Implementation of Open-Source ERP-Based Fleet Management System on SMEs Transportation Service Provider

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Abstract

Enterprises Resource Planning (ERP) systems can be analogized as the backbone of the information system in a company. Many large-scale companies have adopted ERP systems to increase efficiency in the company's business processes. This research departs from the issue of Small and Medium Enterprises (SMEs) that are required to use ERP to compete in the global market but cannot implement an ERP system at a high cost. However, SMEs have financial limitations in adopting high-cost ERP systems. On the other hand, many open-source ERP systems can currently be used for free but with a limited number of modules. This study focuses on implementing an open-source ERP system using Odoo software version 15 on SMEs Transportation Services Providers. The goal is to develop an open-source ERP-based fleet management system for SMEs. The system developed successfully met the company's managerial expectations. All processes previously carried out manually have been carried out using the developed system. All cross-sectional data is stored in the company's master data and can be integrated to support the decision-making process, and company archives have been well documented. Based on the results of User Acceptance Testing (UAT), 98% of the system has met the needs of SMEs. It can be concluded that the implementation of an open-source ERP-based fleet management system is very helpful in managing the business processes of SMEs Transportation Services Providers more effectively and efficiently.

Keywords: Enterprise Resources Planning, ERP, Odoo, SMEs, Transportation Services Providers

1. Introduction

Enterprise Resources Planning (ERP) system covers all functions of managing internal business processes in a company [1, 2]. ERP is used to manage day-to-day business activities such as accounting, sales, procurement, inventory, project management, risk management to supply chain operations. [3]. According to Asif, et al. [2], ERP plays a crucial role in managing a company's business activities. In addition, ERP has the advantages of integrating data with other information technology systems, easy-to-operate user interface, and offering real-time business transactions. [4]. In the last two decades, ERP has become one of the most important things for companies need, yet it is quite expensive to implement [5]. Currently, several open-source ERP systems can be used independently. This is very beneficial to assist in managing business processes, especially for Small and Medium Enterprises (SMEs). Thus, SMEs have the opportunity to increase the effectiveness and efficiency of their internal business activities and compete in a wider market by adopting an open-source ERP system.

Indonesia's SMEs' most significant business sectors are trade, accommodation, food and beverage, manufacturing, transportation and warehousing, and other services. [6]. Land transportation service provider is one type of business in the field of transportation and warehousing. Land transportation is the most popular method of public transportation, which is the link among industries. Regarding the business process, fleet management is one of land transportation service providers' most important internal business activities. The implementation of a fleet management system based on an open-source ERP is very possible to be implemented at a fairly low cost for SMEs in land transportation service providers. Hence, the study aims to improve business processes in the important activities that have been described. Facts support that several previous studies have discussed the implementation of an ERP-based system. ERP

implementation in SMEs as business intelligence during a crisis is carried out by Antoniadis, et al. [7]. ERP systems have also been implemented in various SMEs in many countries, such as India [8], Yunani [7], Serbia [9], and various Europe Countries [4]. In addition, through a literature study, it was found that the implementation of open-source ERP systems for SMEs has been carried out in various sectors. Mostly in manufacturing and retail, as well as the culinary business [10-12]. However, there were no previous studies that carried out the implementation of an open-source ERP system for SMEs in transportation services. Thus, it was appointed as a gap and contribution that will be filled by this research.

This research focuses on the implementation of an open-source ERP fleet management system using Odoo version 15 for SMEs which provide land transportation services. Odoo's open-source ERP system was selected based on the results of a literature study of the last five years. Odoo's open-source ERP system has a complete selection of application modules for many sectors, including transportation service providers. The fleet module in Odoo version 15 can be adopted and implemented in the company's fleet management process. In addition, the system also offers an attractive and simple user interface that is easy to understand. PT. Sang Engon is an SME providing land transportation services as the object of this research. The SME is located in Gresik Regency, East Java and currently operates 25 transporting fleets of tronton losbak trucks for servicing all of its customers. Currently, all activities in the company's business processes are carried out traditionally without using any system or application. Transport fleet management is done manually by recording on the garage chalkboard. Since the processes are completely manual, they often cause problems. There are several problems, including frequent errors in scheduling and assigning fleets where the average number of transports between fleets is a difference of up to 30%, which causes uneven distribution of cargo. In addition, there is also the problem of delays in delivery of up to several working days due to the fleet being damaged either when it is being used or being used. The absence of a history of periodic maintenance, vehicle repairs, and future maintenance plans results in frequent unexpected fleet breakdowns. Without a good recording system, the managerial side has difficulty making strategic decisions quickly.

