	Always	36	34.0	<b>1</b>
	<b>Total</b>	<b>106</b>	<b>100</b>	<b>-</b>

Table 3 illustrated that approximately 38.7% of the respondents have visited the Hurghada hotels' websites, while only 11.3% of the respondents have visited the Safaga hotels' websites. Thus, the researchers involved all of hotels' regions to be represented in the survey. Referring to hotel grades, more than half of the participants (57.5%) visited the websites of five-star hotels. Concerning the frequency of visiting the hotels' websites before visiting the hotels, more than one-third (34%) of the respondents have always accessed a hotel website before visiting the hotel, and only 0.9% of the respondents have not accessed a hotel website before visiting the hotel.

### Web Accessibility Assessment Criteria

**Table 4: Factor Analysis of the Web Accessibility Assessment Criteria**

Statements	Loading
<b>Perceivability ( Information and Interface Components)</b>	
1. The website provides text alternatives for any non-text content such as large print, speech, symbols, or simpler language.	0.75
2. The website provides audio as an alternative to web content.	0.83
3. The website provides video as an alternative to web content (e.g., the sign language version of a web page).	0.85
4. The website provides content in different ways such as spoken aloud, simpler layout, etc.	0.88

5. The website provides easy visual and audio content.	0.82
<b>Operability (Interface Components and Navigation)</b>	
6. The website provides all functionality available from a keyboard.	0.86
7. The website provides enough time to read and use the content.	0.76
8. The website provides content that causes seizures or physical reactions, such as repeated flashes.	0.73
9. The website provides ways to navigate and find content.	0.86
10. The website provides an easy way to operate functionality through various inputs beyond keyboard.	0.76
<b>Understandability (Information and Operation of Interface)</b>	
11. The website provides readable text content.	0.79
12. The website provides understandable text content.	0.76
13. The website provides pages that appear and operate in predictable ways.	0.71
<b>Robustability (Dependable or Reliable)</b>	
14. Website content is compatible with a variety of browsers such as (Firefox, Google Chrome, etc.).	0.83
15. Website content is compatible with a variety of assistive technologies such as (screen readers, captions, transcripts, etc.).	0.72
16. Website content is compatible with a variety of media players.	0.78
17. The website content is compatible with a variety of mobile applications.	0.92
18. Website content is compatible with a variety of electronic devices	0.90
<b>Sums of Squared Loadings</b>	<b>0.81</b>

As shown in Table 4, Rady and Atia (2019) asserted that the suitable level of loading value was 0.6 for the variables. According to factor analysis, the 18 statements were responsible for changes in the variable of the web accessibility assessment criteria after visiting the hotel website with a percentage of 81%.

**Table 5: Statistics for the Web Accessibility Assessment Criteria**

Web Accessibility Assessment Criteria	Mean*	SD	Sig.	Rank
<b>Perceivability ( Information and Interface Components)</b>				
1. The website provides text alternatives for any non-text content such as large print, speech, symbols, or simpler language.	2.91	1.24	0.00	4
2. The website provides audio as an alternative to web content.	3.05	1.29	0.00	2
3. The website provides video as an alternative to web content (e.g., the sign language version of a web page).	2.85	1.25	0.00	5
4. The website provides content in different ways such as spoken aloud, simpler layout, etc.	2.92	1.23	0.00	3
5. The website provides easy visual and audio content.	3.21	1.27	0.00	1
<b>Overall</b>	<b>2.99</b>	<b>1.26</b>	<b>0.00</b>	<b>-</b>
<b>Operability (Interface Components and Navigation)</b>				
6. The website provides all functionality available from a keyboard.	2.77	1.11	0.00	3
7. The website provides enough time to read and use the content.	3.19	1.21	0.00	1
8. The website provides content that causes seizures or physical reactions such as repeated flashes.	2.34	1.08	0.00	5

