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► To cite this version:

Raghuram Balaga. Accessibility Issues in Indonesian E-Commerce Portals: Issues and Recommendations for Business Improvement and Growth. International Working Conference on Transfer and Diffusion of IT (TDIT), Dec 2020, Tiruchirappalli, India. pp.581-591, 10.1007/978-3-030-64861-9_51 . hal-03744813

HAL Id: hal-03744813

<https://inria.hal.science/hal-03744813>

Submitted on 3 Aug 2022

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Accessibility issues in Indonesian E-commerce Portals: Issues and Recommendations for Business Improvement and Growth.

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Abstract.

E-commerce is the fastest and most profitable business that has a global presence. E-commerce companies can attain more profits by creating an accessible environment so that visually challenged consumers can access the website hassle-free. This research work focuses on the identification of accessibility issues in Indonesian E-commerce portals and certain recommendations have been suggested. E-commerce companies in Indonesia can use these recommendations to correct accessibility issues. All the Homepages of three top E-commerce portals have been analyzed using TVT (Total Validator Test) accessibility checking software and few accessibility issues have been identified. Ecommerce companies can identify the accessibility issues and use these recommendations to increase their userbase and finally they can reach the targeted goals and attain more profits.

Keywords: Accessibility, E-commerce companies, profitable business, Issues, Growth

1 Introduction

Indonesia is the fourth largest country in terms of population, and Indonesia has more than 17000 islands making it one of the most island-clustered country. Due to this, the Indonesian government facing many problems in providing quality health care or eye care services to the people who are living in remote locations. According to the report provided by WHO, there are around 3% of the people who are suffering from visual impairments and in Indonesia, most of the eye care centers are maintained by Government or NGOs or Defence organizations[2]. Cataract has been considered as one of the most prevalent visual impairment among the Indonesian population and other

impairments include glaucoma. Since many visually challenged people in Indonesia want to use online services to purchase daily necessities or any other requirements, it is of utmost importance to make the E-business services compatible to visually challenged so that they can use those services hassle-free[3].

The Internet is everywhere, and in every house, there is a computer and Nowadays many people in Indonesia are using smartphones with internet connectivity. A lot of technological advancements such as screen readers and display readers came into existence to fulfill the requirements of visually challenged people. With the advent of Information and communication technology in Indonesia, the growth of the online retail business has reached astronomically [4][5][7]. The main objective of this re- search work is to suggest commendable changes in the existing E-business chain in Indonesia and make it accessible to visually challenged people. On implementing these changes companies can increase their user base and can gain goodwill for making their valuable services accessible to all Indonesians.

Indonesian E-commerce is growing rapidly these days. The market potential of the E-commerce sector is growing exponentially. Since there is a huge scope of E-commerce sector companies often try to engage more consumers by portraying creative and innovative offers, In such a competitive environment, companies fail to address the issues of core and potential consumers. In this paper, such type of potential consumer problems has been addressed. Possible suggestions have been mentioned for the enlightenment of the business and increasing the accessibility levels. The ultimate aim of any E-commerce is to increase the business potential in the form of increasing consumers and increasing conversion [6]. To any E-commerce company, these are the two important and essential parameters for growth and existence. Increasing accessibility will suffice these two aspects, the Conversion rate of visually challenged consumers will increase to a significant percentage if and only if the accessibility issues are rectified. The entire evaluation has been done manually using an accessibility tool called TVT, using that tool, all the three E-commerce portals have been examined thoroughly.

1.1 Reason for Examining the Accessibility of E-commerce portals

Since E-commerce websites are more dynamic, it is evident that there could be some issues in accessibilities that are ignored by the companies. In several cases, the accessibility levels are not up to the guidelines. Consumer visits the web portal in several stages such as product listing, purchasing, and billing section. The problem with website accessibility is the web developers who designed the portal are not disabled, hence they cannot exactly understand the problems of visually challenged people or people with disabilities. When visually challenged consumers try to interpret the information using the screen reader, they tend to get misfocused because of the complexity and misrepresentation of the portal elements. In simple terms, accessibility means making the portal more user friendly to all types of people. Disabled people should feel comfortable in accessing the portal, increasing perceived impression, Understandable text and context will enable the user to more interact with the portal for longer durations. Robustness of the content is another key aspect because the content must be exactly interpreted by assistive technologies. E-commerce portal consists of text and non-text elements. Images are widely present in all most all the E-commerce portals, decoding the images and content present on the images will be a problem for

visually challenged consumers, hence examining the webpage thoroughly is very important and essential these days.

