

Enhancing User Experience in Content Management through MERN Stack Integration

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ABSTRACT

This paper aims to provide a facility to non-coder users who want to be a part of e-commerce but lack programming knowledge and no idea how to make an e-commerce website, so they are unable to be in an online market. Traditional CMS solutions often fall short of addressing the dynamic and complex requirements of online businesses. In response to this gap, this paper presents how CMS leverages cutting-edge technologies to offer a robust and adaptive framework. Many small organizations do not have human resources for this task and cannot support the cost of hiring programmers. Using the proposed solution, it will be easy and can be created in less time. where this research provides the tools and proper documentation for helping them build the website, and this process is as easy as mentioned and especially takes care of non-coders. This paper contributes to making the e-commerce market wider as many people join and extend their businesses virtually, which is profitable for both CMS users and their customers.

Keywords: *MERN, (MongoDB, Express, React.js, Node.js), Content Management System, E-commerce, Non-Coders, Online Market, Products, Shopping.*

1. INTRODUCTION

This application aims to fulfill the rising need by creating a complete Content Management System(CMS) tailored for the ever-changing world of online business. Going beyond the basics, the CMS aims to change the digital shopping experience by adding advanced features crucial for success in the online market. From managing dynamic product catalogs to offering personalized shopping experiences, this system promises to revolutionize how companies connect with customers and manage their online activities. It will be created

using MongoDB, Express.js, React.js, and Node.js (MERN). At the core of the proposed e-commerce CMS is a dedication to cutting-edge technologies. By using tools like Next.js for smooth website display, MongoDB for flexible data storage, and Express.js for strong server capabilities, the aim is to offer excellent performance, security, and flexibility. This application is fully functional with different views for users and admin and it has also been integrated with a payment gateway for checkout. The importance of this project lies in its ability to help businesses of all sizes create an attractive online presence, offer unmatched shopping experiences, and encourage growth. The flexible structure of this CMS makes it easy to connect with existing systems and other services, allowing businesses to customize the system to fit their unique needs effortlessly. After exploring the details of the online market and recognizing the limitations of the usual CMS platforms, this research sets the stage for an innovative solution. This distinctive approach aims to go beyond these limitations, introducing a CMS that not only fixes current issues but also prepares for a new and transformative era in digital retail. In the world of online shopping, how websites organize and show information is super important. This research looks into special systems that help with this, focusing on how these systems affect online stores. This research keeps things straightforward and shares new ideas about how managing content can make a big difference for e-commerce businesses. Imagine shopping online, where everything is neatly organized and easy to find. That's what a content management system does for e-commerce. This research dives into how these systems work their magic, making online shopping smoother. Stick around for insights that are easy to understand and can help businesses sell better in the digital world.

2. LITERATURE REVIEW

In[1], N. CHA, H. CHO, S. LEE and J. HWANG (2019). Proposed "The goal of this research is figuring out AI recommendation effects on consumer's preferences by their types. The anticipated outcome of this study is to provide valuable insights into the optimal utilization of AI recommendation systems in e-commerce platforms."

In[2], E. N. Abdullah, S. Ahmad, M. Ismail and N. M. Diah (2021). Provided " An easy user interface for the user. which a user can easily go and create his or her e-commerce website. Consequently, this paper seeks to

determine which of the compared CMSs is most effective in aiding website developers with usability concerns and design concepts.”

In[3], D. Mishra, M. S. Obaidat and A. Mishra (2021). Advancements in network technology have enabled e-commerce to distribute digital content, yet piracy remains a pressing issue. Digital rights management (DRM) tries to control content sharing, but it can limit flexibility and invade privacy. This novel scheme ensures flexible and transparent content distribution without compromising consumer privacy or violating accountability parameters. Notably, it enables traitor identification without infringing upon the privacy rights of authorized consumers.”

