Factors Affecting the Selection of Web Browsers by University Students: Special Reference to Rajarata University of Sri Lanka

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Abstract. Web browsers are amazing. They make the World Wide Web accessible to everyone. People can read web pages by means of web browsers. Many different web browsers are available on the Internet, free of charge. In addition to most popular web browsers that have superb features people might like more, such as faster, free, secure, and different by design, better interface and such. So, people need to take time experimenting with diverse web browsers to find the one they like best if still using the device's default web browser. This study aims to investigate the factors affecting the selection of web browsers by keeping the straight attention on university undergraduates because, web browser usage has deeply penetrated the academicians not only with their academic workloads but also several purposes. A sample of one hundred and thirty undergraduates who are currently studying in Rajarata University of Sri Lanka selected through stratified sampling technique and research data were collected through structured questionnaire for the study purpose. Descriptive Statistics, Correlation Analysis and Multiple Regression Analysis were used to analyze the data. As per the study findings Browser Performance, Security, Awareness and User Friendliness are the factors need to look at when selecting the web browser to go on. From these results it can be concluded that Browser Performance and Awareness factors were positively and significantly impacted to the Selection of Web Browsers and Security and User Friendliness factors positively but not significantly impacted. The researcher recommends the future researchers to conduct same studies on similar topics, academicians and information seekers for enhance their web browser horizons and web browser developers and technology institutions for provide better web browser products and services by getting the key factors which highlighted in this study in order to their web browsers be the selective web browsers of peoples' web browser list ever.

Keywords: Selection of Web Browsers, Undergraduates

1. Introduction

There is no matter that technology has improved and technology runs our lives these days. In a very short amount of time, technology has exploded in the market and now many people cannot imagine a life without it. So, using internet is becoming an everyday fact of life [25]. Internet is the biggest world-wide communication network connecting millions of computers and maintaining millions of smaller networks like domestic, academic, business, and government networks on the internet which together carry many different kinds of information [5].

In order to access to the unlimited information which are available in the World Wide Web, we need to get the help of web browsers. Basically, web browser can be defined as a software application that can be used for retrieving, presenting, and traversing information resources on the World Wide Web [54]. It is a software program that people use to access the internet and view web pages on their computers [18]. According to [41], web browser is a computer program that allows people to view documents and data and navigate the World Wide Web. A web browser also can address as a gateway to the internet and the main purpose of the web browser is to translate or render the code that websites are designed in into text, graphics, and other features of the web pages that people used to seeking information [18]. Web browsers perform several functions including searching, browsing and scrolling of internet resources [41]. A browser performs several tasks, such as rendering web pages on the screen and executing client-side code often embedded in web pages [43]. So, researcher would like to define the web browser as the window by which people see the web through. It is the very backbone that allows end users to locate, access and display web pages.

However, people may consider some critical factors when choosing a web browser to surf internet [54]. Users have different preferences on using Internet browsers [26]. Depend on each user, they may personally prefer a web browser with various factors. Some may need a web browser which is capable enough to open lots of tabs simultaneously, quick updates, blazing speed, well perform and simplicity web browser [36]. Some may consider page load time, greater security, ease of use, compatibility and free to download the web browser. Load time pertains to the speed a web browser retrieves, presents, and traverse information resources from one point to another [54]. Users typically choose a browser that gives them a satisfying browsing experience, which is partly determined by the speed of the browser [43]. Protecting the user identity and preserving the integrity of the data are top priorities when it comes to the security and blissful internet experience [54]. Ease of use refers to the number of tabs that can be opened at one time [36]. When choosing a compatible web browser, it is important to find a web browser that works best for user's operating system with less crashes [54]. Many different Web browsers are available on the Internet, free of charge [43]. Everyone knows that all web browsers can be easy to download and no cost guarantee [22]. Due to these factors some web browsers can be identified as best or popular web browsers and people may tend to ignore the other web browsers.

Adolescents are currently the defining users of the internet, because they spend more time online than adults do [55]. As we all know that internet has deeply penetrated on young generation alike university students, influencing multiple aspects of their lives. This research started with this fact and in initial reviewing of several sources researcher got to know about university students are accessing internet predominantly for academic purposes, socializing through online social networks (e.g., Facebook), entertainment, shopping online, checking emails, and update with new knowledge and sometimes for mind relaxation. According to [29] more and more academicians are turning to the internet when doing their academic works such as assignments and research works. So it is a clear fact that most of the time university students prefer to plugin to the internet with various reasons and for that they may use different types of web browsers.

