ISSN 2085-4579

Unlocking Sales Insight through Business Intelligence and ERP

Azka Aulia[1], Ririn Ikana Desanti[2], Mahfudz Amri[3]
[1, 2, 3] Information System, Faculty of Engineering and Informatics, Universitas Multimedia Nusantara, Tangerang, Indonesia
[1]azka.aulia@student.umn.ac.id, [2]ririn.desanti@umn.ac.id, [3]mahfudz.amri@lecturer.umn.ac.id

Accepted on June 26th, 2025
Approved on October 28th, 2025

***Abstract*— In recent years, businesses have encountered heightened competitive pressures, inefficiencies in financial management, operational instability, and declining profitability. Empirical research indicates that organizations that have digitized their business processes are better positioned to enhance operational efficiency and mitigate the risk of insolvency. PT Dwi Family Investama, a company founded as a printing and offset business, has faced similar challenges. The reliance on manual methods for recording orders and invoices has resulted in decreased work efficiency, an increased likelihood of recording errors, and difficulties managing customer data. Consequently, this situation hampers the company's ability to formulate effective business strategies and make informed decisions. This study aims to develop a web-based Enterprise Resource Planning (ERP) system with a dashboard designed to facilitate organizational decision-making. By implementing a business intelligence decision support system, the company can transition to digitized business processes and acquire critical insights regarding its operational status based on current data. In this study, the agile development method was established with the Laravel and Streamlit frameworks. As a result, system implementation reveals a significant increase in company performance indicators, with metrics showing an improvement of 52.3% in performance post-implementation. In conclusion, the results of this study prove that web-based ERP and dashboards can overcome company problems with a modular hybrid architecture approach and provide a significant positive impact on company performance.**

***Index Terms*—Business Intelligence; Dashboard; Decision Making; Enterprise Resource Planning; Operational Efficiency;**

I. INTRODUCTION

In the modern world, technology has become an essential aspect of daily living. Indonesia's ICT Development Index (IDI) increased from 80.1% in 2021 to 82.8% in 2022, according to data from the Central Statistics Agency [1]. The continuous development of Indonesia's information and communication technology industry is reflected in this increase in IDI. The need for businesses to adopt digitalization is increasing along with the use of technology. Since technology has a big impact on employee performance, digitizing company operations can increase productivity and efficiency [2]. According to research, businesses that have embraced digitalization see faster growth in productivity per employee than those that have not [3]. Businesses can also get a competitive edge by having access to trustworthy, high-selectivity, and real-time data [4]. Setting objectives and formulating wise suggestions for the future can be facilitated by utilizing well-managed knowledge based on this data [5].

Previous study has proposed that employing a web-based ERP system has many benefits for businesses. This benefit includes more flexibility, better operational performance, and simpler processes that support documentation and reporting and support data-driven decision-making [6]. Moreover, study research has indicated that dashboards in ERP systems are becoming essential due to the growth of big data and the need for real-time analytics. By using data visualization in dashboard, the system can promote understanding, streamline complex information, and facilitate quick and accurate decision-making [7]. Advanced visualization tools also give businesses significant competitive advantages by enabling interactive analytics that reveal hidden patterns and trends [8]. Integrating interactive dashboards and business intelligence (BI) has proven to reduces information gaps and speeds up data-driven decision-making, as shown in a case study in a Portuguese port [9]. As a result, web-based ERP systems with strong dashboard capabilities improve operational effectiveness and facilitate more accurate decision-making across a variety of industries [10]. Additionally, research indicates that businesses that have digitized their operations are more likely to increase operational effectiveness and lower their chance of going bankrupt [11].

A case study from one of the Indonesian willing companies is used in this study. According to management and operational staff interviews and in-person observations, PT Dwi Family Investama is having difficulties since it relies on manual recording techniques for day-to-day operations. Despite handling huge orders, the offset and printing services company lacks a well-organized system for storing customer data. Due to low efficiency, haveise in recording

errors, and trouble tracking client information, the lack of digitalized activities has resulted in large financial losses as well as a delay in timely decision-making and effective business strategies. Without effective data management, the business is unable to know how it is operating, which restricts its capacity to plan and make wise decisions.

