



Web Design Progress and Prospects for E-commerce Websites

Xingyi Chen

Computer Science, Beijing Jiaotong University, Beijing, 100044, China
22722043@bjtu.edu.cn

Abstract. With the rapid development and popularisation of the Internet, more and more users are relying on websites for information acquisition, communication, and interaction as well as commercial activities. Therefore, as one of the main carriers of the Internet, the importance of web pages is self-evident. To meet the diversified needs of users, web development technology has been evolving, aiming to provide a more convenient, efficient, and secure user experience. Traditional research methods tend to focus on theoretical analyses and experience summaries and lack exploration and innovation in practical applications. This prevents some new development concepts and technologies from being applied to actual projects on time, affecting the progress of web development. This paper conducts a study based on the user needs, user experience, and compatibility of web design for e-commerce platforms. This paper firstly briefly describes the most basic functions of designing an e-commerce platform and analyses the conditions for an e-commerce platform to meet its success by taking Amazon as an example. Then the limitations of web design for e-commerce platforms are analysed. This paper analyses the integrity issues, compatibility issues, and loading speed issues of e-commerce platforms and proposes solutions such as tools such as Browserslist that can be used to check the browser support for CSS3 and JavaScript features. Choose the right tool to compress the size of image files and reduce the number of HTTP requests. This paper has positive implications for the design and development of e-commerce platforms.

Keywords: Web design, E-commerce, Amazon.

1 Introduction

Online retailing has been growing steadily over the years. As a result of the development of COVID-19, more and more users who originally preferred offline shopping started to shop online. E-commerce platforms have ushered in their spring [1]. More and more companies want to disseminate their products, product advantages, and service concepts to the public through web pages [2]. However, there are still two problems in the development of e-commerce platforms. Traditional small businesses lack competitiveness compared with large enterprises, making it difficult to survive and display personalised products. Secondly, there are limitations in the

design of e-commerce platforms, such as the lack of stronger regulation of honest transactions between buyers and sellers. The display effects of different devices and browsers are different, which requires developers to consider the compatibility problem when designing. In addition, web design also needs to consider the loading speed, too many pictures and animations may affect the loading speed of the web page and bring a bad experience to users. In this paper, some necessary functions required by e-commerce platforms are analysed. Secondly, briefly introduce the development history of the e-commerce platform. Then, taking Amazon's e-commerce platform as an example, it analyses the reasons for Amazon's success and what features are needed for a good e-commerce platform. Finally, the limitations of e-commerce platforms are discussed, and reasonable solutions and ideas are proposed. By breaking away from traditional layout and design ideas, designers can create web interfaces that are more unique, intuitive, and easy to navigate. And optimise the user's online experience.

2 Design Requirements of E-commerce Websites

The design requirements of e-commerce platforms are very complex, divided into functional requirements and non-functional requirements. Nonfunctional requirements are website technical parameters that affect quality and performance parameters, which are the foundation of user experience. The loading speed of user requests is one of the nonfunctional requirements [3]. For functional requirements, firstly, the most basic requirements must be met, such as: 1) When purchasing a product, there should be a minimum of steps and an icon like a shopping cart that is clear and visible, so that buyers know where the products they have seen before has gone. The development and popularization of mobile technologies that can access the internet, such as smartphones and tablets, have completely changed people's expectations for telecommunications devices. Their use in our daily lives, including commercial transactions, has become crucial. This fact has prompted people to introduce new e-commerce methods [4], so mobile friendliness is very necessary to facilitate both mobile phone users and tablet users. 3) There should be a reliable integration of transportation and payment methods to ensure user trust in payment and transportation. 4) A convenient set of filters is needed to reduce the time users spend on selecting products, facilitate the search system to bring more users to purchase, and bring longer and longer profits. Some recognized requirements like global e-commerce websites require localization and compliance with transportation restrictions. For some nonmedical products that can be returned, e-commerce platforms also need to provide necessary return options. If it is a website targeting American buyers, a return form needs to be created for dissatisfied buyers to express their opinions [5].