In [4], C. Zhang, S. Zhang, T. Chen, R. Zhang and K. Liu (2022). In the realm of e-commerce, promotions frequently spark intense competition for resources. But modern databases struggle to work well with this competition. They slow down when multiple actions fight for the same resources. In this paper, this proposes an optimized transaction processing approach tailored for highly contested e-commerce workloads.”

In[5], P. Kiatruangkrai, P. Phusayangkul, S. Viniyakul, N. Prompoon and P. Kanongchaiyos (2010). Proposed "In real-time communication feature using instant messaging and short message sending. This project aims to address this issue by designing and developing an e-commerce focused content management system emphasizing real-time communication via instant messaging and short message sending.”

In[6], M. Jaskolski, B. Sakowicz and A. Napieralski (2007). This paper outlines the execution of LightCMS, a browser-accessible Content Management System designed for effortless management of basic websites. Uncommon programming techniques used by the authors made this system lightweight and efficient and defined an interesting problem to introduce.”

In[7], Lin, Kai. (2022). Proposed “The article examines the topic of Shopify and Amazon as COVID-19 and the emergence of new technology users in a new era of online retail, B2B and B2C content.”

In[8], Poorna, Lakshmi & Moghul, Mymoon & Ananthakrishnan, G. and Arunachalam, Hariharan. (2013). Proposed “To allow creating and managing websites easily without much technical knowledge or experience with HTML or web site design. It is also possible to easily update the web content without having to rely on support from IT personnel.”

In[9], A. Kumar, A. Kumar, H. Hashmi and S. A. Khan (2021). Proposed "This allows website managers to make updates to their websites without having any understanding of web development tools. This study delves into WordPress's essential features, examining both the advantages and disadvantages of utilizing it as

a content management system. The aim is to furnish newcomers with guidance on harnessing the capabilities of the WordPress CMS tool.”

In[10], A. K. Phulre, S. Pagare and A. Chakrawati (2022). The Internet serves as an informational hub and facilitates the creation of diverse web applications catering to users worldwide. This paper presents a new integrated process for an automated framework for CMS. The framework presented various collections of process descriptions and recommendations. This paper talks about a new way to make CMS more automated and secure, introducing different steps and guidelines."

In[11], A. R. Yadav, S. S. Yadav and S. Kamoji (2023). This research delves into the ways smart computer systems can elevate website performance, with the goal of maximizing user satisfaction by improving functionality. It explores practical implementations, such as integrating smart features into widely-used website platforms. Overall, it says planning, doing things ethically, and keeping things up-to-date are crucial for making websites better with smart technology.”

3. METHODOLOGY

The implemented methodology prioritized a user-centric approach, resulting in an easily navigable and accessible interface for setting up online stores. Features such as product management, SEO customization, and page personalization contributed to a user-friendly experience. The multilingual support and integration with AWS services showcased the platform's scalability and adaptability for a diverse user base and effective handling of extensive data. Robust security measures and integrated payment gateways ensured a secure and seamless transaction experience for users. The provision of detailed analytics and documentation assisted users in gaining insights into their store's performance and leveraging the CMS effectively. Overall, this revealed a successful implementation of a user-oriented e-commerce CMS, emphasizing ease of use, security, and a comprehensive set of features tailored to streamline the process of creating and managing online stores.

The research approach encompasses a dual strategy, employing a case study design to intricately develop and assess the MERN-based e-commerce CMS and implementing a comparative analysis against Shopify. The development process unfolds in a structured manner, commencing with the planning phase, where project goals and requirements are meticulously outlined, followed by the rationale behind opting for the MERN stack, grounded in its suitability for e-commerce CMS development. Agile methodology is adopted for its flexibility and adaptability, embracing practices such as sprints and iterative development. The creation of the

CMS unfolds through sequential steps, starting with database design using MongoDB schemas, backend development utilizing Node.js and Express.js, and frontend development leveraging React for an interactive user interface. Rigorous integration and testing procedures are implemented to ensure the robustness, security, and performance of the CMS. The criteria for feature comparison are established, encompassing selection criteria, performance metrics, and a comprehensive evaluation of customization options, inventory management, payment gateways, and user experience. The subsequent data collection and analysis phases involve user testing, performance measurement and data interpretation using statistical methods and qualitative assessment. Acknowledging limitations such as time and resource constraints and incorporating ethical considerations, the research strives for both internal and external validity and reliability in its methods, ensuring consistency, accuracy, and the applicability of findings to broader e-commerce contexts.



