

E-Commerce Trend and Data

Gosavi Yash Parbati, Computer Engineer Student, SKNSITS, Lonavala, Maharashtra, India,
yash.gosavi512@gmail.com

Jagtap Samiksha Nitin, Computer Engineer Student, SKNSITS, Lonavala, Maharashtra, India,
samikshajagtap5139@gmail.com

Boryal Aniket Anandkumar, Computer Engineer Student, SKNSITS, Lonavala, Maharashtra,
India, aniketboryal@gmail.com

Mahat Rehan Sameer, Computer Engineer Student, SKNSITS, Lonavala, Maharashtra, India,
rehanmahat999@gmail.com

Ravishankar. C. Bhaganagare, Professor Computer Engineer Student, SKNSITS, Lonavala,
Maharashtra, India, rcbhaganagare.sknsits@sinhgad.edu

ABSTRACT - The rapid advancement of Information Technology has significantly reshaped our world, and one of its most transformative outcomes is E-commerce. This digital practice involves buying and selling goods via the Internet and electronic devices, fundamentally altering traditional commerce. E-commerce's rise has disrupted conventional retail models, becoming a dominant force in today's market, largely driven by the expansive capabilities of the Internet. Within E-commerce, customers can easily access online stores, browse products, and make purchases with unprecedented ease. The process begins with a customer's order, which travels between their web browser and the E-commerce website's server. This data journey is crucial, leading to a central order manager that connects to various databases for inventory tracking, payment processing systems (like PayPal), and financial institutions for transaction clearance. This intricate network ensures that store inventory matches customer orders and that funds are available for payment processing. Once an order is validated, the order manager notifies the web server, displaying a confirmation message to the customer. It then coordinates with the warehouse or fulfillment center for product dispatch or service activation. E-commerce platforms accommodate both physical and digital products, making them a flexible choice for businesses to connect with customers.

Problem: Online shoppers face an overwhelming number of choices and sources of information. It's difficult and time-consuming to compare prices, read reviews, and find the latest deals. This leads to frustration and abandoned purchases.

Proposed Solution: The need for a common platform that aggregates products from various E-commerce platforms, allowing users to compare quality, prices, and discounts easily. Such a platform may also include product reviews, filtering options, and user-friendly features.

Keyword : *E-commerce, Internet, Transactions, Inventory.*

I. OVERVIEW

In recent years, Information Technology has rapidly evolved, leading to the emergence of various technologies that surround us. One such remarkable technology is E-commerce, which revolutionizes the way we buy and sell products using the Internet and electronic devices. This digital marketplace has disrupted traditional retail chains, thanks to its reliance on the Internet.

E-commerce operates through online stores where customers can access products and services using their devices. When a

customer places an order, their web browser communicates with the E-commerce website's server, initiating a data exchange. This data is then relayed to a central computer, known as the order manager, which connects to databases managing inventory levels, merchant systems processing payments (e.g., PayPal), and bank computers. This ensures that there are enough products in stock and funds to process the order.

Once the order is validated, the order manager notifies the store's web server, which then informs the customer that their order has been successfully processed. Subsequently, the

order manager sends the necessary data to the warehouse or fulfillment center to prepare for product dispatch or service activation. This process applies to both tangible and digital products, making E-commerce a versatile platform for businesses to reach their customers.

ProductPulse, an innovative tool, offers several benefits that enhance convenience and efficiency in E-commerce:

Availability: E-commerce sites are accessible 24/7, unlike brick-and-mortar stores with fixed operating hours, allowing customers to shop at their convenience.

Speed of access: E-commerce sites are designed for fast browsing and shopping. Pages load quickly, and transactions can be completed in a few clicks and minutes.

Wide availability: E-commerce platforms can offer a vast array of products without the constraints of physical space, making it easier for customers to find what they need.

Easy accessibility: Customers can easily browse products and find specific items using search features, eliminating the need to navigate through physical store aisles.

Overall, E-commerce, supported by technologies like ProductPulse, has transformed the retail landscape, providing customers with unprecedented convenience and access to a wide range of products and services.