9. The website provides ways to navigate and find content.	2.78	1.24	0.00	2
10. The website provides an easy way to operate functionality through various inputs beyond keyboard.	2.75	1.22	0.00	4
<b>Overall</b>	<b>2.77</b>	<b>1.17</b>	<b>0.00</b>	<b>-</b>
<b>Understandability (Information and Operation of Interface)</b>				
11. The website provides readable text content.	3.26	1.27	0.00	1
12. The website provides understandable text content.	3.22	1.31	0.00	2
13. The website provides pages that appear and operate in predictable ways.	2.60	1.14	0.00	3
<b>Overall</b>	<b>3.02</b>	<b>1.24</b>	<b>0.00</b>	<b>-</b>
<b>Robustability (Dependable or Reliable)</b>				
14. Website content is compatible with a variety of browsers such as (Firefox, Google Chrome, etc.).	2.51	1.24	0.00	5
15. Website content is compatible with a variety of assistive technologies such as (screen readers, captions, transcripts, etc.).	3.17	1.08	0.00	1
16. Website content is compatible with a variety of media players.	2.81	1.07	0.00	4
17. Website content is compatible with a variety of mobile applications.	2.88	1.12	0.00	2
18. Website content is compatible with a variety of electronic devices.	2.86	1.13	0.00	3
<b>Overall</b>	<b>2.85</b>	<b>1.13</b>	<b>0.00</b>	<b>-</b>

\*Mean of web accessibility assessment criteria after visiting the hotels' websites. SD = Standard Deviation and Sig. = significance degree of one-sample T-Test.

According to Table 5, the first assessment criterion for the variable "Perceivability" was "The website provides easy visual and audio content" (M= 3.21, SD= 1.27). This finding was in line with Bradbard and Peters (2010); Ferri and Favalli (2018), who declared that content must be made available to users in a format that they can perceive with at least one sense (i.e., sight, hearing, touch). Furthermore, "The website provides video as an alternative to web content (e.g., the sign language version of a web page)" (M= 2.85, SD= 1.25) was the most recent assessment criterion. The overall (M= 2.99, SD= 1.26). According to the researchers, this result could be due to websites' increased interest in providing audio and visual content such as images, information, and audio files over providing videos as one of the most important types of content for customers with disabilities.

The first assessment criterion for the variable "Operability" was "the website provides enough time to read and use the content" (M= 3.19, SD= 1.22). The current result was consistent with Mills et al. (2008), who stated that an accessible website should ensure that all its pages are accessible to everyone who visits it. "The website provides content that causes seizures or physical reactions such as repeated flashes," according to the last assessment criterion (M= 2.34, SD= 1.08). Overall (M=2.77, SD=1.17).

As shown in the previous table, the first assessment criterion for the variable "Understandability" was "The website provides readable text content" (M= 3.17, SD= 1.08). The current findings agreed with Bradbard and Peters (2010) and Ferri and Favalli (2018), who found that content must be presented in a way that users can understand. The researchers claimed that the previous result showed that the hotel websites in the study sample paid more attention to providing readable content for

disabled customers. "The website provides pages that appear and operate in predictable ways," according to the last assessment criterion (M= 2.60, SD= 1.14). Overall (M= 3.02, SD= 1.24). According to the researchers, providing pages that appeared to customers with disabilities and were managed in predictable ways was a negative thing because it irritated him if it appeared, and thus must be considered when designing. This meant that its absence was an indicator of good website design. The first assessment criterion was "Website content is compatible with a variety of assistive technologies such as (screen readers, captions, transcripts, etc.)", which was based on the variable "Robustability" (M= 3.17, SD= 1.08). This finding agreed with Slatin and Rush (2003), who stated that the information on the websites could be accessed directly or via assistive technologies. Furthermore, an accessible website had to be flexible enough to work with all of these assistive technologies. "Website content is compatible with a variety of browsers such as (Firefox, Google Chrome, etc.)", was the last assessment criterion (M= 2.51, SD= 1.24). The previous result agreed with Akgül and Vatansever (2016); W3C (2020), who stated that making web browsers and media players usable and operable for customers with disabilities is possible through assistive technologies. The overall (M=2.85; SD=1.13). Based on these findings, the researchers discovered that the hotel websites in the sample population were more concerned with content directly or through assistive technologies, but not with the website's content compatibility with different web browsers and that this point was lacking.

