

Performance of E-Commerce Websites on Multiple Devices: Nykaa, Flipkart, ShopClues & Snapdeal

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Abstract— Electronic Commerce a.k.a eCommerce is the buying of products from various traders via Internet as a medium. In our research we are analyzing the performance of eCommerce websites on laptops and mobile phones to track their load timings that hampers eCommerce website's performance.

Key words: Nykaa, Flipkart, Shopclues, Snapdeal, Lenovo, Asus, Performance, Measures, Devices, Configuration

I. INTRODUCTION

E-commerce made its way in the early '70s while the concept boomed when Amazon pioneered into this business by purchasing & delivering products to their consumers. E-commerce relates to the website of a vendor associated with them for trading their products. It has now brought a complete change in the traditional technique of doing business.

But we have seen in the past that when there is business there is challenges. Many studies reveal that eCommerce website fails to make business mostly due their performance. Some of such websites are Footlocker, Rakuten Urban Outfitters etc.

The major challenges an eCommerce website face to hold their performance are listed below: [1]

- Parsing content from various other sources.
- The complexity of the site and user experience (UX)
- Unavailability of browser caching
- Non-optimized images
- High interaction time
- Lack of unique/saved URLs for custom advanced searches
- Lack of mobile optimization of the website
- Display what is required only
- Incorrect platform
- Un-easy navigation
- Usage of outdated CMS version

We have selected four eCommerce portals for our study 'Flipkart', 'ShopClues', 'Nykaa', 'Snapdeal' and would analyze its performance in comparison to each other as well as in laptops and mobile phones.

A. Snapdeal

Snapdeal headquartered in Delhi, India launched snapdeal.com in February 2010. The company was founded by Kunal Bahl, a Wharton graduate, and Rohit Bansal, an alumnus of IIT Delhi and has partnered with several global marquee investors and individuals such as SoftBank, BlackRock, Temasek, Foxconn, Alibaba, eBay Inc., Premji Invest, Intel Capital, Bessemer Venture Partners, Mr. Ratan Tata etc. [1]

B. Flipkart

Flipkart an Indian based company that came into existence in 2007 after Sachin Bansal and Binny Bansal, former students of IIT Delhi, developed this website. Flipkart has also

pioneered Cash-on delivery payment mode and on May 2018 Walmart, an American based retailer, signed acquisition with Flipkart obtaining 77% of its share. [2]

C. Nykaa

Nykaa was founded in 2012 by Falguni Nayar, former managing director of Kotak Mahindra Capital Company, with only 20 employees working with her. From 2016 till 2017, Nykaa has grown by about 350% and this year onwards they are going to grow on other 300%. [3]

D. ShopClues

ShopClues based in Gurugram was founded in July 2011 by Sandeep Aggarwal, Sanjay Sethi and Radhika Aggarwal. ShopClues was founded with the idea of giving the best bargains via internet to the people of India and claims to be technology driven as their merchants require least manual intervention, for ShopClues gives them with a self-service platform. [4]

The below data in Fig-1 refers where these website stands at international level.

Website	Rank		% of visitor	
	Global	India	Global	India
Flipkart	130	10	95.6	0.8
Snapdeal	938	69	0.8	95.2
Nykaa	9028	655	1.1	94.1
ShopClues	3351	255	1.1	93.4

Fig. 1:

II. OBJECTIVES

- To analyze the performance of Nykaa's, Flipkart's, ShopClues's & Snapdeal's website
- To understand the issues of these eCommerce websites on various devices
- To know how the measures are effecting these websites performance

III. OVERVIEW OF RESEARCH

This segment is about the method chosen for research. The data was collected during the website's performance testing in 2 laptop- Asus i5, Lenovo i3, and 2 mobile platform- Android Nexus 5X, iOS iphone7.

- We have performed tests for each of these websites using Lighthouse audit tool by Google
- The data in Fig-2 is categorized in order to compare performance of Flipkart, Snapdeal, Nykaa and ShopClues in laptop vs phones against a set of reasons that can hamper user's experience.

