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Survey on Bridging Flexibility and Transparency in E-Commerce

Sona Bhoir[1], Inshaal Shaikh[2], Omkar Singh[3], Bhavika Thakur[4]
[1](Department of Computer Engineering, Viva Institute of Technology, India)
[2](Department of Computer Engineering, Viva Institute of Technology, India)
[3](Department of Computer Engineering, Viva Institute of Technology, India)
[4](Department of Computer Engineering, Viva Institute of Technology, India)

Abstract : *The development of an innovative e-commerce platform designed to address limitations in traditional online shopping by integrating a real-time negotiation feature. Conventional e-commerce systems often lack flexibility in pricing, which can hinder buyer-seller interaction and limit personalized shopping experiences. To solve this problem, the proposed platform introduces a dynamic negotiation module, enabling buyers to negotiate product prices directly with sellers. This fosters a more interactive and customer-centric marketplace, enhancing flexibility and providing tailored deals. Key features include a secure payment gateway, advanced product search and filtering options, and an intuitive user interface for seamless navigation. The negotiation system ensures transparency and fairness through predefined rules and automated assistance, encouraging trust and boosting customer engagement. The report outlines the platform's design, development process, technologies employed, and results from user testing, emphasizing how the negotiation feature sets this platform apart from conventional e-commerce solutions.*

Keywords - *Buyer-seller interaction, Personalized shopping experience, Smart negotiation engine, Transparent pricing.*

I. INTRODUCTION

In the fast-evolving landscape of online retail, e-commerce platforms have become the cornerstone of modern shopping experiences. With the increasing demand for user-centric and flexible purchasing options, traditional fixed-price models are being challenged. This report introduces an innovative e-commerce platform that integrates a negotiation feature, offering a unique value proposition to both buyers and sellers. Unlike typical platforms where prices are set by sellers with little room for flexibility, this system allows users to negotiate directly with vendors, creating a more personalized and dynamic shopping experience. The negotiation feature not only enhances user engagement but also encourages competitive pricing, fostering a sense of interactivity that is often missing in online shopping. The platform's architecture supports secure transactions, seamless communication between parties, and a robust set of tools for product discovery and purchase management. By incorporating a real-time negotiation interface, the system seeks to empower buyers with greater control over pricing while providing sellers the opportunity to close deals more effectively. This introduction explores the rationale behind the project, its objectives, and the anticipated benefits for all stakeholders involved. The integration of negotiation in e-commerce represents a shift towards more interactive and flexible pricing models, similar to the bargaining practices seen in traditional marketplaces. This feature caters to a growing consumer desire for personalized shopping experiences, where they can actively participate in determining the final price. Additionally, the platform incorporates advanced analytics and machine learning algorithms to offer personalized recommendations, enhancing the overall shopping experience.

Furthermore, this system benefits sellers by providing them with more control over inventory movement and pricing strategies, allowing them to adjust offers in real time based on demand and buyer behavior. The platform also addresses the need for transparency and fairness, utilizing automated negotiation aids and predefined rules to guide users through the process, ensuring that both parties reach mutually beneficial agreements. The project also highlights the importance of security, incorporating robust encryption techniques to protect user data and financial transactions. Additionally, the platform's user-friendly interface ensures a seamless and intuitive experience, making it accessible to a wide range of users, regardless of their technical proficiency. By introducing this novel feature, the project aims to bridge the gap between digital convenience and traditional market dynamics, offering a unique approach to online retail that stands apart from current solutions. The report delves into the

detailed design and development process, the technologies employed, and the outcomes of extensive user testing, showcasing how the negotiation feature not only differentiates this platform but also significantly enhances user satisfaction and engagement.