The number of problems caused by manual and unsystematic processes often creates losses for the company. On the other hand, SMEs have limited financial capacity to implement information systems. Based on the background that has been explained in this study, an open-source ERP-based fleet management system was implemented for SMEs providing transportation services. The implemented system is expected to be able to increase productivity in SMEs providing transportation services so that they can compete in a wider market. With the implementation of an open-source ERP-based fleet management system, the previously manual business processes were changed using the system. The company's document printing process can also be done directly through the system so as to minimize repetitive work. That way, the entire process is recorded in the system so that it can help the company's decision-making process based on data on the ERP system.

In this section, a literature study is conducted on previous research on the implementation of open-source ERP-based systems. The details can be seen in Table 1. From the literature study, it can be seen that there have been many previous studies that have implemented open-source ERP-based systems in various business sectors. It was found that the implementation had been carried out in the manufacturing (Mfg), retail (Ret), and distributor (Dist) sectors.

Table 1. Literature reviews

No	Authors	Sector	Sales	Production	Purchasing	Inventory	Warehouse	Accounting	Manufaktur	CRM	Software
1	Ridho, et al. [13]	Mfg	√		√	√		√			Odoo
2	Akbar and Juliastrioza [14]	Ret	√		√	√					Odoo
3	Akbar and Akbar [15]	Mfg	√	√		√					Openbravo
4	Fitrah, et al. [16]	Mfg	√		√	√		√			Odoo
5	AM and Akbar [17]	Ret	√			√					WebERP
6	Putra and Azhari [18]	Mfg	√	√	√	√					ADempiere
7	Hardjono, et al. [19]	Ret	√			√					Odoo
8	Terminanto, et al. [20]	Dist	√						√		Odoo
9	Limantara and Jingga [12]	Mfg	√	√							Odoo
10	Fauzi, et al. [21]	Mfg						√			Odoo
11	Aziza and Rahayu [22]	Dist	√			√					Odoo
12	Amelia and Sintawati [11]	Ret				√		√	√		Odoo
13	Muchaendepi, et al. [10]	Mfg					√				Odoo
14	Ristyawati, et al. [23]	Dist	√								Odoo
15	Wibowo, et al. [24]	Mfg	√		√	√				√	Dolibarr

The literature study showed that no previous studies implemented open-source ERP-based systems in logistics service companies, especially for fleet management in transportation services. This literature study also illustrates that most of the previous researchers used Odoo's open-source ERP software. While some of the rest use Openbravo, WebERP, Adempiere, and Dolibar. Odoo's open-source ERP

system offers an easy-to-understand user interface and completes enough modules so that it can be applied to many sectors.

2. Research Methods

The method used in this study was adapted from the Odoo Implementation Method and the needs of the company. The stages of method are divided into four stages. The first stage is Planning and Preparation, followed by Analysis and Business Blueprint in the second stage. After that, in the third stage, Design and Development were carried out. In the fourth or final stage, implementation and training are carried out. In detail, the methodology used in this study can be seen in Figure 1.
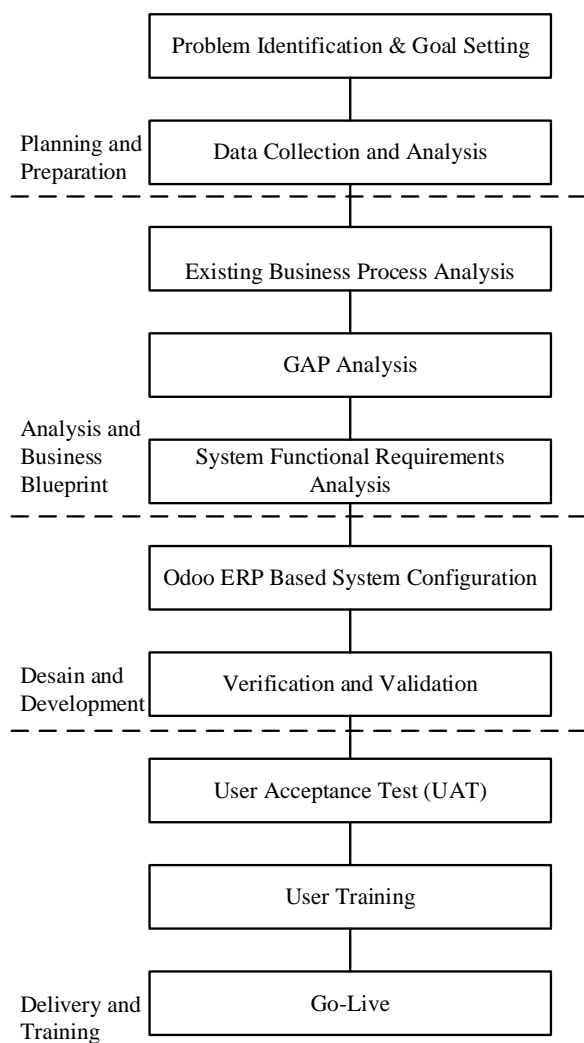

