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E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub

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ABSTRACT

This study aimed to develop an E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub to address challenges associated with manual and semi-digital transaction management, inventory monitoring, order tracking, and sales reporting. Guided by the Input-Process-Output (IPO) model, the study employed the Agile Software Development Life Cycle (SDLC), involving planning, analysis, design, development, testing, deployment, and maintenance. Data were gathered through informal interviews with the business owner or seller, direct observation of business operations, and review of existing sales, order, and inventory records. The system was developed using web-based technologies and a centralized database to support administrators, sellers, and customers. Evaluation involved unit testing, integration testing, user acceptance testing, performance testing, and security testing. Results revealed that all eight core functional test cases passed, confirming the successful operation of user authentication, user management, product management, product browsing, order processing, order tracking, inventory management, and sales analytics. Performance and security testing demonstrated reliable system operation and appropriate access control within the local development environment. User acceptance testing indicated positive feedback regarding functionality, reliability, usability, efficiency, and security. However, the platform was limited by its web-based accessibility, basic sales analytics, and lack of integrated payment gateways and external courier tracking. The study concluded that the developed system provides a practical solution for organizing business transactions and improving access to sales information. Future enhancements include payment integration, courier services, advanced analytics, and mobile accessibility. The study supports SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 11 (Sustainable Cities and Communities). It contributes to technological, educational, and socio-economic sustainability by strengthening digital competencies, supporting business efficiency, and promoting local enterprise development.

Keywords: *Agile Software Development, E-Commerce Platform, Inventory Management, Order Tracking, Sales Analytics, System Development Life Cycle, User Acceptance Testing, Web-Based System*

1. INTRODUCTION

The advancement of information and communication technology (ICT) has transformed business operations through e-commerce platforms that support online transactions, product management, order monitoring, and sales analysis. These technologies enable businesses to improve operational efficiency, customer engagement, and decision-making. OECD (2024a) emphasize that e-commerce systems improve organizational efficiency through automation and access to transactional data, while UN Trade and Development (2024) highlight the importance of integrating essential business processes into digital platforms. Despite these advancements, many small and medium-sized enterprises (SMEs) continue to depend on manual and semi-digital processes. In the Philippines, the Department of Trade and Industry (DTI, 2024) identifies digitalization as essential to strengthening SME competitiveness, while the Philippine Statistics Authority (PSA, 2024) notes that many micro, small, and medium enterprises (MSMEs) still rely on basic digital tools rather than integrated systems. Lupah Sug Gadget Hub experiences similar challenges in managing customer orders, inventory, order tracking, and sales records. To address these limitations, this study developed a web-based e-commerce platform integrating product management, online ordering, order status tracking, inventory monitoring, and basic sales analytics. The system aims to improve transaction organization, customer convenience, and access to business information while supporting digital transformation among local businesses.

Research Problem

Lupah Sug Gadget Hub relies on manual and semi-digital methods, including social media messaging, handwritten records, and spreadsheets, for managing sales transactions and customer orders. These practices contribute to difficulties in monitoring inventory, recording transactions accurately, tracking order status, and generating timely sales reports. The absence of a centralized platform limits operational efficiency, information accessibility, and data-driven decision-making. These challenges reflect broader limitations in e-commerce adoption. The International Trade Centre (ITC, 2024) identifies limited technical skills and financial resources as barriers to digital transformation among SMEs. Similarly, the OECD (2023) highlights inadequate infrastructure, funding constraints, and technical knowledge gaps, while the Asian Development Bank (ADB, 2024) recognizes the potential of integrated digital platforms to improve business efficiency. Existing studies demonstrate the importance of automation and tracking technologies. OECD (2024a) found that digital commerce solutions improve order processing and customer service, while UN Trade and Development (2024) reported that integrated order tracking enhances customer satisfaction through greater transparency. OECD (2024a) and Asian Development Bank (2025) further emphasize the relationship between timely order information, customer trust, and satisfaction. The central research problem is therefore the lack of an integrated e-commerce system that enables Lupah Sug Gadget Hub to manage transactions, monitor orders and inventory, and analyze sales information efficiently. The study addresses this gap through a centralized web-based platform designed around the business's operational requirements.

