# A Web-Based Data Driven Analytics System for Income and Operations Management Using Linear Regression for Modern Concept Prints

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## ABSTRACT

This project, titled "A Web-Based Data Driven Analytics System for Income and Operations Management Using Linear Regression for Modern Concept Prints," was developed to address the inefficiencies of manual income tracking and operations management in small enterprises. Income management, which includes tracking revenue, managing expenses, and ensuring profitability, is crucial for financial planning and long-term sustainability. Operations management, which involves the efficient handling of day-to-day processes such as task delegation, inventory monitoring, and order fulfillment, is equally essential for business optimization. When these areas are not integrated or managed manually, it becomes difficult to control costs, optimize performance, and make informed decisions.

This study follows an applied research approach, focusing on the development of a Web-Based System to solve real-world business challenges faced by Modern Concept Prints, a local printing business. The business had been relying on spreadsheets and verbal coordination for its operations, leading to frequent delays, inaccurate records, and limited forecasting capabilities. To address these issues, the researchers designed and implemented a centralized platform that automates key business processes, including Sales Monitoring, Inventory Management, and Task Tracking, while utilizing Linear Regression for Income Prediction based on historical data. The system also integrates Predictive Analytics to forecast future income, thus enhancing decision-making. The project followed the Spiral Model as its software development methodology, allowing for iterative development, continuous risk assessment, and frequent refinement of the system based on user feedback.

Developed using PHP, MySQL, HTML, CSS, and JavaScript, the system offers a dynamic, user-friendly interface that supports real-time data analysis and visualization. Evaluation results, guided by ISO 25010 quality standards, showed high satisfaction among both technical and user respondents in terms of System Usability, Data Security, functionality, reliability, and security. The system significantly improved operational workflows, reduced manual errors, and enhanced financial planning through automated income prediction and sales monitoring. The project demonstrates how integrating automation, Predictive Analytics, Linear Regression, and business management can help small businesses optimize decision-making, productivity, and long-term sustainability. Future recommendations include adding accounting and payroll modules, mobile compatibility, and advanced forecasting algorithms to further enhance scalability and performance.

**Keywords:** Web-Based System, Business Management, Income Prediction, Linear Regression, ISO 25010, Spiral Model, Predictive Analytics, Inventory Management, Sales Monitoring, Task Tracking, Data Security, System Usability

## INTRODUCTION

Income and operations management are critical components for a successful business. Income management ensures profitability by tracking revenue and expenses, while operations management focuses on the efficiency of daily activities such as order processing, task delegation, and inventory monitoring. When handled manually, these processes often result in inefficiencies and poor decision-making. As Gonzales (2020) emphasized, the adoption of data-driven systems—particularly those utilizing predictive analytics—enables businesses to forecast outcomes accurately and improve decision-making. Similarly, Jain and Chhabra (2016) noted that

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integrating business management systems enhances sustainability and organizational performance through automation and centralized data.

Small enterprises like Modern Concept Prints face significant challenges due to outdated manual processes. Despite business growth and a wide customer base, the company still relies on Excel sheets and verbal communication, causing delays, inaccurate records, and poor coordination. Del Rosario (2019) discussed that many SMEs in the Philippines experience similar setbacks due to limited access to digital tools, which hinders operational efficiency. In alignment with this, Osei and Boateng (2022) demonstrated that implementing web-based management and forecasting systems can significantly improve financial monitoring and reduce human errors.

To address these limitations, a web-based business management system is proposed to automate order tracking, inventory control, and task assignment. The system will incorporate a linear regression model to forecast monthly income based on historical sales data, as supported by studies from Zhang, Huang, and Li (2020), who found that regression-based income prediction enhances planning accuracy for SMEs. According to Kumar and Lee (2021), integrating machine learning models into small business ERP systems increases both productivity and decision accuracy.

This study aims to show how a web-based system with predictive analytics can improve the operational efficiency and income forecasting of Modern Concept Prints. By centralizing these processes, the system is expected to reduce errors, enhance productivity, and provide visual insights for better management decisions. Furthermore, compliance with ISO/IEC 25010:2011 standards ensures that the system upholds quality attributes such as usability, reliability, and security, as discussed by Sharma and Rathore (2021) and Al-Qutaish (2010).

**Scope**

This research centers on designing and creating a web-based management system for the printing business, specifically customized for Modern Concept Prints. Its main purpose is to automate and enhance multiple manual business processes like task assignments, sales tracking, inventory monitoring, and revenue forecasting by leveraging machine learning, specifically the linear regression algorithm. The system seeks to optimize internal processes, improve data precision, and facilitate better decision-making by offering cohesive tools for handling daily activities and financial strategizing The main functions and coverage of the system are as follows:

- Manage order records, production schedules, and customer information.
- Track orders, monitor inventory, and oversee business activities in real time.
- Upload design files and update progress reports for ongoing projects.
- Generate analytical reports such as sales summaries, income forecasts, and visual while integrating charts using linear regression results.
- Observe seasonal order patterns and classify customer types to assist in strategic planning.