1.2 Problem statement

Ecommerce portals ignoring the persons with disabilities, despite advanced web portal technology, still there exists certain accessibility issues in these E-commerce portals. Visually challenged people are facing a lot of problems in interpreting the contents on the website. This can impact the revenue because the visually challenged consumer is also a potential buyer. Ecommerce portals should resolve these issues periodically and systematically.

1.3 Objectives of this research work

1. .To identify the accessibility issues (related to visually challenged people) in the Existing Indonesian E-commerce portals.
2. To design a research model to find accessibility issues.
3. To determine the accessibility issues using TVT software.
4. To suggest the necessary corrections for better accessibility of the portal.

1.4 Impact of accessibility on Business Growth

Increases the Innovation

The increasing accessibility level of the website always helps in standing ahead from competitors in innovation perspective, because in the field of E-commerce competitors always create unique propositions by creating innovative page layouts, discount coupons, and attractive images. Increasing accessibility is the best strategy. Accessibility innovation can be done at various stages. Auto screen magnifiers and adjustable screen font will help visually impaired consumers who have low vision.

Legal compliance

According to W3C guidelines, an E-commerce website should be accessible to all, so maintaining the portal to better accessibility conditions is also a favorable aspect from a legal perspective because law enforcement guidelines must be followed.[10]

Increasing the market size

There will a huge visitor growth for the E-commerce portals because visually challenged persons will visit the portal more frequently, perhaps there will more returning consumers than previous.[9][10], Price competition always exists as a competitive element in digital commerce, competitors tend to lower the price more frequently. So, it is very difficult to survive in the E-commerce market if the market size is limited.

2 Literature review

Indonesian E-commerce sector is growing at a rapid rate, a lot of foreign investors are considering Indonesia as one of the most profitable and advantageous countries for E-commerce. People are more compelled towards online purchasing because of the time and price aspect. Consumers can also choose over a wide range of products through the portal[3]. Generally, E-commerce portals mention the product specifications in the form of images, and descriptions or brief specifications of the products. Using screen readers, visually challenged persons can understand the product specification but speech synthesizer cannot decode the image of the product. This is one of the major problems encountered by visually challenged people while shopping online using an E-commerce portal[4]. WCAG gave certain regulations regarding website design standards and E-commerce companies must consider those guidelines while designing the portal. The E-commerce market in Indonesia has grown rapidly in the last few years and many people in Indonesia are opting to purchase online because they have an option to choose a wide range of products and they can also choose their favorite product from billions of available products. The total revenue generated from E-commerce is around 8 billion dollars annually(Bose, 2014).

According to a survey report, there are around 77 million active Internet users in Indonesia, compared to other countries, Internet users in Indonesia are growing rapidly. Mobile users are also growing rapidly because of the advent of mobile technology(Aribawa, 2016b). This scenario gave a chance to many companies to enter into the B2C market. Apart from the rapid technological advancement, the Indonesian economy has shown significant growth in these years. Because of economic growth and advancement, people in Indonesia are more interested in spending their disposable income. Online consumers are from a middle-class background(Sohaib & Kang, 2017). Another noticeable fact is 'convenience' since online shopping is more convenient. Visually challenged consumers often use screen reader software to access the E-commerce portal for shopping, but the unfavorable aspect of screen reader software is it cannot decode the images on the portal. Hence certain elemental text must be included. JAWS is the major software, almost used by 82% of visually challenged consumers to purchase the products online.

2.1 Accessibility guidelines

According to the rules and regulations provided by the web content accessibility (W3C), the websites must follow these rules and regulations(Bai et al., 2019) ., Descriptive titles are to be mentioned in every page, Labels must be mentioned in all pages, In case of images and other graphical elements, necessary site description should be provided, so that speech synthesizer can decode the information to visually challenged consumers[8]. There should be a universal webpage that can be accessed by all the people irrespective of their disabilities, the most common problems that are observed during accessing the portal is broken tags, Image positioning is not available According to the web content accessibility guidelines, there are 4 important principles that must be considered before developing a web portal. The first principle is perceptiveness, as the name itself indicates that the website should be easy to read and interpret fast. The content should not be limited to only a certain class of people, it should be universal

and more relevant to all the people. In case, if there is any form of graphical elements, corresponding should be mentioned clearly. Information should not be complex; it should be clear and neat. It needs continuous modification and updating. The second most important principle is the ease of operation. The consumer should be able to access the information on the portal using keyboard strokes and also mouse buttons, both actions should yield similar results. Sometimes, for the skip notification section, mouse operation can be used as an alternative to keyboard strokes. User navigation should be simple and deterministic. Understandability and Robustness are two important principles, the content present on the website should be easy to read and the website should run on all types of browsers.

