



Business Process Improvement and Information System Design in Procurement Process at Pharmaceutical Company

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Abstract. The Indonesian Ministry of State-Owned Enterprises at the beginning of 2022 officially formed B company, whose members are B company as the parent company, H company, K company and I company as subsidiaries, based on global health sector trends and diseases in developing countries. The procurement function at B company currently does not have a system that can support the joint procurement process. Another problem is that each subsidiary has a different procurement process time and exceeds the set time target. The aim of this research is to produce an information system design for B company, so that the procurement process can be carried out digitally and it is hoped that the flow in the supply chain will be more effective. This starts from coordinating the delivery of goods/services requirements, scheduling and controlling procurement in relation to supporting production operations. The system development method used in this research is the Agile Scrum method. The system creation stage begins with business process analysis, then the system creation stage by collecting what is needed by eliciting user needs by interviews and using the MDI method and TOE method, then continues to the system testing stage using black box testing and ISO 9126. The results of this research are a goods and services procurement information system to make it easier for B company to carry out the procurement process between subsidiaries so that it is effective and efficient and reduces the procurement process time at B company.

Keywords: Business Process Improvement, Agile Scrum, Information System for Procurement of Goods and Services, Joint Procurement

1 Introduction

The Indonesian Ministry of State-Owned Enterprises at the beginning of 2022 officially formed B company, whose members are B company as the parent company, H company, K company and I company as subsidiaries, based on global health sector trends and diseases in developing countries. The aim of the formation of PT XYZ is to strengthen the independence of the national pharmaceutical industry, increase product availability, by creating joint innovation in the supply of pharmaceutical products. The procurement function at B company currently does not have a system that can support the joint procurement process for all B company subsidiaries. The development of an E-Procurement system in B company is one way to support and centralize the procurement process, especially as a continuous improvement action to create good supply chain management so that it can achieve cost leadership as a step in improving business processes for the management and implementation of procurement of goods and services in B company subsidiaries. With the development of the E-Procurement system, it is hoped that the supply chain flow will become more effective and efficient starting from coordinating the delivery of goods/services requirements, scheduling and controlling procurement in relation to supporting production operations, then inventory storage to product sales and delivery.

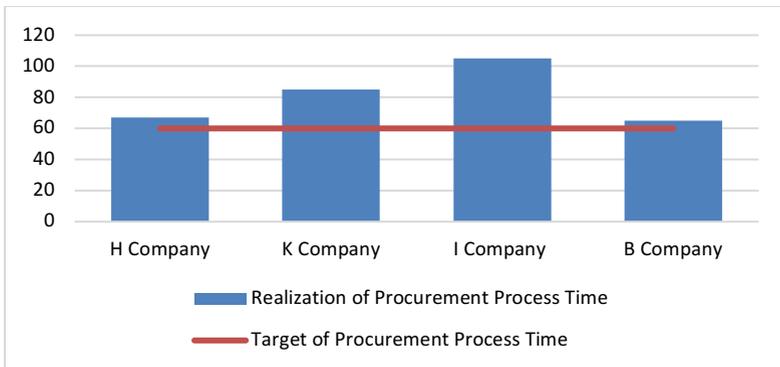


Fig. 1. Target and Realization of Procurement Process Time

The figure above shows the procurement process time for each B company subsidiary, which before the joint procurement system had different procurement process times. The root of the problem for B company is that the procurement process time has not been effective and efficient because each subsidiary company has a different procurement process, namely the period for the procurement process, names of goods, raw materials, and different procurement systems.

2 Literature

2.1 Procurement of Goods and Services

E-procurement is an information and technology system to carry out procurement processes from purchasing to goods/services that can be used for production processes systematically, effectively, efficiently, and well-integrated electronically [1], [2] and [3]. E-Procurement is being implemented quite intensively in various companies, especially in various government to support e-government programs [4] and [5].

2.2 Information System

An information system is technically a series of interconnected components that collect, store, process and distribute information to support decision making and monitoring in an organization [6]. Visualization of data and information related to matters regarding visual perception and data presentation media, delivery of dashboard components must prioritize aesthetics, ergonomics and effectiveness of information delivery [7].

2.3 Agile Methods

Agile is a set of software development methodologies based on iterative development, where requirements and solutions develop through collaboration between organized teams [8] and [9]. Scrum is a way of developing a product that is freer and more holistic, allowing developers to work as a unit to achieve a common goal. In Scrum, iterations can also be said to be sprints, their duration ranging from one week to up to one month [10] and [11].