The primary focus of this study is to offer a digital solution that enhances workflow efficiency and incorporates predictive analytics for financial forecasting. This system is meant for internal implementation at Modern Concept Prints and aims to streamline its processes while establishing a foundation for data-driven business management.

## LIMITATION

The developed Web-Based Business Management System for Modern Concept Prints exhibits strong functionality in automating processes and supporting data-driven decisions. However, it is specifically designed for the internal operations of Modern Concept Prints, which limits its adaptability for businesses with different workflows and operational structures. The system's income forecasting feature depends solely on historical sales data, without considering external factors such as inflation, market trends, and supply chain disruptions that may influence accuracy. In addition, it currently lacks integration with third-party accounting or Point-of-Sale (POS) systems, restricting seamless data exchange and broader usability.

Moreover, the system's functionality is further constrained by the absence of mobile accessibility and real-time payment processing, which limits flexibility for users requiring remote access or quick transaction capabilities.

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Its predictive capacity remains confined to linear regression, without the use of more advanced artificial intelligence algorithms that could enhance analytical depth and forecasting accuracy. These technical and functional limitations define the current development scope, emphasizing the system's focus on automation and operational efficiency. Future improvements are recommended to enhance interoperability, mobile accessibility, and the incorporation of advanced AI-driven analytics to expand the system's reach and overall performance.

## THEORETICAL FRAMEWORK

This study is anchored on theories that explain how automation, data analysis, and predictive modeling contribute to efficient business management and decision-making. The Systems Theory, Data-Driven Decision-Making (DDDM), and Predictive Modeling using Linear Regression serve as the foundational concepts of the developed system.

The Systems Theory views an organization as a collection of interconnected components that function together toward a common goal. In the context of Modern Concept Prints, this theory supports the integration of various operations—such as task management, order tracking, and sales monitoring—into a unified platform to promote coordination, efficiency, and streamlined workflows.

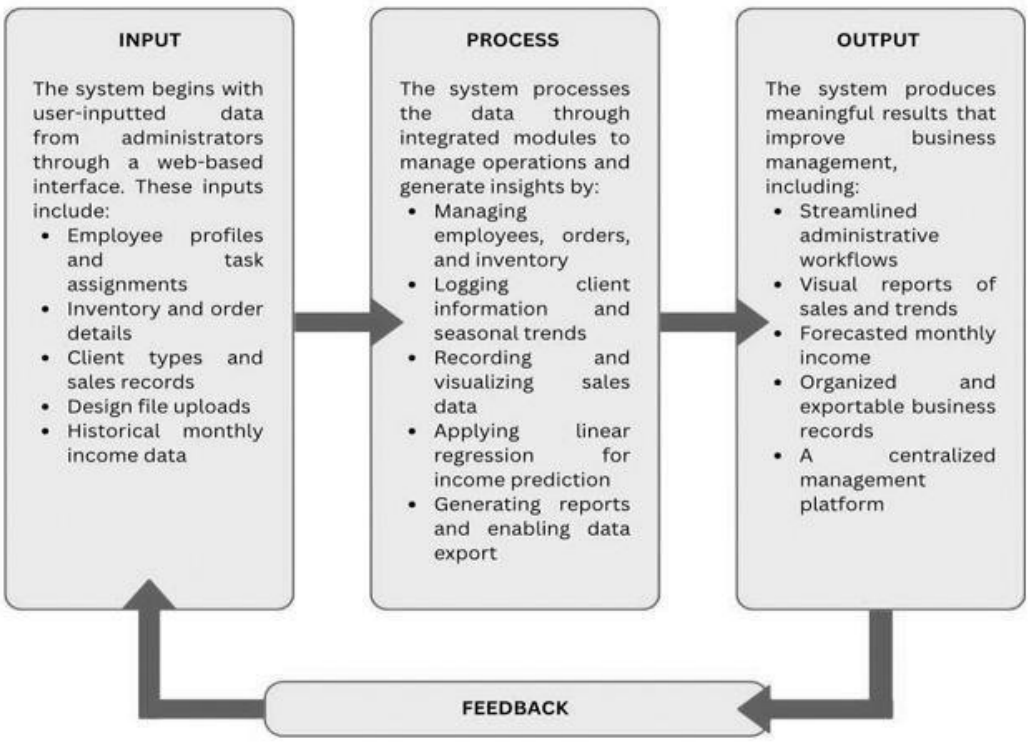
The Data-Driven Decision-Making (DDDM) theory emphasizes the importance of basing business decisions on factual data rather than intuition. By collecting, analyzing, and visualizing operational data, the system enables Modern Concept Prints to plan effectively, allocate resources strategically, and make informed decisions grounded in accurate insights.

The Predictive Modeling using Linear Regression theory explains how historical data can be analyzed to forecast future trends. Through this approach, the system predicts income and identifies sales patterns, helping the business anticipate demand and develop proactive financial strategies.

