Usability Evaluation of E-Commerce Websites

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Abstract— Usability is the most vital factor for successful of any website. It helps the users to figure out whether the website is useful or not. There are various parameters like performance, content etc. that decides the Usability of a website. A website with higher Usability factors adds to the profit in business. In this paper, Usability of e-commerce websites is being analyzed with the help of automated testing tools already available in literature. For Usability analysis three parameters, namely Performance, Accessibility and Search Engine Optimization (SEO) have been selected. The results have shown that no single website is giving best value for the above said parameters, but different websites are giving different Usability according to parameters.

Keywords— Accessibility, Nibbler, Performance, Qualidator, Site Analyzer, Usability, Website Grader

1. INTRODUCTION

Every individual uses the internet for different purposes, as per there requirement. Mostly they use websites to get some information or to get help in doing some work. Therefore, websites must be reliable, secure and have good quality. Directly or indirectly Usability is considered as main quality attribute for websites and web applications. The idea of Usability was originally known as slogan 'easy to learn, easy to use' in the late 90's. If user can face problems in using the website, they will switch to other similar type of websites, which is not good for a business website.

Usability is a unit to measure "user experience" as how easily they use and learn the man-made object such as a tool or device. Usability becomes more important in case of e-commerce website as people prefer to buy and sell the products online [1]. To draw the attention of buyers, sellers should be certain that their websites are usable enough.

The aim of this paper is to check if shopping sites are qualifying the web Usability standards. The rest of this paper is organized as follows. Section II summarized the Usability and its key parameters. Section III contains relevant previous studies and literature review. Section IV mainly focused on Usability evaluation criteria, which has subparts Usability evaluation tools and sample data. Section V gives results with tables and graph. In Section VI analysis from results can be done. Finally, the conclusion is given in the Section VII.

2. USABILITY

The term Usability has multiple definitions by different researcher and standards organization.

International Organization for Standardization (ISO) 9241 defined Usability as "the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments", where:

1) Effectiveness means "the accuracy and completeness with which specified users can achieve specified goals in particular environments",
2) Efficiency means "the resources expended in relation to the accuracy and completeness of goals achieved", and
3) Satisfaction means "the comfort and acceptability of the work system to its users and other people affected by its use".

ISO 9241-11 defines Usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use [2] [3]." This definition is most widely accepted definition of Usability in the area of Human-Computer Interaction (HCI). Both these definitions are closely related to the user's satisfaction and interaction between the product and user.

Jakob Nielsen defines Usability as "a part of the utility of a product [4]." He declared Usability as a quality attribute, which is not a single dimension property. It was separated into five key entities learnability, efficiency, memorability, errors, and satisfaction [4] [5]. These five quality components are discussed as follows:

1) **Learnability:** How easily user can learn to complete the basic task, as they encounter the website first time.
2) **Efficiency:** After learning the way to complete the task, how much time they take to perform the task.
3) **Memorability:** After the gap in use of site, how efficiently they perform task.
4) **Error:** Number of errors made by users while performing some tasks, how severe are these errors, and is it effortless to recover these errors?
5) **Satisfaction:** Level of satisfaction of user after performing or accomplishing the task.

2.1 Key attributes to evaluate Usability

Usability is stated as one of the main aspect of websites quality [6] as it considered as crucial component for any successful website. Designing a highly usable website is not a minor task, as the Usability of website improves gradually from the very first phase of development of the website or product. A high usable website is one that allow

users to achieve their goals rapidly, efficiently, and effortlessly [7].

