

ShopSico: Bridging Gap for the Users with Disabilities in E-commerce using ML

Shrawani Shirpurkar

PG Student, Department of Computer Application, G. H. Raisoni University, Amravati, Maharashtra, India

ABSTRACT

E-commerce platforms have revolutionized online shopping, providing businesses with seamless ways to manage digital storefronts. Shopsico, is a modern theme for OpenCart framework, it offers an optimized and featured solution for online stores. This research explores the advantages of using Shopsico within the OpenCart ecosystem platform, its impacts on user experience, accessibility, and its potential for the business growth. Shopsico is a crucial aspect of modern e-commerce for ensuring compliance with accessibility standards such as the Americans with Disabilities Act (ADA). Shopsico integrates accessibility-friendly design principles, ensuring that every individual with disabilities can navigate and interact with online store more effectively and efficiently. Features like high-contrast modes, keyboard navigation, screen reader compatibility, and adjustable screen sizes will help improve usability for disabled and normal customers. Additionally, the theme adheres to Web Content Accessibility Guidelines (WCAG), ensuring an inclusive shopping experience with Shopsico for individuals with visual, auditory and motor impairments. By prioritizing accessibility, Shopsico enhances the user engagement, boosts the customer satisfaction and expands the market reach. This paper evaluates the theme's accessibility features and its compliance with ADA regulations. It also focus on how business can leverage these functionalities to create more inclusive e-commerce platforms.

KEYWORDS: Rubix ML, Artificial Intelligence, NVDA, SASS, OpenCart, ADA.

I. INTRODUCTION

In this paper, we present the architecture and methodology of the rapid growth in e-commerce that has been transformed the way businesses to operate and interact with customers. As digital storefronts have become an essential component of modern retail and selecting the right platform for achieving the critical theme for business success [10] [8]. OpenCart is an open-source e-commerce platform which is widely recognized for its flexibility, scalability, and easy for use (Loiacono & McCoy, 2004) [11] (Jaeger, 2006) [12].

Shopsico, a premium theme that is been built for designing the Ecommerce, it enhances both the aesthetic appeal and functionality of all online stores. With a specific focus on user experience (UX) and user interface (UI), search engine optimization (SEO) and accessibility. Shopsico helps businesses to optimize their digital presence (Schmutz, Sonderegger, & Sauer, 2018) [14] (Kelly et al., 2007) [13]. Its modern design, coupled with advanced customization options that makes it more popular choice among online retailers seeking to provide seamless shopping experiences

for their customers (Henry & Grossnickle, 2014) [10] (Lazar, Olalere, & Wentz, 2012) [15].

In addition to enhancing visual appeal and performance of the application, Shopsico includes the accessibility features in compliance with American Disability Act (ADA) and Web Content Accessibility Guidelines (WCAG). This ensures that e-commerce sites built with Shopsico can accommodate individuals with disabilities and creating more integrated online shopping environment (Jaeger, 2006) [12].

This research paper explores the key advantages of Shopsico. It integrates with OpenCart also provides impact on user engagements and role of accessibility in improving customer requirements (Henry & Grossnickle, 2014) [10]. (Lazar & Jaeger, 2011) [8]. This study highlights how Shopsico contributes to the business growth while meeting modern technologies and E-commerce standards (Kelly et al., 2007) [13] (Schmutz, Sonderegger, & Sauer, 2018) [14].