2.4 Unified Modelling Language

UML is a method of visual modeling that is used as a means of designing object-oriented systems. UML can also be defined as a standard language for visualizing, designing and documenting systems, or also known as a standard language for writing software blueprints. UML is expected to be able to simplify software development and meet all user needs effectively, completely and precisely. This includes the factors of scalability, robustness, security, and so on [12] and [13].

3 Methodology

3.1 Research Framework

This research consists of several planned and systematic stages contained in the thinking framework. A thinking framework is a picture that explains the interrelationship of the problems that will be raised in research, functioning to find the right solution in designing a system. The thinking framework is a flow of thought that will be carried out in the research.

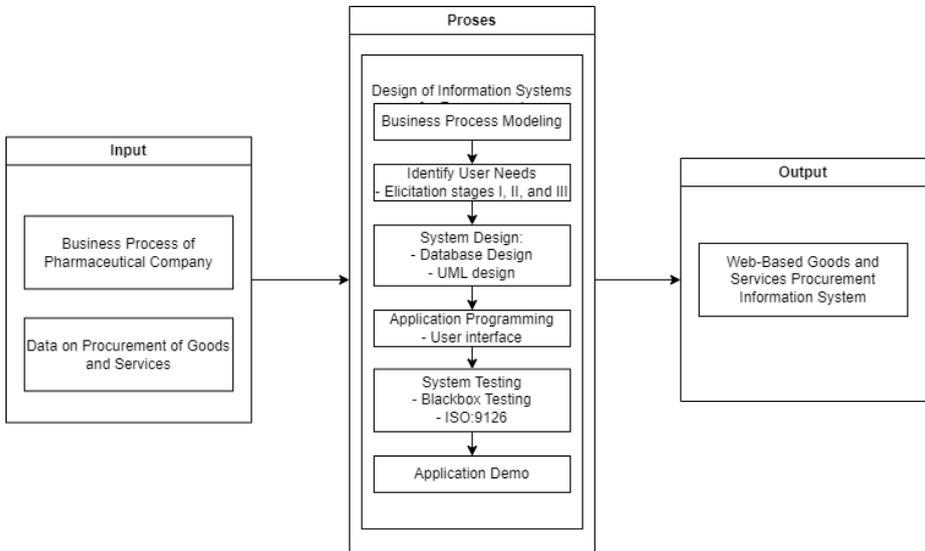


Fig. 2. Research Framework

The research stages are described in systematic problem solving to obtain a solution. The research systematics are divided into three parts, namely, the identification stage to determine the solution to the problems found in company B, determining the research objectives and determining the boundaries of the research problem, the system design stage using the agile scrum method to create a procurement application system, and the final stage in the form of conclusions from the research. has been carried out and suggestions that make the research better for use in further research.

3.2 Data Collection

Data collection was carried out by interviews with users at B company to identify problems and solutions. Every interview conducted is recorded for needs that will be used as a reference in completing this final assignment. The author uses the agile scrum method of interviews and observations in identifying needs because with this method the author can explore the needs and desires of users so that they can be in accordance with what is needed and expected for the system to be built.

3.3 Data Calculation

Data processing is carried out using elicitation in stages, elicitation is used to obtain priority needs needed by the user. The design of the website-based application was carried out using the Agile Scrum method and the development used the PHP programming language because it is easy to understand and has good data integration with the MySQL database.

4 Result and Discussion

4.1 Business Process Using Bizagi

Business process analysis is carried out using business process modeling notation (BPMN) where Business process modeling notation is a standard for explaining a business process and business process modeling which provides graphical notation in explaining business processes. Identification of business process times is done using bizagi. Bizagi is a tool for creating, optimizing, and displaying workflow diagrams in business process modeling to improve efficiency and governance processes in all parts of the organization [14].