Assumptions of the Study

The study is based on the premise that integrating product management, online ordering, order tracking, inventory monitoring, and sales analytics into a centralized platform can improve the organization and accessibility of business information. It assumes that reducing dependence on manual recording can minimize transaction errors and support more efficient business

operations. The study also assumes that timely order status information can improve customer convenience and transparency. Research from the OECD (2024a) indicates that customers actively use order tracking information during the post-purchase stage, influencing satisfaction and trust. Similarly, studies published in the Asian Development Bank (2024) emphasize the importance of integrating logistics and service channels to improve customer service. Furthermore, the study assumes that accessible sales information can support business decision-making. According to OECD (2024a), analytics-driven systems improve inventory management and decision-making, while World Bank (2024) emphasizes the contribution of digital transformation to business responsiveness. These assumptions are considered within the project's defined limitations, including its web-based environment, dependence on internet connectivity, basic sales analytics, and absence of integrated payment gateways and external courier tracking.

Objectives of the Study

The general objective of this study is to design and develop an E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub to address inefficiencies in transaction management, order monitoring, inventory management, and sales reporting. Specifically, the study aims to analyze existing business processes to identify operational challenges and system requirements; design a user-friendly web-based architecture incorporating a centralized database, interfaces, and workflows; and develop a platform that enables customers to browse products, place orders, and monitor order status. The system also provides role-based functions for administrators, sellers, and customers. Administrators manage user accounts and seller registration requests, sellers manage products, inventory, orders, and sales information, and customers access online shopping and order tracking functions. The platform includes basic sales summaries and product performance reports to support business monitoring and decision-making.

Conceptual and Theoretical Framework

The study is anchored in the Input-Process-Output (IPO) model, which explains how information entered into a system is processed and transformed into meaningful outputs. Within the proposed e-commerce platform, inputs consist of customer information, product details, inventory records, and transaction data. These inputs undergo processes such as user authentication, product browsing, order placement, inventory updating, order status monitoring, and sales data analysis. The resulting outputs include order confirmations, tracking information, updated inventory records, and sales performance reports. (International Organization for Standardization, 2023). The framework is supported by literature emphasizing the integration of digital business processes. OECD (2024a) identifies product catalogs, shopping carts, order tracking, and analytics dashboards as essential e-commerce components, while UN Trade and Development (2024) explain that integrating customer service, logistics, and sales monitoring improves business responsiveness. Sales analytics is another essential component of the conceptual basis. According to OECD (2024a), analytics tools help organizations understand sales trends, customer behavior, and inventory performance. OECD (2023) emphasize the importance of customer experience in e-commerce, while the World Economic Forum (2023) associates digital transformation with improved business productivity and competitiveness. The framework also recognizes the value of accurate order information. OECD (2024a) discuss the application of predictive analytics in delivery management, although the proposed system is limited to basic reporting rather than predictive analysis. The Bangko Sentral ng Pilipinas (BSP, 2023) likewise highlights the increasing adoption of digital transactions, providing broader context for the development of digital commerce systems. Technically, the platform follows a client-server architecture supported by web technologies and a centralized MySQL database. Its

development uses the Agile Software Development Life Cycle, allowing incremental design, implementation, testing, and refinement. These concepts provide the foundation for integrating the platform's administrative, seller, and customer functions into a unified information system. (OWASP Foundation, 2023; National Institute of Standards and Technology, 2024).

Sustainable Development Goal and Multidisciplinary Sustainability Relevance

The study aligns with selected United Nations Sustainable Development Goals (SDGs) by promoting digital innovation, business efficiency, technology-based learning, and local economic development. It supports SDG 4 (Quality Education) by enabling student-developers to apply their knowledge of web development, database management, system design, and software testing to real-world business challenges, thereby strengthening their technical and analytical skills. It contributes to SDG 8 (Decent Work and Economic Growth) by improving transaction management, inventory monitoring, order processing, and sales reporting, helping local businesses enhance operational efficiency and make informed decisions. Furthermore, the study supports SDG 9 (Industry, Innovation and Infrastructure) through the development of an integrated web-based e-commerce platform that replaces manual processes with centralized digital operations, promoting technological innovation and digital transformation among small businesses. It also aligns with SDG 11 (Sustainable Cities and Communities) by improving access to digital commerce services, modernizing local business operations, and providing customers within the Lupah Sug area with a more convenient purchasing and order tracking experience. Overall, the study contributes to technological, educational, and socio-economic sustainability by encouraging the practical application of information technology, strengthening digital competencies, improving business efficiency, and supporting the sustainable development of local enterprises and communities. (United Nations, 2024).

