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WEB PROGRAMMING

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Assignment 1

Report - Comparative Evaluation of E-Commerce Websites

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1.0 INTRODUCTION

In today's competitive e-commerce landscape, website performance is a key driver of customer satisfaction and business success. This report evaluates the performance of six leading e-commerce websites which are Amazon, eBay, Walmart, Lazada, Shopee, and Rakuten. The evaluation focuses on their homepages and product pages. By using Google Lighthouse, we can assess key metrics like Performance, Accessibility, Best Practices, and SEO.

2.0 METHODOLOGY

Google Lighthouse is an open-source automated tool used to evaluate website quality for this analysis. The audit targets homepages and product pages of Amazon, eBay, Walmart, Lazada, Shopee, and Rakuten. Four metrics are assessed which are Performance (loading speed, interactivity), Accessibility (usability for diverse users), Best Practices (modern coding standards), and SEO (search visibility). All reports were generated and tests conducted in desktop mode to ensure consistent across results.

3.0 LIGHTHOUSE SCORE

3.1 LIGHTHOUSE SCORE RESULTS

E-COMMERCE WEBSITE	HOMEPAGE	PRODUCT PAGE
Amazon		
eBay		
Walmart		
Shopee		
Lazada		
Rakuten		

3.2 LIGHTHOUSE SCORE SUMMARY

HOMEPAGE SCORES

METRIC/SITE	AMAZON	EBAY	LAZADA	RAKUTEN	WALMART	SHOPEE
PERFORMANCE	76	80	61	53	84	39
ACCESSIBILITY	88	88	54	81	96	76
BEST PRACTICES	93	100	78	96	78	100
SEO	100	92	92	100	92	58

PRODUCT PAGE SCORES

METRIC/SITE	AMAZON	EBAY	LAZADA	RAKUTEN	WALMART	SHOPEE
PERFORMANCE	93	63	23	64	61	27
ACCESSIBILITY	66	90	63	81	96	76
BEST PRACTICES	93	100	81	96	74	100
SEO	92	85	77	100	58	58

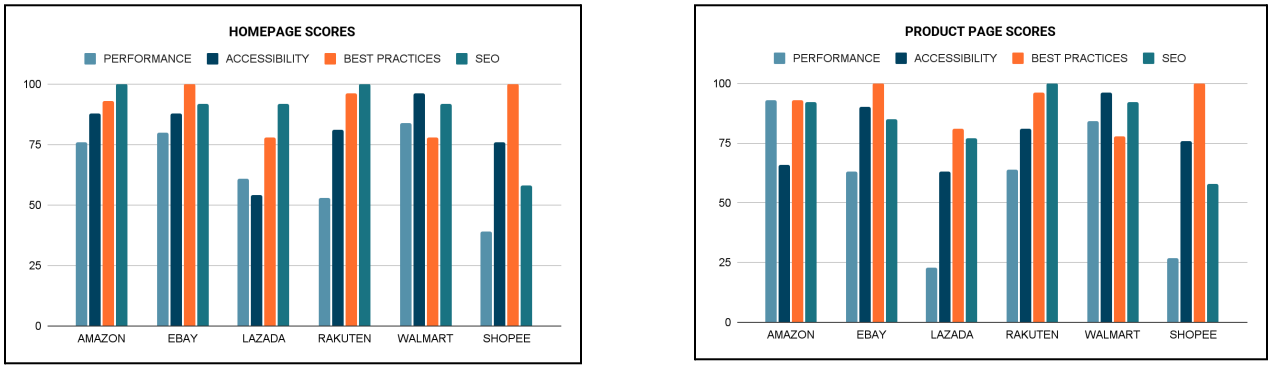

FIGURE 1.0: Display the scores for both Homepage and Product page from all websites.

4.0 INDIVIDUAL WEBSITE FINDINGS (STRENGTHS & WEAKNESSES)

4.1 AMAZON

Amazon's homepage scored exceedingly in all the key Lighthouse metrics especially in **SEO (100)** and **Best Practices (93)**. It has shown **good accessibility (88)**, structured navigation, and contents. Its **performance score (76)**, however, indicates room for improvement, primarily regarding image loading and JavaScript executions. **Large DOM sizes, unused CSS/JS, no viewport meta tag reduces responsiveness and efficiencies**, mostly on mobile users.

Amazon's product pages are quite **high at performance score (93)** compassed, demonstrating **excellent Best Practices and SEO compliance (each more than 92)**, delivering fast, secure, and discoverable experience. However, **access still becomes a sore point with a poor score of 66**, mainly due to **missing labels and low contrast elements**, in addition to absence of the viewport tag.