This research focuses on developing an Enterprise Resource Planning (ERP) system in the form of a web-based system integrated with an interactive dashboard. It brings an innovative approach by using an interactive Streamlit-based dashboard, which functions independently while remaining fully integrated within the Laravel-based ERP system. This hybrid approach provides more responsive real-time data visualization and improves user experience because all functions are provided in one platform. Moreover, independent separation of the dashboard from the ERP system facilitates development flexibility, enabling ease of customization and scalability. The system is intended to digitize operations and enhance organizational decision-making.

Unlike previous studies that focus solely on ERP systems or dashboard visualization as standalone tools, this research integrates both in a cohesive framework tailored to the needs of SMEs in the printing industry. This study aims to investigate the impact of ERP and dashboard implementation on the operational efficiency of the company, specifically in reducing manual recording errors and improving data-driven decision-making. The contribution of this research lies in demonstrating how the integration of a customizable dashboard within an ERP system can serve as a strategic tool for small enterprises to enhance efficiency, transparency, and responsiveness.

II. METHOD

The operational inefficiencies of PT Dwi Family Investama were addressed in this study using the agile development technique. Agile is chosen because it provides flexibility in handling shifting system requirements [12]. Moreover, Agile also enables close collaboration between developers and the organization throughout the development cycle [13]. To identify issues and determine the system's requirements, information was gathered through interviews and in-person observations of firm personnel. Every stage of the development process allowed for continuous input and improvement because it was iterative.

Laravel is chosen as the primary web development framework for the system's implementation in order to construct the ERP modules. In addition, Streamlit is utilized to produce analytical dashboards. Laravel is chosen because this framework has a strong MVC structure that facilitates structured and scalable programming [14]. On the other hand, Streamlit makes it possible to create interactive data visualizations that link straight to the same database, giving decision-makers access to real-time insights [15]. Streamlit was chosen over traditional JavaScript-based visualization libraries due to its ability to create highly interactive dashboards with minimal development overhead [16]. Its Python-based structure allows rapid prototyping and real-time updates, making it ideal for building dynamic, data-driven interfaces in a short timeframe [17].

This combination allows for a modular and integrated solution so that the development of web-based ERP and interactive dashboards can run optimally and be integrated without interfering with each other, thus providing flexibility in development.

III. RESULT AND DISCUSSION

A. *Requirement Analysis*

To systematically define and document the system requirements, thorough observations and structures are conducted. The managers of the business and the customer service are interviewed and observed to gain better understanding of the company situation and current problem. Important information about the current operational workflows and process bottlenecks was obtained from these exchanges.

The interview results showed that WhatsApp is currently used to process the majority of consumer orders. To negotiate and complete their orders, customers reach out to customer support agents. After the order is placed, invoice for the agreed-upon down payment is then created and forwarded to the client. After the down payment is paid, the manufacturing team receives the order information. A product sample is created and shown to the client as part of the quality assurance procedure to make sure it meets their requirements and expectations. The production process does not start until the sample has been formally approved. Finally, the logistics process for product shipment is then initiated when the customer completes the remaining payment balance. Figure 1 provides a graphic summary of this business process flow.

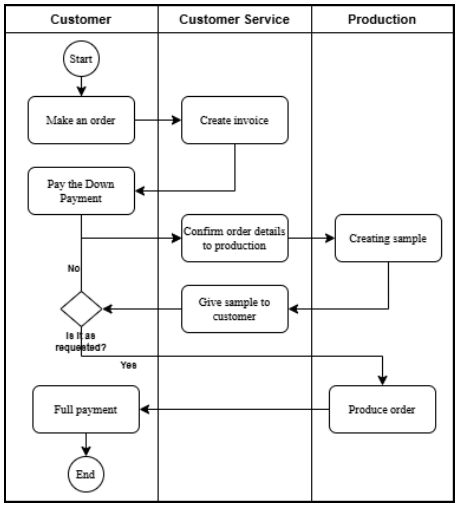

Fig. 1. Company's Order Business Process

In order to examine the current workflow and gain a better understanding of the business processes and related difficulties, observations and interviews were carried out. As shown in Table 1, the results will guide the creation of system features and functions that meet business requirements and describe how the suggested system resolves existing problems.