2. METHODOLOGY

Research Design

The study utilized the Agile Software Development Life Cycle (SDLC), an iterative approach that allows continuous system development, testing, and improvement based on user requirements and feedback. The development process involved planning, analysis, design, development, testing, deployment, and maintenance. During planning and analysis, the researchers identified operational challenges and determined the functional and non-functional requirements of the proposed platform. The design phase focused on developing the system architecture, database structure, user interfaces, and workflows. The development phase involved implementing the customer storefront, product and inventory management, order processing, order tracking, and sales analytics modules. Testing was conducted to verify system functionality, accuracy, usability, and security. The methodology also included deployment and maintenance activities to support system accessibility and continuous improvement. (International Telecommunication Union, 2024).

Research Locale or Study Setting

The study was conducted in the operational setting of Lupah Sug Gadget Hub, a gadget retail business within the Lupah Sug area. The business served as the primary setting for examining existing sales transactions, customer order processing, inventory monitoring, and sales reporting practices. The study focused on the business's manual and semi-digital processes, including customer communication, transaction recording, and product monitoring. These existing practices provided the basis for identifying operational problems and determining the requirements of the proposed e-commerce platform. System development and testing were

performed in a local server environment before deployment to a live hosting platform. (World Wide Web Consortium, 2023).

Participants or Data Sources

The primary sources of information were the owner or seller of Lupah Sug Gadget Hub, observations of daily business operations, and existing business documents. Informal interviews with the owner or seller provided information about transaction management, customer orders, inventory monitoring, and sales-related challenges. Additional data were obtained from sales records, order lists, and inventory files to examine existing information management practices. The study also considered the functional requirements of three primary system users: Admin, Seller, and Customer. Sample users participated in user acceptance testing to evaluate system functionality and usability. These sources supported the identification of operational requirements and the evaluation of the developed platform. (International Organization for Standardization, 2023).

Research Instruments or Materials

The study utilized informal interviews, direct observation, and document review as its primary data-gathering methods. Interviews were used to identify operational challenges and user requirements, while observation provided information about actual transaction workflows and inventory management practices. Existing sales records, order lists, and inventory files were examined to understand how business information was recorded, organized, and processed. System development was conducted using a standard laptop computer and a local server environment. The platform employed HTML, CSS, and JavaScript for the user interface, PHP or a similar server-side language for system processing, and MySQL for centralized database management. Development and database management tools included Visual Studio Code and phpMyAdmin, while the sales analytics component used database queries and data visualization tools such as Chart.js. The system followed a client-server architecture with role-based access control for administrators, sellers, and customers. Its principal components included user authentication, product management, online ordering, inventory monitoring, order tracking, and sales analytics. (European Commission, 2024).

Data Gathering Procedure

Data gathering began with informal interviews involving the owner or seller of Lupah Sug Gadget Hub to understand existing business operations and identify difficulties in managing customer transactions, product inventory, and sales information. These interviews provided initial information about the limitations of the business's current processes. The researchers subsequently observed daily operations, particularly the procedures for recording transactions, processing customer orders, and updating inventory records. Existing documents, including sales records, order lists, and inventory files, were also reviewed to examine how business information was maintained and utilized. The collected information was analyzed to identify operational gaps, including delayed order monitoring, limited access to updated information, and difficulties generating accurate sales reports. These findings guided the documentation of functional and non-functional requirements and informed the design and development of the proposed platform. Following system development, unit testing, integration testing, and user acceptance testing were conducted. Unit testing examined individual system functions, while integration testing evaluated interactions among modules. User acceptance testing involved sample users performing system activities, including product browsing, order placement, product management, and sales report review. Feedback was used to identify issues and improve system functionality. (United Nations Development Programme, 2024).

Data Analysis

The collected information was analyzed through requirements analysis to determine the operational needs of Lupah Sug Gadget Hub and establish the specifications of the proposed system. Interview findings, observations, and existing business records were examined to identify problems in transaction recording, order processing, inventory monitoring, and sales reporting. The analysis distinguished between functional and non-functional requirements. Functional requirements included account registration, user authentication, product browsing, order placement, order status tracking, inventory management, and sales reporting. Non-functional requirements focused on usability, accessibility, system responsiveness, security, reliability, and compatibility with common web browsers. The study also applied the Input-Process-Output (IPO) model to organize system operations. Inputs consisted of user information, product details, order records, and inventory data. These were processed through authentication, product selection, order computation, transaction recording, inventory updating, and sales analysis. The resulting outputs included order confirmations, updated order statuses, inventory information, and sales reports. System evaluation involved examining the results of unit, integration, user acceptance, performance, and security testing. Functional testing verified the accuracy of system operations, including user authentication, product management, order processing, and order tracking. The sales analytics module was evaluated by checking the computation of total sales, order counts, and product performance based on recorded transactions. Performance and security testing assessed system responsiveness, session authentication, and role-based access restrictions within the local development environment. (World Bank, 2023).