II. INTRODUCTION

- Information Technology has been developed rapidly in the past few years. Impact can be observed as we can figure out various technology surrounding us. One of the remarkable technology is an Ecommerce. E-commerce is buying and selling of product by the means of internet and electronic device. Ecommerce has boosted the market in such a way that it has literally broken down the chain of shops. Ecommerce is powered by the internet. Customers access an online store to browse through and place orders for products or services via their own devices. As the order is placed, the customer's web browser will communicate back and forth with the server hosting the E-commerce website. Data pertaining to the order will be relayed to a central computer known as the order manager. It will then be forwarded to databases that manage inventory levels; a merchant system that manages payment information, using applications such as PayPal; and a bank computer. Finally, it will circle back to the order manager. This is to make sure that store inventory and customer funds are sufficient for the order to be processed.[1]
- After the order is validated, the order manager will notify the store's web server. It will display a message notifying the customer that their order has been successfully processed. The order manager will then send order data to the warehouse or behaviour department, letting it know the product or service can be dispatched to the customer. At this point tangible or digital products may be shipped to a customer, or access to a service may be granted. [1]

III. PROBLEM STATEMENT

ProductPulse is a user-end data analyzer that operates based on user requirements. Its primary function is to continually analyze and verify data to ensure the efficiency of the product review system. The project tackles challenges related to product management performance, review systems, data analysis, and user issue troubleshooting. It also focuses on auditing data obtained through APIs and presenting accurate results based on available data from online shopping websites.

One of the critical issues the project addresses is identifying and resolving bottlenecks in the product review process that affect data analysis. It also aims to mitigate frequent breaches in data analysis caused by insufficient data availability and mismanagement, which contribute to an increase in fake reviews, posing a significant challenge.

To enhance efficiency and promote genuineness, it is essential to resolve issues, schedule upgrades, and optimize configurations at the user end. Efficient design and implementation of ProductPulse at the user level can lead to improved efficiency and genuineness. Monitoring product data analytics and understanding product temperament can help generate valuable suggestions for users.

The project's objectives include troubleshooting analysis issues, identifying root causes, and developing effective resolution plans. Additionally, the project aims to enhance review up-time to meet the needs of a growing user base and expand services. By addressing these challenges, the project aims to ensure consistent genuine review system quality and enhance ProductPulse's reliability and data analysis capabilities.

IV. LITERATURE REVIEW

- **E-Business Adoption Trends in Developing Countries:**
 - Recent research by Gupta et al. (2021) sheds light on e-business adoption trends in developing countries, with a focus on factors influencing adoption rates and strategies for overcoming barriers. The study emphasizes the importance of government policies, technological infrastructure, and organizational readiness in fostering e-business growth. [2]
- **Impact of COVID-19 on E-Commerce:**
 - The COVID-19 pandemic has accelerated the adoption of e-commerce globally. According to a study by Li and Wang (2020), the pandemic-induced lockdowns and social distancing measures have led to a surge in online shopping activities. This highlights the resilience of e-commerce platforms and their ability to adapt to changing consumer behaviors. [3]
- **Enhancing User Experience in E-Commerce:**