3 A Brief History of the Development of E-commerce Websites

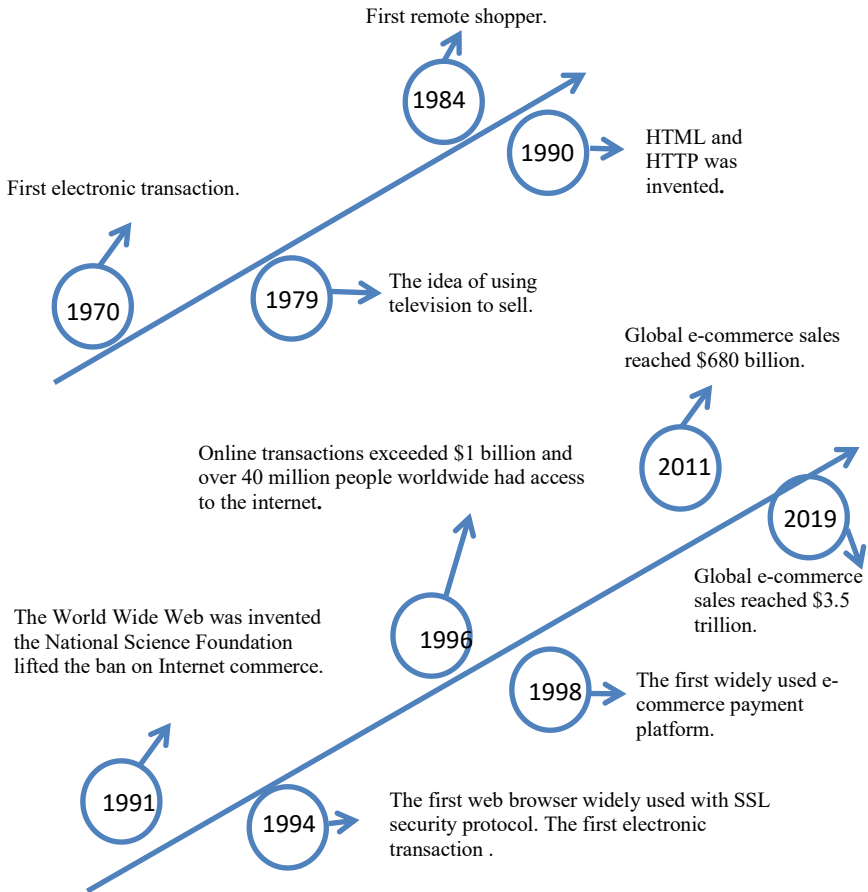


Fig. 1. Historical development chart of the e-commerce platform. (Picture credit: Original)

As shown in Figure 1, with the development of technology, e-commerce platforms have become an indispensable part of people's lives.

4 Development and Discussion of E-commerce Platforms – Take Amazon as an Example

4.1 Why Can Amazon Serve as a Representative of E-commerce Platforms

As one of the world's largest e-commerce platforms, Amazon not only has a huge user base and market share, but also provides sellers with a wide range of product choices, strong brand reputation, and consumer trust. On Amazon, consumers can find a variety of products, from electronic products to household items, clothing, books, food, and more, to meet various needs. While focusing on quantity, Amazon also values product quality. At the same time, Amazon has many patents. Amazon recently announced the number of Amazon's global innovation patents at the Amazon China 2018 Innovation Day held in Beijing. As of January 2018, Amazon has successfully registered about 10400 patent technologies worldwide, covering multiple emerging technologies, including machine learning, cloud computing, artificial intelligence (AI), and robotics. There are 310 million active users on Amazon. More than 197 million people use Amazon's applications every month. As shown in Figure 1, Amazon's global buyers have exceeded 6 million, including 2.5 million active sellers. Amazon can fully represent e-commerce platforms.

4.2 The Reason for Amazon's Success and its Implications for Other E-commerce Platforms

Firstly, Amazon operated commercially as a book retailer in 1995 but later entered the fields of music and e-commerce seeking development. In the following 27 years, Amazon has entered the fields of e-commerce, cloud computing, and personal and home interaction technology, becoming a leader [6]. The reason for its success is firstly due to its development in multiple fields.

Secondly, Amazon has an invention patent, and Amazon engineers have designed a program that allows customers to make purchases with just a click of the mouse. They have also applied for a patent - One Click, which has withstood multiple challenges in the United States. Therefore, competitors either obtain technology licenses from Amazon or develop more systems [6]. This laid the technological and material foundation for Amazon's success.