The measures selected for the testing were based on

- how fast the first content was available referred as First Meaningful content
- how quick was the content available referred as Speed Index

- how rapidly did the site fully interact referred as Time to Interact
- how reluctant was the site to respond to the user's input.referred as User Input latency
- how long it took the site to load completely referred as Fully load time

The devices with different specification & configuration were set to perform audits for all the listed eCommerce website at a certain time interval to give result mentioned measures.

Category of devices	Website	Reasons					# Requests	
		First Meaningful Paint (in sec)	Speed Index (in secs)	Time to Interact (in secs)	User Input Latency (in secs)	Fully load time (in secs)		
Laptop	Asus i5	Flipkart	4.0	11.2	10.8	0.19	3.4	84
		Snapdeal	4.4	8.3	7.4	0.64	4.0	98
		Nykaa	5.0	33.9	25.0	0.74	7.5	230
		Shopclues	4.3	11.0	13.6	0.90	4.1	126
	Lenovo i3	Flipkart	4.4	13.9	14.2	0.31	4.8	83
		Snapdeal	4.4	8.6	7.5	1.04	3.5	97
		Nykaa	9.5	29.2	25.2	1.0	6.3	229
Phone	Nexus 5x	Flipkart	2.3	9.5	12.8	10.0	13.3	74
		Snapdeal	4.2	10.1	16.2	17.6	18.2	99
		Nykaa	4.6	16.7	23.5	22.1	23.4	189
		Shopclues	9.8	12.6	19.7	17.6	20.2	147
	iphone 6	Flipkart	1.3	4.0	5.4	3.0	5.6	62
		Snapdeal	2.8	4.3	5.3	3.1	6.0	91
		Nykaa	2.7	7.8	13.4	8.7	13.1	186
		Shopclues	6.1	6.1	6.4	6.0	9.5	144

Fig. 2:

IV. METHODOLOGY & PERFORMANCE ANALYSIS

In our research, we have used the scatter-line chart to plot our data and analyze. Thus, the below figure represents how Flipkart, Snapdeal, Nykaa, and ShopClues is behaving to the devices that were used

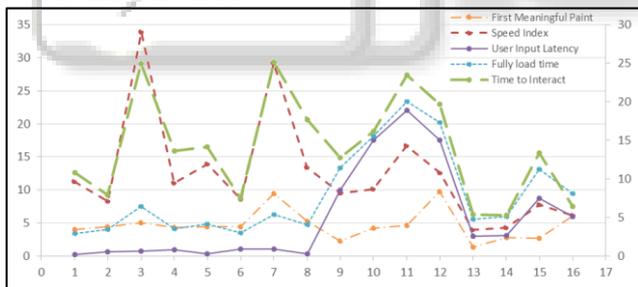


Fig. 3:

- # (1-4) refers ASUS(Flipkart, Snapdeal, Nykaa, Shopclues)
- # (5-8) refers LENOVO(Flipkart, Snapdeal, Nykaa, Shopclues)
- # (9-12) refers NEXUS 5X(Flipkart, Snapdeal, Nykaa, Shopclues)
- # (13-16) refers iPHONE(Flipkart, Snapdeal, Nykaa, Shopclues)

For each website plotted on the X-axis (represented with numbers starting from 1-16).

According to the graph, we are able to identify the following-

A. Flipkart

- Its performance is firm throughout all the devices for loading FMP
- its quick availability of contents (speed index) for laptops is quite high while it stands low for phones. Although in

comparison to laptops it is low in phones, the load time in Nexus pulls the graph up.