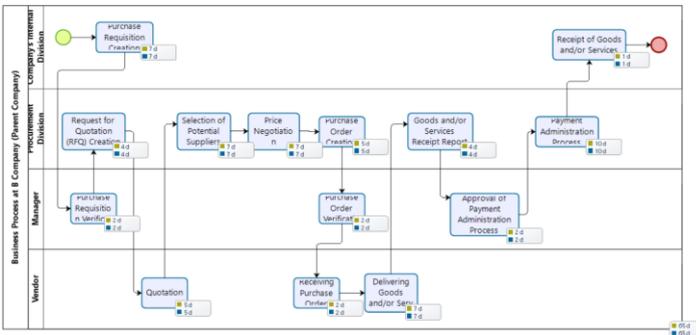


Fig. 3. Parent Company Procurement Process Time

4.2 Database Design

Entity relationship diagram (ERD) is used to model the database used to describe the conceptual scheme of the system [15]. ERD is designed to describe users and basic objects which are called entities and the relationships between entities which are usually called relationships. The database design is created based on the user needs elicitation stage in the previous stage, the following is the data base design.

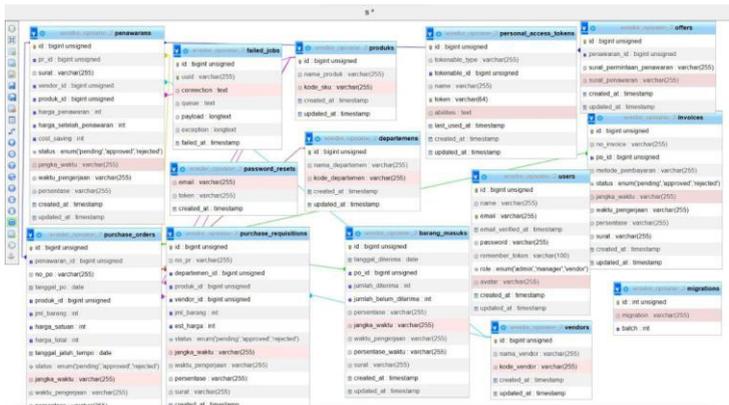


Fig. 4. Database Design

4.3 Use Case Diagram

Use cases diagram work by describing typical interactions between users of a system and the system itself through a story about how the system is used [16].

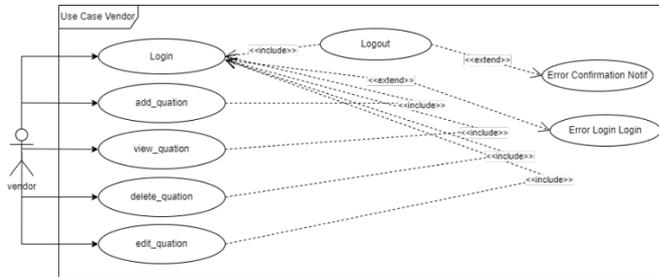


Fig. 5. Use Case Diagram (Vendor)

4.4 Activity Diagram

An activity diagram is a diagram that describes the workflow or activities of a system in the software.

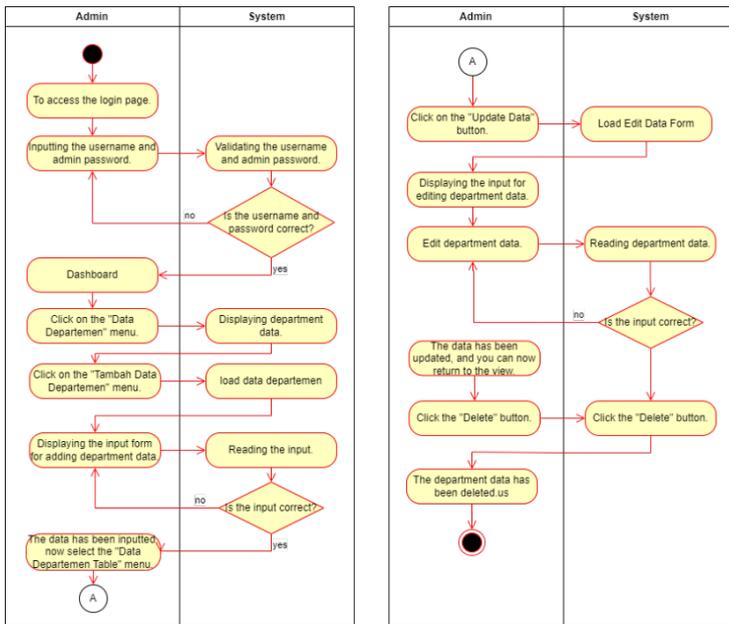


Fig. 6. Activity Diagram

4.5 Sequence Diagram

Sequence Diagrams are diagrams used to describe interactions between objects and activities that are occurring in the system [17]. Sequence Diagrams are a continuation of usecase diagrams that describe the activities that occur.