II. LITERATURE SURVEY

Dr. Anil Varma [1] tells us that the paper "Future of E-commerce in India 2023" is focused on addressing the rapid growth and transformation of the e-commerce sector in India. It highlights the challenges posed by increasing internet penetration, the proliferation of mobile devices, and changing consumer behaviors. The paper aims to explore how these factors are reshaping the Indian e-commerce landscape, identifying both opportunities and obstacles for businesses operating in this rapidly evolving market. The research seeks to understand the implications of these changes for the future development of e-commerce in India.

Yufei Ren [2] explained us, the rapid advancement and integration of Artificial Intelligence (AI) technologies into the e-commerce sector have significantly transformed business operations and customer interactions. While AI has demonstrated its potential to enhance efficiency, customer experience, and operational processes, the full scope of its implications and challenges remains underexplored. This research aims to identify and analyze the key applications of AI in e-commerce, investigate its impact on business performance, and address the potential challenges and ethical considerations associated with its adoption. By addressing these aspects, the study seeks to provide a comprehensive understanding of AI's role in e- commerce and offer insights into optimizing its use for sustainable business growth.

Aakriti Saxena [3] has shown us the challenges that traditional e-commerce platforms face in handling dynamic content and scaling to meet fluctuating user demands. Traditional server- based architectures often struggle with scalability, maintenance, and cost-efficiency, particularly during peak shopping periods or unexpected traffic surges. The paper addresses these issues by exploring how serverless computing can provide a more flexible, scalable, and cost-effective solution for building e-commerce websites, while also ensuring better performance and handling of sensitive customer data.

Yilin Feng [4] explains the paper "Enhancing E-Commerce Recommendation Systems through the Approach of Buyer's Self-Construal" revolves around the limitations of current e-commerce recommendation systems. Traditional recommendation algorithms often fail to capture the complex psychological aspects of consumers, such as their self-construals how individuals perceive themselves in relation to others. The research identifies a gap in existing systems that do not account for these psychological factors, leading to less personalized and less effective recommendations. The study proposes a novel approach that integrates self-construal theory into recommendation algorithms, aiming to improve the accuracy and relevance of recommendations in e-commerce settings.

Halima Afroz Lari [5] tells us the rapid advancement and integration of Artificial Intelligence (AI) technologies into the e-commerce sector have significantly transformed business operations and customer interactions. While AI has demonstrated its potential to enhance efficiency, customer experience, and operational processes, the full scope of its implications and challenges remains underexplored. This research aims to identify and analyze the key applications of AI in e-commerce, investigate its impact on business performance, and address the potential challenges and ethical considerations associated with its adoption. By addressing these aspects, the study seeks to provide a comprehensive understanding of AI's role in e- commerce and offer insights into optimizing its use for sustainable business growth.

Novrindah Alvi Hasanah [6] explained us that with the intense competition among e-commerce platforms, it is crucial for these platforms to enhance their website quality to stay competitive. However, there is a need to evaluate and improve the functional suitability of e-commerce websites, as it directly impacts user satisfaction and service quality. This study aims to assess the functional suitability of various Indonesian e-commerce websites using the ISO/IEC 25010 standard, focusing on attributes such as completeness, correctness, and appropriateness. By doing so, the research provides insights and recommendations for improving the functional quality of e-commerce websites, ultimately contributing to better user experiences and competitive advantage in the market.

Nico Fernando [7] has shown the rapid development of internet technology and the resulting increase in data, known as "Big Data," has revolutionized various fields, particularly e- commerce. This research addresses the extent to which big data generated from e-commerce can affect business operations and provide benefits such as expanding transaction scopes and supporting decision-making. Despite the potential advantages, e-commerce businesses often face challenges in effectively utilizing this data, particularly in managing inventory and making strategic business decisions. The study uses sales data from a gift shop to demonstrate how big data can be processed and analyzed to improve stock management and promotional strategies, ultimately enhancing business efficiency and customer satisfaction.