TABLE I. TABLE COMPARISON BETWEEN THE EXISTING PROBLEM AND THE SOLUTION PROPOSED

Existing Situation	Problems Caused	Proposed Solution	Benefit
Manual recording on a whiteboard.	Order data is lost or forgotten due to space limitations.	Web-based ERP for digital order tracking.	Improves operational efficiency and prevents data loss.
Reliance on WhatsApp for customer data.	Loss of important customer and order details.	Centralized customer data management via ERP.	Reduces data loss, builds trust, and improves customer relations.
Manual paper invoices.	High costs and lack of professionalism with no standard template.	Automated invoicing through the ERP system.	Cuts costs, enhances professionalism, and speeds up transactions.
Poor integration of customer and order data.	Difficulty making data-driven decisions.	Real-time analytical dashboard with ERP.	Enables faster, informed decision-making and boosts competitiveness.

As a solution to the problems listed in Table 1, this web-based ERP prototype is designed to accommodate the company's needs. The web-based ERP design includes six essential features such as dashboard, customer list, order manager, invoice center, product manager, and account manager. The dashboard facilitates company analysis through graphical representations. Furthermore, the customer list addresses data management challenges by centralizing customer information that previously relied on chat applications. Moreover, the order manager resolves issues of dependence on whiteboards for order tracking. Additionally, the invoice center automates invoice generation based on order data. The product manager ensures that companies can manage the products offered. Lastly, the account manager enables user access to the ERP system. Each feature encompasses various functionalities such as viewing data lists, accessing detailed data, creating new data entries, and updating existing data.

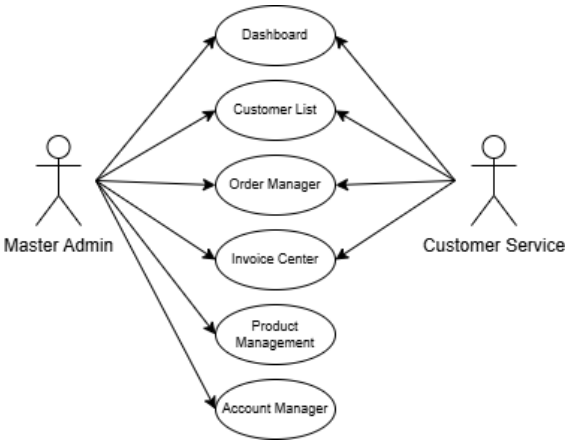

Fig. 2. Company's Order Business Process

The system will accommodate two types of users: customer service representatives and master administrators. Only the master administrator can access critical features like product management and account management, ensuring secure handling of sensitive configurations and user accounts. This access separation helps maintain data integrity and protects operational processes

B. Implementation of ERP Modules using Laravel

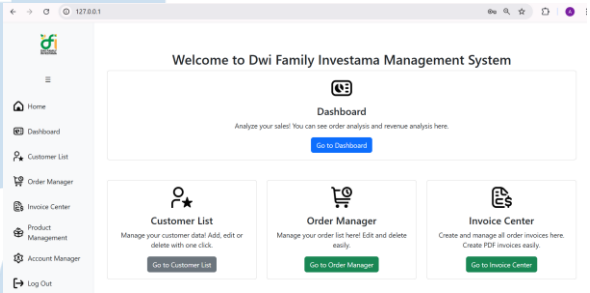

Fig. 3. Web-based ERP Prototype

The ERP system developed using the Laravel framework, chosen for its strong MVC architecture that promotes separation of concerns and structured code organization [18]. During development, Laravel's routing system enabled efficient mapping between user requests and backend logic. The separation is useful when managing features such as order input, invoice generation, and product listing.