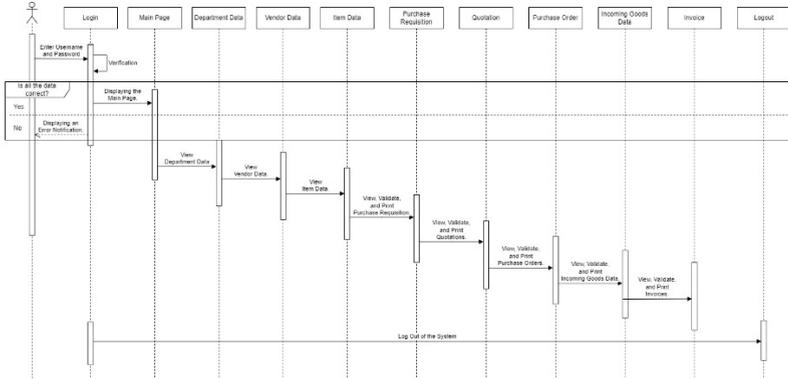


Fig. 7. Activity Diagram

4.6 Class Diagram

A class diagram is a description of the system structure in terms of defining the classes that will be created to build the system.

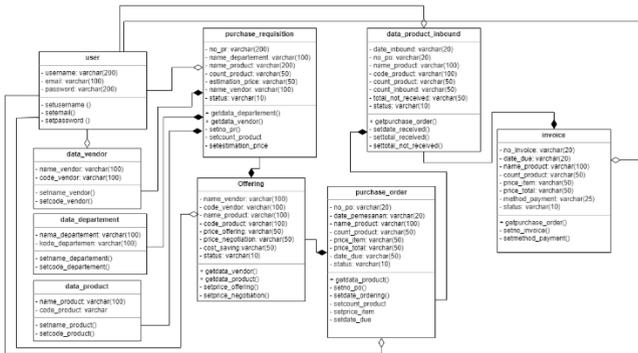


Fig. 8. Class Diagram

4.7 Deployment Diagram

Deployment diagram in website application design as in the image below.

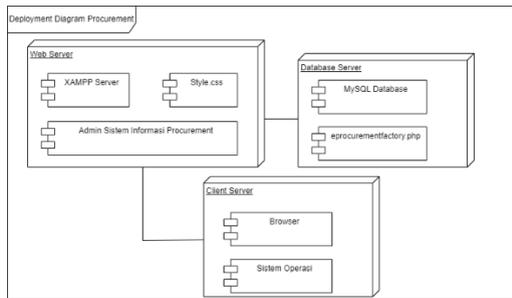


Fig. 9. Deployment Diagram

4.8 User Interface

The user interface is an application interface that has been designed according to a previously proposed design. The user interface created in this research is as follows.

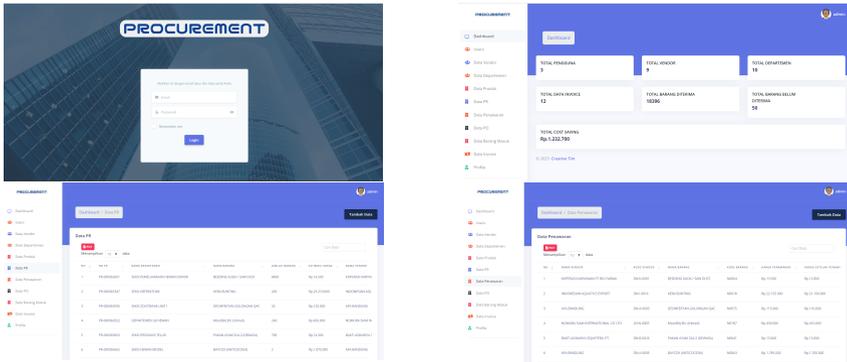


Fig. 10. User Interface of Application

4.9 Black Box Testing & ISO 9126

In the testing process, Blackbox Testing is used to test the system that has been created whether it is desired or not. The following are the results of system testing using Blackbox Testing [18]. The ISO:9126 testing process is carried out using 5 quality testing characteristics, namely functionality, reliability, usability, efficiency and portability. Functionality testing is carried out by testing all the functions of the application that has been designed. It can be seen that the number of functions in the application is 22.

$$X=1 - \frac{A}{B} = 1 - \frac{0}{22} = 1$$

In the Reliability testing process, it is carried out using the k6.io website, this website is used to analyze the performance of the website that has been designed and uploaded to the internet.