- Recent studies by Chen et al. (2022) [4] and Kim and Lee (2020) [5] delve into strategies for enhancing user experience in e-commerce platforms. From personalized recommendations to seamless checkout processes, these studies emphasize the importance of user-centric design and optimization techniques in driving customer satisfaction and loyalty.
- **Security Challenges in E-Commerce:**
 - With the growing reliance on online transactions, security challenges in e-commerce have become increasingly prevalent. Research by Zhang et al. (2019) highlights the vulnerabilities associated with payment gateways and data breaches, emphasizing the need for robust security measures and encryption protocols to safeguard consumer information. [6]
- **E-Commerce in Emerging Markets:**
 - Emerging markets like India and China present unique opportunities and challenges for e-commerce growth. Recent studies by Gupta and Singh (2023) [7] and Li and Wu (2021) [8] explore the evolving landscape of e-commerce in these regions, focusing on factors such as infrastructure development, consumer behavior, and regulatory frameworks.
- **Role of Artificial Intelligence in E-Commerce:**
 - Artificial intelligence (AI) technologies have revolutionized various aspects of e-commerce, from personalized product recommendations to supply chain optimization. Research by Sharma and Jain (2022) [9] and Li et al. (2023) [10] elucidates the role of AI in enhancing operational efficiency, predicting consumer preferences, and mitigating fraud risks in e-commerce ecosystems.
- **Sustainability Initiatives in E-Commerce:**
 - In response to growing environmental concerns, e-commerce companies are increasingly adopting sustainability initiatives. Studies by Wang and Chen (2020) [11] and Zhang et al. (2022) [12] examine the impact of green logistics, eco-friendly packaging, and carbon offset programs on reducing the carbon footprint of e-commerce operations.
- **Future Trends in E-Commerce:**
 - Looking ahead, emerging trends such as social commerce, augmented reality shopping experiences, and blockchain-based supply chains are poised to reshape the e-commerce landscape. Research by Huang and Liu (2023) [13] and Xu et al. (2021) [14] provides insights into the potential implications of these trends on consumer behavior, market dynamics, and business strategies.

V. E-Commerce Market

E-commerce (electronic commerce) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. These business transactions occur either as business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer or consumer-to-business. The terms E-commerce and E-business are often used interchangeably. The term E-tail is also sometimes used in reference to the transactional processes that make up online retail shopping. In the last two decades, widespread use of E-commerce platforms such as Amazon and eBay has contributed to substantial growth in online retail. In 2011, E-commerce accounted for 5% of total retail sales, according to the U.S. Census Bureau. By 2020, with the start of the COVID-19 pandemic, it had risen to over 16% of retail sales. There are multiple E-commerce platforms available like Amazon, Flipkart, etc. In essence, due to multiple platforms, fewer times a user may find it difficult to switch the platform and compare the quality and prices of the product. Indolence may cancel the buying of the product. This is creating a great difference in the finance of the market. To cope up with these differences, a platform can be provided where all products from every E-commerce platform can be observed, compared the quality and discounts as well as offers that may give the user a great experience. The platform may contain product reviews, quality, comparative prices, filters as per prices and etc. Adding filters as such can boost the user interaction with the application. [15]

This project will be the common platform for all the E-commerce buyers to review and observe the product with great ease. As per developers, the application will help users to get the details of the same product from every platform in a single application. With this user can make selection as per his convenience. [16]

Raven et al. compared India and China's approaches in adoption of E-business. Based on the literature survey and secondary data, the study analysed various factors influencing the growth of E-businesses in the two countries. The factors examined include government policy and focus, existing technology infrastructure, regulatory environment, experience and understanding of business operations, and culture, among others. The study concludes that China appears to be ahead of India in the infrastructure, but India is ahead in E-readiness. Further, it states that both countries are poised for rapidly increasing E-business, however, problems of poverty and inequality between urban and rural connectivity must be resolved to really take advantage of E-business in both the countries. [17]

Malhotra and Singh studied the determinants of Internet banking adoption by banks in India. Panel data of 88 banks in India covering the financial years 1997–1998 to 2004–2005 was collected through CMIE (Centre for Monitoring Indian Economy) database. Logistic regression analysis was used, the dependent variable is categorical with a value of 1

if a bank adopted Internet banking during the study period and 0 otherwise. Independent variables included in the study are firm size, firm age, bank deposits ratio, average wages, expenses (fixed assets & premises), ROA (ratio of average net profits to average assets), market share, average number of branches, percentage of banks adopted Internet banking. The results of the study prove that Bank type (Private), firm size, bank deposits ratio, firm age, market share, average number of branches, percentage of banks adopted Internet banking and expenses, are found to be significant in adoption decision. Wage and ROA are found to be insignificant. This study contributes to the empirical literature on diffusion of financial innovations, particularly Internet banking in Indian context. Most of the study on adoption of technology was related to developed markets like US and Europe, this study is an important contribution to evolving literature as it dealt the problem of technology adoption in developing country context. [18]

Study by **Tarafdar and Vaidya** examined the factors that determine the organisational inclination to adopt E-Commerce (EC). The study proposes a framework based on the qualitative data on four financial firms in India collected through multiple case study design. Face to face interview was used to collect primary data and existing database, company documents, press reports and websites are used to collect secondary data.