2.3 Websites chosen for the study

Bukalapak is one of the fastest-growing E-commerce companies in Indonesia, Apart from E-Commerce, Bukalapak has expanded its business to flight and train ticket booking services. This implies that the company is keen on business expansion through diversified strategies. According to the survey report, the percentage of mobile traffic is high compared to other digital access systems. Lazada, Another E-commerce company that has a huge presence in Indonesia. Started as a small online platform for goods, with continuous growth it has reached to 2nd largest E-commerce portal in Indonesia. It has got showering investments from many giants such as Alibaba. The business model of Lazada is similar to other E-commerce portals, Elevenia is started with a motto price, convenience, and trust. Now it has become word of mouth for its speed of delivery and competitive pricing strategies.

2.4 W3C guidelines for accessibility of web portal

Ecommerce companies must follow these additional guidelines to improvise the scale of Business. Updating the portal with ample software assistive technologies such as screen reading addon and magnifier addon for consumers with low or minimal vision. Checking the accessibility aspect, time to time to gauge the level of performance of accessibility tools. Considering the feedback from visually challenged consumers, through speech messages or using chatbots, talking chatbots must be established on the Homepage of these Ecommerce portals. While displaying the discounts or offers, Heavy Red-colored font must not be used, because consumers who are suffering from color blindness cannot access the portal freely. All the product-related information must be recorded, so that visually challenged consumers can immediately access the information by clicking the speech navigation button. Product description must be short and lengthy, complicated sentences shall be avoided. It is very important to add ALT text to Text (HTML format) because screen readers often find difficulty in decoding the text without ALT. The web design team must implement commercial applications such as Dream weaver because they have inbuilt accessibility guidelines.

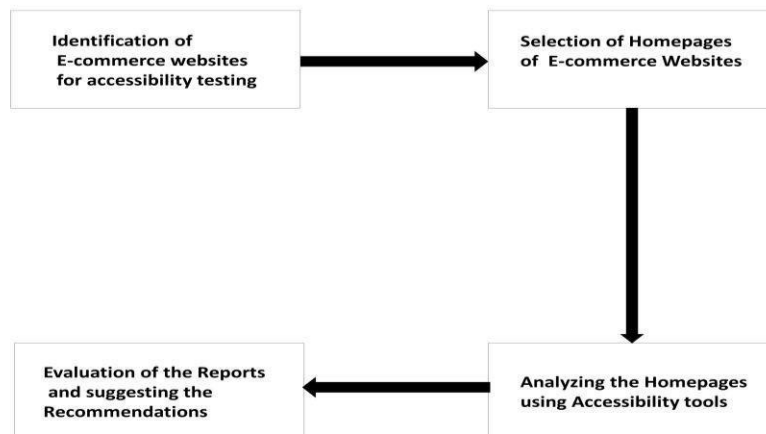
2.5 Accessibility testing using TVT software

Using TVT software multiple aspects can be tested and reports can be generated in seconds, this software has predominant importance in designing the web portals and considering the level of accessibility in all these aspects. Different errors such as HTML errors, CSS errors, broken links errors can be identified using this software. TVT can also check for spellings in the webpage, that may cause misrepresentation and disturbance because text readers don't have autocorrection feature. Hence all the text present on the portal must be checked thoroughly. Using TVT we can test the portal offline and we can ensure that the page is free from all types of errors and then the page can be uploaded. TVT can be used in all platforms, Windows, Mac, Linux, etc.

3 Research methodology

Accessibility checking tools have been used to check the accessibility of E-commerce portals in Indonesia. A four-step model has been used in this methodology, Identification, selection, Analysis, Evaluation of the reports.

Fig. 1. Research model representing four Sequential Steps



Step 1: Identification of Ecommerce websites

Three top E-commerce websites have been chosen for this study; the websites are selected based on the annual number of visitors. Website statistics have been collected using online information sources. All the websites, more or less have equal characteristics and they offer similar product catalog. But each Ecommerce portal has its unique strategy for business growth. Certain key information such as information processing, security aspect, and several landing pages has been collected from the online sources to identify the foresaid Ecommerce companies. B2C category E-

commerce portals offers a wide range of products to the consumers and consumers can select the products and they can buy those products using debit or credit card numbers or using internet banking. Since the focus area of this study is related to the accessibility issues of visually challenged consumers, only viewing and clicking aspects have been considered. Accessibility issues in order and payment have not been discussed in this paper.