4.2 eBAY

eBay's **good performance in Lighthouse scores includes a perfect 100 in Best Practices** and a really **good 80 in Performance**. Its homepage was fast loaded, **stable (low CLS),** and would meet all the modern web standards thoroughly. **Accessibility is also pretty good (88)**, with room for improvement in descriptive alt text and ARIA labeling. **A little unused CSS and JS hinder the performance of the site**, but overall a very effortless and technically sound experience.

The eBay product pages reflect the same characteristics as their homepage, particularly concerning **Best Practices (100)** and **Accessibility (90)**. Generally, layout stability and code structure contribute to a consistent experience for the user. **Performance (63)**, however, is dragged down by **too many DOM elements coupled with lots of unused CSS**, which lead to an increase in initial loading time.

4.3 WALMART

Walmart gives one of the most balanced homepages among all platforms evaluated. The score in **performance which is 84, accessibility is 96** demonstrated fast page loading and a good emergence to deal with a wide range of users. **Strong SEO at 92** makes the site fit for search results. The only **significant weakness is Best Practices (78)** caused by **unused JavaScript and CSS**, which compromise a little on the cleanliness and maintainability of the codes.

Walmart excels in performance and maintains it at its product pages where it flaunts the identical speed (84), accessibility (96), and layout stability traits as its homepage. Fast LCP and low CLS values contribute toward a pleasant browsing experience. However, like the home page, unused code lowers this Best Practices score, ready for improvement with regular code audits.

4.4 SHOPEE

Shopee stands out for its perfect Best Practices score (100) on both the homepage and product page, indicating **high adherence to web standards and security protocols**. The platform also maintains a decent level of Accessibility, scoring 76 on the homepage.

However, Shopee experiences significant issues with **Performance**, scoring **39 on the homepage** and **27 on the product page**. These are the lowest scores in the comparison and are primarily due to **long blocking tasks, render-blocking scripts, and slow LCP**. Additionally, Shopee's **SEO score** is low, particularly on the homepage **(58)**, due to **missing meta descriptions and blocked content**, which can **limit search engine visibility**.

4.5 RAKUTEN

Rakuten demonstrates strong and consistent performance in SEO, scoring a perfect 100 on both the homepage and product page. Accessibility is also commendable with a score of 81 across both pages. Additionally, the homepage showcases **an excellent CLS value of 0.02,** ensuring a **stable visual layout** during page load.

Despite these strengths, Rakuten shows moderate Performance—53 on the homepage and 64 on the product page. The platform is **notably affected by unused JavaScript, lack of image optimization, and main-thread blocking caused by third-party scripts.** These technical inefficiencies **impact page responsiveness and speed.**

4.6 LAZADA

Lazada exhibits moderate strengths in both its homepage and product page in terms of SEO and Accessibility, with scores consistently within the 70s. This reflects a **reasonable effort toward content discoverability and user inclusiveness across both interfaces.**

However, Lazada faces significant challenges with Performance. Both the homepage and product page record the lowest performance scores among the platforms evaluated—23 on both pages. These scores are impacted by **high CLS and slow LCP**, indicating **substantial visual instability and slow content rendering**. Such issues can **hinder user satisfaction and increase bounce rates.**

5.0 COMPARATIVE ANALYSIS

Metrics	Best Performer Websites	Notable Insight
Performance	eBay	Quick load times and low blocking.
Accessibility	Amazon/eBay	Lazada requires significant work.
Best Practices	eBay	Fully compliant with recommendations.
SEO	Amazon	Perfect score for SEO readiness.

6.0 CONCLUSION & RECOMMENDATION

The analysis reveals that eBay and Walmart balance performance, accessibility, and best practices effectively. In contrast, Lazada and Shopee face critical performance challenges, especially on product pages. Rakuten excels in SEO but needs resource optimization to improve loading speeds.

Performance can be enhanced across all platforms by **implementing lazy-loading** and **next-gen image formats**. **Minifying JavaScript** and **deferring non-essential scripts** can significantly **improve responsiveness.** Accessibility improvements should focus on using ARIA attributes appropriately and ensuring accessible names for forms and buttons. **Simplifying navigation structures** will further assist users with disabilities. Best Practices can be strengthened by **removing unused resources** such as JavaScript and CSS and ensuring static assets use efficient caching policies. For SEO, **adding and improving meta descriptions** and ensuring all pages are crawlable by search engines are crucial steps.