Laravel's model layer was used to handle business logic and interaction with the MySQL database [19]. For instance, the order module linked order records with customer and product data using Eloquent ORM, simplifying database queries and maintaining relational consistency. Additionally, Laravel's built-in validation features ensured data integrity at the input level, reducing the risk of human error in form submissions [20].

Moreover, the Laravel's Blade templating engine also facilitated the rapid development of clean and maintainable UI components. It enabled separation between interface design and dynamic logic, which

allowed for easy updates based on iterative feedback during Agile sprints.

TABLE II. EXPLANATION OF EACH MODULE IN WEB BASED ERP

Modules	Description
Customer List	Centralizes customer records and eliminates reliance on messaging apps.
Order Manager	Digitally records orders, replacing manual whiteboard tracking.
Invoice Center	Generate structured invoices from order data, supporting partial and full payment logic.
Product Management	Manages the product catalog and recommendation price.
Account Manager	Manage roles and authentication, especially for admin vs. customer service separation.

C. *Analytical Dashboard Development using Streamlit*

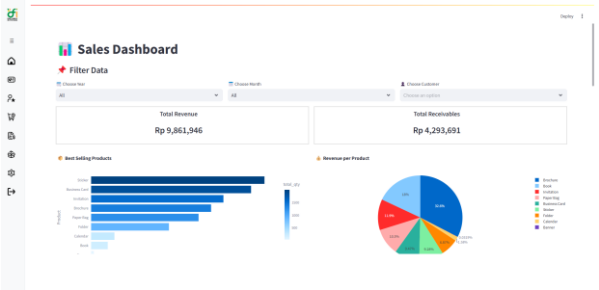

Fig. 4. Prototype Streamlit Dashboard

To complement the transactional ERP system, a web-based analytical dashboard was developed using Streamlit. Streamlit was selected for its ability to make an interactive and real-time dashboard based on database connection [21].

The dashboard connects directly to the same MySQL database used by Laravel, ensuring consistency and real-time data visualization. Streamlit's interactive components, such as multiselect filters and date range pickers, enabled users to perform customized analyses without the need for advanced technical skills. This proved particularly useful for managerial roles in the company, who needed immediate insights into sales, receivables, and customer trends.

Nine core visualizations were implemented, including revenue trends, product performance, customer rankings, and receivables breakdowns. These visualizations were dynamically updated based on user-defined filters and offered deeper understanding of business performance compared to traditional spreadsheet-based analysis.

D. *System Integration and Synchronization*

Despite being built using two different frameworks (Laravel and Streamlit), the ERP system and dashboard operate on a shared data foundation, namely a centralized MySQL database. This design choice allowed loose coupling between modules while preserving data consistency across components. The dashboard will be integrated directly into the web-based ERP by embedding iFrame. Thus, users can access all functions in one integrated web-based ERP.

To ensure synchronization, transactional data entered through the Laravel interface is immediately accessible to the dashboard. For example, when a new order is created and partially paid, the receivables chart on the Streamlit dashboard reflects the update in real time. This architectural setup supports real-time monitoring and decision-making without requiring additional data pipelines or synchronization scripts.

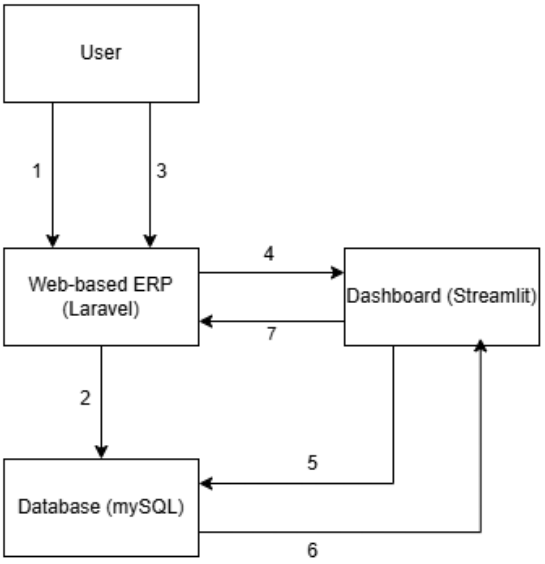

Fig. 5. System Architecture

The architectural overview of the system is illustrated in Figure 5. This architecture reflects the seamless integration between the web-based ERP application, the analytical dashboard, and the centralized MySQL database. From the user's perspective, all features appear to be unified within a single web-based platform. However, in practice, the analytical dashboard is a separate application built using Streamlit. Dashboard has been embedded into the ERP system interface to provide a cohesive user experience.