## CONCEPTUAL FRAMEWORK

The conceptual framework of the Web-Based Business Management System for Modern Concept Prints illustrates how operational, sales, and employee data are processed through automated workflows and predictive models to support data-driven management. The framework follows the Input–Process–Output (IPO) Model, demonstrating the systematic flow from data collection to the generation of business insights.

Figure 1: Conceptual Framework



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The conceptual framework of the Web-Based Data-Driven Analytics System for Income and Operations Management is structured according to the Input–Process–Output (IPO) Model, which illustrates the systematic progression of the system from data collection to the generation of outputs.

**Input**

The input phase includes the collection of all vital data and resources necessary for the system's creation and functionality. This encompasses employee details, designated tasks, client information, order and inventory records, uploaded design files, and historical monthly sales figures. These inputs form the basis for the system's automation and predictive analytics capabilities.

**Process**

The processing stage emphasizes the transformation of the gathered data into valuable and functional components using automation and data analysis. The system handles information by overseeing tasks, monitoring inventory, logging sales, and producing reports. It also incorporates a linear regression algorithm to evaluate historical sales data and predict future revenue, while data visualization tools display outcomes through graphs and charts, facilitating easier analysis and decision-making.

**Output**

The output phase signifies the completed system and its expected advantages. The created web-based platform offers a centralized management system that enhances workflow, boosts productivity, and minimizes human errors. It generates structured reports, provides real-time updates, and delivers precise income projections that empower Modern Concept Prints to make informed, data-driven business decisions.

**Significance of the Study**

The research is significant because it seeks to improve the operational effectiveness and financial oversight of Modern Concept Prints by creating a web-based business management system that incorporates data analytics and predictive modeling.

- To Business Owners and Administrators**:** The system provides a centralized platform for managing employees, orders, inventory, and sales. It enables owners to monitor business performance in real time, forecast income trends, and make well-informed operational decisions.
- To Staff and Employees: Organized task assignments and progress tracking help employees work efficiently and reduce errors. The system improves coordination, communication, and overall workflow within the team.
- To Clients: The system improves service delivery through better order tracking and timely updates. Clients experience faster transactions, greater accuracy, and higher satisfaction.
- To Future Researchers and Developers: This study serves as a guide for developing future business management systems with data analytics and machine learning. It may be expanded with advanced features like accounting integration, mobile access, and enhanced predictive tools.

## REVIEW OF RELATED LITERATURE

- According to Zhang et al. (2020)**:** Examined the integration of machine learning, particularly linear regression, into business management systems for SMEs. Their findings showed that using historical sales and income data allows businesses to generate accurate forecasts, identify operational inefficiencies early, and enhance inventory control.
- As stated by Kumar and Lee (2021)**:** Discovered that ERP systems enhanced with linear regression algorithms improve income prediction and automate the analysis of customer behavior, seasonal demand, and expenditure trends, supporting more informed financial decisions.
- As emphasized by Patel and Singh (2021)**:** Developed a cloud-based analytics platform for apparel SMEs in India. This platform improved revenue prediction accuracy by 30% and reduced inventory losses by 20%, demonstrating the value of predictive analytics in small business operations.

- As highlighted by Osei and Boateng (2022)**:** Designed a web-based forecasting platform for logistics SMEs in Ghana. This system incorporated linear regression and visualization tools, leading to a 25% improvement in prediction accuracy and more efficient budget allocation.
- As pointed out by Del Rosario (2019)**:** Highlighted the importance of digital transformation and predictive modeling tools for MSMEs in the Philippines, enabling businesses to make informed financial decisions, manage inventory efficiently, and reduce operational risks.
- According to Gonzales (2020)**:** Noted that the adoption of data-driven strategies enables microenterprises to quickly respond to market fluctuations, improve workflow coordination, and maintain competitiveness in dynamic industries.
- As identified by Reyes and Santos (2022)**:** Developed a web-based financial management system for a local printing business, utilizing linear regression to forecast income with 85% accuracy, which improved financial planning and operational performance.
- In the study by Dela Cruz and Villanueva (2021)**:** Created a similar system for tarpaulin printing that improved production scheduling and reduced material waste by using predictive analytics to optimize resources.

**Synthesis**

The literature and studies reviewed collectively highlight the significance of incorporating digital systems and predictive analytics to enhance business management and financial decision-making processes. Both international and local research concur that machine learning, especially linear regression, is crucial for improving the accuracy of income forecasts and optimizing business operations. Globally, research points out that predictive tools enable small and medium enterprises to foresee financial trends, improve inventory management, and proactively react to market changes. These technologies revolutionize conventional business methods into efficient, data-driven practices that reduce human error and boost productivity.