Step 2: Selection of Homepages of these websites

Homepages are only considered for analyzing the accessibility because it is very difficult to analyze all the pages of E-commerce portals and it is evident that people visit Homepages and navigate through the entire portal using navigation buttons. Only home pages are selected in this study because it is very difficult to perform accessibility tests on all the pages of a particular E-commerce website. The following parameters have been considered while selecting the Homepages of these websites.

Step 3: Analyzing Homepage using TVT accessibility testing software

TVT tool has been used to check the accessibility in all aspects such as HTML pages, color contrast levels, buttons, navigation, mobile compatibility, Text to speech, size of the font, and WCAG guidelines. All these accessibility tools are designed according to international guidelines issued by WCAG. Total validator test software has been considered as one of the best software to test the accessibility levels of the portal, this software has many advantages compared to other software, Before uploading the webpage to the server, the developer can subject the webpage to test the accessibility levels, TVT software can determine HTML errors, webpage accessibility warning, and other minor and neglected issues. In this software, the URL of the E-commerce portal must be entered, it automatically verifies the URL and its analysis of the page and reports the errors. The best part of this software, apart from analyzing the portal it also segregates the errors into various categories and it assigns the codes for interpretation of those warnings. Further details regarding the interpretation of those have been explained in the results section. The warning is mentioned in numbers preceded by codes.

Step 4: Evaluating the report and Suggestion of Recommendations

After analyzing all the 3 E-Commerce portals, the generated reports have been studied and compiled in tabular form, after finding the pertaining issues, recommendations have been suggested to increase the accessibility levels of all these E-commerce portals. Apart from the specified suggestions certain other suggestions also mentioned for Business development and engagement of visually impaired consumers. Business improvement recommendations are provided in specific to Indonesian E-commerce because E-commerce business potential varies from one country to another. However, these mentioned business recommendations can be very helpful for the improvement of the portal and creating more impact than the present.

Among these five E-commerce portals, three of them have been chosen for this study, the following table represents the specific details of these portals and categorization (Business to Business, Business to Consumer, Consumer to Consumer)

Table 1: Details of Ecommerce companies offering their services in Indonesia

Ecommerce portal	Type	Annual visitors	Product
Lazada	Category Business to consumer	50 million+	Retail goods
Tokopedia	Consumer to consumer and Business to Consumer	45 million +	Retail goods
Bukalapak		28 million +	Retail goods
Elevenia	Consumer to consumer and Business to consumer	30 million +	Retail goods
Blibli	Consumer to consumer		
	Business to consumer	25 million +	General and electronic goods

4 Results and Interpretation

After analyzing the website homepages, these are the issues that have been identified and necessary recommendations have been suggested to mitigate these issues and these recommendations must be followed to make the website accessible to visually challenged.

4.1 Interpretation of TVT Accessibility analysis report

W001 warning is related to attribute, white spaces shall not be added to the attributes. W001 issue is the most neglected and ignored issue, there are 13 issues related to attribute errors that might cause difficulty in accessing the portal more frequently. W619 is a warning related to the missing name attribute in the element, 2 W619 warnings have been found in the Home page of Lazada portal. W860 warning is related to compliance of W3C guidelines, it states that ALT test is left empty, it may result in difficulty in accessing the portal in some situations where the consumer uses screen

recorder software to decode the information on the portal. W868 error is related to the multiple links that may cause confusion for visually impaired consumers, Links that are not essential shall be removed and utmost care must be taken to avoid the combination of multiple links. W874 is related to skip navigation, This warning highlights that skip navigation is missing on the Homepage of Lazada. W884 discusses mouse and keyboard equivalent, for some actions, consumers rely on the mouse pointer. To provide more comfort all the keyboard actions shall be provided with equivalent mouse pointers.

Accessibility analysis report – Total validator test software

```

Start page:      https://www.lazada.co.id
Started at:      2020/06/21 05:37:30 IST
Time taken:      8 seconds
Validator Version: 15.0.2
Total pages checked: 1
Total pages with issues: 1
[+] Total errors found: 592
[-] Total warnings found: 45
    Parsing [13]: W001 [13]
        HTML [2]: W619 [2]
  
```

Fig. 2. Homepage of Lazada and TVT accessibility test results.