The following describes the flow of interaction within the integrated system.

1. Users interact with the web-based ERP system to input, update, or manage transactional data.
2. The ERP system processes the input and stores the corresponding data in the MySQL database.
3. When users navigate to the dashboard feature, they remain within the ERP interface.
4. The ERP application renders the Streamlit dashboard using an embedded iFrame component.

5. Upon loading, the Streamlit dashboard sends SQL queries to the shared MySQL database to retrieve relevant data.
6. The MySQL database responds with the requested data, enabling real-time access.
7. Streamlit dynamically generates visualizations and displayed within the ERP interface, ensuring a seamless transition between ERP system and analytical dashboard.

This modular yet unified integration architecture allows for system flexibility and maintainability. Specifically, it decouples the development of web-based ERP and analytical components, enabling independent iteration and updates. As a result, enhancements to the dashboard logic do not interfere with the ERP's core functionalities, and vice versa.

E. System Output and Performance Evaluation

Black box testing is carried out in this study to ensure that all system functions operate correctly [22]. Fifty-five test cases were developed to evaluate the system's functionality and completeness. The test includes validation from both the front-end and back-end systems. As a result, all test cases have been successfully executed, and the system passed the black box testing trials, confirming that it operates as expected and aligns with the defined requirements.

Following black box testing, performance is evaluated by comparing the company's performance metrics before and after the ERP system and dashboard are put into place. This involves a fifteen-question questionnaire addressing challenges like recording errors, transparency issues, data management difficulties, and inaccuracies. Customer service representatives and master administrators completed the questionnaire twice: once before (pre-test) and once after (post-test) system implementation. Five people will participate in filling out this questionnaire. Two of them are company owners who also oversee overall business operations, and the rest are customer service employees.

As detailed in Table III, the data collected is analyzed to determine the percentage change in performance indicators.

TABLE III. TABLE INDICATOR FOR EACH QUESTION

Indicator	Description	Score
A	Strongly Agree	5
B	Agree	4
C	Neutral	3
D	Disagree	2
E	Strongly Disagree	1

The total score for each respondent was calculated by summing the values of all selected answers [23]. Based on the questionnaire, the total score before system implementation is 146 as stated in Table 4. Moreover, the total score is increasing after the implementation system as shown in Table 5, resulting in 342 total score.

TABLE IV. TABLE SCORE BEFORE IMPLEMENTATION

Indicator	Score
Business Owner 1	22
Business Owner 2	31
Customer Service 1	31
Customer Service 2	31
Customer Service 3	31
Total Score	**146**

TABLE V. TABLE SCORE AFTER IMPLEMENTATION

Indicator	Score
Business Owner 1	72
Business Owner 2	67
Customer Service 1	68
Customer Service 2	70
Customer Service 3	65
Total Score	**342**

To find the highest score, use the following formula:

$$X = highest\ score \times (total\ questions \times total\ respondents)$$

In this case, the highest possible score for each indicator is 5, and 5 respondents answer 15 questions. Therefore, the calculation for the highest score is 375. Moreover, in order to interpret the company's performance, the following formula was used to calculate the performance percentage:

$$P = \frac{Score\ Answer}{Highest\ Score} \times 100\%$$

Based on the calculation, the company's performance value before the implementation of the system is calculated based on a score of 146, which amounts to 38.9%. In contrast, following the implementation of the system, the performance score significantly increased to 342, which corresponds to 91.2% of the maximum possible score