FEATURES OF SHOPSICO

Shopsico is built with a variety of features design that improves the functionality and usability of online stores. One of its key attributes is responsive design, Ensures the optimal functionality across various platform, browsers and devices. It includes desktops, tablets, and smartphones. This feature improves customer engagement and improves the rate by making navigation easy and intuitive for users, regardless of the screen size they use. Another important feature is SEO optimization, which plays crucial role for online visibility. Shopsico includes built-in SEO tools that enhance search engine optimization ranking. These allows businesses to optimize metadata, structured data, and URLs. This provides better results in indexing by search engines and enhanced SEO performance to boost online visibility. Customization is another major strength of Shopsico. The theme provides advanced customization options that allows the Admin user to modify layouts, color schemes and typography to align with their business requirements. The inclusion of drag-and-drop design tools enables users to effortlessly build personalized storefronts. Additionally, Shopsico supports custom banners, sliders, and product displays by giving merchants greater control to refine store's visual appeal. A key highlight aspect of Shopsico is its commitment to accessibility compliance. The theme is designed in accordance with ADA and WCAG guidelines, ensuring that e-commerce platforms are integrated for all users which includes individuals with disabilities. Shopsico supports screen readers which enable visually impaired users to navigate and interact with online stores through auditory feedback. It includes high-contrast modes and adjustable screens for visibility. Enhancing readability for users with vision difficulties. Keyboard navigation supports and ensures

that individuals with motor disabilities can browse and shop without using a mouse.

II. RELATED WORK

Several E-commerce themes and platforms have been developed with a focus on accessibility, user experience (UX) and enhanced performance. Popular platforms such as Shopify, WooCommerce and Magento offer themes with responsive designs, SEO tools, and accessibility features like Shopsico. However, many of these themes require additional extensions or modifications to achieve full compliance with accessibility standards like ADA and WCAG. OpenCart is one of the leading open-source e-commerce solutions that has inspired numerous themed developments which aim to balance the functionality. OpenCart offers high customization options but lacks robust accessibility features. Shopsico integrates accessibility features at its core, reducing the need for third-party plugins and additional modifications in the system. Accessibility research in E-commerce highlights the importance of integrated web design. Studies indicate that a significant percentage of online shopper's face accessibility barriers, leading to lost revenue opportunities for businesses. By incorporating high-contrast modes, screen reader compatibility, and keyboard navigability, Shopsico aligns with best practices in inclusive e-commerce design. Compared to other OpenCart themes, Shopsico sets itself apart by offering a combination of accessibility, multi-vendor support, and SEO optimization. While some competitors focus solely on design whereas Shopsico on other hand takes a holistic approach by prioritizing usability for all users including those with disabilities. As a result, its standout choice for businesses looking to create an integrated and highly functional online store.

III. DATA AND SOURCES OF DATA

This study integrates with both primary and secondary data sources. It provides a comprehensive understanding of Shopsico's impact on e-commerce platforms. Primary data is collected by conducting direct experimentation with the Shopsico theme within OpenCart installations, conducting usability tests for assessing accessibility compliance and performing in-depth evaluations of the user experience. This hands-on approach offers empirical insights into the theme's performance, customization capabilities, role in improving e-commerce functionality. Additionally, real-world insights are collected through user feedback, surveys, and case studies from businesses that have implemented Shopsico. Practical testing reveals key perspectives on how Shopsico enhances customer interaction and accessibility.

Secondary data sources include extensive documentation from OpenCart, developer resources detailing the Shopsico theme's features and configurations, and industry reports on online shopping trends. Academic research on e-commerce accessibility and compliance with ADA and WCAG guidelines

further supplements the study, providing a theoretical foundation for understanding the importance of accessibility in digital commerce. This study is further supported by academic research on e-commerce accessibility and adherence to ADA and WCAG guidelines, reinforcing the importance of inclusivity in digital commerce. Moreover, industry benchmarks and comparative analyses with other OpenCart themes contribute to a broader perspective on Shopsico's competitive advantages. Through the integration of both primary and secondary sources, this research ensures a data-driven approach in evaluating the effectiveness of Shopsico for OpenCart. The combination of experimental analysis, user feedback and industry reports strengthen the reliability and depth of the study's findings.

IV. RESEARCH METHODOLOGY

The research methodology adopts a mixed-method approach which incorporates both qualitative and quantitative methodologies to analyse the Shopsico theme within the OpenCart E-commerce framework. By leveraging empirical testing, user feedback, and academic literature, the study aims to provide a comprehensive understanding of Shopsico's impact on accessibility and business growth.