Figure 1. Research Method

2.1. Stage 1: Planning and Preparation

The first stage is carried out after the literature study related to the implementation of an open-source ERP fleet management system and field studies on SMEs have been completed. At this stage, the initial data collection and analysis of SMEs are also carried out. The data taken include documents related to operational management, organizational structure, to business processes in the form of SOPs and policies. This is to identify the focus of research on SME business processes that will be explored further.

2.2. Stage 2: Analysis and Business Blueprint.

The Analysis and Business Blueprint stage consists of the analysis of existing business processes, GAP analysis, and system functional requirements analysis. First, an analysis of existing business processes is carried out through interviews and Focus Group Discussions (FGD) with the Business Process Owner (BPO). The output of the process model is made using the BPMN 2.0 standard. Then, a gap analysis is carried out to evaluate existing business processes and identify opportunities for improvement that can be made. Furthermore, system requirements analysis will be carried out and mapped into an open-source ERP-based system, namely Odoo version 15.

2.3. Stage 3: Design and Development

At this stage, the configuration of the fleet management system based on the open-source Odoo ERP version 15 was carried out as well as verification and validation. Odoo's open-source ERP system version 15 was configured according to the functional requirements of SMEs. The configuration process adapts to the SME business processes where there is a fleet management module to accommodate the main business processes of SMEs providing transportation services. In addition, it is also necessary to ensure that all modules have covered the entire business process of the SME. At this stage, verification was also carried out with a checklist of the results of the configuration of the fleet management system, all of which have been carried out and meet the system's functional requirements. After all the configuration results are completed and verified, validation is carried out by conducting FGD and presenting to the BPO before the User Acceptance Test (UAT) is carried out.

2.4. Stage 4: Delivery and Training

The stages of delivery and training include the User Acceptance Test (UAT), User Training (UT), and preparation of implementation report documents. First, the User Acceptance Test (UAT) is conducted to see how the configured system meets the functional requirements. Then, a Test Case will be created; each BPO will try the system according to the Test Case document. The BPO will provide feedback on the experimental results to make improvements if necessary. After the UAT is completed and approved by the BPO, broader system training or user training is carried out. Previously, the module for the use of the developed fleet management system was prepared. User training will involve all relevant parties who will use the

developed fleet management system. The training will be divided into two, namely key user training conducted for BPO. User training will be conducted for all users in the company, including staff, drivers, admin level, and others. After User Training is done, the next step is to create a configuration result document, UAT, and UT.

3. Results and Discussions

3.1. Existing Business Process

In the company's existing business processes, the most crucial process that affects many divisions is the sale of products in the form of providing transportation services. This main business process is closely related to the company's fleet management process. The fleet management process starts from scheduling, and distribution of cargo, to fleet maintenance. Table 2 shows the stages of activities in the company's existing conditions, starting from incoming orders, which will trigger the assignment of the carrier fleet until the delivery is complete.

Table 2. Existing Business Process

No	Activity	Actor	Output Documents
1	Receive Orders	Data and Finance Division	Sales order.
2	Issue Delivery Order notes	Fleet management and scheduling division.	Delivery Order Note.
3	Fleet planning and order appointments.		
4	Hand over delivery order notes and loading order notes.	Data and Finance Division	Delivery Order Note & Loading Order Note.
5	Fleet Pre-departure Checking	Mechanic.	-
6	Operational Budget handover to Drivers.	Data and Finance Division	-
7	Loading Process.	Driver & Loading Management Division.	Loading Specification
8	Sending to Unloading Place.	Driver	Proof of Loading.
9	Proof of delivery submission	Data and Finance Division	Invoice.