F. Review

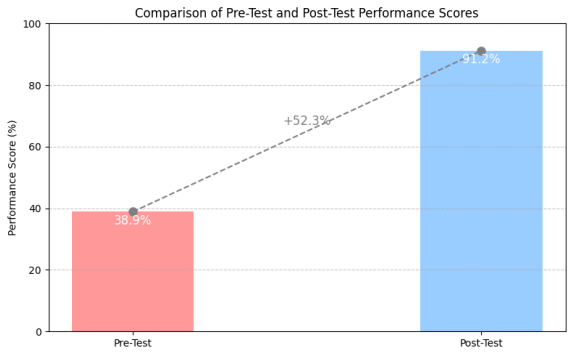

Fig. 6. System Architecture

The implementation of the ERP system and integrated dashboard resulted in a significant improvement in the company's operational performance. The improvement is reflected by a 52.3% increase in performance indicators post-implementation. This significant rise is not merely a numerical achievement, but also an indicator of the system's ability to address fundamental business challenges including data fragmentation, manual errors, and lack of process visibility.

In terms of efficiency, ERP system is successfully digitized and centralized key business functions. This transition eliminated reliance on manual tools that the company previously used, such as whiteboards and chatting apllication. The ERP system improved data traceability and enhanced organizational professionalism. Additionally, the analytical dashboard component further extends the system's value by enabling real-time insights into business metrics. The use of Streamlit allowed non-technical users, such as managers, to interact with complex data intuitively through dynamic filters and visualizations. This democratization of data access supports more agile, data-driven decision-making.

Beyond efficiency, the implementation of ERP system also enhanced transparency across the organization. Business information that was previously scattered can now be accessed centrally, ensuring all departments operate with consistent and up-to-date data. Moreover, the integrated dashboard helps provide real-time visibility of key business metrics. This shift has also strengthened the company's data-driven work culture, where decision-making increasingly relies on objective information rather than intuition.

The system implementation also has a positive impact on organizational responsiveness. With real-time access to operational and customer data, managers are able to adapt quickly to fluctuations in order volumes and operational challenges. Insights generated by the dashboard enable proactive responses, allowing the company to anticipate rather than merely react to issues. This responsiveness not only supports day-to-day operations but also lays the foundation for future technological advancements such as IoT-based process monitoring, AI-driven demand forecasting, and system-based supply chain management.

Feedback from management reported notable improvements in accuracy, ease of access to customer data, and overall agility after system implementation. The combined ERP and dashboard solution has effectively mitigated problems like data loss and manual tracking limitations.

IV. CONCLUSION

Research has been conducted to develop a dashboard in a web-based ERP prototype that addresses the issues identified at PT Dwi Family Investama. The resulting web-based ERP prototype features six key components such as dashboard, customer list, order manager, invoice center, product management, and account manager. Although web-based ERP and dashboards are developed in different frameworks, they are nevertheless integrated. The new system addresses the company's challenges by creating a centralized digital record-keeping system, reducing lost orders and customer data issues previously caused by manual methods. It also lowers operational costs by automating invoice generation and allowing data-driven decisions through an analytical dashboard, ultimately enhancing the company's competitiveness in the digital age

This research offers several notable contributions to both academic inquiry and practical ERP development. Firstly, it demonstrates a successful framework integration between Laravel and Streamlit, which originates from distinct technological ecosystems, PHP for transactional operations and Python for data analytics. By enabling these frameworks to interact seamlessly through a centralized MySQL database, the study presents a modular architectural approach that supports cohesive functionality without the need for middleware or third-party integration layers.

Furthermore, the adoption of Agile methodology within the development cycle highlights the adaptability and effectiveness of iterative implementation in microenterprise contexts. The ERP system evolved through continuous feedback loops involving actual users, ensuring alignment with real-world business processes and needs. This underscores the viability of Agile practices in resource-constrained environments, which are often underserved in traditional ERP research.