Furthermore, Amazon has achieved customer-centric innovation. To adapt to the customer-centric concept, Amazon has redesigned its stores by launching "Your Store Services" to cater to each customer. As a well-known e-commerce platform, Amazon has accumulated a strong brand effect and user trust. When buyers shop on Amazon, they tend to trust the platform more, which wins the trust of customers for sellers [7].

In addition, Amazon has also done quite well in terms of shopping convenience, user evaluation system, and advertising promotion. The platform has a user-friendly interface and powerful search function, providing multiple payment methods, as well as functions such as one-click purchase, shopping cart, wish list, etc., making the shopping process simpler and smoother. This corresponds to the minimum purchase

steps and a shopping cart-like icon required for an excellent business website as mentioned earlier. Amazon also has a simple and clear return button that corresponds to the requirement mentioned earlier in Figure 2, which is Amazon's cart icon and return button. Amazon also has a convenient set of filters that are convenient for users to use and search for. As mentioned earlier, an excellent business website must have a concise filter that corresponds to it. At the same time, the establishment of a user evaluation system allows consumers to view other users' evaluations and feedback on the product and seller, increasing the transparency and credibility of shopping. Advertising promotion provides an important way for enterprises to increase product exposure and sales opportunities.



Fig. 2. Shopping cart icon for Amazon platform [8].

Finally, Amazon provides a global logistics network and localized service system. Its logistics network covers various parts of the world, including advanced warehousing systems, efficient distribution services, and global logistics partners. This powerful logistics system not only enables sellers to easily achieve fast and reliable global shipping, improving the shopping experience for customers but also reduces the logistics risks and costs of cross-border e-commerce. It can also ensure that users trust logistics and payment in accordance with the e-commerce platform mentioned above. This convenience and efficiency undoubtedly attract many sellers and buyers to Amazon. Amazon also provides merchants with multilingual support and currency conversion services to help them better expand their global market. Meanwhile, its professional platform management and marketing support services have also helped businesses improve operational efficiency and sales performance.

From the successful case of Amazon, it can be found that an excellent e-commerce platform requires not only a convenient product filter, clear shopping cart icons, and a necessary clear return option, but also a convenient purchasing system. There are also developments in multiple fields and innovations in new technologies.

4.3 The Impact of the Development of E-commerce Platforms and Predictions for Future Development

E-commerce can not only be used to purchase physical goods, but also save customers a lot of time. Nowadays, some e-commerce platforms have introduced the function of online payment, which eliminates the need for customers to queue up for long periods to pay water and electricity bills or handle banking services, as these cumbersome tasks can be easily completed online. In addition, government services such as applying for licenses and permits can also be easily processed online, greatly improving work efficiency [9]. The existing web design features also enable online

communication between customers and sales. By using the online platform provided by the enterprise, customers will be able to receive more comprehensive support during the purchasing process. The platform not only provides detailed product specification information but allows customers to understand the various functions of the product more comprehensively. It also provides online sales support and troubleshooting help to ensure that customers can get timely help and answers during use. It is worth mentioning that customers can also provide feedback on their products and services to enterprises through this platform, and this valuable feedback will become an important basis for enterprises to improve their products and services. Meanwhile, this feedback can also be used as a reference by other customers when making purchasing decisions, helping them make wiser choices. The development of e-commerce has brought many conveniences and better services, bringing positive impacts.

E-commerce has both negative and positive impacts on people's lives. The negative impact is the integrity issue brought about by e-commerce. The rapid development of e-commerce has greatly facilitated netizens to open online stores. However, with the continuous increase in online transaction volume and imperfect webpage design, the issue of transaction integrity is becoming increasingly prominent. Some sellers may use real product photos to mislead buyers, and even deceive buyers by registering multiple accounts and forging positive reviews, thereby selling inferior products. This behavior seriously damages the trust foundation between the two parties in the transaction. In addition to the difficulty in ensuring product quality, it is also common for sellers to delay shipping, refuse to fulfill return and exchange commitments, and provide inadequate after-sales service. These issues have brought significant challenges to the development of e-commerce [10]. Based on the above question, web design should have a dedicated feature in the future to check the authenticity of seller photos and whether multiple accounts have been registered at the same time. Punish sellers who fail to provide adequate after-sales service on time.