- It's time to interact is higher and is almost similar to time value for speed index in all the devices
- Its latency for user's input is minimal for laptop and somewhat steady for iPhone whereas it stands very high for Nexus
- its criteria for fully load time stands somewhat constant in laptops and iPhone but spikes up in Nexus

B. Snapdeal

- its time consumption for FMP is low across all the devices
- it used a very stable time for speed index for both laptops and Nexus but used less time in iPhone
- time to interact for both the laptops and iPhone is almost persistent but draws the graph high for Nexus
- its user input latency factor stands tall in Nexus whereas very low for laptops
- Asus and Lenovo are stable for fully load time factor whereas time being used for phones were high. Nexus has consumed more load time than iPhone

C. Nykaa

- It has consumed high time to act on FMP for Asus, iPhone, and Nexus but pulls the graph up for Lenovo
- The time for quick availability of loading content stands high as compared to the rest of the websites and also consumes a lot of time to load for every device
- Its consumption for time to interact is equal for both the laptops (Asus and Lenovo) but gradually dips down for phones

- Its user input latency measure is low for laptops but Nexus grows to the peak even in comparison to iPhone
- Its fully load time factor takes a hike for every device but reaches the peak for Nexus

D. ShopClues

- FMP stands stable for Asus, Lenovo, and iPhone but spikes up for Nexus
- It consumed a uniform time for Speed Index similar to the other websites but the time value for iPhone is less as compared to the rest of the devices
- Time consumed to interact is lowest for iPhone, highest for Nexus and at a moderate level for Asus and Lenovo
- Results for user input latency is at a low value for laptops but grows high for phones where time consumption for Nexus is comparatively very high than iPhone
- The fully load time criteria for laptops are moderate but points very high for Nexus and relatively less for iPhone

The performance of Flipkart, Snapdeal and ShopClues in Laptop is high for Asus due to its i5 processor which is able to respond to the multiple requests quickly. Since, these websites have multiple requests that needs to be fetched externally, it is time consuming for low-end laptops. Thus, Lenovo’s i3 processor consumed excess time to load the websites. However, Nykaa has consumed almost equal amount of time for Asus and Lenovo that has resulted in bad performance for its website.

For the performance of these website when compared with Android and iOS, all the websites have less loading time in iPhone 6 resulting to have good performance. However, Nykaa has consumed more time than the others in iPhone 6.

Below table in Fig 4 refers the average time taken to load the page for each of the websites.

Category of devices		Websites	Average
Laptop	Asus i5	Flipkart	5.92
		Snapdeal	4.95
		Nykaa	14.43
		Shopclues	6.78
	Lenovo i3	Flipkart	7.52
		Snapdeal	5.01
Nykaa		14.24	
Phone	Nexus 5x	Flipkart	9.58
		Snapdeal	13.26
		Nykaa	18.06
		Shopclues	15.98
	iPhone 6	Flipkart	3.86
		Snapdeal	4.30
		Nykaa	9.14
		Shopclues	6.82

Fig. 4:

V. CONCLUSIONS

A performance of any website not only depends on how much time it takes to load every content but also depends on the device’s configuration. As per our analysis of the data, while we have compared Asus i5 vs Lenovo i3, the performance of

websites in i5 processor is better than i3 processor as it consumes less time to load the first interaction. Similar goes with configurations of phones. Although in our analysis Nexus 5X has hexa-core processor and iPhone 6 has dual-core, the results of performance in iPhone is higher than Nexus 5X.

Yet, every website should focus on ‘first interaction’ which keeps the customer hooked on to the website rather than let customer stare at blank screen till all the elements and contents have been load.

VI. RECOMMENDATION

From our analysis and referring to the expert’s views, we have listed few recommendations that can benefit the website’s speed if incorporated and enhance the performance.

A. Flipkart

- Specify width and height for the images to render

B. Snapdeal:

- Reducing file sizes based on place of the images in website
- All static resources can have either a Last-Modified or ETag header. This will allow browsers to take advantage of caching and speed up page

C. Nykaa:

- The page should be interactive within 10 seconds in laptops and within 5 secs for phones.
- Reducing total page size to less than 100K will allow to speed up the first interaction.
- The total size of images is 502475 bytes. For quick load considering to switch to graphic formats to achive smaller file sizes (from JPEG to PNG for example).

D. Shopclues:

- The page should be interactive within 5 seconds in phone.
- To improve page load time ask visitors to save and reuse the files included in the website.
- Reducing the size of files sent from the server to increase the speed
- Serve identical resources from a consistent URL rather than different URL’s
- Minimize HTTP redirects from one URL to another. Thus, it will cut out wait time for users.

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