1) **Simplicity/Design:** Users love to visit the site which have valuable content, well design and easy to navigate. If the design of site is simple it is easy to use. (design, content, Usability). design of user interface is an essential requirement for achieving intended purpose, increasing efficiency and ease of use [6].
2) **Performance:** Performance [8] is one of the major factors for successful website. It is a parameter which includes page loading speed, download speed. A page should load in few seconds than its performance is good. A website with low loading speed will turns the user off and they switch to other websites. Performance of website refers to the speed and time web page takes to download and to get display on the user's screen. High downloading speed with less time to load will help in more user retention. Performance is one of the main reasons behind the success of the website therefore the critical factor to concentrate. There are different methods which will be helpful in improvement of website performance and some of them are simple code, reduce the size of images, web cache, etc.
3) **Accessibility:** The term Accessibility refers to how easily user can access the product. Web accessibility means that sites are planned and established in such way so the users with any disabilities cannot face problem in accessing sites. International standards organization for the Internet WAI and W3C published WCAG 2.0 and WCAG 2.1 latest guidelines for web accessibility. There are 4 principles which is known as POUR: Perceivable, Operable, Understandable and Robust which contains twelve to thirteen guidelines.
4) **Mobile compatible:** There are different electronic communication device used by individual anytime anywhere. It may be a desktop, laptop, e-book, mobile etc. Therefore, website must be compatible to different browsers and devices.
5) **SEO:** Search engine optimization (SEO) is the method to increase the popularity of a website. Make sure the website is secure for users to discover—and easy for search bots to understand—with better page titles, headings, and meta descriptions
6) **Homepage:** Homepage is an essential page from the whole website, for the successful website. If the service of the company is not clear from the homepage user will prefer not to be glued with the website [9]. Homepage must be less than 20kb According to the Usability standards of ISO.
7) **Security:** Security is a vital factor in B2C websites as user's personal data relay on website server.

3. LITERATURE REVIEW

Fangyu and Yefei [1] in 2011, proposed a work to analyze the Usability of E-commerce business to customer (B2C) websites of China. Two questionnaires were designed to capture the attributes of web usability. Initial questionnaire decided the appropriate attributes for web usability. It had fifteen attributes which were marked by twenty-seven subjects on the scale of 1-5. In the second questionnaire, the critical attributes of websites were elected and evaluated. From the result of the second questionnaire, fifteen attributes were reduced to nine attributes only. These nine attributes remained after the deletion of six attributes, namely, Credibility of seller and goods, Web page error rate, Merchandise promotions, Merchandise information quality and Website Layout were Navigation system, Website popularity, Privacy protection, Pay system, Evaluation information, Website security, Merchandise catalog update, Search efficiency and Merchandise catalog Authors concluded that these nine attributes were focused while improving the usability of websites.

Komal and Sushopti [6] in 2017, focused on agricultural websites. They discussed that people from rural areas are not much aware from the technology. Therefore these sites are helpful for them to bring a change in the way of doing farming. After discussing the reason, they performed the usability evaluation of ten different agricultural websites using tool-based evaluation method. The tool used for the proposed work are Website Grader, Qualidator and Seoptimer. The different tool evaluates the website in different parameters. Paper concluded that only one website score well in each parameter while other websites need to improve the performance.

Khalid [10] in 2017, evaluated twelve Saudi Arabia Universities' websites which offer distance education to analyze and measures the internal and external attributes of usability. Two different usability evaluation methods, namely Tool-based evaluation and Heuristic Evaluation were used to analyze the attributes. Three online free automated tools Qualidator, Web Page Analyzer and Website Grader, were used to assess the internal attributes while heuristic evaluation of websites was resulted in evaluating external attributes related to the usability of e-learning websites. From the result of both approaches, the author concluded that Saudi Arabian universities' websites are well designed and reliable but also need some fundamental improvement in homepage search engines and sitemap linked to every single page of the site.

Sukhpuneet and Kulwant [11] in 2016, focused on evaluating ten university websites from Punjab state which includes six state universities, one central university, two Deemed universities and one Private University. The evaluation was done using two automated online tools- Site Analyzer and Qualidator. Site Analyzer was used to measure six different attributes Content, Design, Performance, SEO and Page Analysis. Qualidator tool evaluates the usability, Accessibility, SEO, and Quality of

the website. They proposed their work to find out the best university with high web usability, but they concluded that different tool selects different sites as best according to the tested attributes. They also find different issues in sites related to usability attributes, that web designers must focus on while designing a website.

Ratnaker and Nitasha [12] in their research in 2017, followed the tool-based approach to evaluate the usability of a website, which had two version. The first version, AUT1 was basic version and the second version, AUT2 had enhanced interface and added the functionality of search within a website. Five metrics of usability - Navigability, Readability, Loading Speed, Accessibility and Functional performance were evaluated using five different tools, namely Google Analytics, Readable.io, GTMetrix, Qualidator, and Nibbler testing tool. The outcome for both versions decided that which version of the website was better than the other and which tool gave result Optimizely. From the results, the author concluded that version of the website with enhanced interface i.e., AUT2 was more usable and Google Analytics was better than the other four tools.