5 Design Limitations and Solutions for E-commerce Websites

In addition to the integrity issues mentioned above in e-commerce, e-commerce websites are websites that can be used on both computer and mobile devices, so compatibility issues are also crucial in the design of e-commerce platforms. How to solve compatibility issues? Firstly, tools such as Browserslist can be used to check the browser support for CSS3 and JavaScript features, avoiding the use of technologies that are not widely supported. Secondly, it is important to implement responsive design. Using media queries to adapt to different screen sizes and device types, can help to ensure that web pages display correctly on different devices. A mobile-first design and development process should also be adopted, prioritising basic functionality and usability for small-screen devices before making enhancements for larger-screen devices.

When designing an e-commerce website, care should also be taken to minimise the use of animations and images to avoid lag. However, e-commerce platforms require many photos to promote products, and product photos are essential content for e-commerce platforms. How to reduce the lag caused by too many pictures in the design is an urgent problem to be solved. To solve the webpage lag problem, several methods can be adopted. Firstly, it is vital to optimise image and video resources. Reducing the size of image files by using image compression tools and choosing the right image format, such as JPEG or PNG, can significantly improve loading speed. It's also vital to reduce HTTP requests, which can be achieved by merging CSS and JavaScript files, using CSS Sprites techniques, and reducing the number of images on the page. Secondly, code and file optimisation should not be overlooked. Compressing CSS and JavaScript files reduces file size and increases loading speed. Merging multiple files into a single file also reduces the number of HTTP requests, resulting in faster loading.

6 Conclusion

This article summarizes and analyzes the webpage design of e-commerce platforms. Firstly, it researches the requirements of an e-commerce platform and summarizes several necessary design requirements, such as a clear shopping cart icon to let users know where their products are going, a return button, convenient filters, and minimal purchase steps. According to research on the Amazon e-commerce platform, it has been found that the platform meets all the above requirements, which proves that an excellent e-commerce platform must meet the above design. According to research and analysis on Amazon, it is found that excellent e-commerce platforms also require innovation and multipolar development. Secondly, the positive impact of e-commerce platforms on people's lives was analyzed, which has facilitated people's lives today. Finally, three limitations of e-commerce platforms were pointed out, including integrity issues, compatibility issues, and lag issues, and some solutions were proposed in webpage design. This article can provide some references for webpage design and optimization for those who are designing e-commerce websites.

References

1. Braun, S., Sauer, M., Sürmeli, J. et al.: Selbstbestimmte Identitäten im E-Commerce. HMD (2024). <https://doi.org/10.1365/s40702-024-01064-5>
2. Qing, H., Ibrahim, R. and Nies, H.W.: Analysis of web design visual element attention based on user educational background. *Scientific Reports* 14, 4657 (2024).
3. 10 Major Requirements for E-commerce Website Built on Shopify and BigCommerce, <https://digitalsuits.co/blog/10-major-requirements-for-e-commerce-website/>, last accessed 2024/4/24.
4. Almeida, L. G., Lunardi, G. L., Dolci, D. B.: From e-commerce to m-commerce: An analysis of the user's experience with different access platforms, *Electronic Commerce Research and Applications*, 58, 101240, (2023).

5. Functional Requirements for eCommerce Websites, <https://dinarys.com/blog/functional-requirements-for-ecommerce-site>, last accessed 2024/4/24.
6. Snyder, E. A., Canaday, J., Hughes, M.: Amazon's Three Major Lines of Business, New Working Paper Series, No. 319, University of Chicago Booth School of Business, Stigler Center for the Study of the Economy and the State, Chicago, IL (2022).
7. Zana, M.S., Saeed, H.: Analyzing the Amazon success strategies. *Journal of Process Management New Technologies* 6(4), 65-69 (2018).
8. Mignon, C.: The positive impact of E-commerce in developing economies (2021). DOI:10.13140/RG.2.2.10727.27046/1.
9. Amazon Homepage, <https://www.amazon.com/>, last accessed 2024/4/24.
10. Liu, Y.: The negative impact of e-commerce on real life and countermeasures. *Heilongjiang Science and Technology Information*, 17, 84 (2009).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