Saqib Saeed [8] explained the problem addressed in this research paper centers on the growing concerns of e-commerce security and customer trust in developing countries, with a specific focus on Pakistan. Despite the rapid expansion of e-commerce, customer apprehensions regarding data privacy, financial fraud, and the overall

security of online transactions persist. These concerns are exacerbated by a lack of robust cybersecurity measures and inadequate support from financial institutions in cases of fraud. The study aims to investigate the factors influencing customer perceptions of e-commerce security and trust, employing the protection motivation theory (PMT) as a framework. By understanding these perceptions, the research seeks to propose strategies to enhance e-commerce security and build customer trust, ultimately fostering a safer online shopping environment in developing economies like Pakistan.

Moutaz Haddara [9] tells the General Data Protection Regulation (GDPR) presents significant challenges for e-commerce companies that rely heavily on big data analytics and business intelligence. While GDPR aims to enhance consumer protection and privacy, its implementation may impose additional costs and require substantial changes in the data processing practices of these companies. This research seeks to investigate the extent to which GDPR influences e-commerce analytics operations in the Netherlands, focusing on the limitations and adjustments that companies have made to comply with the regulation.

Mohammad Waliul Hasanat [10] explained in this paper that in the retail industry, eCommerce platforms are critical for reaching and engaging with customers in the digital marketplace. However, many retail businesses struggle to optimize their online presence to effectively attract and convert customers. The integration of social media and Search Engine Optimization (SEO) techniques presents a significant opportunity to enhance visibility, drive traffic, and boost sales. Despite the potential benefits, there is often a lack of understanding of how to strategically implement these tools to maximize their impact. This paper investigates the optimization of eCommerce platforms through the effective use of social media and SEO techniques, aiming to provide actionable insights for retail businesses seeking to improve their online sales performance. The focus is on identifying the most effective strategies and demonstrating their practical application in the retail sector.

Yanyan Wang [11] shown us that the rapid growth and transformation in the retail and e- commerce sectors driven by big data technology. Despite the booming development of "new retail" and e-commerce (EC) in China, regional differences in development levels and factors affecting these trends are not well-understood. The study aims to explore the future development trends of "new retail" and e-commerce by analyzing big data to provide insights and strategic recommendations for enhancing regional development. Specifically, it examines the development status and influencing factors in Anhui Province, focusing on Hefei and Huangshan. The paper seeks to construct an evaluation index system for regional development, analyze the impact of big data on traditional trade and circulation enterprises, and propose strategic measures to improve the "new retail" business model and regional EC platforms.

Fabio Santos [12] tries to explain us in this paper, as businesses increasingly rely on both eCommerce platforms and Enterprise Resource Planning (ERP) systems to manage their operations, the integration of these two systems becomes critical for maintaining seamless workflows, accurate data exchange, and efficient business processes. However, this integration presents significant architectural challenges, including issues related to data synchronization, system interoperability, real-time processing, and scalability. Without effective integration, businesses may face operational inefficiencies, data inconsistencies, and hindered decision- making capabilities. This paper explores the architectural challenges encountered during the integration of eCommerce and ERP systems through a case study, aiming to identify key obstacles and propose potential solutions to enhance system compatibility and operational efficiency.

Satish Kumar [13] tells us that this paper aims to provide a comprehensive overview of the evolution of electronic commerce (e-commerce) research over the past two decades. It identifies the key developments, trends, and shifts in research focus within the domain of e-commerce. The paper systematically reviews and synthesizes existing literature to highlight the progress made, the challenges faced, and the future directions for e-commerce research. This review is crucial for understanding how e-commerce has transformed over the years and how it can continue to evolve to meet the demands of a rapidly changing digital landscape.

Mark Anthony Camilleri [14] shows in this paper that the significant gap in understanding consumer fulfillment and after-sales service quality in e-commerce, particularly during extraordinary crises like the COVID-19 pandemic. While existing empirical studies have explored various aspects of retail website service quality, there is limited research focusing on how consumer order fulfillment impacts satisfaction, loyalty behaviors, and word-of-mouth activities during such unprecedented situations. This study aims to investigate the effects of website attractiveness, functionality, security, and consumer order fulfillment on consumer satisfaction and behaviors, contributing to both academic knowledge and practical applications in the e-commerce industry.