Handaru and Dhanapal [13] in 2009, evaluated the quality of five E-government websites from Asia. The standards developed by IBM were followed to check the quality of the websites. The quality attribute of website was further divided into six quality dimensions - response time, load time, size of the website, HTML validation, HTTP requests and dead links of the website. Four different web diagnostic tools, namely Web Page Analyzer, W3C Markup Validation Service, W3C Link Checker, and Link Popularity were used to diagnose these quality dimensions. The results from these tools indicated that most of the websites didn't meet the standards of quality by IBM. The accessibility of websites was evaluated using Tawdis Software, which checks whether the web developer followed the color contrast guidelines. The authors concluded from the outcomes of tools that the web developers of E-government websites need to focus more on performance and quality of the website.

Nishtha kesswani [14] analyzed the accessibility of educational websites of universities from different countries to check whether these sites were following the guidelines of accessibility or not. HERA, TAW and Firefox Accessibility evaluation toolbar were used to evaluate accessibility of educational websites. From the results he concluded that less than 50% of accessibility guidelines were followed while designing the website.

Samuddhi and Sushopti [15] in 2017, performed the usability evaluation of college website "piit.ac.in" using three different free online automated tools, namely Website Grader tool, SEOptimer Tool, and Qualidator. They discussed the advantages of using automated tools. In their research, they assured that usability is a significant aspect to understand while designing the website. All tools used different attributes. By comparing the results, it was concluded that the website needs improvement in different usability attributes like SEO.

Mustafa and Al-Zous'bi [16] in 2008, conducted a study to evaluate the usability of nine Jordanian universities' websites. These websites were evaluated using two methods – open source tool-based and questionnaire. The HTML Toolbox and Web Page Analyzer tools were used to evaluate the internal usability attributes of websites, namely, HTML check errors, load time, and browser compatibility problems which were not directly perceived by the users. The questionnaire was developed to find the percentage of satisfied and not satisfied respondents. It was divided into five categories which had 23 different usability criteria and 252 users were considered from 9 different Jordanian universities to scale 23 usability criteria. The responses collected from the users indicated that 51% of users were satisfied where 23% of user were not satisfied, and 26% of users judged the websites as being "fair". The study concluded that Jordanian educational institutes websites were reasonably acceptable. However, there was a chance to improve the design of websites.

Bayan Abu Shawar [17] in 2015, compared the Jordan educational websites with educational websites of England and Arabic in terms of accessibility. They investigated the accessibility of websites by following the guidelines of WCAG accessibility by World Wide Web Consortium (W3C). Accessibility evaluation was done in two phases using online tool- WAVE. In first phase, WAVE evaluated six each educational university website from the Jordan, UK and Arabic educational websites. It reviewed the websites in the attributes- accessibility errors, structural and semantic icon notifications, table layout and alert. In second phase, statistical analysis of values obtained from WAVE evaluation of websites can be done and concluded that England educational websites were following more Accessibility guidelines than Jordan and Arabic websites.

Gopinath and Kartheeswaran [18] in 2016 conducted a study to check the level usability and accessibility standards followed by highly used 47 E-government web portals of Sri Lanka. WCAG 2.0 was considered as accessibility guidelines. To analyze the websites five different online tools WAVE, GooglePageSpeed insight, google Mobile-Friendly Test, Pingdom tool, and PowerMapper were used.

Ivory and Chevalier [19] in 2002, claimed their work as the first study of website testing tools. They reviewed and modified five websites using three open-source automated tools WatchFire Bobby, W3C HTML Validator, and UsableNet LIFT tools. Information-seeking task from both version of the five websites, original and modified, was completed by users with and without their disabilities. It was concluded that the modifications done by designers with the use of tools was not helpful in improvising the user performance.

4. EVALUATION CRITERIA FOR USABILITY

There are number of parameters that calculates the usability of website. From the literature survey three parameters Performance, Accessibility and SEO are

selected. After selecting the attributes, the next step is to choose the Usability evaluation Method (UEM). Usability evaluation is an effective method that can help to understand the Usability of products, (to measure the level of Usability, i.e. how easily one can use and learn the website) and its results can be used to identify problems and issues that need to be improved for quality assurance of websites [1]. There are various methods exist to evaluate the Usability.