The research methodology ensures a balanced evaluation by integrating primary data obtained from practical experimentation and secondary data derived from academic studies and industry reports. The data analysis follows a structured approach, it consists of both qualitative and quantitative techniques. Performance metrics, including page load speed, accessibility scores and user satisfaction ratings, are analysed to assess the efficiency. Surveys are quantitatively assessed using statistical methods, while qualitative feedback from interviews and user evaluations. It is thematically analysed to identify risk areas for improvement.

The triangulation method is employed to ensure the credibility of findings by cross-verifying results from multiple data sources. To ensure the validity and reliability of the research, several measures are implemented. Pilot testing of survey instruments is conducted before full-scale data collection to refine the questions and ensure clarity. To gain deeper insights, surveys and interviews with eCommerce store owners, developers, and end-users are carried out, capturing qualitative feedback on real-world application and usability challenges.

Accessibility compliance is evaluated using standardized assessment tools, such as WCAG compliance checkers, to provide objective evaluations. The study also adheres to ethical research guidelines, ensuring informed consent from participants, maintaining the confidentiality and anonymity of responses, and transparently reporting findings without bias.

Figures

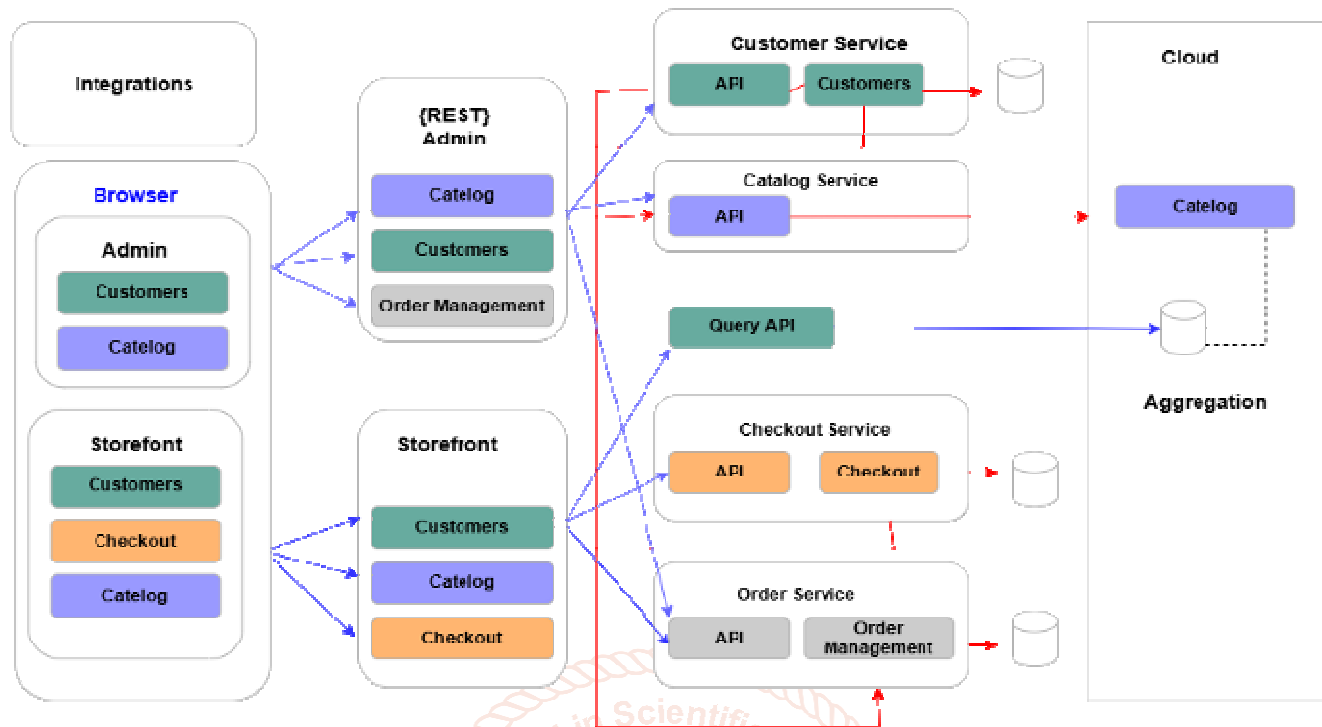


Fig.1 System Architecture For ShopSico Modal.