Fig. 11. Reliability & Efficiency Test

4.10 Proposed Business Process Analysis

Business processes that already have a website-based application system, the procurement process at PT XYZ is not carried out manually but has been saved automatically into the system. When the admin inputs data into the system, the data will be automatically saved into the system. Furthermore, when the procurement division (admin) or manager wants to see that the available data is up to date. In this website-based application there are three users, namely the procurement division (admin), manager and vendor. The admin user can input, view, delete, edit, and print data in the application, the manager user can only view, validate and print data and the vendor user can only access the offer page and can input, view, delete, edit and print data.

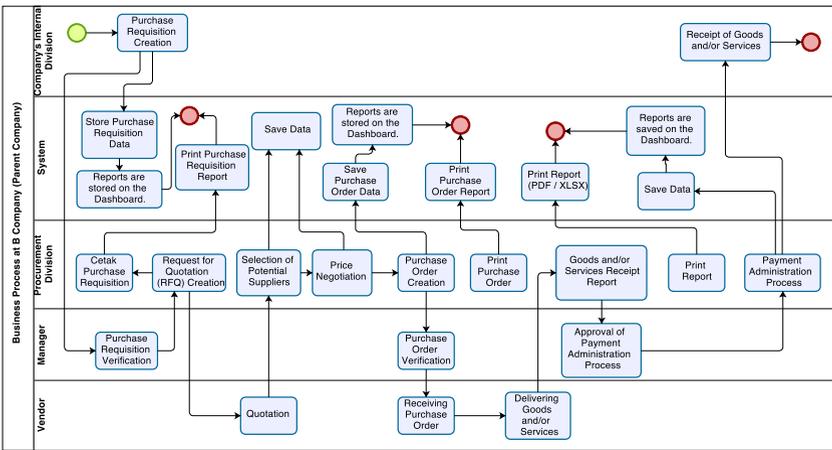


Fig. 12. Proposed Business Process of B Company (Parent Company)

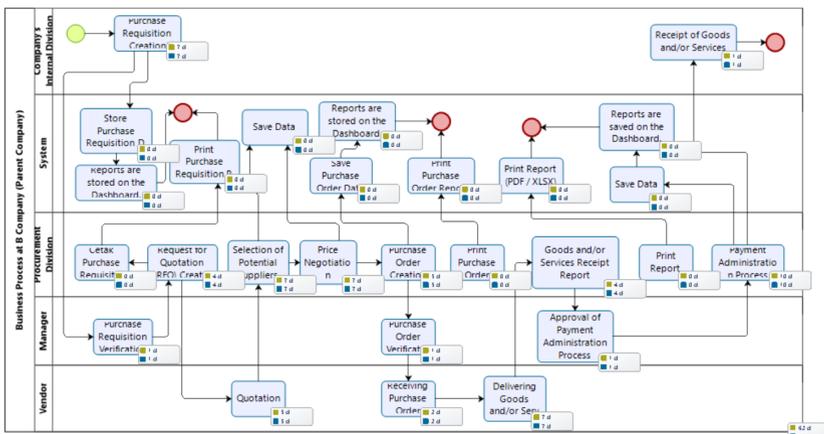


Fig. 13. Proposed Business Process Time of B Company (Parent Company)

The figure shows the proposed business process time for Company B from all proposed business process activities with an information system for Company B which is carried out from the request for goods to the payment process. It is found that the total procurement process time is 62 days.

5 Conclusion

Based on research that has been carried out in designing website-based applications at Company B using the agile scrum method, the conclusion obtained in this research is that the goods and services procurement information system that was created can be used to help make the goods and services procurement process at Company B more effective and efficient to 62 days. Produce an information system design for Company B to improve the joint procurement process so that the procurement process is more effective and efficient between subsidiaries starting from coordinating the delivery of goods/services requirements and scheduling. Designing a website-based goods and services procurement information system, the features on the dashboard can display performance measures from the timeliness of the procurement process and the suitability of the quantity of goods received. The entire process of procuring goods and services is now well recorded, so that Company B can analyze data on procurement of goods and services so that problems can be identified more precisely and accurately.