The system also represents a low-cost, yet high-impact ERP solution tailored for small-to-medium enterprises (SMEs), addressing a critical gap in ERP accessibility. By leveraging open-source technologies and a modular design, the prototype delivers essential functionalities without the expensive price typically associated with commercial ERP suites. As such, this study provides a scalable and replicable model for other SMEs facing similar operational and financial constraints.

Finally, this research also highlights evidence of an increase in company performance after implementing the ERP system and analytical dashboard. The significant increase of 52.3% in performance metrics post-implementation reinforces evidence the effectiveness of the system. Moreover, it also brought organizational impacts such as increased transparency and accountability in the work environment. Furthermore, this implementation also strengthens a data-driven work culture, where decisions are no longer based on intuition alone, but are based on objectives and real-time information.

Nevertheless, the prototype is not without limitations. From a security perspective, the system currently relies on standard authentication and has not yet implemented data encryption. Scalability is also a concern, as the prototype has only been tested in a small-scale environment and may require architectural adjustments to handle larger datasets or a higher volume of concurrent users.

For future research, it is recommended to enhance the system's security and integrate more ERP modules to support system functionality and provide a more comprehensive data source for the dashboard. Additionally, further exploration of dashboard customization based on employee roles could improve usability. Integrating AI-based analytics would also facilitate better data insights and support better-informed decision-making.

ACKNOWLEDGMENT

This research was conducted with the support of Universitas Multimedia Nusantara and PT Dwi Family Investama. Thank you for the assistance and resources provided throughout the writing of this article, and for granting consent to be used as a case study.

REFERENCES

[1] Badan Pusat Statistik, "Indeks Pembangunan Teknologi Informasi dan Komunikasi 2023," 2023.

[2] S. R. Ningsih, "Pengaruh Teknologi Terhadap Produktivitas Tenaga Kerja di Indonesia," *Benefit J. Bussiness, Econ. Financ.*, vol. 2, no. 1, pp. 1–9, 2024, doi: 10.37985/benefit.v2i1.341.

[3] D. A. Almajali, F. Omar, A. Alsokkar, A. S. Alsherideh, R. Masa'Deh, and Z. Dahalin, "Enterprise resource planning success in Jordan from the perspective of IT-Business strategic alignment," *Cogent Soc. Sci.*, vol. 8, no. 1, 2022, doi: 10.1080/23311886.2022.2062095.

[4] C. T. Gonçalves, M. J. A. Gonçalves, and M. I. Campante, "Developing Integrated Performance Dashboards Visualisations Using Power BI as a Platform," *Inf.*, vol. 14, no. 11, 2023, doi: 10.3390/info14110614.

[5] G. Laurent, M. D. Moussa, C. Cirenei, B. Tavernier, R. Marcilly, and A. Lamer, "Development, implementation and preliminary evaluation of clinical dashboards in a department of anesthesia," *J. Clin. Monit. Comput.*, vol. 35, no. 3, pp. 617–626, 2021, doi: 10.1007/s10877-020-00522-x.

[6] M. B. Boutros, C. El Hajj, D. Jawad, and G. Martínez Montes, "Diffusion of ERP in the Construction Industry: An ERP Modules Approach: Case Study of Developing Countries," *Buildings*, vol. 14, no. 10, pp. 1–18, 2024, doi: 10.3390/buildings14103224.

[7] R. J. J. Chen, "The Future of Data Visualization in Business," in *Proceedings of the 4th International Conference on Business and Policy Studies*, 2025, pp. 195–200. doi: DOI: 10.54254/2754-1169/133/2025.19669.

[8] R. Panghal, "The Role of Data Visualization in Decision Making – Case of D-mart," *Int. J. Multidiscip. Res.*, vol. 6, no. 3, pp. 1–13, 2024, doi: 10.36948/ijfmr.2024.v06i03.19630.

[9] M. Gonçalves, C. Salgado, A. de Sousa, and L. Teixeira, "Data Storytelling and Decision-Making in Seaport Operations: A New Approach Based on Business Intelligence," *Sustain.*, vol. 17, no. 1, pp. 1–26, 2025, doi: 10.3390/su17010337.