Figure 1: System Architecture for ShopSico platform aims to provide an inclusive and accessible online shopping experience for individuals with disabilities. Its architecture employs a multi-layered strategy to guarantee the integration of accessibility features, an intuitive interface, and strong backend processing. This architecture is built with accessibility-first design principles, ensuring that users with disabilities can shop online independently. The multi-layered approach integrates responsive and accessible UI, AI-powered support features, secure backend services, and third-party integrations for enhanced usability. The architecture is composed of four essential layers: the User Interface (UI) Layer, Application Layer, Backend Services Layer, and Third-Party Integrations. Each layer is vital for maintaining a fully functional and accessible e-commerce platform.

1. **User Interface:** The UI Layer acts as the main interface for user interaction with the platform. It is designed with Web Content Accessibility Guidelines (WCAG) compliance to ensure that users with disabilities, such as visual, auditory, motor, or cognitive impairments, can navigate and shop easily. The platform accommodates both web and mobile applications, incorporating inherent accessibility functions, such as Screen reader support, Voice navigation, Keyboard shortcuts, User authentication and profile management.
2. **Application Layer:** This layer serves as the backbone of the ShopSico platform, handling business logic, accessibility features, and order processing. E-commerce engine is a robust system that manages product catalogs, shopping carts, checkout processes and order tracking. The platform integrates AI-based tools to enhance accessibility. It includes voice-based search product recommendations based on user preferences and past searches.
3. **Backend Services:** It is responsible for data management, security and communication between the frontend and application. It includes API Gateway, Database Management System and Security Compliance. Accessibility often intersects with data security. It ensures compliance with General Data Protection Regulation and Americans with Disabilities Act to protect user data.
4. **Third-Party Integrations:** Third-party integrations play an important role. Whereas it ensures that the platform is not only feature-rich but also fully accessible for users with disabilities. It integrates with external services, the system can improve payment processing and logistics management, making the platform more efficient and user-friendly. These integrations provide seamless interoperability between different components. It allows the user to interact with the system easily while ensuring compliance with accessibility standards.

V. RESULTS AND DISCUSSION

The results and discussion analysis highlight significant trends in order management. It reflects user engagement and purchasing behavior over time. The data shows noticeable fluctuations in the number of orders and sales. It suggests the influence of seasonal demand and platform accessibility. In certain months, a peak in both orders and sales suggest high user interest, likely driven by marketing efforts or product availability. It helps in Understanding the trends is crucial for optimizing the platform's performance, improving user accessibility, and implementing data-driven strategies to enhance overall e-commerce efficiency.