In fact, people turn more and more to the Internet, which means they may continue a great deal with web browsers. Web browsers play a critical role on behalf of internet users [54]. Out of the hundreds of web browsers, some web browsers that users choose as their gateway to the internet while others are the specialty web browsers for internet users with specific needs. The web browsers that users choose as their gateway to the internet can be ranked from best to worst [37]. Users typically choose a web browser that gives them a satisfying browsing experience [43]. Almost all the people may be willing to surf the internet by using best or popular web browsers. According to [03] every internet user has their own favorite web

browser. There may be some factors behind that user preference. In the real sense of the word, this is the research problem which researcher is going to investigate and add some new knowledge to the existing knowledge of web browsers.

When studying each research paper and other data sources separately related to this research area, researcher found that most of the studies were done by the researchers in the international level. As well as most of the studies have concentrated on the topic web browsers, but very limited sources highlighted that the factors which impact on the selection of web browsers. As the examples the research articles like Advanced Evidence Collection and Analysis of Web Browser Activity by [34], Benchmarking Modern Web Browsers by [43], prove the above statement. In Sri Lanka, there was no any research founded related to the factors which impact on the selection of web browsers by university students. So, it is clear now in the Sri Lankan context, there is a research gap in relevance with this research area. Therefore, this study further attempts to determine the main factors affecting the selection of web browsers and how those factors impact on selection of web browsers separately.

2.   Methodology

The research held with respect to this thesis is a Basic one, which is going to find the factors affecting to the selection of different web browsers by university students. On the other hand, this is an Explanatory Research, which more focuses on clarify and confirm the variables which affecting on selection of different web browsers by university students and find out the exact impacts of those factors towards the selection of web browsers. As well as this is a Deductive Research which goes from broader unto narrow area. In this study researcher based on sound and well-developed literature related to the web browsers and tend to apply that vast knowledge into vary specific area called factors affecting to the selection of web browsers by university students, in order to test further the developed theories, models and concepts in vast web browser knowledge. Hence, in this level it is hard to go with Qualitative Approach, researcher tend to select Quantitative Approach. The reason is researcher has sufficient literature. By looking at them can prepare a questionnaire and the responses can put into different scales and measure them numerically. Finally, can analyze those data and come to a quantitative conclusion. Research methodology of this dissertation highlights the theoretical framework, research hypothesis, population and sample, data collection and data analysis techniques under the chapter three in details.

3.   Literature Review

It is an obvious fact that most of the internet users are using internet through the web browsers by installing them on various devices such as computers, tablets, and smartphones and so on. Web browser is an essential application program for accessing the Internet [34]. According to [41] internet browser is a computer program that allows users to view documents plus data and navigate the World Wide Web. [53] also defined a web browser as an application that can be used to access the web or connect with the internet and view webpages, images, videos, or other information. The first web browser was released in 1990 called World Wide Web and now it is called as Nexus who created by Sir Tim Berners-Lee. It was giving at least people a basic way to view web pages [18].

Most web browsers come with basic features like free to download, greater security, higher speed and efficiency, user friendliness, attractive user interface, ease of use and more customizable [22]. All these five popular web browsers also continuously improving their features [43]. The detailed information which grab from several sources about those five top web browsers in the browser list, may feel comfortable of the differences between them as follows.

Internet users can have more than one web browser chosen and installed on their devices. As an example, the Windows users are no need to get stuck with Internet Explorer, the Apple users are thinking they only relate for Safari; but it is not like that. Because, a web browser is also a software program like other programs so, users can have many browsers on their devices as they like. It is always a good idea to keep at least two web browsers on the device which users use to surf the internet either computer, mobile phone or tablet. Mozilla Firefox, Google Chrome, Opera, Safari and Internet Explorer are the alternative web browsers that users can try out at the same time with no conflicts. It is safe to run multiple web browsers at one time because they all act independently [09]. Moreover, Computer Hope website mentioned that users should run alternative browsers due to other web browsers may have something that is not available with the browser which users are currently using. According to the [23], if users are limiting to the pre-installed browsers on their devices and they need to expand their browser horizons and find the best one what they love.

Sure enough, the results indicate substantial differences among web browsers, due to users tend to select a particular web browser after considering so many factors [43]. According to [39] there are many available internet browsers considered as best, but when choosing a web browser user may consider three main things such as syncing, security and browser performance. [04] provide necessary information regarding the user satisfaction, the one main factors user may consider when they need happy browsing. Most of people tend to choose a web browser and stick with it forever, it can be hard to break away from their comfort zones. Especially less awareness about other browsers may be the reason for it. But trying a different browser can greatly improve user experience on the web [11]. [50] mentioned that performance, security and user friendliness of the web browsers are the three main points that have to be considered when carry out an analytical comparison among web browsers under methodology part in their studies. Based on above literature evidence researcher found main four critical factors that impact to the selection of web browsers such as, Browser Performance, Security, Awareness and User Friendliness of the web browsers.