On a local level, studies concerning Filipino micro, small, and medium enterprises (MSMEs) reveal an increasing transition towards digital transformation as a vital element for gaining a competitive edge. Research indicates that web-based systems assist business owners in managing their sales, inventory, and financial performance more efficiently. By embracing automation and analytics, local SMEs are empowered to make informed decisions, allocate resources effectively, and maintain operational consistency even in periods of high demand. Nonetheless, while these systems offer considerable benefits, most local implementations are confined to basic forecasting tools and lack sophisticated predictive modeling capabilities.

This shortfall emphasizes the necessity for initiatives like the Web-Based Data-Driven Analytics System for Modern Concept Prints, which merges conventional management practices with contemporary machine learning techniques. By utilizing a linear regression model, the system improves financial forecasting and operational effectiveness, allowing small businesses to operate in a more intelligent and competitive manner. In summary, the synthesis of related literature supports the objective of the project—to encourage a more data-driven, automated, and sustainable method of managing business income and operations.

## METHODOLOGY OF THE STUDY

This research utilizes an Applied Research Design aimed at creating a web-based data analytics platform to improve income and operational management for Modern Concept Prints. Its goal is to develop a practical digital tool that automates essential processes and incorporates predictive analytics to enhance decision-making and financial planning.

The study engages the owner, employees, and production staff, selected through purposive sampling to gather perspectives from those directly involved in the daily operations. Data was obtained through structured interviews and direct observations, which highlighted workflow challenges and informed the system’s design and development. User feedback collected during evaluation and testing was utilized to measure usability and functionality, with all processes conforming to ethical guidelines and the Data Privacy Act of 2012.

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Figure 2: SDLC Spiral Model

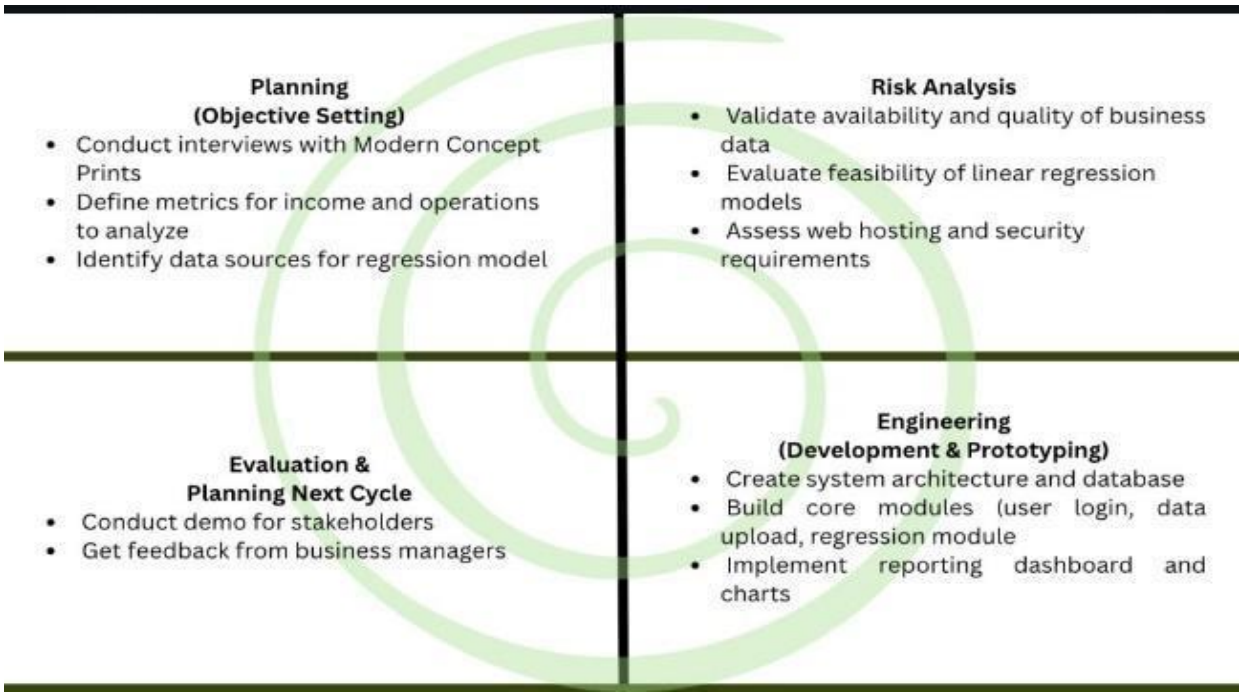


Figure 2 is the methodology employs the Spiral Model of the System Development Life Cycle (SDLC), which highlights iterative development, risk management, and ongoing feedback from stakeholders. This approach is ideal for projects that incorporate analytics and machine learning elements, as it permits adaptable enhancements after every cycle. Every iteration comprises planning, risk assessment, engineering, and evaluation, guaranteeing that the system gradually aligns with the operational requirements of Modern Concept Prints.

The design of the database is arranged to effectively manage and organize crucial business information, including employee profiles, client orders, inventory records, and sales data. It guarantees data integrity, scalability, and security while facilitating key functionalities like order tracking, income monitoring, and income prediction based on linear regression.