Saani Solomon [15] tells us the e-commerce industry's massive growth potential in India, investigating whether existing businesses can meet consumer expectations and sustain themselves in a competitive market. It raises concerns over the critical issues consumers face, such as product defects, delivery delays, and unavailability of products in certain areas. Additionally, the study questions how customer trust, privacy, and security concerns influence e-commerce site selection and overall user satisfaction. The research also aims to assess the role of digital marketing in shaping customer perceptions.

III. ANALYSIS TABLE

Table 3.1: Analysis Table

Title of paper	Technology Used	Advantages	Disadvantages	Open challenge
Future of E-commerce in India- 2023. [1]	Automated transaction management, blockchain, IPFS/Swarm for storage.	Optimized resources, scalability, decentralized security.	Data privacy issues, high costs, expertise required.	Strengthening data privacy, security, and delivery logistics.
Optimal Recommendation Strategies for AI Powered E-Commerce Platforms: A Study of Duopoly Manufacturers and Market Competition. [2]	AI-based user data analysis, market simulation, duopoly competition study.	Personalized recommendations, increased sales, competitive edge.	Privacy concerns, infrastructure cost, bias in algorithms.	Balancing personalization with fair competition and transparency.
Creating Dynamic and Scalable E Commerce Websites With Serverless Computing. [3]	Blockchain, serverless architecture, distributed data storage.	Cost-efficient, scalable, decentralized security.	Limited control, migration difficulty, blockchain scalability.	Addressing blockchain scaling and interoperability issues.
Enhancing e-commerce recommendation systems through approach of buyer's self-construal. [4]	Integration of psychological self-construal into AI models.	Enhanced engagement, personalized recommendations, improved accuracy.	Privacy risks, limited data for new users.	Incorporating psychological insights effectively.
Artificial Intelligence in E commerce: Applications, Implications and Challenges. [5]	Collaborative filtering, NLP, large-scale training models.	Personalization, automated tasks, 24/7 support.	Data dependency, talent shortage, high costs.	Ensuring data quality and privacy compliance.
Functional Suitability Measurement Based on ISO/IEC 25010 for e-Commerce Website. [6]	Systematic quality measurement for websites.	Comprehensive evaluation, user requirement fulfillment.	Time-consuming, resource-intensive.	Standardized functional suitability measurements.
Utilization of Big Data In E Commerce Business. [7]	Clustering, predictive analytics, collaborative filtering.	Improved segmentation, forecasting, personalization.	Privacy issues, high costs, complexity.	Effective integration of diverse data sources.
A Customer-Centric View of E Commerce Security and Privacy. [8]	PKI, encrypted channels, cryptographic protections.	Secure transactions, consumer trust, loyalty boost.	Lack of practical implementation guidance.	Strengthening consumer trust and compliance.
Exploring the Impact of GDPR on Big Data Analytics Operations in the E Commerce Industry. [9]	UX optimization, conversion testing.	High-quality user interactions, unique applications.	Computational expense, integration difficulty.	Maintaining privacy and customer trust.

E-commerce optimization with the implementation of social media and Seo techniques to boost sales in retail business. [10]	SEO, social media integration.	Boosted visibility and sales.	Time-consuming, neglects other tools.	Skilled professionals for effective AI integration.
Future Development Trend of "New Retail" and ECommerce Based on Big Data. [11]	Linear weighting, range standardization.	Personalized marketing, real-time insights.	Privacy issues, data accuracy challenges.	Seamless tech integration and consumer adaptation.
Architectural challenges on the integration of e-Commerce and ERP systems. [12]	PRIMAVERA ERP, APIs, SQL, WCF web services.	Cost reduction, productivity boost, simplified integration.	Maintenance complexity, secure data transfer.	Automating processes and securing integration.
20 years of Electronic Commerce Research. [13]	Global partnerships, new business models.	Growing citations and adoption, especially in Asia.	Limited attention to new technologies and regions.	Adapting to evolving consumer needs and compliance.
E-commerce websites, consumer order fulfillment and after-sales service satisfaction: The customer is always right, even after the shopping cart check-out. [14]	Efficient order processing, tailored services.	Improved satisfaction, loyalty, and retention.	Delays, poor after-sales, security issues.	Maintaining customer satisfaction post-purchase.
Impact Of E-Commerce Platform On Consumer's Mindset. [15]	EDI, EFT, digital marketing.	Time-saving, lower prices, global access.	Defective products, delivery delays.	Building trust and improving delivery reliability.