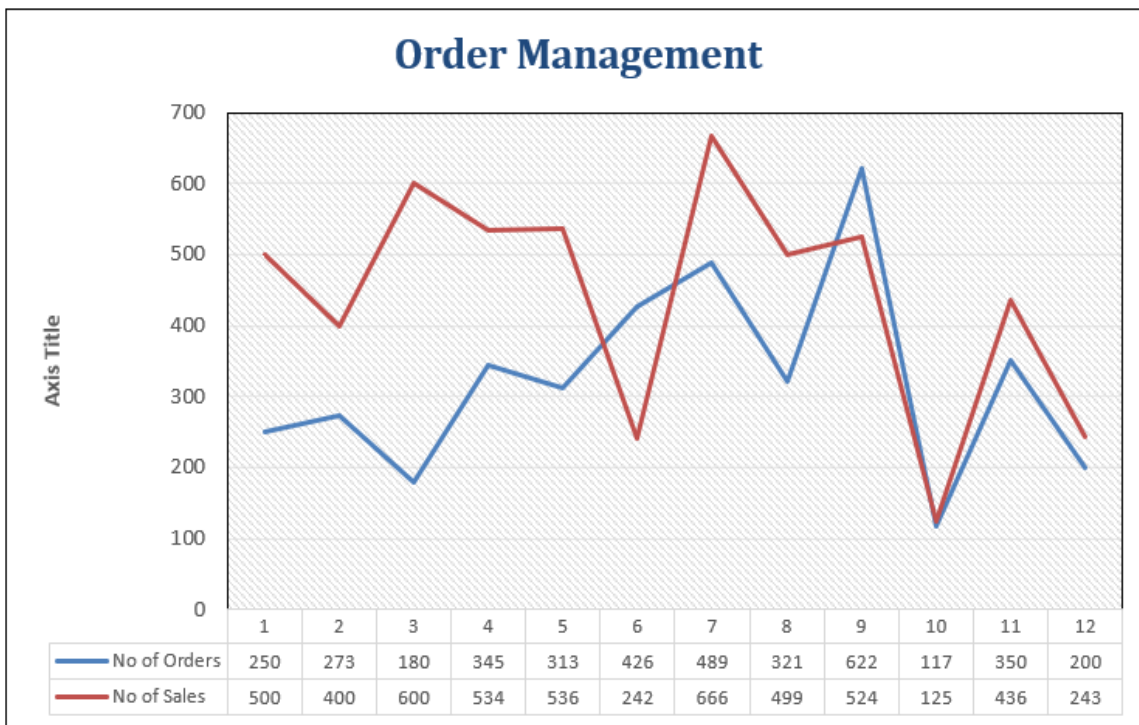


Fig 2: Order Management Graphical Representation.

Figure 2: The Order Management graph provides valuable insights into monthly trends of orders in ShopSico. The graph presents data with the blue line representing the number of orders and the red line representing the number of sales. A noticeable observation is the fluctuation in both orders and sales. It indicates seasonal variations or possible external market influences. Analyzing the correlation between orders and sales can help to identify potential bottlenecks in order fulfillment or changes in customer purchasing behavior. Order Management graph implements data-driven strategies to improve conversion rates and create a more inclusive digital market.



Fig 3: Region Sale Summary Graphical Representation

Figure 3: The Pareto chart in the image represents the Region Sale Summary in an e-commerce context, illustrating sales distribution across various regions. The bar graph indicates that a few top-performing regions contribute to most total sales. This data is crucial in the context as it helps identify potential accessibility barriers to impact sales. Lower-performing regions indicate usability challenges or limited digital inclusion for users with disabilities. Addressing these gaps through improved assistive technologies and compliance with accessibility standards can foster inclusivity and expand market reach. Moreover, focusing on high-performing regions ensures that accessibility improvements have a widespread impact, benefiting a significant portion of users. By leveraging data-driven insights from such sales analytics, e-commerce platforms can prioritize inclusive features, optimize user experiences, and create a more accessible digital marketplace for individuals with disabilities worldwide.