All variables had a p-value of (0.00) in the one-sample T-test. There were significant differences between the test value "4" and the means of the perceivability, operability, understandability, and robustability dimensions. This value was chosen because it referred to a degree of "agreement" and was a good fit. In other words, respondents' responses to all statements were lower than the test value, indicating that (perceivability, operability, understandability, and robustability) in web accessibility assessment criteria were lower than the standard level after visiting the hotel website. This meant that web accessibility standards for websites for customers with disabilities were lacking.

### Loyalty of the Hotel Website

**Table 6: Factor Analysis of Loyalty after Visiting the Hotel Website**

Statements	Loading
1. I say positive things about this hotel website to others.	0.91
2. I recommend this hotel website to my friends and family.	0.96
3. I encourage friends and relatives to do business with this hotel website.	0.93
4. I consider this hotel website my first choice when I want to purchase the hotel's services.	0.88
5. I am willing to do more business with this hotel website in the next few years.	0.91
6. I would consider myself loyal to this hotel website.	0.95
<b>Sums of Squared Loadings</b>	<b>0.92</b>

Table 6 illustrated that all six statements responsible for changes in the variable of loyalty after visiting the hotel website with a percentage of 92%.

**Table 7: Statistics for Loyalty after Visiting the Hotel Website**

Loyalty after Visiting the Hotel Website	Mean*	SD	Sig.	Rank
1. I say positive things about this hotel website to others.	3.15	1.27	0.00	3
2. I recommend this hotel website to my friends and family.	3.19	1.29	0.00	1
3. I encourage friends and relatives to do business with this hotel website.	3.07	1.29	0.00	4
4. I consider this hotel website my first choice when I want to purchase the hotel's services.	2.96	1.31	0.00	6
5. I am willing to do more business with this hotel website in the next few years.	3.04	1.25	0.00	5
6. I would consider myself loyal to this hotel website.	3.16	1.32	0.00	2
<b>Overall</b>	<b>3.09</b>	<b>1.24</b>	<b>0.00</b>	<b>-</b>

\*Mean of Loyalty after Visiting the Hotel Website; Where 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5=Strongly Agree. SD = Standard Deviation and Sig. = significance degree of one-sample T-Test.

The tabulated data in table 7 involved that there were six statements about loyalty after visiting the hotel website. The first one according to participants' responses was "I recommend this hotel website to my friends and family", (M= 3.19, SD= 1.29), the current result agreed with Zhang et al. (2018); Tseng et al. (2018) and Shamah et al. (2018) that customer's loyalty was an effective commercial result and also generated other relevant results, such as: repeated purchases, positive word of mouth, and willingness of customers to pay higher prices. On the other side, "I consider this hotel website my first choice when I want to purchase the hotel's services" was ranked as last statement (M= 2.96, SD= 1.31), this result conformed with Tarasietal et al. (2013) that high customer satisfaction firstly led to customer retention, market share, loyalty, and also higher property profits. It also agreed with Martínez (2015) that loyal customers tended to buy more, spent a larger share of their income at the property, and they also tended to be less price-sensitive than other customers. Additionally, loyal customers bought more than non-loyal customers with high visit frequency. The overall (M= 3.09, SD= 1.24). The p-value of the one-sample T-test was (0.00) which indicated that there were significant differences between loyalty after visiting the hotel website and the test value (4), this value was selected because it was a suitable value that referred to a degree of "agreement". In other words, respondents' responses of all statements were less than the test value; this result meant that loyalty after visiting the hotel website were less than the standard level.