IV. PROPOSED SYSTEM

Our proposed system is a secure and user-friendly e-commerce solution that aligns with modern e-commerce requirements through a structured and efficient workflow. The system begins by handling user actions, offering new users a seamless registration process and returning users secure authentication with error handling for invalid credentials. It provides a comprehensive display of product categories and details, enabling users to browse and make informed choices. For selected products, users can either add them to the cart or initiate a dynamic negotiation process, where price details are validated, counteroffers are calculated, and agreements are finalized transparently.

The checkout process collects shipping and payment details, validates transactions, confirms orders, and updates inventory records for accuracy. Post-order processing ensures smooth follow-up with order confirmations, seller notifications, shipment tracking, and feedback requests. The robust Admin Panel facilitates product management, order monitoring, negotiation oversight, and dynamic pricing adjustments. The platform emphasizes an intuitive user interface, integrated customer support, and dynamic notifications to keep users informed throughout their journey. Thorough testing and deployment ensure reliability, while the secure design addresses all aspects of user and transaction safety. They following some steps are:

Step 1: Start.
Step 2: Handle user actions:
New user: Present registration form, collect details.
Returning user: Authenticate credentials. Grant access if valid, else display error.
Step 3: Display product categories with details.

Step 4: Handle user action for the selected product:
Add to cart or initiate negotiation.
Negotiation: Fetch price details, validate user offer, calculate counteroffers, and finalize if agreed.
Step 5: Proceed to checkout:
Collect shipping/payment details, validate payment, process transaction, confirm order, and update inventory.
Step 6: Post-order processing:
Send confirmation email, notify the seller, track the order, update shipping details, and request feedback post-delivery.
Step 7: Admin/Seller management:
Manage products, monitor orders, oversee negotiations, and adjust pricing.
Step 8: End.

V. FUTURE SCOPE

The proposed e-commerce platform has significant potential for future enhancements to ensure scalability, user engagement, and technological advancement. It can integrate advanced AI models like NLP and machine learning for dynamic and personalized negotiations, along with voice and chat-based interfaces for seamless interactions. Blockchain technology can be implemented for secure, tamper-proof transactions, while augmented reality (AR) can offer immersive product previews. Features like dynamic pricing based on market trends, multi-language and multi-currency support, and social commerce integration can expand global reach. Gamification, sustainability tracking, and subscription plans can enhance customer engagement and loyalty. Advanced analytics for sellers, integration with logistics for real-time updates, and robust fraud detection mechanisms will improve functionality and security. Additionally, adapting to evolving regulations like GDPR and offering scalable solutions for B2B transactions will position the platform as a future-ready solution in the competitive e-commerce landscape.

VI. CONCLUSION

In conclusion, the development of an e-commerce platform with a negotiation feature addresses key limitations of traditional fixed-pricing models, offering a more dynamic and flexible shopping experience. By integrating AI-driven algorithms, the system allows for personalized, real-time price negotiations, improving customer satisfaction and conversion rates. The platform's scalability and adaptability, supported by robust backend architecture and continuous learning, ensure its future growth potential. With features that enhance trust, transparency, and user engagement, this project positions itself as a pioneering solution in the evolving landscape of e-commerce, paving the way for smarter, customer-centric digital commerce systems.

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