3.1 Browser Performance

When moving to the browser performance, it is good to have an idea on every internet user's mind about the web browsers which work or perform better than other web browsers. So, researcher found a question like "Do all web browsers perform as the same?" According to [22] some may say yes and others may say they do not have any idea. The reasons for that answers are some have access to the several web browsers and they are aware about those web browsers. On the other hand, some does not have access to the several web browsers and they are unaware about those web browsers. Due to that, the answers for the above question can be differed. It would be great if all web browsers perform an equal manner and do everything exactly same. But it is not always possible due to web browsers don't all work the same way. It means they just work differently from one another same as the other products in the real world settings. So, how does an internet user select a web browser among the bunch of web browsers for surfing the internet? [33] argue that web browser performance is one of the factors influencing for selection of web browsers. As well as [33] have further defined web

browser performance as the speed in which web pages are downloaded and displayed on the user's web browser. The experimental results of [43] show that there can be significant differences in overall performance between the different browsers. [22] accepted that web browsers perform differently on each operating system, the fastest ones are Microsoft Internet Explorer, Google Chrome and Mozilla Firefox respectively but Opera has fallen behind in terms of speed. According to [32] in terms of pure speed, Opera takes the first place due to Opera has a turbo mode that makes browsing faster whether users on mobile devices or desktops. The results revealed that Opera performs the best in speed, Internet Explorer performs the best in memory usage, Mozilla Firefox performs the best in download time and page layout, in the comparative study among those web browsers who has done by [50]. [28] was tested the latest versions of top five popular web browsers named Google Chrome, Mozilla Firefox, Microsoft Internet Explorer, Apple Safari and Opera, under six performance indicators in order to clarify the overall performance of those web browsers. The performance indicators were JavaScript Speed, CPU Usage, DOM Selection Speed, CSS Rendering Speed, Page Load Time and Browser Cache Performance. As the result first place won by Google Chrome, Mozilla Firefox and Apple Safari won the second places respectively. Opera won the third place and Microsoft Internet Explorer has shown the least overall performance [28]. As per the results of [43] performance related research on different web browsers, internet users tend to choose a web browser with best speed. Internet users should aware about the performance differences of web browsers, if want to surf the internet with superb web browser.

According to the researcher, overall performance of a web browser can be measured through the web browser speed and memory usage. Moreover, researcher identified the page load time and download time are the two main measures of web browser speed based on existing literature. Hence, it is clear now web browser performance is mainly depending on speed and memory usage of web browsers. [54] defined the speed of the web browser as the speed which takes to retrieve, present and traverse information resources from internet to users. According to [50] speed of the web browser includes rendering Cascading Style Sheet (CSS), rendering table and script speed.

As per the website of Speakeasy the download time denotes how fast internet users can download files once after a user makes a request. The downloading speed can be fast as fast at the first attempt of internet browsing. But over the time web browser can begin to slow down and take much time to download details. This may badly affect towards the browser performance. Keep fewer tabs open, use fewer extensions and delete the cache and browsing history are three simple tips to follow to improve the web browser performance [20].

3.2 Security

Security of the particular web browser is another critical factor which may directly influence to the selection of web browsers. The factor of web browser security can be defined as an application of internet security to web browsers in order to protect networked data and computer systems from breaches of privacy or malware. Security refers to a web browser's ability to keep hackers and cyberattacks away [32]. It is a good idea to use the most secure web browser that definitely make secure zone for internet users, if internet users need to have a good internet browsing practices [07]. Web browser security is pretty important factor to consider when choosing a web browser for safer internet surfing [39]. The security of web browsers is extremely important when users want to protect themselves from attacks, tracking, or unwanted advertising [41]. According to [39] there is a ton of alternative browsers out there, but not all of them have powerful security features. The most popular benchmarking web browser brands like Microsoft Internet Explorer, Apple Safari, Google Chrome and Mozilla