The database defines clear relationships among entities—employees, orders, inventory, and administrators—to ensure smooth data flow and prevent redundancy. The next illustration shows the system's overall structure and interactions.

Figure 3: Context Diagram

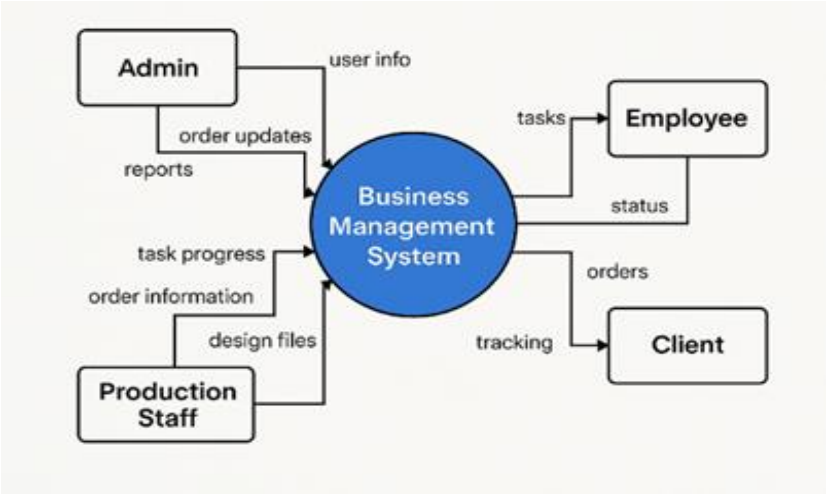


Figure 3 illustrates the interactions between primary users, including administrators, employees, and clients, with the system. These interactions enable the system to facilitate real-time data management, coordination of

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tasks, and financial forecasting, thereby ensuring effectiveness and dependability throughout all business processes.

**Respondents of the Study**

The research consists of two primary categories of participants: user respondents and technical respondents. User Respondents – This category contains 50 individuals, comprising marketing analysts, students, and business professionals. They were selected based on their knowledge of business systems and their capacity to provide insightful feedback as end-users. Their assessment concentrated on the system's usability, functionality, and overall user experience. Technical Respondents – This group also encompasses 50 participants, made up of IT specialists such as developers, programmers, and system analysts. They evaluated the system from a technical viewpoint, focusing on aspects such as performance, reliability, maintainability, and security. In total, 100 participants took part in the study, equally divided between the two categories. The participants were selected through simple random sampling, and the sample size was calculated using Slovin's formula to guarantee representativeness and precision.

**Development and Evaluation Procedure**

The development of the Web-Based Business Management System for Modern Concept Prints utilized various programming languages, frameworks, and software tools to ensure functionality and responsiveness. The system was developed using PHP for backend operations, MySQL for database management, and Bootstrap 5 for a responsive interface. Visual Studio Code served as the main code editor, while GitHub was used for version control. Font Awesome and JavaScript enhanced the system's design and interactivity. The Spiral Model guided the development and testing phases, allowing iterative improvement through Unit, Integration, and System Testing to ensure reliability and performance.

The evaluation focused on criteria from the ISO 25010 Quality Model, which includes:

- Functionality – The system's ability to perform its intended features accurately.
- Usability – Ease of use and user satisfaction.
- Performance Efficiency – The system's capability to provide appropriate performance relative to the amount of resources used.
- Security – Protection of user data from unauthorized access.
- Overall Satisfaction – The general satisfaction of users with the system's performance and features.

These evaluation procedures ensured that the final version of the system met quality standards, operated efficiently, and effectively addressed the operational challenges faced by Modern Concept Prints.

**Data Analysis Plan**

The primary research instrument was a survey questionnaire. The researchers used weighted mean as a statistical method to evaluate the system in accordance with the ISO/IEC 25010 Software Quality Model. The criteria for evaluation included Functional Functionality, Usability, Performance Efficiency, Security, and Overall Satisfaction. Frequency Percentage Distribution was employed to break down respondents' answers and the weighted mean was used to assess the overall effectiveness of the system. A four-point Likert scale, ranging from 1 (Strongly Disagree) to 4 (Strongly Agree), was used to gauge user satisfaction and system quality in alignment with the ISO 25010 characteristics. This approach enabled a comprehensive evaluation of the system's performance and user satisfaction.