4.1 Automated tools for Evaluating Usability

Automated tools were used to assess different necessary attributes to evaluate Usability of the website. Number of tools are available which have different Usability attributes. In this work, five online evaluation tools are chosen to determine various Usability attributes such as performance (response time), load time, mobile, design, SEO, accessibility that are one way to measure the user satisfaction. Tools used in this study were as follow:

I. ***Site Analyzer:*** Site analyzer [2] is an open source online tool that can be used for Page analysis of website. It has different features like Crawling, Rank Tracking, Backlinks, Page Analysis, Keyword Research etc. In this work, page analysis feature of this tool is taken. It can calculate different attributes or parameter which are helpful in finding the level of web Usability. It can calculate Content, SEO, Design, Performance, Accessibility. It can warn the user about the errors.

II. ***Qualidator:*** The Qualidator is a free online tool for analyzing the website. It performs automated validation for entire website page by page with 60-70 automated tests, by focusing on 4 main aspects Usability, accessibility, SEO and overall quality. Qualidator validates the quality of site and gives the results in percentile. It helps the web designers, developers and owners to improve the design and quality of website [2][6][7].

III. ***Web page Analyzer:*** This is free online speed testing tool for websites which can calculate the size of page, composition and time taken to download the page. After analysis if there are some issues, it recommends some solution for example problem in script size can be solved by using HTTP compression or optimize the JavaScript size. So basically, it helps to speed up the web [1].

IV. ***Nibbler:*** Nibbler is a free online tool that grades websites in attributes accessibility, SEO, social media and technology. User can enter the URL of testing website and tool will give a report scoring the website out of 10 for each attribute.

V. ***Website Grader:*** It is also a free tool which is available online. it can calculate performance, mobile, SEO and Security on the scale of 30, 30, 30 and 10 respectively. By considering performance of website as a crucial factor it also calculates the page size, page requests and page speed to improve or increase the traffic [8].

Table 1 gives the comparative Analysis of automated tools based on Usability, Accessibility, SEO, traffic Rank and overall technical quality.

TABLE 1
COMPARATIVE ANALYSIS OF WEBSITE EVALUATION TOOLS

Criteria/Tools	Qualidator	Web Grader	Web Page Analyzer	Site Analyzer	Nibbler
Design				✓	
Performance		✓	✓	✓	
Content				✓	✓
Accessibility	✓			✓	✓
Mobile		✓			✓
SEO	✓	✓		✓	
Security		✓			
Usability	✓				
Page Analysis	✓		✓	✓	✓

4.2 Sample Data

For this research, 6 Indian shopping,mostly used by the users, amongst the various e-commerce websites are randomly selected.

TABLE 2.
LIST OF WEBSITES USED IN THIS WORK ALONG WITH URLS

Site	URL of websites
Myntra	https://www.myntra.com/
Amazon	https://www.amazon.in/
Snapdeal	https://www.snapdeal.com/
Nykaa	https://www.nykaa.com/
Paytm	https://www.paytm.com/
Flipkart	https://www.flipkart.com/

5. RESULTS OBTAINED USING AUTOMATED TOOLS

5.1 Web Page Analyzer and Website Grader

Usability is also referred as the quality of website. If the quality of website does not match the standards, then there is huge percent of effect on Usability of the website. There

are numerous parameters that are responsible for website quality and discussed in Table 3.

TABLE 3.
LIST OF WEBSITES USED IN THIS WORK ALONG WITH URLS

Site	Total HTTP Requests (<20)	Load time (<30 sec)	Size (bytes) (<64kbytes)	Page speed (<3sec)
Myntra	5	80.36	398191	1.7
Amazon	5	22.75	108642	1.6
Flipkart	6	9.91	43728	2.9
Snapdeal	63	563.06	2761965	3
Nykaa	386	407.05	1629947	9.4
Paytm	25	95.82	5313878	3.7

Table 3 shows the evaluated of quality using Website Page Analyzer, and Website Grader. These dimensions are discussed as follows:

- *Page speed:* It is the time taken by per page to loads and referred as response time of webpage.
- *Load time:* It is the time taken to download the site on different connection rates range. In this study we evaluate the download time via 56k connection
- *Size:* total size of website in bytes were evaluated from web page analyzer.

5.2 Results of Site Analyzer

Site Analyzer tool evaluates the websites using six parameters, namely Content, Design, Performance, Accessibility, SEO, Page Analysis Score. Evaluating all the sample online shopping websites by this tool, the calculated results are stored in Table 4.