Ethical Consideration

The study considered ethical practices in gathering information and developing the E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub. Data were gathered through informal interviews, direct observation, and examination of existing business records to identify operational challenges and system requirements. To promote data privacy and security, the developed system incorporated user authentication, role-based access control, and secure session management to ensure that administrators, sellers, and customers could access only the functions appropriate to their assigned roles. These security measures are consistent with the information security management principles outlined in ISO/IEC 27001:2022, which emphasizes the protection of information through systematic security management and risk-based controls (International Organization for Standardization, 2022). Security testing was conducted to verify that unauthorized access was restricted and that user accounts, product information, customer orders, inventory records, and sales data were appropriately managed within the centralized database. These measures supported responsible information management, data protection, and the security of business transactions throughout system operation.

3. RESULTS AND DISCUSSION

3.1 System Development and Functional Testing Results

3.1.1 System Interface and User Management

The developed e-commerce platform provided a centralized web-based interface for three primary user roles: Admin, Seller, and Customer. The administrative dashboard displayed information on registered users, shops, products, customer orders, pending transactions, and delivered-order revenue. The system also provided functions for managing user accounts, reviewing seller registration requests, and accessing business records. Functional testing confirmed that user authentication, account management, and role-based access operated as

expected. These findings demonstrate that the platform provides an organized approach to managing user activities and business information. The integration of administrative functions into a centralized interface reduces the difficulties associated with fragmented records and supports more efficient monitoring of daily operations. Role-based access also helps maintain system organization by restricting functions according to user responsibilities.

3.1.2 Product and Inventory Management

Functional testing showed that sellers could add, update, and manage product information, including product details, prices, and available quantities. Customers could browse available products and view their corresponding information through the shopping interface. Inventory records were successfully updated and monitored within the centralized database. The product management, product browsing, and inventory management functions passed their respective functional tests. These results indicate that the platform supports more organized product and inventory management compared with the business's previous manual and semi-digital processes. Centralized product records allow sellers to maintain updated information and monitor product availability, while customers can conveniently access product details. These functions address the identified difficulties in recording and managing product information.

3.1.3 Order Processing and Tracking

The system successfully processed customer orders through product selection, shopping cart management, and checkout. Functional testing confirmed that submitted transactions were recorded in the database and that the system generated order tracking references. Customers could view their order status and purchase history, while authorized users could manage and update order information. The order processing and order tracking functions produced the expected results during testing. These findings demonstrate that integrating order processing and tracking into one platform improves the organization and accessibility of transaction information. Customers can monitor the progress of their orders through system-generated updates, while sellers can manage order records more systematically. The tracking function addresses the limitations of manual order monitoring, although it is restricted to internal order status updates and does not include integration with external courier services.

3.1.4 Sales Analytics and Reporting

The sales analytics module successfully processed recorded transaction data and generated basic business information, including total sales, number of orders, and product performance. The administrative and seller dashboards provided access to sales summaries and related reports. Functional testing confirmed that the analytics module displayed sales information based on stored transaction records and performed its intended functions. These results indicate that the integration of sales analytics provides a more organized method of monitoring business performance. By presenting sales summaries and product performance information within the platform, the system supports sellers in reviewing transactions and evaluating sales activities. However, the analytics functions remain limited to basic reporting and do not include predictive forecasting or artificial intelligence-based analysis.

3.2 System Testing and Validation

3.2.1 Functional Testing Results

Functional testing evaluated eight major system components, including authentication, user management, product management, product browsing, order processing, order tracking, inventory management, and sales analytics. All eight functional test cases passed and produced their expected results. Valid login credentials provided access to the appropriate dashboard, while invalid credentials were rejected. Product information was correctly stored and displayed, customer orders were processed and recorded, order tracking information was generated, inventory records were updated, and sales reports were successfully displayed. The successful completion of all eight functional tests indicates that the system's core components operated according to their specified requirements. These results support the functional reliability of the platform within the tested conditions and demonstrate that its integrated features can support the intended workflows of administrators, sellers, and customers.

3.2.2 Performance and Security Testing

Performance testing was conducted in a local development environment using XAMPP. The evaluation covered product listings, product management, order processing, order tracking, inventory monitoring, and sales analytics. The system consistently performed its intended operations, while the centralized database supported the storage and retrieval of business records. Security testing confirmed that valid users could access their assigned functions, invalid login credentials were rejected, and unauthorized access to restricted modules was prevented. The performance and security tests passed within the defined testing environment. These findings indicate that the developed platform demonstrated operational reliability and appropriate access control under the tested conditions. The use of authentication, session management, and role-based permissions supported the protection of restricted system information. However, the results were obtained in a local development environment and do not establish performance under large-scale or nationwide deployment conditions.