Firefox have a team of people working consistently to address issues and fix bugs of the web browsers and attacks from malicious hackers [39]. Modern internet browsers have developed into powerful tools that let users safely and quickly access their favorite websites [18]. Computer Geeks Online (2018) also mentioned that modern internet browsers help to keep the systems safe and secure with their built in safety features and just make the internet experience better in general. But as per the [07] popular web browsers do not necessarily mean they are secure web browsers. As an example, Google Chrome is the most popular web browser available, but it may not be the most secure. An unsafe web browser can lead quickly to a variety of computer problems. Ideally, internet users should evaluate the risks from the web browser they use. Users give priority to safe internet experience. So, when people select web browsers, they mainly concern about the browser security. Web browser security is the first and foremost thing should be looked when selecting a web browser [32]. Many users do not know how to configure their web browser securely and they are unwilling to enable or disable functionality as required to secure their web browser. Exploiting vulnerabilities in web browsers has become a popular way for attackers to compromise computer systems. According to Nick safest choice of web browser is Microsoft Edge and its bit more secure than Mozilla Firefox and Google Chrome. With reference to the study of [43] researcher can believe that there is a numerous avenue for future works related to the web browser security. As per the updated details of [11] Firefox, Chrome, Opera, Edge, Internet Explorer, Vivaldi and Tor browsers are the most secure bowsers respectively. So, the knowledge of prior studies relating to the web browser security states to the researcher that internet users' privacy, attacks and threats, and warnings/notifications/security alerts, automatic updates like web browser security features can be used to measure the factor of web browser security.

Even not identically, both security and privacy terms are very closely related. Browser security more helps to protect the web users' privacy. Hence, internet users tend to select a secure web browser especially to keep their browsing privately on their devices [16]. Actually, it's a good thing to know that January 28th has been fix as the 'Data Privacy Day' since 2008. The goal of Data Privacy Day implies the importance of privacy and protecting personal information. Almost all the modern web browsers tend to provide the private browsing mode in addition to the ordinary windows in order to protect the internet users' privacy and keep safer online travels [45]. All four major browsers (Internet Explorer, Firefox, Safari and Google Chrome) have implement the private browsing mode in different names as InPrivate in Internet Explorer, Private Browsing in Firefox and Safari, and Incognito in Google Chrome [01]. Private browsing means the web browser will forget some kinds of information only on user's device by ignoring cookies, but it does not mean users are invisible. It is a good way to hide users' browsing from snoops and people who use one's device. There are plenty of valid reasons to use private browsing mode such as browser removes the search history, temporary browsing data and personal information like credit card details only on user's device, helps to speed up future page loads, can signing into multiple accounts like multiple emails, social networks or bank accounts via multiple tabs at the same time, allows to testing websites and download file, and basically can prevent other users search one's device browsing activities.

With increasing number of attacks and threats like phishing, credit card scams, computer viruses and so on, everyone should give priority to protecting yourselves. This should be start with good browsing practices and users should make sure that they are using the most secure web browser or aren't. Safety web browsers definitely less vulnerable for hackers, malware attacks and threads away and protecting web users is most important. [16] stated that when users browse the web and perform transactions online, two security risks to be aware of are malware and phishing which perpetrated by individuals or organizations who hope to steal the personal information. No wonder a virus can be infected to the user's device just by visiting a website without user's assistance. Due to the malicious websites can exploit browser

vulnerability features and deliver a virus into the device. At the same time, an attacker may not always use sophisticated technical ways to hijack user's device, but could instead find simple and clever ways to trick users into making a bad decision. According to [16], most modern web browsers guard users from hacking, phishing, malware and virus attacks like threads when browsing the web and limit the security risk.

Adhering to the web browser warnings (also can called as notifications or security alerts) should help to protect the people from variety of attacks and web threats. These browser warnings are a key part of web browsers' security [38]. [02] used over 25 million warnings impressions to observe the users' behaviors regarding the web browser security warnings. As per the results of their field study, users continued through a tenth of Mozilla Firefox's malware and phishing warnings, a quarter of Google Chrome's malware and phishing warnings, and a third of Mozilla Firefox's SSL warnings. These results demonstrate that web browsers' security warnings can be effective in practice [02]. According to the report of [17] web browser warning messages help to protect over three billion devices per day in the situations like when users attempt to navigate to dangerous websites or download dangerous files. Also, further mentioned that nowadays Google Chrome and other web browsers use safe browsing to show users a warning message before they visit a dangerous site or download a harmful app [17]. It's must be making the world's information safely accessible first instead of any other thing.

Keeping the web browser up-to-date is a prior indicator of web browser security. The out dated web browsers will affect for serious security problems and cause to miss out cool new and useful features which the web browser support. As results of security vulnerabilities exploit, users' personal information such as emails, banking details, online sales, photos and other sensitive details can harmfully affect. According to [60] it is better to deal with up-to-date web browser even users' personal data is not stolen yet.