TABLE 4
SITE ANALYZER TOOL FOR SHOPPING WEBSITES

Sites	Content	Design	Performance	Accessibility	SEO	Page analysis score
Myntra	62.6	71	73.2	79.6	84.1	78
Amazon	37.3	71	49.8	48.1	65.8	60.3
Flipkart	61.7	71	40.2	37.8	79.5	66.7
Snapdeal	58.3	63.8	52.4	45.8	64.6	63.3
Nykaa	44.6	49.4	49.8	54.6	57.8	57.6
Paytm	53.6	71	59.8	85.6	63.5	77

Site Analyzer evaluates the websites in six parameters, but in this work, parameters, namely performance, accessibility and SEO are selected from the data calculated by this Site Analyzer tool to find out the Usability of websites. From the results, Myntra has got highest performance and SEO value with 73.2% and 84.1% respectively while Paytm got highest accessibility value of 85.6%.

5.3 Results of Qualidator tool

The qualidator evaluates the webpages with 60-70 defined tests. It has 4 major aspects of Usability, Accessibility, SEO and overall technical quality. The results in % value calculated by this tool on sample online shopping sites are store in table 5.

TABLE 5.
QUALIDATOR TOOL FOR SAMPLE WEBSITES.

Sites	Usability	Accessibility	SEO	Overall
Myntra	74.8	79.8	82.6	78.8
Amazon	60.9	47.8	65.8	66.7
Flipkart	72.8	78.9	80	76.4
Snapdeal	78.9	50.3	79.2	79.3
Nykaa	80	80.1	78.5	81.8
Paytm	72.5	71.3	60.9	75.1

From the qualidator tool, two parameters accessibility and SEO are selected to evaluate the websites. By analyzing the sites with 60-70 tests, we conclude that Myntra scores highest in SEO with 82.6% and Nykaa has got highest accessibility value with 79.8%.

5.4 Results of Website Grader Tool

Website Grader tool reviews all the shopping website using four parameters performance, mobile, SEO, Security. The calculated result of the websites is stored in table 6.

TABLE 6
WEBSITE GRADER FOR SAMPLE

Sites	Performance	Mobile	SEO	Security
Myntra	80	100	100	100
Amazon	63.3	100	20	100
Flipkart	80	80	50	100
Snapdeal	80	100	50	100
Nykaa	46.6	100	50	100
Paytm	90	100	100	100

In this work, parameter performance is taken to evaluate the Usability and from the results, it is concluded that Paytm scores highest in performance with 90%.

5.5 Results of Nibbler tool

Nibbler tool calculates all the sample websites using five major aspects accessibility, experience, marketing, technology and overall score of websites. The calculated result of the websites using this tool is stored in Table 7.

TABLE 7
NIBBLER TOOL FOR SAMPLE WEBSITES

Sites	Accessibility	Experience	Marketing	Technology	Overall
Myntra	80	86	92	81	86
Amazon	73	57	61	73	67

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Flipkart	80	74	64	84	80
Snapdeal	75	84	93	79	85
Nykaa	79	62	73	84	72
Paytm	86	80	91	73	80

Nibbler calculates different major internal and external parameters. Accessibility is selected from them to evaluate or to discuss the Usability of websites. The result concludes that Paytm has got highest score in accessibility with 86%.

6. ANALYSIS OF RESULTS

6.1 Performance

Numerous tools are available for testing the performance of website from which some are online, and some are desktop based. These tools provide the overall performance rating, download speed, page speed, etc. In this study two tools, namely Website Grader and Site Analyzer are used to evaluate the performance of the sample websites.

The key attributes used by Website Grader are page size, page request (HTTP request), page speed, where Site Analyzer's attributes are file size, compression rate, execution rate for evaluating the performance of websites.

From the output of the table 4 and table 6, table 8 is tabulated where performance of websites is analyzed to conclude the more usable website with highest performance.

TABLE 8
PERFORMANCE EVALUATION BY TOOLS WEBSITE GRADER AND SITE ANALYZER

Sites	Website grader	Site Analyzer
Myntra	80	73.2
Amazon	63.3	49.8
Flipkart	80	40.2
Snapdeal	80	52.4
Nykaa	46.6	73.2
Paytm	90	59.8

Table 8 shows the performance of sample websites evaluated by using tools Website Grader and Site Analyzer. The data obtained using these tools represent the level of website performance and analyze the website with best performance.