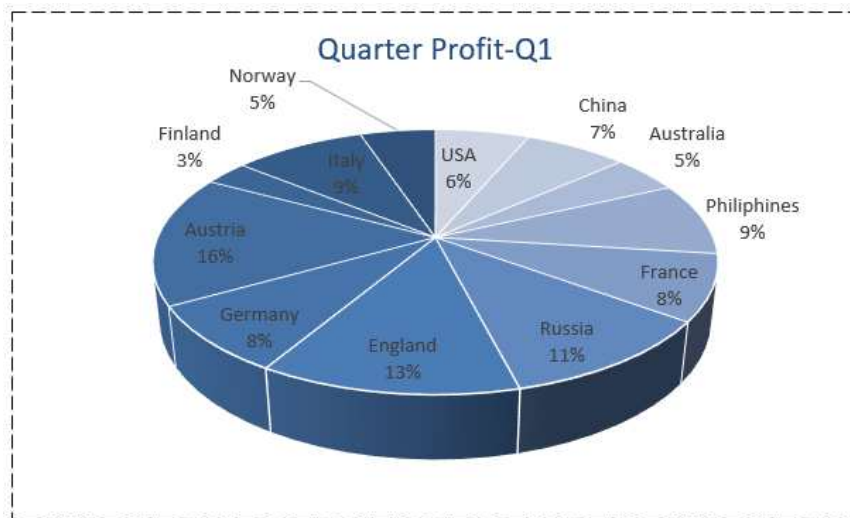


Fig 4: Model Training and Validation Loss

Figure 4: The Quarter Profit-Q1 pie chart provides insights into the distribution of profits across various regions. This data is crucial for analyzing regional disparities in e-commerce accessibility and how they may impact profitability. The lower profit percentages in regions like Finland and Norway could indicate potential barriers for users, including individuals with disabilities. ShopSico can prioritize accessibility initiatives, expand digital inclusivity, and foster a more equitable e-commerce landscape for users with disabilities, ultimately bridging the gap between technology and accessibility.

VI. REFERENCES

- [1] Treviranus, J. (2014). "Leveraging the Web as a Platform for Economic Inclusion." *Behavioral Sciences & the Law*, 32(1), 39-51.
- [2] Stephanidis, C. (2001). "User Interfaces for All: Concepts, Methods, and Tools." *International Journal of Human-Computer Interaction*, 13(2), 187-218.
- [3] Kane, S. K., Bigham, J. P., & Wobbrock, J. O. (2008). "Slide Rule: Making Mobile Touch Screens Accessible to Blind People Using Multi-Touch Interaction Techniques." *Proceedings of the 10th International ACM SIGACCESS Conference on Computers and Accessibility*, 73-80.
- [4] Hanson, V. L. (2009). "ACM's Commitment to Accessibility." *Communications of the ACM*, 52(8), 50-56.
- [5] Petrick, E. (2012). "Fulfilling the Promise of the Personal Computer: The Development of Accessible Computer Technologies, 1970-1998." *IEEE Annals of the History of Computing*, 34(1), 46-59.
- [6] "National Federation of the Blind v. Target Corporation." (2006). *United States District Court for the Northern District of California*, 452 F. Supp. 2d 946.
- [7] "Millions with Disabilities Feel Excluded from Products Due to Accessibility Issues." (2024). *The Sun*.
- [8] Lazar, J., & Jaeger, P. T. (2011). "Reducing Barriers to Online Access for People with Disabilities." *Issues in Science and Technology*, 27(2), 68-82.
- [9] Power, C., Freire, A., Petrie, H., & Swallow, D. (2012). "Guidelines Are Only Half of the Story: Accessibility Problems Encountered by Blind Users on the Web." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 433-442.
- [10] Henry, S. L., & Grossnickle, E. (2014). "Accessibility in E-commerce: Understanding the Needs of Disabled Consumers." *Journal of Electronic Commerce Research*, 15(3), 215-225.
- [11] Loiacono, E. T., & McCoy, S. (2004). "Website Accessibility: A Cross-Sector Comparison." *Universal Access in the Information Society*, 4(4), 393-399.
- [12] Jaeger, P. T. (2006). "Assessing Section 508 Compliance on Federal E-government Web Sites: A Multi-method, User-centered Evaluation of Accessibility for Persons with Disabilities." *Government Information Quarterly*, 23(2), 169-190.
- [13] Kelly, B., Sloan, D., Brown, S., Seale, J., Petrie, H., Lauke, P., & Ball, S. (2007). "Accessibility 2.0: People, Policies and Processes." *Proceedings of the 2007 International Cross-Disciplinary Conference on Web Accessibility (W4A)*, 138-147.
- [14] Schmutz, S., Sonderegger, A., & Sauer, J. (2018). "Implementing Recommendations from Web Accessibility Guidelines: A Comparative Study of Nondisabled Users and Users with Visual Impairments." *Human Factors*, 60(5), 669-683.
- [15] Lazar, J., Olalere, A., & Wentz, B. (2012). "Investigating the Accessibility and Usability of Job Application Web Sites for Blind Users." *Journal of Usability Studies*, 7(2), 68-87.
- [16] Mankoff, J., Fait, H., & Tran, T. (2005). "Is Your Web Page Accessible? A Comparative Study of Methods for Assessing Web Page Accessibility for the Blind." *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 41-50.