References

- [1] Z. A. Haryani, *Analisis Pengadaan Barang Dan Jasa*, 2nd ed., vol. 11. Epigram, 2014.
- [2] S. Willem, *Manajemen Pengadaan, Procurement Management*. Bandung: Alfabeta, 2012.
- [3] T. A. Auliandri and R. Wualndari, "Penerapan Sistem E-Procurement Pada Proses Pengadaan PT Petrokimia Gresik," 2017.
- [4] T. D. Putri, "Transparansi Dalam Pelaksanaan E-Procurement Pada Lembaga Pengadaan Secara Elektronik (LPSE) Kota Padang," vol. XIII, no. 11, p. 103, 2019.
- [5] T. Aryati and L. Pangaribuan, "ANALISIS PENGARUH IMPLEMENTASI E-PROCUREMENT DAN KOMPETENSI PEGAWAI TERHADAP KINERJA PENGADAAN," *JURNAL PENELITIAN DAN KARYA ILMIAH LEMBAGA PENELITIAN UNIVERSITAS TRISAKTI*, vol. 4, no. 1, pp. 19–24, Feb. 2019, doi: 10.25105/pdk.v4i1.4012.
- [6] K. C. Laudon, *Management Information Systems : Managing The Digital Firm*, 15th ed. Harlow: Pearson, 2017.
- [7] I. Wahyudi and A. Syazili, "Dashboard Monitoring Website Dosen Studi Kasus Universitas Bina Darma," *Jurnal Pengembangan Sistem Informasi dan Informatika*, vol. 2, no. 3, pp. 188–197, Nov. 2021, doi: 10.47747/jpsii.v2i3.555.

- [8] R. Pressman, *Software Engineering: A Practitioner's Approach*. McGraw-Hill Education, 2014.
- [9] I. Sommerville, *Software Engineering (Rekayasa Perangkat Lunak)*. Jakarta: Erlangga, 2011.
- [10] M. Younas, D. N. A. Jawawi, I. Ghani, T. Fries, and R. Kazmi, "Agile development in the cloud computing environment: A systematic review," *Inf Softw Technol*, vol. 103, pp. 142–158, Nov. 2018, doi: 10.1016/j.infsof.2018.06.014.
- [11] R. Sukanto, *Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek*. Bandung: Informatika, 2018.
- [12] B. Unhelkar, *Software Engineering with UML*. 2018.
- [13] P. S. Muttaqin, W. Margareta, and A. D. Zahira, "Green warehouse performance monitoring system design using analytical hierarchy process and supply chain operation reference," *Applied Engineering and Technology*, vol. 1, no. 3, pp. 146–153, Apr. 2022, doi: 10.31763/aet.v1i3.687.
- [14] I. Ismanto, F. Hidayah, and K. Charisma, "Pemodelan Proses Bisnis Menggunakan Business Process Modelling Notation (BPMN) (Studi Kasus Unit Penelitian Dan Pengabdian Kepada Masyarakat (P2KM) Akademi Komunitas Negeri Putra Sang Fajar Blitar)," *Briliant: Jurnal Riset dan Konseptual*, vol. 5, no. 1, p. 69, Feb. 2020, doi: 10.28926/briliant.v5i1.430.
- [15] A. Adelia and J. Setiawan, "Implementasi Customer Relationship Management (CRM) pada Sistem Reservasi Hotel Berbasis Website dan Desktop," *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 6, no. 2, 2011.
- [16] M. I. Fatoni, A. Y. Ridwan, and P. S. Muttaqin, "Design of Vendor Selection System Using FAHP and FTOPSIS in Engineering-To-Order Manufacturing Industry," 2022. doi: 10.2991/aer.k.220131.055.
- [17] P. Fridhayanti, L. djajanto, Z. Abdul Haris, J. Akuntansi, and P. Negeri Malang, "Perancangan Aplikasi Sistem Informasi Pemesanan Tiket Bus Online (E-Ticketing) Pada PO. Handoyo," *Jurnal Intra-Tech*, vol. 2, no. 2, 2022, doi: 10.53067/ijebef.v2i2.
- [18] F. C. Ningrum, D. Suherman, S. Aryanti, H. A. Prasetya, and A. Saifudin, "Pengujian Black Box pada Aplikasi Sistem Seleksi Sales Terbaik Menggunakan Teknik Equivalence Partitions," *Jurnal Informatika Universitas Pamulang*, vol. 4, no. 4, p. 125, Dec. 2019, doi: 10.32493/informatika.v4i4.3782.

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