**The System**

The system outputs include comprehensive income forecasts that enable Modern Concept Prints to anticipate future sales and revenue trends. It also provides detailed analytics on customer orders, printing demand, and seasonal variations in business activity. Administrators and staff have access to predictive reports and interactive dashboards that promote data-driven decision-making and efficient workflow management. Additionally, the

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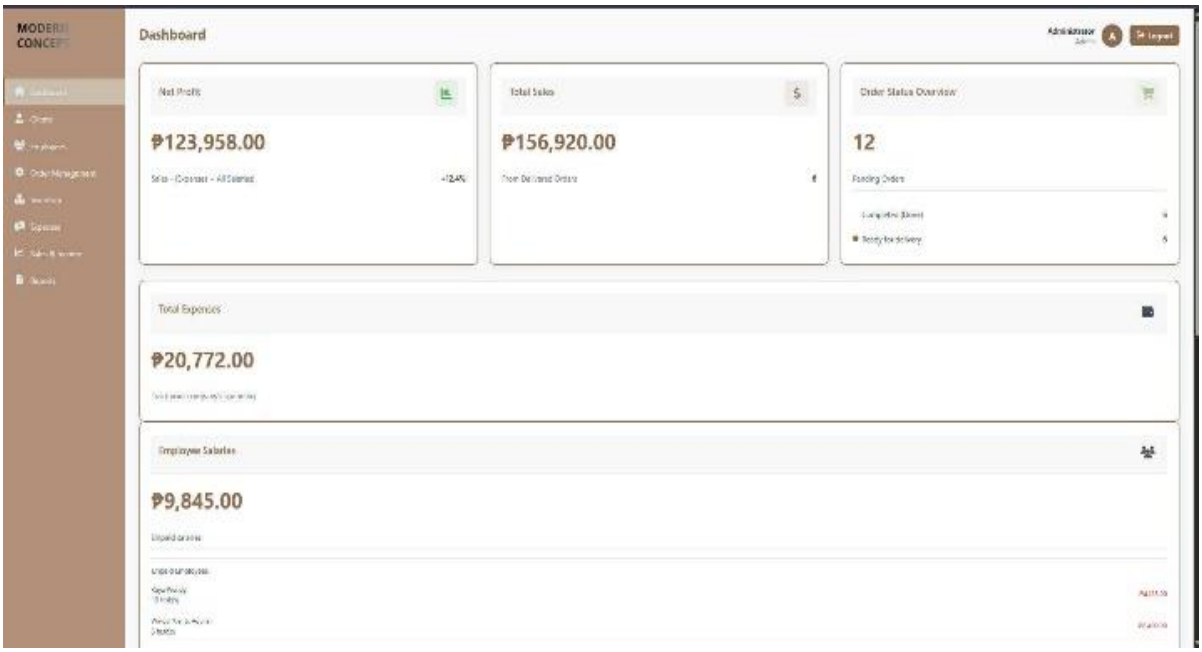
system delivers actionable insights for resource allocation, inventory control, and performance enhancement. Overall, these outputs significantly contribute to improving operational efficiency, accuracy, and business growth for Modern Concept Prints.

The following figures present the key system interfaces and output features developed for the Web-Based Business Management System of Modern Concept Prints:

Figure 4: Order Management Page


The Order Management Interface allows staff to add, view, and update customer orders in real time. It includes search and filter options for easy tracking of order progress and completion status. The interface presents a structured layout that ensures accurate recording of transactions and minimizes delays in processing client requests.

Figure 5: Analytics Dashboard Page




The Analytics Dashboard Interface provides a visual summary of the company's operational data, such as total sales, inventory levels, and income predictions generated through Linear Regression. It features interactive charts and graphs that help the admin analyze performance trends, supporting better business planning and decision-making.