As shown in Table 8, according to Website Grader, the site Paytm has got the highest performance with 90% results where Myntra, Flipkart and Snapdeal shared the same spot in performance test with 80% results. Amazon has 63.3% results followed by Nykaa, which shows the lowest performance with 46.6% results.

Site analyzer evaluates that Myntra and Nykaa are the sites with highest performance of 73.2% which are followed by Paytm with 59.8% of results. Snapdeal, Amazon and Flipkart have the value of 52.4%, 49.8% and 40.2% respectively.

It is concluded from Table 8 that Myntra shows the best performance among the sample websites as website grader evaluates its performance with 80% results and site analyzer with 73.2% of results.

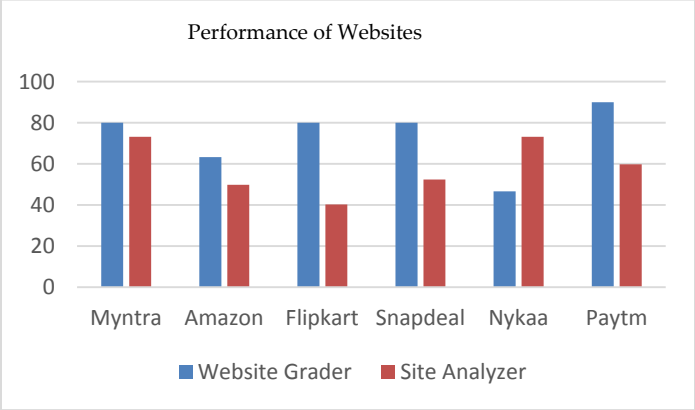

Fig. 1 Performance Graph for Website Grader and Site Analyzer

From Table 8, graph for performance parameter is drawn. Figure 5.6 shows the bar graph with blue color representing performance for Website Grader and red for Site Analyzer.

6.2 Accessibility

Accessibility of the websites is tested using three tools, namely Qualidator, Site Analyzer and Nibbler and the results are tabulated in Table 9 after analyzing the tables 2, 3 and 5.

TABLE 9
ACCESSIBILITY EVALUATION WITH TOOLS QUALIDATOR, SITE ANALYZER, NIBBLER

Sites	Qualidator	Site analzer	Nibbler
Myntra	79.8	79.6	80
Amazon	47.8	48.1	73
Flipkart	78.9	37.8	80
Snapdeal	50.3	45.8	75
Nykaa	80.1	54.6	79
Paytm	71.3	85.6	86

The data shows the level of accessibility guidelines followed by websites. These accessibility guidelines are given in WCAG. The key attributes used by site analyzer to evaluates accessibility are URL rewriting and domain length where nibbler uses heading, mobile, page title, URL format to configure the accessibility of websites.

From the table 9, according to qualidator from the sample website Nykaa satisfy maximum accessibility

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standards with 80.1% results followed by Myntra with 79.8% results. It analyzes that Amazon is the site which satisfy the accessibility standards only upto 47.8%, the least satisfying web accessibility standards.

Site analyzer analyzes Paytm with maximum accessibility of 85.6% followed by Myntra with 79.6% of accessibility result. Flipkart got minimum accessibility with37.8% of result.

From the data obtained from nibbler it is concluded that Paytm has highest value for accessibility and Amazon has lowest value for accessibility, 86% and 73% respectively.

It is concluded from table 9 that Paytm is the highest web accessibility satisfying site among the sample websites as qualidator evaluates its accessibility with 71.3% results, site analyzer with 85.6% of results and nibbler with 86%.

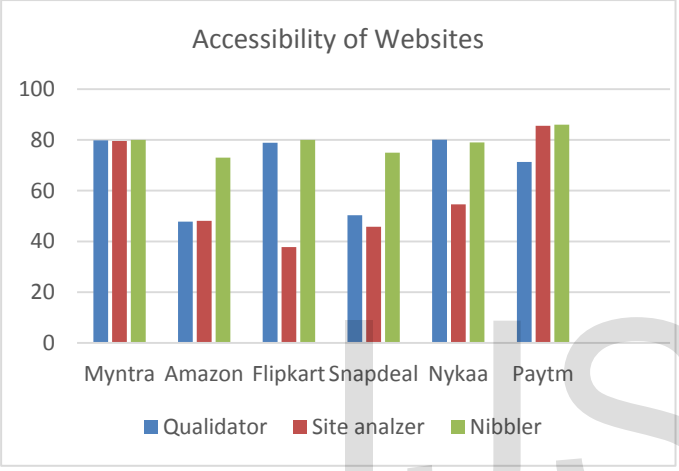

Fig. 2 Accessibility Graph for Qualidator, Site Analyzer and Nibbler

From the Table 9, graph for accessibility parameter is drawn. Fig. 2 shows the bar graph with blue color representing accessibility for Qualidator, red for Site Analyzer and Green for Nibbler tool.