Figure 1 : User Registration and Authentication

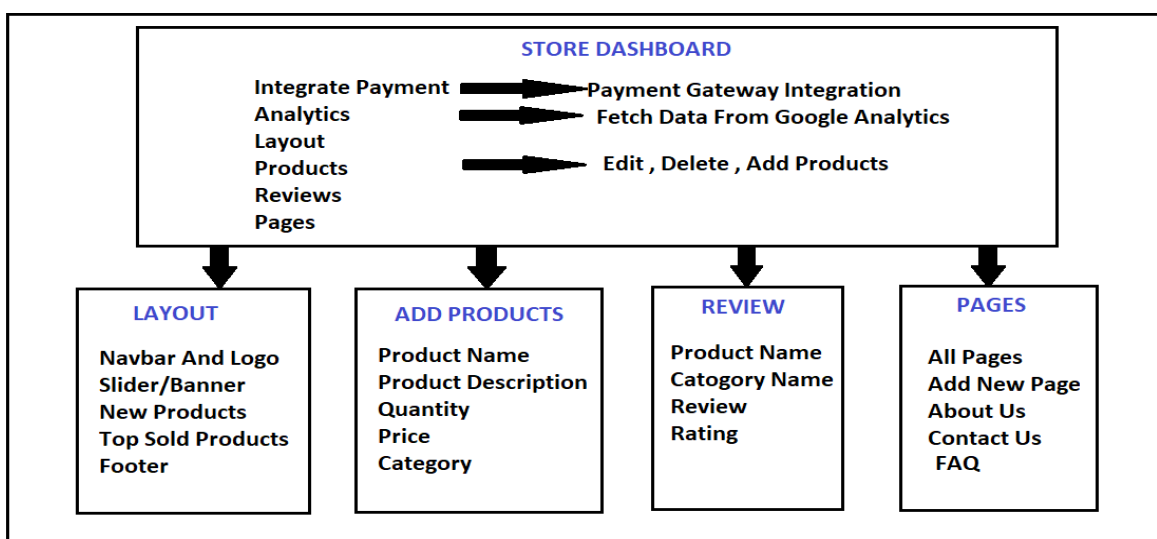


Figure 2 : Store Creation and Customization

In Figure 1, there are layouts displayed for Register, Login, Profile, Manage Store, and Create Store functionalities. In the Register section, users can sign up to create their online store. Input fields such as name, email, date of birth, mobile number, password, and confirmation password will be available. Upon registration, this data will be stored in the MongoDB collection, and users will be redirected to the login page. The login page requires users to input the credentials previously used during registration. Upon successful verification, users will be redirected to their profile page. The profile page houses the user's personal details, offering options to edit the profile, access available stores, and create new stores. Clicking on "Create New Store" redirects users to a page with input fields necessary for store creation, including store name, location, mobile number, email, and description. Upon completion, the store is created.

As you see in figure 2, once your store creation process is complete, you'll be directed to the store dashboard, where various options await, including payment gateway integration, Google Analytics data fetching, layout customization, product management, review handling, and page editing. Within the layout section, users gain control to personalize the navbar, upload or alter the logo, modify banners, introduce new products, feature top-selling items, and adjust the footer, allowing full customization of the e-commerce store layout. Under the "Add Products" section, fields are provided for inputting product details such as name, description, quantity, price, and category, facilitating the seamless addition of products to the store. The "Review" section presents product names, category details, reviews, and ratings, enabling users to access specific product ratings and approve or delete reviews, thereby managing customer feedback effectively. Pages management encompasses options for accessing all pages, creating new ones, and editing default pages such as "About Us," "Contact Us," and "FAQs."