3.3 Awareness

Many different web browsers are available on the internet for internet users, free of charge [43]. Everyone knows that all web browsers can be easy to download and no cost guarantee. But the practical situation is, we are not going to try the each and every available web browser and at certain times in our lives, we are just used to handling one browser and ignoring the rest like we do in social media networks [22]. Many users are not even aware that they have a choice in what web browser they use [48]. The reason for that matter is many people simply use the web browser that came installed on their computer, tablet or smartphone and there are many options for internet browsers that could potentially be more compatible with the users' needs [37]. According to [18] the best way to find out which web browser is well-suited for internet users to surf the internet is to download the all available web browsers and play around with them. People are mostly selecting web browsers which are mostly known web browsers. With reference to [39] almost all the internet users wish to have an awesome web browser that is relatively known by all users. So, it is a clear fact that internet users' awareness about different web browsers is an important aspect that should be overlooked when people are going to select a web browser to travel on web.

Researcher could be able to identify the measures of awareness of the web browsers via reviewing the existing literature regarding that area and they can be mentioned as user preference, popularity and device's default regular using web browser.

When turning to the user preference on internet browsers, users have shown different preferences on using internet browsers and user preferences may vary from place to place and change over time [26]. The browser that users use can often come down to their personal

preference [60]. Everyone has their own preference on which web browser they prefer to use. Choosing the best web browser ultimately comes down to personal preferences, whether a particular browser got favor speed, user-friendliness or security [07]. All web browsers contain with competitive features which other browsers offer. So, it is only a matter of preference on what web browser users like to use for their browsing needs [24]. According to [09] users try a different browser on how much they like the look or feel of the new web browser and how much prefer options are available on that browser.

Awareness of the web browsers is not denoting that internet users don't know about the web browsers. As long as if users follow a particular internet browser, they can't go with any of another web browser in the web browser list. As per the details of [35], in relevance to the target market's latest survey, these are the browsers that are currently used on a regular basis and point out that just 42% of respondents said that they regularly use Internet Explorer, while 45% said they use Google Chrome and 44% use Firefox, 10% said they regularly use Safari, 4% use Opera and 2% use other browser options. Many web users less aware about the currently available web browsers which can be used to try the internet because, they are just limit to their default web browser that comes with computer, phone, tablet or any other device [60]. They further request from internet users to try out several web browsers to travel in the web in addition to the always using default web browser. Thankfully, users no need to uninstall their default web browser when they are moving to another browser.

3.4 User Friendliness

Another critical independent factor which affect for the selection of web browsers by internet users is user friendliness. Web browser user friendliness spell out that how easy to use a web browser and making the web browsing effortless for users. If so, users will stay and otherwise they will leave [12]. According to [49], user friendliness is a kind of outmoded label which used in early 1990s and it can be replaced as usability. A usable web browser is user friendly [06]. Moreover, [49] mentioned that if a web browser is more user friend, web browser user ship also grows up. Firefox, Chrome, Internet Explorer, Safari are the most user friendly web browsers as per the results of web browser usability test. [24] has mentioned that Mozilla Firefox, Google Chrome, Microsoft Internet Explorer, Apple Safari and Opera as the five top popular and user- friendly web browsers.

As per the details of [06] web browser user friendliness can be measured through the clear design of the browser interface and it is all about the ugliness or beauty in browser interface. For the web users, browser interface can be seen after starting a web browser [40]. Web browser that have a user-friendly design and easy to use interface, user's continuously keep mind on such browsers [19]. The truth is one person's ugly may be other's beauty and vice versa. Anyhow, clear browser design plays an important role in browser user friendliness and further mentioned that readability (how easy to read the things) and understandability (understand how the things work) determine the web browser design and these things make internet users come towards the browser again and again [06]. According to [19] it should be very easy to learn the interface for new users and if users are not being able to read and understand the user interface, they fail to perform tasks efficiently and accurately.

Even though, there are plenty of web browsers, some web browsers increase the frustration level of the web users while others make the experience painless [48]. User friendliness can be measure through the happiness of the internet users. How does the happiness of internet users grow and decay during the course of web browsing? Needless to say, an unfriendly web browser can cause a ton of frustration due to almost all internet users expect to have adequate information while browsing. According to [04] web users feel happy when web browsing

operations provide them with necessary information. Otherwise, they feel bitter. [47] also said that good and user friendly web browser always helps to the visitors to find the information they need quickly and easily. From the user's point of view, how much work and satisfaction/frustration user experiences by using a web browser can be used to determine the web browser user friendliness [49]. Users typically tend to choose a web browser that gives them a satisfying browsing experience which means whenever users preferable for choose user friendly web browsers [43]. With reference to the survey which done by [35] overall, 55% of respondents said they are very satisfied with their current browser, and 38% said they are somewhat satisfied. 50% of Internet Explorer users said they are very satisfied. 55% of Firefox users said they are very satisfied. 53% of Chrome users said they are very satisfied. 55% of Safari users said they are very satisfied and 44% of Opera users said they are very satisfied. These figures justified that user friendliness is based on internet user's satisfaction,

4. Data Presentation

Researcher used simple tables, cross tables, bar charts, pie charts like data presentation tools in the case of exploring and presenting the collected data. The respondents were included in the questionnaire survey according to the following demographic results. Summary of the sample presented in below Table 1.