3.2.3 System Usability and User Acceptance

User acceptance testing was conducted with sample users to evaluate the functionality and usability of the E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub. Participants performed various system activities, including navigating the platform, placing orders, managing products, and reviewing sales reports. Feedback was collected regarding ease of use, clarity of order tracking, and dashboard readability. Identified issues were addressed through subsequent system revisions to improve overall functionality and user experience. The findings indicated positive user acceptance in terms of functionality, reliability, usability, efficiency, and security. The results suggest that the developed platform adequately supported the operational requirements of administrators, sellers, and customers by providing an accessible and organized interface for managing business transactions. However, the evaluation was based on documented user feedback without numerical satisfaction ratings or detailed statistical analysis, limiting the findings to a qualitative assessment of system usability and acceptance.

3.3 Operational Challenges and System Limitations

The study identified several challenges associated with the previous business processes, including manual transaction recording, delayed order monitoring, difficulties in inventory management, and limited access to organized sales information. The developed system addressed these issues by integrating essential business functions into a centralized platform.

Nevertheless, the implementation remains dependent on internet connectivity, user familiarity, and regular system maintenance. The platform also excludes online payment gateway integration, external courier tracking, advanced predictive analytics, and a dedicated mobile application. These findings indicate that the system provides a practical solution to the identified operational challenges while remaining within the project's intended scope. Although centralization and automation improve the organization of business information, the platform's effectiveness may depend on reliable connectivity, proper user interaction, and continued technical support. Its limitations also identify areas that may be considered for future system enhancement.

3.4 Overall Discussion of System Effectiveness

The overall findings demonstrated that the E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub successfully integrated product management, customer ordering, inventory monitoring, order tracking, and sales reporting into a centralized web-based system. All eight core functional test cases passed, while performance and security testing confirmed that the platform operated as intended within the local development environment. The system supported the assigned responsibilities of administrators, sellers, and customers and provided access to organized transaction and sales information. These results demonstrate that the developed platform addresses the major operational gaps identified in the business's previous manual and semi-digital processes. Its integrated functions provide a more systematic approach to managing transactions, monitoring orders, maintaining inventory records, and reviewing sales performance. The findings support the project's objective of developing a functional e-commerce solution for Lupah Sug Gadget Hub, although its broader effectiveness and long-term business impact would require further evaluation beyond the documented testing conditions.

4. CONCLUSIONS AND RECOMMENDATIONS

The study concluded that the E-Commerce Platform with Integrated Order Tracking and Sales Analytics for Lupah Sug Gadget Hub successfully addressed the identified challenges in manual and semi-digital sales and order management processes. The developed web-based system integrated product management, customer ordering, inventory monitoring, order processing, order tracking, and sales analytics into a centralized platform, improving the organization and accessibility of business information. Functional, integration, security, and user acceptance testing confirmed that the major system features operated as intended, with appropriate access provided to administrators, sellers, and customers. The evaluation also indicated positive user acceptance in terms of functionality, reliability, usability, efficiency, and security. Overall, the system provided a practical digital solution that supports more efficient transaction management, order monitoring, inventory control, and sales reporting within the defined scope of the project.

Based on the findings, the study recommends further enhancement of the e-commerce platform through the integration of online payment gateways and legitimate courier services to improve payment convenience, delivery coordination, and shipment tracking. The sales analytics module may also be expanded to include advanced reporting, forecasting, and analytical features to provide more comprehensive business insights. Developing a dedicated mobile application or improving mobile accessibility is recommended to enhance user convenience. Furthermore, regular system maintenance, security improvements, data backups, and continuous user evaluation are encouraged to maintain system reliability and responsiveness. Future

researchers may conduct longer-term evaluations involving a larger number of users to further assess the platform's effectiveness in improving business operations and customer experience.

The study was limited to a web-based platform designed primarily for businesses and users within the Lupah Sug area and was not intended for nationwide or large-scale deployment. The system did not include a dedicated mobile application, integrated online payment gateways, or connections to external courier services, as delivery arrangements were handled through manual coordination between sellers and customers. Order tracking was limited to monitoring order status within the platform, while sales analytics provided basic reports without advanced predictive or artificial intelligence-based features. These limitations defined the project's scope and identified potential areas for future development and improvement.

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