4. ANALYSIS

Table 1: Comparison between Wordpress, Shopify and Proposed MERN based CMS Approach.

| Parameter | Wordpress | Shopify | Proposed MERN based CMS Approach |
|------------------------|--|---|--|
| 1. Architecture | Utilizes a PHP-based architecture with a wide array of plugins and themes. | Hosted solution with a proprietary backend, providing a comprehensive e-commerce suite. | Built on the MERN stack with MongoDB, Express.js, React, and Node.js, it offers flexibility and customization. |

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|---|---|---|--|
| 2. Cost Considerations | WordPress is open-source, but expenses may arise from hosting, premium themes, and plugins. | Subscription-based expenses include monthly fees, transaction fees, and additional app purchases. | Development costs for setup, customization, and maintenance; ongoing hosting charges; but no platform subscription fees. |
| 3. Scalability and Maintenance | Scalability might be challenging without proper optimization; it requires regular updates and maintenance. | Built for scalability, maintenance is handled by the platform, reducing the need for manual updates. | Highly scalable with proper architecture; maintenance demands development knowledge for updates and enhancements. |
| 4. User Experience | The user experience varies based on chosen themes and plugins and may lack consistency. | Known for its intuitive and consistent user interface, it ensures a smooth shopping experience. | The user experience can be tailored to specific needs but requires meticulous design and development. |
| 5. Customization and Flexibility | Highly customizable with a vast library of plugins and themes, but might require technical expertise for complex customization. | Limited customization compared to WordPress but provides a user-friendly interface for modifications. | Offers high customization but requires development skills for implementation. |
| 6. Features | Offers e-commerce functionality through plugins like WooCommerce. | All-in-one platform with extensive built-in e-commerce functionalities. | Tailored e-commerce functionalities were developed based on specific project requirements. |

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|---------------------------|--|---|---|
| 7. Market Position | Known for its versatility, it requires technical expertise for optimization and scaling. | It is recognized for its user-friendly interface and scalability and is particularly suited for beginners and small to medium-sized businesses. | Offers high scalability and customization but requires development expertise for setup and maintenance. |
|---------------------------|--|---|---|

The CMS is a powerful and flexible tool, especially suitable for projects with unique requirements. While it offers a cost advantage with no subscription fees, initial development costs and ongoing maintenance expenses should be considered. High scalability is a plus, but it's essential to have skilled developers for efficient setup, updates, and enhancements. The level of customization is extensive, making it a suitable choice for businesses or projects that require a tailored user experience. In summary, this CMS is a robust solution for those with development expertise looking to create and maintain highly customized and scalable websites.

CONCLUSION

Many websites are available in the market for creating a dynamic and responsive site, but every site is similar to each other as same like Shopify, Magenta, Wordpress and this web application is like that, but in which many new features that allow users to reach the site from bottom to top because in this web application, this paper uses new technologies like MongoDB, Express.js, React.js, Node.js, Next.js which can increase the number of web applications among others. This application creates the website with full functionality, scalability, and custom power. The main powerful feature is that it is user-friendly and a user-recommended system. This application also provides such a level of security and cost-effectiveness that it will be available in a multilingual, community-based, and performance-enhancing system. Many websites are available in the market for creating e-commerce sites, but no one is available in MERN stack technology, so it provides the main new feature and is fast for all of them. Many cms web applications can't provide suggestion segmentation, but here this web application provides suggestion segmentation.

The future of content management systems for e-commerce holds exciting possibilities. As technology advances, this paper anticipates enhanced personalization features and streamlined integration with emerging online platforms. Also another feature will be added in the future, which is product recommendation based on

customer behavior using machine learning. The integration of blockchain for secure transactions and transparent supply chain management could become a standard, fostering trust among online shoppers.

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