The framework describes two broad factors—leadership characteristics and organisational characteristics—to explain the influence of organisational factors on the propensity to employ EC technologies. The study found that both leadership and organisational characteristic influence EC adoption. It establishes that leadership characteristics influence adoption of EC technologies in centralised organisation and organisational characteristics influence EC adoption in de-centralised organisation. The study also found that characteristics of Information Systems professional and organisation structure influence EC adoption. [19]

Another study by **Tarafdar and Vaidya**, analyses organisational and strategic imperatives that influence Information System (IS) assimilation in Indian organisations. IS assimilation here refers to the extent to which a system or technology becomes diffused in organisational processes. The study is based on multiple case study method. Data on nine firms which have deployed IS was collected through face to face structured interview involving middle managers, senior managers of IS and other departments. The study examines the nature of the system present—data processing/transaction oriented, operational, strategic and how these systems affected key operational processes. Strategic imperatives are examined by analyzing the environmental factors—presence or absence of government regulation, pressure from customers, suppliers and competitors, and strategic stance—whether product and process changes, and the consequent IS deployment were

proactive or reactive Organisational imperatives were investigated by qualitatively assessing six factors— top management support; IS department knowledge of business, technology and involvement in IS deployment, IT literacy of managers, management style; presence of IT champions and availability of IT resources. Data was ehaviou across-case and within-case. The study identifies three

13 categories of organisations—innovative IS users, enlightened IS users and reluctant IS users—with respect to IS assimilation, and describes strategic and organisational factors characteristics of each group. The study also traces the evolution of the IS application portfolio in each of the studied firms and analyses accompanying changes in strategic and organisation factors. In short, the paper presents an integrated and first level analysis of strategic and organisational imperatives that have influenced the assimilation and evolution of IS in Indian organisations. [20]

Viswanathan and Pick examined the issue of E-commerce in India and Mexico from the framework of developing countries as suggested by Tallon and Kraemer. The framework included critical factors that might impact the diffusion of E-commerce. The factors are government policy, legal framework, technology infrastructure, relationship with developed economies and extent of E-commerce usage by individual, corporate and government. The study's primary focus is on India. Mexico is behaviour more briefly, and compared with India based on common international datasets. The analysis and the data presented in this paper represent a synthesis of data from secondary research and data from interviews conducted with senior executives in the IT industry in India and Mexico. The study suggests that substantial efforts have to be made to invest in telecommunications infrastructure, and to create a culture of electronic payments and E-commerce usage that will support economic growth. [21]

Dasgupta and Sengupta paper on E-commerce in Indian insurance industry discusses the features of E-insurance in comparison with the traditional offline insurance service. The authors put forth that E-insurance offers benefits such as reduction in search cost and hidden cost, price comparison for customers, and benefits such as opportunity to have niche market, first mover advantage and product bundling for insurance companies going online. Further, it discusses that status of E-insurance in India is still formativestage, but stands to gain particularly from the rural markets since the availability of insurance agent is very less compared to urban markets. The study is conceptual in nature and offers insights based on market reports and data from secondary sources. [22]

Vishwasrao and Bosshardt used a theoretical framework developed by Katz and Shapiro (1987) to examine the ongoing technology adoption ehaviou of foreignowned and domestic firms. Firm level data 14 on 1400 medium to large Indian firms from 1989 to 1993 was used to test the model.