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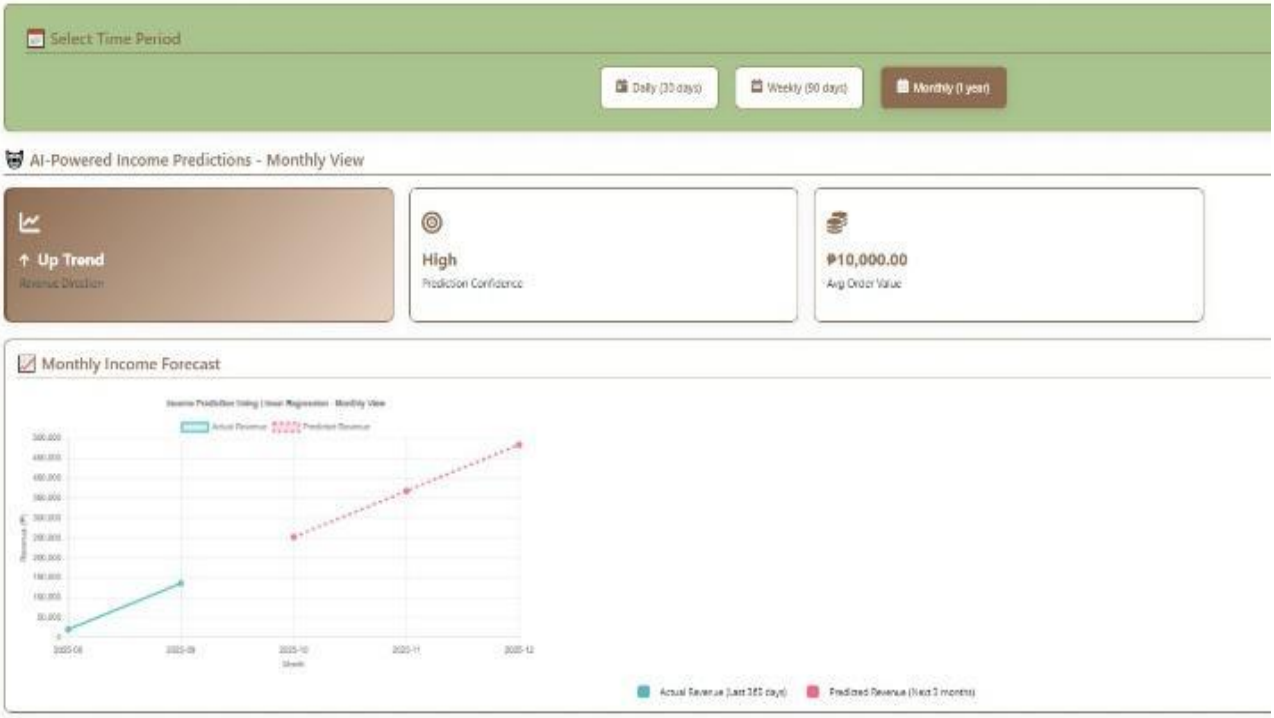
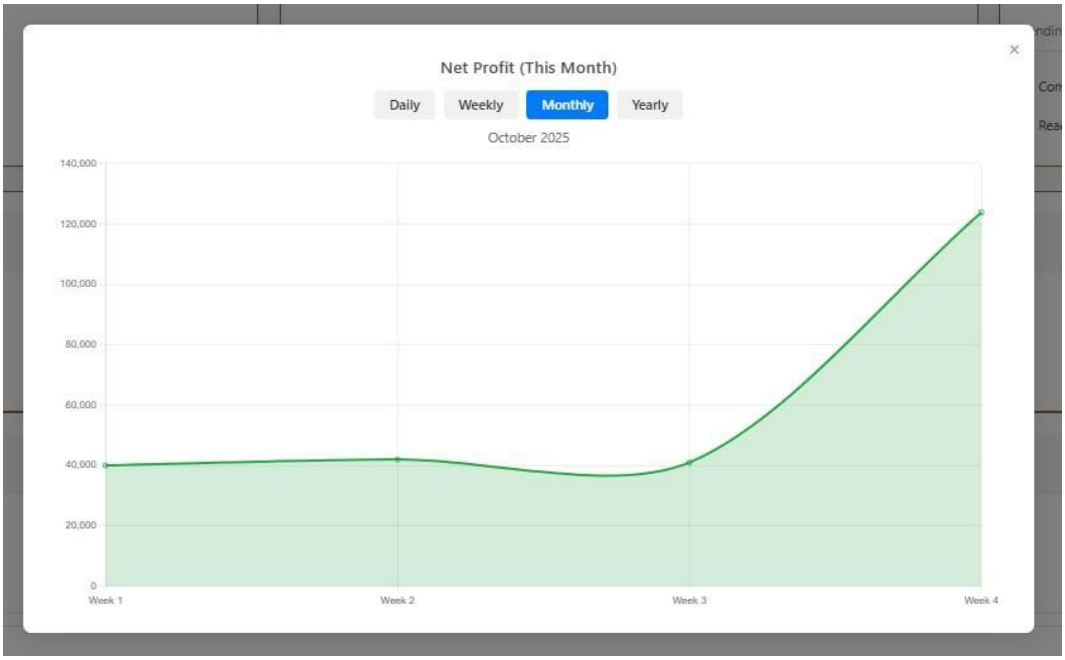
Figure 6: Sales Summaries




This presents the Sales Summaries section of the system. It provides an overview of total monthly and annual sales, including completed and pending transactions. The section displays summarized sales data to help administrators quickly assess the overall business performance and track income trends over time.

Figure 7: Income Forecasts




This shows the Income Forecasts section of the system. It presents predictive results generated through linear regression, allowing users to anticipate future income based on historical data. This feature helps the business make informed financial decisions and plan for future sales growth.

**Assessment: Summary of Respondents on the System**

The following tables present the distribution of respondents with their corresponding size (n) and percentage. The consolidated summary of responses from both users and technical participants is also shown. The assessment

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follows the ISO/IEC 25010 Software Quality Model, which measures the system's overall effectiveness and user satisfaction based on the gathered feedback from staff and technical evaluators of Modern Concept Prints.

Table 1. Distribution of Respondents

| Respondents | Size (n) | Percentage |
|---|---|---|
| Users | 30 | 60% |
| Technical | 20 | 40% |
| Total (n) | 50 | 100% |

The table shows the total number and percentage of respondents who participated in the evaluation. Out of 60 participants, 30 are user respondents, representing 60% of the total, while 20 are technical respondents, making up 40%. This distribution ensures that the evaluation results reflect both the user experience and the technical assessment of the system's performance and quality.