4.2 Interpretation of the TVT accessibility analysis report (Bukalpak)

W001 indicates the warning related to the presence of whitespace before an attribute value. W618 is related to an obsolete attribute value, web browsers such as google chrome, Internet explorer and firefox will not consider the obsolete attributes. So, while designing the webpage, the CSS should be managed properly, so that W618 can be avoided. W619 is common in both the portals: Lazada and Bukalpak. W860 warning is related to decoding of image attributes, Text reading software cannot perfectly decode the image attributes. White spaces must be avoided. W874 is common in both the portals, this warning is related to skip navigation option.

Accessibility Analysis report – TVT software

Start page: <https://www.bukalapak.com>
 Started at: 2020/06/24 10:08:24 IST
 Time taken: 1 seconds
 Validator Version: 15.0.2
 Total pages checked: 1
 Total pages with issues: 1
 + Total errors found: 51
 - Total warnings found: 7
 Parsing [2]: **W001** [2]
 HTML [3]: **W618** [2], **W619** [1]
 WCAG21 A [2]: **W860** [1], **W874** [1]

Fig. 3. Homepage of Lazada and TVT accessibility test results.

4.3 Interpretation of TVT accessibility analysis report (Elevania)

Elevania has the highest number of accessibility warnings compared to Lazada and Bukalapak. Attribute error exists common in all the three E-commerce portals. W860 is also common in all these E-commerce portals. W872 is a warning related to changing with keyboard strokes. Warning related to mouse and keyboard equivalents W884 is also present in Elevania. W895 warning identifies that the submit button is missing on the Homepage of the E-commerce portal and it causes several misinterpretations while accessing the portal.

```

Start page:      https://www.elevenia.co.id
Started at:     2020/06/25 03:18:09 IST
Time taken:     2 seconds
Validator Version: 15.0.2
Total pages checked: 1
Total pages with issues: 1
Total errors found: 178
Total warnings found: 109
  Parsing [22]: W001 [22]
    HTML [5]: W614 [1], W618 [4]
  WCAG21 A [82]: W860 [2], W863 [1], W867 [67], W872 [2], W874 [1], W884 [1], W892 [1], W895 [7]

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Fig. 4. Homepage of Elevenia and TVT accessibility test results.

5 Discussion and Recommendations

These issues identified using TVT total accessibility testing software. These results represent the overview of no. of accessibility issues in these E-commerce portals. One important aspect is visually challenged consumers use the mouse instead of the keyboard since the keyboard has a lot of complicated keys, they often feel that using a mouse can be an option to better access the portals. The navigation menu should be made more accessible to the visually impaired consumers, To do that Navigation menu shall be equipped more mouse oriented rather than complex keyboard naviga- tions. All the navigation menus consist of submenus, that provide more information related to categorical product listing. So, while navigating, visually challenged con- sumers often get confused due to multiple submenus, and multiple landing pages with complex hyperlinks. High graphical content and complex sentences should be avoided in navigation menus and submenus. Tags must be added so that the screen reader can read the main page first and the remaining pages next. Screen readers cannot decode the buttons, text present on the buttons should be readable and short and more in- formative. The time factor is also an important aspect, Nowadays, many E-commerce companies are focusing on this aspect. The process of viewing, purchasing should not be time- consuming. For Normal consumers, this wouldn't be a big deal but for visual- ly challenged consumers, time is the most important aspect when it comes to access- ing the E-commerce portal because whatever the screen reader says they should memorize it first and they should proceed to the next step accordingly. Heterogeneity of the content often disturbs the visually challenged consumers and it creates more entropy. Information should be limited and ample. It also helps the portal to load much faster compared to high content portals. Adding shorter text, shorter images helps the visually

challenged consumers to access the portal at a better speed. One menu is sufficient and through that menu using hyperlinks, other submenus shall be made accessible, because while operating the screen reader visually challenged consumers need to listen to all the elements that are present on the main menu, this creates a little stress in remaining connected to the content flow. Before selecting the favorite product, visually challenged consumers want to listen to the product description. Hence product description should be shorter in length and it should be meaningful and convective. If the consumer has a product of his own choice, Consumers will enter the product name using speech software or braille enabled keyboard. In such situations, search results should be minimum. To reduce the number of items, sorting can be used as the technique to reduce the item count. A small sort option must be provided so that visually challenged consumers can access it using a mouse click.

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