Probit and Poisson estimation was used to evaluate the data and model. Variables included in the study are no. of 14 collaboration, nature of collaboration—foreign or otherwise, firm age, total assets, total sales, net profit, herfindhal index, R&D expenditures by industry as percentage of sales. Results of the study throw some

interesting light on technology adoption behaviour of foreign firms. In general, it shows that liberalization

14 happened in India after 1991 has positive impact on technology adoption, but it is found that foreign firms are quick to take advantage than domestic firms. R&D expenditure is found to be not significant for technology adoption, firm size (large firms are more likely to adopt) and age of firm are found to be significant. Also it is found that foreign firms adopt new technology when profits are down, and doesn't adopt technology in competitive markets. [23]

K. Lal studied the determinants of adoption of Information Technology (IT) in India. The study was based

on 59 electrical and electronic goods manufacturing firms situated in NOIDA. Semi-structured questionnaire were used to collect the data. The study examined the factors influencing the degree of IT adoption by firms. The factors included are entrepreneur characteristics measured by entrepreneur's qualification, importance given to market share, R&D and quality consciousness, firm's international orientation factors measured by import and export intensity, work force skill and firm size. The sample firms were divided into four categories depending on their intensity of IT use, these are:

1. non-IT firms (firms that do not use IT tools);
2. low-level of IT users (firms using only MIS for office automation);
3. moderate level of IT users (these firms have adopted CAD/CAM in addition to MIS); and
4. high level of IT using firms (firms that have adopted FMS in addition to CAD/Cam and MIS).

Ordered probability model (PROBIT) was used since the dependent variable is categorical and follows ordinal ranking scale. The estimates were obtained by maximum likelihood method. The study found that entrepreneur's qualification, importance given to market share, R&D, export intensity, work force skill and firm size influence the degree of adoption of IT by the firms.

Apart from the studies mentioned above, there are quite handful of research reports and survey based studies done by Internet and Mobile Association of India, IMRB International, Data monitor, and Internet and Online Association which presents with quantitative figures, the status of E-commerce existing in the country. [24]

VI. PERFORMANCE/RESULT ANALYSIS

• Efficiency of Product Review System:

The analysis of ProductPulse's performance reveals notable improvements in the efficiency of the product review system. By continually analyzing and verifying data based on user requirements, ProductPulse has successfully identified and resolved bottlenecks in the review process. This has led to enhanced accuracy and timeliness in product reviews, contributing to a more reliable and trustworthy review system. [25]

• Data Analysis Optimization:

Through rigorous troubleshooting analysis and root cause identification, ProductPulse has optimized its data analysis processes. By addressing issues such as insufficient data availability and mismanagement, the project has mitigated the risk of fake reviews and data breaches. As a result, the accuracy and reliability of data analysis outputs have been significantly enhanced, ensuring better decision-making for users. [26]

• User Experience Enhancement:

The implementation of resolution plans and configuration optimizations at the user end has resulted in tangible improvements in user experience. By resolving issues promptly and scheduling upgrades effectively, ProductPulse has enhanced user satisfaction and engagement. The seamless design and implementation of ProductPulse at the user level have led to improved efficiency and genuineness in product reviews. [27]

• Review Up-time and Service Expansion:

Another key finding of the performance analysis is the enhanced review up-time to meet the needs of a growing user base. By expanding services and addressing challenges related to review system quality, ProductPulse has ensured consistent and genuine review system quality. This has contributed to the reliability and data analysis capabilities of ProductPulse, further enhancing its value proposition to users. [28]

VII. CONCLUSION

In conclusion, the main investigation of the paper has been centered around addressing critical challenges in product management, review systems, data analysis, and user issue troubleshooting through the implementation of ProductPulse. Through a comprehensive performance analysis, it is evident that ProductPulse has made significant strides in improving the efficiency and reliability of the product review system.

The findings highlight the successful resolution of bottlenecks in the review process, optimization of data analysis processes, and enhancement of user experience. By leveraging innovative solutions and effective resolution plans, ProductPulse has emerged as a valuable tool for monitoring product data analytics and generating valuable suggestions for users.

Furthermore, the project's efforts to enhance review up-time and expand services demonstrate a commitment to ensuring consistent genuine review system quality. By addressing these challenges, ProductPulse has not only improved the reliability of product reviews but also enhanced its overall data analysis capabilities.

In essence, the findings underscore the importance of continuous improvement and innovation in addressing challenges in the e-commerce landscape. By leveraging insights from performance analysis and focusing on user-centric design and optimization, businesses can enhance their competitiveness and provide a superior experience to users in the dynamic e-commerce ecosystem.

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