6.3 SEO

SEO of the websites is calculates using two tools, namely qualidator and site analyzer. From the output of the table 4 and table 5, table 10 is tabulated as the analysis of SEO of the websites. The key attributes to calculate SEO of websites by the tools Website grader and Site analyzer are same. Both checks Page Title, Meta Description, Heading and Sitemap to analyze the SEO level of websites.

TABLE 10
SEO EVALUATION WITH TOOLS QUALIDATOR, SITE ANALYZER AND WEBSITE GRADER

Sites	Qualidator	Site Analyzer	Website Grader
Myntra	82.6	84.1	100
Amazon	79.5	65.8	15
Flipkart	79.2	79.5	50
Snapdeal	64.3	64.6	50
Nykaa	78.5	57.8	50
Paytm	60.9	63.5	90

Table 10 has the recorded values of SEO of each website using automated tools. According to Qualidator among the sample website, Myntra has highly optimized search on search engine with 82.6% of value for SEO followed by Amazon with 79.5% of results. Snapdeal and Paytm are the least optimized search with 65.3% and 60.9% values for SEO respectively. According to Website Grader tool, Myntra score highest for SEO with 100% results. Site Analyzer evaluates the sample websites and results with highest value of SEO is in the favour of Myntra, followed by Flipkart. It is concluded from the table 10 that according to the both tools Qualidator, Website Grader and Site Analyzer, Myntra is best in case of SEO with 82.6% and 84.1% respectively success in browsing.

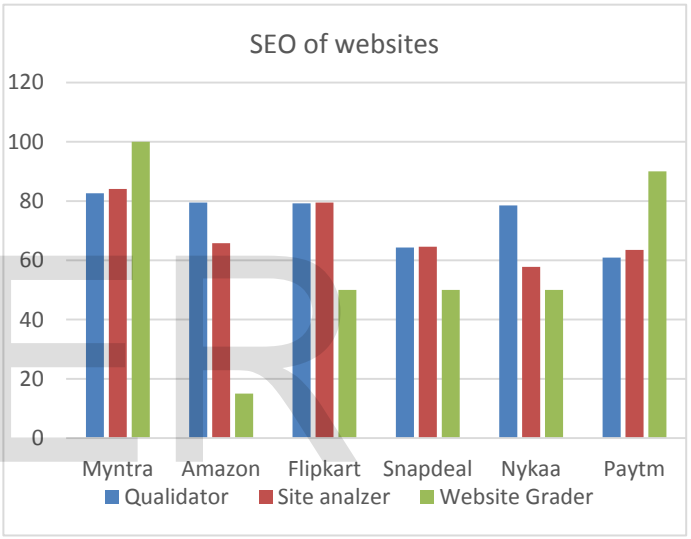

Fig.3 SEO Graph for Qualidator, Website Grader and Site Analyzer

7. CONCLUSION

Usability plays important role in shopping website as it brings the people closer to the technology and provides ease in buying stuff. Providing users with good and simple websites are profitable for both the users and business. So, developing shopping websites with high Usability is very essential for business. This work targets to evaluate the Usability of shopping websites based on selected parameters performance, SEO and accessibility by automated tools Web Grader, Nibbler, Site Analyzer and Qualidator. Comparative results of selected attributes are tabulated. Analysis of these attributes are shown in table 6, 7 and 8. It is analyzed that for different attribute different websites are ranked the highest by automated tools. Overall the website Myntra with URL www.Myntra.com scores the highest for technical quality from the results of tools qualidator, Site Analyzer and Nibbler shown in Table 9. It is seen from table 6 and table 8, that Myntra has attain the highest performance and SEO while from Table 7 Paytm

has got highest score in accessibility. Hence, Myntra can be concluded as the best shopping website with more Usability than the other shopping websites. From the results of this work, website designers of other websites can focus on the specific features where they are facing some issues as it is very important for the success of their business.

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