The researchers adopted the linear regression coefficients for testing the hypotheses as follows:

**Table 8: Linear Regression Coefficients for the Impact of Perceivability in Web Accessibility Assessment Criteria on Customers with Disabilities' Loyalty.**

Dependent Variable		Independent Variable
		Perceivability in Web Accessibility Assessment Criteria
Customers with Disabilities' Loyalty	R	0.870
	R <sup>2</sup>	0.757
	Sig.	0.000
	Constant	0.159
	β	0.983

As shown from table 8, there was a strong significant correlation between perceivability in web accessibility assessment criteria and customers with disabilities' loyalty ( $R=0.870$ ), as well as  $R^2$  was 0.757. The Sig. value was (0.00) (less than (0.05)) suggesting that, the null hypothesis of the research was not accepted. Furthermore, the statistical constant ( $\alpha$ ) has equaled 0.159, whereas  $\beta$  equal 0.983, with a significance level less than 1%. The previous result suggested the following equation:

$$\text{Customers with Disabilities' Loyalty} = 0.159 + (0.983 * \text{Perceivability in Web Accessibility Assessment Criteria})$$

Hence, the first hypothesis was supported. Perceivability in web accessibility principles has a significant impact on customers with disabilities loyalty.

**Table 9: Linear Regression Coefficients for the Impact of Operability in Web Accessibility Assessment Criteria on Customers with Disabilities' Loyalty.**

Dependent Variable		Independent Variable
		Operability in Web Accessibility Assessment Criteria
Customers with Disabilities' loyalty	R	0.722
	$R^2$	0.521
	Sig.	0.000
	Constant	0.439
	$\beta$	0.960

Table 9 referred that there was a strong significant correlation between operability in web accessibility assessment criteria and customers with disabilities' loyalty ( $R=0.722$ ), as well as  $R^2$  referred to the determination coefficient was 0.521. Moreover, the Sig. value was less than 0.05 (0.000). The research did not accept the null hypothesis and accepted the alternative hypothesis. Furthermore, the statistical constant ( $\alpha$ ) has equaled 0.439 with a significance level less than 5%, whereas  $\beta$  has equaled 0.960, with significance level less than 1%. From the previous result, the following equation was suggested:

$$\text{Customers with Disabilities' Loyalty} = 0.439 + (0.960 * \text{Operability in Web Accessibility Assessment Criteria})$$

Thus, the second hypothesis was supported. Operability of web accessibility principles has a significant impact on customers with disabilities loyalty.

**Table 10: Linear Regression Coefficients for the Impact of Understandability in Web Accessibility Assessment Criteria on Customers with Disabilities' Loyalty.**

Dependent Variable		Independent Variable
		Understandability in Web Accessibility Assessment Criteria
Customers with Disabilities' loyalty	R	0.637
	$R^2$	0.405
	Sig.	0.000
	Constant	0.802
	$\beta$	0.757

Table 10 indicated that there was a strong significant correlation between understandability in web accessibility assessment criteria and customers with disabilities' loyalty ( $R=0.637$ ), as well as  $R^2$  was 0.405. Sig. value was (0.00) (less than (0.05)) suggesting that, the null hypothesis of the research was not accepted. On

the other hand, the statistical constant ( $\alpha$ ) has equaled 0.802, whereas  $\beta$  has equaled 0.757, with significance level less than 1%. The previous result suggested the following equation:

**Customers with Disabilities' Loyalty = 0.802 + (0.757 \* Understandability in Web Accessibility Assessment Criteria)**

*Therefore, Understandability of web accessibility principles has a significant impact on customers with disabilities loyalty*

**Table 11: Linear Regression Coefficients for the Impact of Robustability in Web Accessibility Assessment Criteria on Customers with Disabilities' Loyalty.**