[10] A. Rahman, S. Alam, and S. H. Mrida, "How Interactive Dashboards Improve Managerial Decision-Making in Operations Management," vol. 01, no. 01, pp. 122–146, 2025, doi: 10.63125/cqm5jk84.

[11] S. Tkachenko, Y. Ohrenych, and N. Kairachka, "Digitalization of Business Processes as a Tool to Prevent Bankruptcy in Enterprises in the Conditions of Variability of the Market Environment," vol. 1, no. 92, pp. 183–194, 2024, doi: 10.26906/EiR.2024.1(92).3327.

[12] E. al. Kashif Asad, "An AHP-Based Framework for Effective Requirement Management in Agile Software Development (ASD)," *Int. J. Recent Innov. Trends Comput. Commun.*, vol. 11, no. 10, pp. 454–463, 2023, doi: 10.17762/ijritcc.v11i10.8509.

[13] A. N. Dugbartey and O. Kehinde, "Optimizing project delivery through agile methodologies : Balancing speed , collaboration and stakeholder engagement," 2025, doi: 10.30574/wjarr.2025.25.1.0193.

[14] V. Soumya, "Laravel-Based Task Management System : Design , Development , and Implementation," pp. 1–5, 2025, doi: 10.55041/IJSREM43066.

[15] D. Ekambaram and V. Ponnusamy, "Real-Time Monitoring and Assessment of Rehabilitation Exercises for Low Back Pain through Interactive Dashboard Pose Analysis Using Streamlit—A Pilot Study," *Electron.*, vol. 13, no. 18, 2024, doi: 10.3390/electronics13183782.

[16] J. P. Pilante, S. Anika, C. P. Abanobi, C. L. V Sam, C. H. Benito, and J. S. Paguigan, "Cultivating Personalized Learning : A Web- Based Data Dashboard and Analytics Using Python with Streamlit and Pandas," vol. 6, no. 6, pp. 1–11, 2024, doi: 10.36948/ijfmr.2024.v06i06.33342.

[17] T. C. Russell Chien, Y. W. Chang, S. E. Weng, Y. J. Wu, S. R. Wang, and W. T. Hsu, "An interactive visualization dashboard for predicting the effect of sacubitril/valsartan initiation in patients with heart failure," *Comput. Biol. Med.*, vol. 186, no. October 2024, 2025, doi: 10.1016/j.compbiomed.2025.109667.

[18] K. Patel, "A Comprehensive Booking Management System Using Laravel," no. March, 2025, doi: 10.13140/RG.2.2.15925.79846.

[19] O. Kevin, M. Geoffrey, and N. John, "Structural Complexity Metrics for Laravel Software," *Int. J. Softw. Eng. Appl.*, vol. 15, no. 4, 2024, doi: 10.5121/ijsea.2024.15404.

[20] J. Nazurin, A. K. Alya, and A. Nordin, "Collaborative Requirements Review Tool (Collaborev) to Support Requirements Validation," *Int. J. Perceptive Cogn. Comput.*, vol. 10, no. 1, pp. 105–112, 2024, doi: 10.31436/ijpcc.v10i1.456.

[21] J. Krause *et al.*, "CNVizard – a lightweight streamlit application for an interactive analysis of copy number

variants," *BMC Bioinformatics*, pp. 1–6, 2024, doi: 10.1186/s12859-024-06010-2.

[22] O. M. A. AL-atraqchi, "A Proposed Model for Build a Secure Restful API to Connect between Server Side and Mobile Application Using Laravel Framework with Flutter Toolkits," *Cihan Univ. Sci. J.*, vol. 6, no. 2, pp. 28–35, 2022, doi: 10.24086/cuesj.v6n2y2022.pp28-35.

[23] Suryasari, J. Wiratama, and R. I. Desanti, "The Development of Web-based Sales Reporting Information Systems using Rapid Application Development Method," *Ultim. Infosys J. Ilmu Sist. Inf.*, vol. 13, no. 2, pp. 110–116, 2022, doi: 10.31937/si.v13i2.3005.