Table 2: Summary & Comparison of Evaluations of Respondents

| Criteria (ISO 25010) | Respondents (50) | | | |
|---|---|---|---|---|
| | Users (30) | | Technical (20) | |
| | WM | VI | WM | VI |
| 1. Functionality | 3.73 | Agree | 3.81 | Agree |
| 2. Usability | 3.72 | Agree | 3.78 | Agree |
| 3. Performance Efficiency | 3.68 | Agree | 3.73 | Agree |
| 4. Security | 3.68 | Agree | 3.76 | Agree |
| 5. Overall Satisfaction | 3.78 | Agree | 3.76 | Agree |
| Overall Average Mean | 3.72 | Agree | 3.77 | Agree |

Table 2 presents the summarized comparison of evaluations based on the ISO/IEC 25010 software quality standards. The results show that user respondents obtained an overall average mean of 3.72, interpreted as Agree, while technical respondents achieved an overall average mean of 3.63, also interpreted as Agree. Among the evaluated criteria, Functionality received the highest rating from both users (3.73) and technical respondents (3.78), indicating that the system performs its intended functions effectively. On the other hand, Security received the lowest mean for both groups, suggesting that while the system is generally secure, there is still room for improvement to further strengthen data protection and system safety. Overall, both user and technical respondents agreed that the Modern Concept Prints Web-Based Business Management System meets the ISO 25010 software quality standards, proving its functionality, usability, and overall reliability in supporting internal business operations.

**Ethical Considerations**

The study guarantees that all data gathered from respondents are treated with strict confidentiality and integrity. Personal information is safeguarded, and no identifying details are shared without the participant's permission. The research upholds voluntary participation, allowing respondents to withdraw at any point without facing any consequences. Proper data protection practices are implemented to avoid unauthorized access or misuse of information. Lastly, the results are presented truthfully and accurately, ensuring that no manipulation or bias affects the credibility and reliability of the study.

**Summary**

The evaluation results show that the developed Web-Based Business Management System for Modern Concept Prints effectively meets the ISO/IEC 25010 software quality standards.

Based on the assessment, user respondents obtained an overall average mean of 3.72, while technical respondents achieved 3.63, both interpreted as Agree. Among all the criteria, Functionality received the highest mean score from technical respondents, indicating that the system performs its intended functions efficiently.

On the other hand, users rated Overall Satisfaction the highest, suggesting that they are pleased with the system's performance and usability. Although the Performance Efficiency and Security criteria received slightly lower means, these still fall under the "Agree" interpretation, showing that the system performs well and maintains data protection standards.

Overall, both groups of respondents confirmed that the system is functional, user-friendly, and reliable in supporting Modern Concept Prints' internal business processes.

## CONCLUSION

Based on the results of the system evaluation using the ISO/IEC 25010 software quality model, it can be concluded that the developed Web-Based Business Management System for Modern Concept Prints effectively meets the standards of functionality, usability, performance efficiency, and security. The evaluation results from both user and technical respondents indicate that the system performs efficiently and provides a satisfactory user experience. Its functionality supports key business operations such as sales recording, order monitoring, and inventory tracking, which help streamline internal processes. The high usability rating reflects that users find the system intuitive and easy to navigate, while the overall satisfaction rating confirms that its performance aligns with user expectations. Although the system achieved positive feedback across all criteria, performance efficiency and security were identified as areas for further enhancement to ensure optimal reliability and protection. Overall, the study concludes that the developed system is functional, user-friendly, and reliable, making it an effective tool for managing the internal operations of Modern Concept Prints and contributing to improved business management and operational productivity.

## RECOMMENDATION

It is recommended that future researchers and developers continue to enhance the Modern Concept Prints Web-Based Business Management System to improve its overall functionality, scalability, and efficiency. Organizations should prioritize maintaining accurate data management and continuous system optimization to ensure reliable and secure performance. Respondents emphasized that ISO standards—particularly functionality, performance efficiency, and security—must remain central to guarantee the system's dependability and user protection. Future development may focus on expanding the system's capabilities for multi-business applications, making it adaptable to various industries and workflows. Additionally, refining the income prediction feature by incorporating external factors such as inflation rates, market fluctuations, and supply chain conditions will enhance the accuracy and reliability of its forecasts.

Moreover, it is strongly encouraged to integrate third-party accounting software, Point-of-Sale (POS) systems, and payment processors to achieve seamless financial management and interoperability. Incorporating mobile and offline accessibility or developing a dedicated mobile application will allow users to monitor operations and access data conveniently anytime and anywhere. Implementing real-time payment processing and exploring advanced machine learning algorithms beyond linear regression can further improve analytical precision and predictive depth. Continuous system enhancement guided by Agile methodology will ensure adaptability to evolving business needs and technological trends. Finally, collaboration between academic institutions and business organizations is recommended to refine the system, broaden its application, and ensure long-term sustainability and user satisfaction.

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