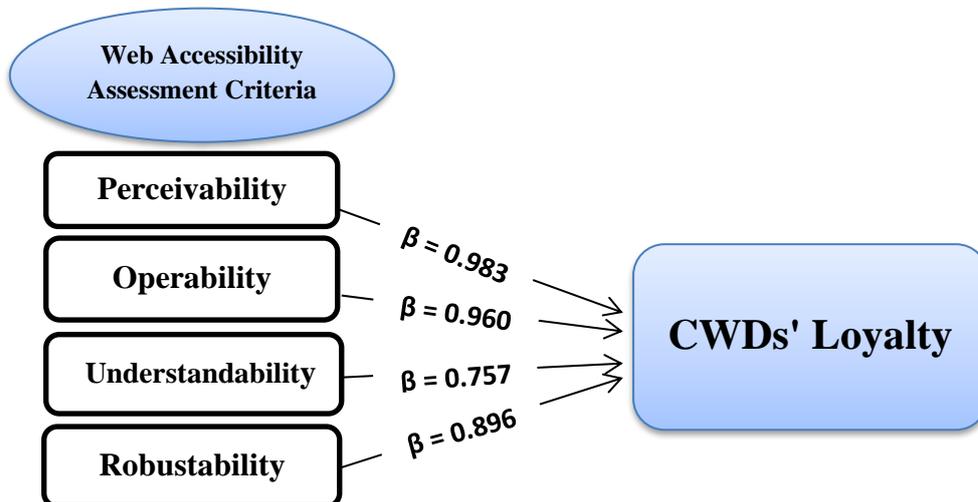
Dependent Variable	Independent Variable	
	Robustability in Web Accessibility Assessment Criteria	
Customers with Disabilities' Loyalty	R	0.645
	R <sup>2</sup>	0.416
	Sig.	0.000
	Constant	0.546
	$\beta$	0.896

From table 11, there was a strong significant correlation between Robustability in web accessibility assessment criteria and customers with disabilities' loyalty (R=0.645). R<sup>2</sup> was 0.416. The Sig. value was (0.00) (less than (0.05)) suggesting that, the null hypothesis of the research was not accepted. Moreover, the statistical constant ( $\alpha$ ) has equaled 0.546, whereas  $\beta$  has equaled 0.896, with significance level less than 1%. The previous result suggested the following equation:

**Customers with Disabilities' Loyalty = 0.546 + (0.896 \* Robustability in Web Accessibility Assessment Criteria)**

*Hence, Robustability of web accessibility principles has a significant impact on customers with disabilities loyalty.*

**6.1. The Empirical Research Model**



**Figure 2:** The Empirical Research Model.

**7. Conclusion and Recommendations**

By using a web-based questionnaire, this research applied a quantitative approach. 106 participants from customers with disabilities in four and five-star hotels in the Red Sea Governorate (Hurghada, Marsa Alam, and Safaga), and the South Sinai Governorate (Sharm El Sheikh). Customers with disabilities' levels of disagreement or agreement about web accessibility assessment criteria after visiting the hotel website

and its impact on loyalty after visiting the hotel website were gathered using a five-dimensional Likert scale. To assess the research tool's reliability and validity, the Cronbach's Alpha coefficient and the factor analysis test were used. The G\*Power version 3 was used to determine the optimal sample size. The data was statistically analyzed using SPSS version 22. The results indicated that most of the respondents were males, between 20s and 40s years old, with auditory disabilities, and Foreigners. Approximately 38.7% of the respondents visited Hurghada hotels' websites, more than half of the participants visited five-star hotels' websites, and most of the respondents had always accessed a hotel website before visiting the hotel. Concerning the web accessibility assessment criteria (perceivability, operability, understandability, and robustability), the attitude of participants' responses ranged from disagree to neutral with its statements. It meant that there were lacks of Egyptian hotels web accessibility criteria. According to loyalty participants' responses attitude, it also ranged from disagree to neutral. It referred to how a customer's loyalty influenced the presence of web accessibility assessment criteria. The findings of the research indicated that perceivability, operability, understandability, and robustability in web accessibility assessment criteria influenced significantly on customers with disabilities loyalty. The research contained human, time, and place limitations. The human limitations were customers with disabilities who were intended in the study (visually, auditory, cognitive, and physically impaired). The time limitations were the time of conducting the practical part of the study. It was from November 2021 to February 2022. The place limitations were choosing four, and five-star hotels located in Red Sea province (Hurghada, Marsa Alam, and Safaga) and South Sinai province (Sharm El Sheikh) as places for conducting the study. The researcher faced some barriers during the study. The first barrier was related to literature review where there was a lack of books and data sources about customers with disabilities' loyalty and its relation with web accessibility in the hospitality industry. The second barrier was about lack of CWDs in Egyptian hotels that constituted a constraint through collecting the data. The third barrier was related to using of the quantitative approach although its extensive and effective results but using the qualitative approach would have provided more diverse and enriching results. Further research could be conducted using qualitative approach to enrich and expand more results. Further research could be conducting a comparative study between independent and chain hotels in Egypt concerning web accessibility.