Table 1: Sample Profile

Faculty	Gender		Total
	Male	**Female**	
Applied Sciences	13	7	20
Social Sciences and Humanities	15	10	25
Technology	9	9	18
Management Studies	37	30	67
Total	74	56	130

Source: Survey Data

The questionnaire was distributed among two hundred undergraduates in Rajarata University of Sri Lanka, Mihintale premises but researcher could be able to receive only one hundred and thirty responses correctly. When considering the respondents based on their faculty, most of the respondents are from Faculty of Management Studies (sixty-seven students), next most is from Faculty of Social Sciences and Humanities (twenty-five students), twenty students from Faculty of Applied Sciences and eighteen students from Faculty of Technology. Further, most of the respondents are male (seventy-four out of one hundred and thirty.

The questionnaire was distributed randomly among both male and female Rajarata University undergraduates and one hundred and thirty students successfully responded to the questionnaire. Out of that one hundred thirty respondents, seventy-four were male and fifty-six were female which are 57% and 43% of the total respectively. The female students' percentage is lower compared to the male students' percentage.

Respondents were grouped into four groups according to their faculty. 52% of undergraduates from Faculty of Management Studies and it is the highest number of faculty group. 19% of undergraduates were represented Faculty of Social Sciences and Humanities,

15% of undergraduates were represented Faculty of Applied Sciences and 14% undergraduates represented Faculty of Technology and it is the lowest faculty group.

4.1 Data Analysis

Reliability Analysis

Table 2: Result of Reliability Analysis

Variable	Number of Items	Cronbach's Alpha
Selection of Web Browsers	5	0.798
Browser Performance	5	0.814
Security	7	0.831
Awareness	4	0.706
User Friendliness	7	0.851

Source: Survey Data

According to above Table 2, Cronbach's Alpha for variables of Selection of Web Browsers, Browser Performance, Security, Awareness, and User Friendliness were 0.798, 0.814, 0.831, 0.706 and 0.851 respectively. All they were greater than 0.7, it means all the questions which were used to test quality of particular variables have better internal uniformity. All Cronbach's alpha values were greater than 0.7 also implies that all the questions are highly reliable to analysis.

Descriptive Statistics

Table 3: Result of Descriptive Statistics

Variable	Mean	Std. Deviation	Skewness	Kurtosis
Selection of Web browsers	3.6923	0.83533	-0.514	-0.406
Browser Performance	3.9369	0.83751	-0.839	-0.045
Security	4.0516	0.73190	-1.158	1.193
Awareness	3.5654	0.84424	0.195	-1.208
User Friendliness	3.9286	0.72325	-0.786	0.603

Source: Survey Data

The mean values for the Selection of Web browsers, Browser Performance, Security, Awareness and User Friendliness were 3.6923, 3.9369, 4.0516, 3.5654 and 3.9286 respectively on Likert five-point scale. Mean values of the Selection of Web browsers, Browser Performance, Security, Awareness and User Friendliness were in the higher agreement level of the respondents. Those mean values reveal that the respondents have higher level of selection of web browsers by considering independent variables. Standard deviations for the all variables were 0.83533, 0.83751, 0.73190, 0.84424 and 0.72325 as well as the coefficients of variation were 22%, 21%, 18%, 23% and 18% respectively. It reveals that there are considerable high as well as low variations among the undergraduates on their web browser selection. All four variables except the Awareness were negatively skewed and it

states that the selection of web browsers is high among most of the undergraduates. Skewness of Awareness showed 0.195 skewness and it was in normally skewed position. As per the coefficients of kurtosis, all curves of data distribution show flatted tops as their nature.

Correlation Analysis

Correlation for Selection of Web Browsers and Browser Performance was 0.630 and it was a strong positive relationship between these two variables. Also, this relationship was significant at 0.01 level. The correlation between Selection of Web Browsers and Security was 0.603 implies that there was a strong positive relationship between these two variables and relationship was significant at 0.01 level. Correlation for Selection of Web Browsers and Awareness also was a strong positive relationship shows 0.504 which was significant at 0.01 level. Finally, correlation between Selection of Web Browsers and User Friendliness shows that there was a strong positive relationship as 0.558 and relationship was significant at 0.01 level. Therefore, it can be statistically said that there were significant and strong positive relationships between Selection of Web Browsers and other independent variables.