The current research suggested some recommendations to hotels management as follows:

1. The hotel management should provide video as an alternative to web content (e.g., the sign language version of a web page) in its website.
2. The hotel website should be provided with text alternatives for any non-text content such as large print, speech, symbols, or simpler language.
3. The hotel management should avoid content that causes seizures or physical reactions such as repeated flashes in its website.
4. The hotel website should be provided with an easy way to operate functionality through various inputs beyond keyboard.
5. The hotel management should avoid pages that appear and operate in predictable ways in its website.
6. The hotel website should be provided with understandable text content.
7. The hotel website content should be compatible with a variety of browsers such as (Firefox, Google Chrome, etc.), and different media players.

8. The hotel management could encourage customers with disabilities to share their experiences with its personnel about web accessibility criteria leakage.
9. The hotel website should be accessible through its interface and high-quality services for customers with disabilities to improve their online product brokering efficiency by reducing the cost of information search and improving the quality of their decision-making.

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## تأثير إتاحة الوصول إلى المواقع الإلكترونية للعملاء متحدى الإعاقة على ولائهم في الفنادق المصرية

### الملخص العربي

يشكل العملاء متحدى الإعاقة شريحة كبيرة ومنتامية من السوق. ولقد أدى تقديم خدمات إتاحة الوصول إلى العديد من المزايا التنافسية، فضلاً عن زيادة رضا العملاء وولائهم. يهدف هذا البحث إلى استكشاف تأثير إتاحة الوصول لمواقع الفنادق الإلكترونية للعملاء متحدى الإعاقة على ولائهم. تم استخدام المنهج الكمي في هذا البحث، وتم كذلك إجراء استبيان على شبكة الإنترنت لعينة مكونة من 106 مشارك من العملاء متحدى الإعاقة في الفنادق المصرية ذات الأربع و الخمس نجوم بمحافظة البحر الأحمر متمثلة في الغردقة، مرسى علم، وسفاجا، ومحافظة جنوب سيناء متمثلة في شرم الشيخ. تم تحليل بيانات البحث باستخدام مقاييس الإحصاء الوصفي اختبارات T ومعادلات الانحدار الخطي. وكشفت الدراسة أن هناك ضعفا في إتاحة الوصول لمواقع الفنادق الإلكترونية للعملاء متحدى الإعاقة بالفنادق المصرية. كما أشارت نتائج البحث إلى أن الإدراك والتشغيل والفهم والقوة في معايير تقييم إتاحة الوصول لمواقع الفنادق الإلكترونية كان لها أثرا كبيرا على ولاء العملاء متحدى الإعاقة. قدم هذا البحث مجموعة من التوصيات اللازمة لتعزيز إتاحة الوصول للمواقع الإلكترونية وولاء العملاء متحدى الإعاقة للفنادق المصرية.

**الكلمات المفتاحية:** العملاء متحدى الإعاقة، الفنادق المصرية، إرشادات إتاحة الوصول إلى محتوى المواقع الإلكترونية، إتاحة الوصول، الولاء.