Table 4: Result of Correlation Analysis

Correlations	Browser Performance	Security	Awareness	User Friendliness	Selection of Web Browsers
Browser Performance	1				
Security	.768** .000	1			
Awareness	.443** .000	.425** .000	1		
User Friendliness	.657** .000	.664** .000	.507** .000	1	
Selection of Web Browsers	.630** .000	.603** .000	.504** .000	.558** .000	1

**. Correlation is significant at the 0.01 level (1-tailed).
Source: Survey Data

Multiple Regression Analysis

Hence this study was based on one dependent and four independent variables, researcher tend to drop the consideration to the Adjusted R Square value in the case of assessing the overall regression model. Adjusted R Square was 0.472 and it argues that 47.2% of Selection of Web Browsers was explained by the independent variables taken under the model 1 and remaining 52.8% of Selection of Web Browsers is described by other factors which have not specified in the study.

Table 5: Model Summery

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.699a	0.488	0.472	0.60713

a. Predictors: (Constant), Selection of Web Browsers, Browser Performance, Security, Awareness, User Friendliness

Source: Survey Data

Table 6: Result of ANOVA Analysis

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	43.936	4	10.984	29.799	.000b
	Residual	46.076	125	. 369		
	Total	90.012	129			

a. Dependent Variable: Selection of Web Browsers

b. Predictors: (Constant), Browser Performance, Security, Awareness, User Friendliness

Source: Survey Data

The F test was 29.799 with the significance value of 0.000 in ANOVA Analysis Table 4.13. This meant that the probability of these results occurred by chance was less than 0.05 (P=0.001). Therefore, a significant relationship was presented between Browser Performance, Security, Awareness, User Friendliness and Selection of Web Browsers and overall regression model can be considered as a significance one.

Table 7: Result of Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.272	.334		.813	0.418
	Browser Performance	.303	.105	.303	2.874	.005
	Security	.228	.121	.200	1.886	.062
	Awareness	.226	.075	.229	3.034	.003
	User Friendliness	.127	.108	.110	1.168	.245

a. Dependent Variable: Selection of Web Browsers

Source: Survey Data

The coefficients in Table 7 shows that the β values for Browser Performance, Security, Awareness and User Friendliness are 0.303, 0.228, 0.226 and 0.127 respectively. That's mean, these all variables indicate positive impacts on Selection of Web Browsers. Statistically significance impact on Selection of Web Browsers showed by only the variables called Browser Performance and Awareness. They were 0.005 and 0.003 (P<0.05) respectively. Other two variables called Security and User Friendliness showed insignificance impact on Selection of Web Browsers. They were 0.062 and 0.245 (P>0.05) respectively. This implies that there is a significance and positive impact of Browser Performance and Awareness on Selection of Web Browsers

4.2 Hypotheses Testing

This research study has four hypotheses and all hypotheses were concerned with a positive impact from independent variables to dependent variable. Therefore, in this study Multiple Regression Analysis and Pearson's Product Movement Correlation Analysis were run to test the hypotheses and results of those analyses can be summarized as follows.

In this study used Correlation Analysis and Multiple Regression Analysis for hypotheses testing. Specific objectives of this research were achieved through the hypotheses testing. According to the Correlation Analysis there was a significant positive relationship between Selection of Web Browsers and Browser Performance. When considering Multiple Regression Analysis, Regression Coefficient (B) also indicates that there was a positive impact of Browser Performance on Selection of web Browsers. It was a significance positive impact which showed 0.005 significance value. According to the both analyses, results were supports to first hypothesis (H1) of the study. Therefore, hypothesis one is accepted by both Correlation and Multiple Regression Analyses.

The correlation between Selection of Web Browsers and Security shows that there was a significant positive relationship. The Unstandardized Multiple Regression Coefficient (B) for Security was positively influenced to the Selection of Web Browsers but, it was an insignificant impact. According to the Correlation Analysis, results were supports to second hypothesis (H2) of the study while Multiple Regression Analysis results not supported for that. Therefore, hypothesis two is accepted by Correlation Analysis and rejected by Multiple Regression Analysis.

The correlation between Selection of Web Browsers and Awareness shows that there was a significant positive relationship. The Unstandardized Multiple Regression Coefficient (B) for Awareness was significantly and positively influenced towards the Selection of Web Browsers. Hence, according to the both analyses, results were supports to third hypothesis (H3) of the study. Therefore, hypothesis three is accepted.

According to the Correlation Analysis there was a significant positive relationship between Selection of Web Browsers and User Friendliness. When considering Multiple Regression Analysis, Regression Coefficient (B) indicates that there was a positive but insignificant influence of User Friendliness on Selection of Web Browsers. So, the Correlation Analysis results were supports to fourth hypothesis (H4) while Multiple Regression Analysis results not supported for that. Therefore, hypothesis four can be accepted by Correlation Analysis and rejected by Multiple Regression Analysis.

Finally, according to the results of Multiple Regression Analysis Square of Adjusted R was 0.472, This value indicates that the model was fitted to the data set and 47.2% variance of Selection of Web Browsers was explained by those four independent variables (Browser Performance, Security, Awareness and User Friendliness).

5. Conclusions and Recommendations

5.1 Conclusions

The main objective of this research was to examine that what the factors are affecting on selection of web browsers and their impacts towards the web browser selection. To conduct this research, researcher collected data from one hundred and thirty university students in Rajarata University of Sri Lanka using a structured questionnaire. After collecting data,

researcher analyzed those data by using IBM SPSS Statistics 21 software tool. Throughout prior studied, researcher founded four independent variables which influencing to the Selection of Web Browsers. Using finding of prior studies researcher developed four hypotheses.

According to the mean values and standard deviations of Descriptive Statistics, all research variables were represented higher agreement level of the respondents. As per the Correlation Analysis, there was strong positive and significant relationship for all hypotheses. Likewise, according to the Multiple Regression Analysis, there was positive relationship for all hypotheses. Therefore, researcher could be able to finalize that all hypotheses were accepted according to the result of Correlation Analysis and H1 and H3 hypotheses were accepted according to the Multiple Regression Analysis. On the other hand, H2 and H4 hypotheses were rejected from Multiple Regression analysis due to they were showed an insignificant impact on web browser selection.

From these results it can be concluded that Browser Performance and Awareness factors were positively and significantly impacted to the Selection of Web Browsers and Security and User Friendliness factors positively but not significantly impacted. When contribute impacts of these all matters researcher founded a positive web browser selection behavior among the undergraduates in Rajarata University of Sri Lanka. This research also served as a guideline for all the researchers interested studying in this area. The findings of this study help to the web browsers developers, technology institutions, information seekers and academicians.

5.2   Recommendations

Researcher pretty sure that after go through this study, readers can feel more comfortable of the variety of web browsers and their differences. The wonderful truth is human beings are much love to compare the things and choose one to go on. The same theory relevant to the web browsers when users are going to select one. Because, there are different web browsers available and those web browsers have different strengths and weaknesses. Almost all the web browsers do their best to adhere to the web standards created by World Wide Web Consortium (W3C), Internet Engineering Task Force and other official organizations. This study can use as an evidence to prove that there is a cool competition among the popular web browser developers, technology companies and institutions that specialized in web browser related services such as Google, Apple, Microsoft, Mozilla to provide web browsers which work better than other web browsers. Competition makes the things better. Therefore, researcher recommends to the non-popular web browsers developers to consider the factors which researcher have highlighted in this study in order to develop productive web browser brands. They also can use this study as a competitive strategy which can compete with popular web browser developers and attract internet users to their web browser products.

Researcher also recommends to the information seekers and the academicians who always use web browsers, to enhance their browser horizons to multiple web browsers without getting stuck to the pre-defined default web browsers on their devices. By trying different web browsers out, users may able to figure out the once that adhere to the all independent factors that have highlighted in this study, (Browser Performance, Security, Awareness, and User Friendliness) which encourage their browsing activities. Hence this research focus on undergraduates and fill the practical gap of their web browser selection, moreover researcher recommends to use this study as a tool for several academic programs for increase the awareness level of students about the web browser selection.

As a result of this attempt, many of web browsers will reach to their success at achieving the desired performance, security, awareness and user friendly goals. So, the popular web browser

developers can get the economic advantages, non-popular web browser developers can get the competitive advantages and internet users can get the consumption advantages.

6.   Future Direction

Researcher believes that there are numerous avenues for future research works. Therefore, researcher proposes some suggestions for future researchers who interested in this area, for the purpose of making some improvements in their research.

There were limited literature reviews were seen in the "factors affecting the selection of web browsers". Researcher couldn't find any study related the factors affecting the selection of web browsers in Sri Lankan context. There is a clear research gap with regarding this research area. So, researcher suggests that to conduct further research in this research area. This analysis was done within a six-month time period which is short when considering the other research of similar nature. Therefore, future researchers could spend enough time to conduct a research and it will produce more accurate results. Future researchers can refer more research articles, journals, reports and other knowledge sources to improve their base knowledge. Research was conducted using only the undergraduates in Rajarata University, Mihintale premises. So, it is not a true representation of all undergraduates in entire Sri Lankan state universities. Future researchers must extend the sample size. Other than the four factors which have highlighted through this study, there are so many factors which impact the selection of web browsers. Therefore, strongly suggests that, the future researchers have to add more independent variables which will increase the significant of the research.

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