First, the data and finance division take orders from customers. The order will be processed to produce a sales order document. Furthermore, based on the incoming sales order, the fleet management and scheduling division will issue a travel permit and plan the assignment of the fleet according to capacity and queues in the garage. This process will generate a travel permit for each assigned vehicle. Furthermore, the data and finance department will make a loading order and give it to the driver along with the road certificate that was previously made. The transport fleet that has been assigned will be checked first by the mechanic. After being declared roadworthy, the data and finance department will provide operational money to the driver of the fleet to be dispatched. When the vehicle arrives at the loading location, the loading and distribution division is responsible for ensuring the appropriate amount of goods is loaded into each conveyance vehicle. After loading is complete, the driver leaves for the unloading point. The driver who has finished delivering the goods will return to the garage and submit proof of delivery documents to the data and finance division for further making a customer invoice.

3.2. GAP Analysis

Based on the conducted GAP analysis, it was found that there is a gap between management expectations and the performance of most business activities. Previously the company ran its business processes manually and conventionally. The company has never used information systems for service sales, procurement, and management of its transportation fleet. All recording and documentation are carried out using a physical form that has been provided previously and then written manually. It is not uncommon for customers to require special forms, so staff must create them manually through a word editor application. In detail, the results of the GAP analysis are described in Table 3.

In the activity of issuing delivery documents, such as delivery orders and loading order documents, all recordings and documents are created manually using a prescribed form. The management expects this process to be carried out through the developed system. In this way, repetitive writing can be avoided as much as possible. The integration of sales and transportation modules in the developed system could accommodate all sales activities of transportation services to the issuance of travel documents. Master data that has been created does not need to be written repeatedly, thereby reducing repetitive work. In addition, previous invoice printing activities were carried out manually on the prepared form. In the developed system, invoice printing can be done systematically and automatically with the invoice module.

One of the important activities in managing the transportation fleet at a transportation service company is planning for fleet assignments, transportation and unloading of goods, and fleet maintenance. Currently, fleet assignment planning is done manually with vehicle queue records written on a blackboard in the garage. This results in frequent recording errors. For example, vehicles that have been used or have finished serving are forgotten to be recorded, resulting in misinformation. In addition, physical notes that can only be seen on a chalkboard in the garage cause decision-making to be inflexible from other places. The system developed will take advantage of the transportation and fleet management modules for records that can be accessed in real-time, anywhere with an informative dashboard.

Table 3. GAP Analysis

No	Activity	Ideal Condition Expectations	GAP	Recommended Solution
1	Receive Orders	As previous.	-	-
2	Issue Delivery Order notes	Order Logging and printing through the system, thereby reducing repetitive writes.	Order logging was still manual, and Delivery orders were written on the prescribed form	Sales data input and delivery document printing are done using the sales and transport module.
3	Fleet planning and order appointments.	There is a visualization of the fleet queue sequence that can be accessed in real time from anywhere.	Recording of truck orders is still manual on the blackboard in the garage.	The recording is done using the fleet management module.
4	Hand over delivery order notes and loading order notes.	As previous	-	-
5	Fleet Pre-departure Checking	management can see the history of maintenance and damage to each fleet.	There is no record of the maintenance and damage history of each fleet.	The recording is done using the fleet management module so that the history of maintenance, damage and odometer information can be seen.
6	Operational Budget handover to Drivers.	As Previous.	-	-
7	Loading Process.	As Previous.	-	-
8	Sending to Unloading Place.	As Previous.	-	-
9	Proof of delivery submission	Invoices or bills can be printed automatically through the system.	Invoices are still written manually on a prescribed form.	Invoice or billing documents can be printed automatically via the invoice module.

On the other hand, transportation service providers are certainly inseparable from their fleet maintenance. Currently, vehicle maintenance activities are not properly recorded. The company has no history of vehicle repairs, both minor and major repairs. This makes it difficult for the management to determine when the right time for maintenance is and what spare parts must be of concern to be replaced or repaired. Managerial expect a vehicle maintenance and repairs record so that future decision-making can be maximized. In the developed system, the fleet management module can accommodate these records. Management can find out the history of vehicle maintenance and repairs, mileage, and get reminders for routine fleet maintenance.

3.3. To-Be Business Process

In accordance with the recommendations and results of the previous GAP analysis, the business process proposed by the SME transportation service provider is divided into three, namely Sales of Logistics Services (Sales and Invoices Module), Transportation Registration (Transport Module), and Fleet Management (Fleet Management Module). The four modules above are recommended for an integrated fleet management system in transportation service SMEs. Based on this analysis, the Odoo ERP version 15 system was chosen as the basis for later development configuration. The system base was chosen because it was considered the most appropriate and met the needs of the company. In detail, the proposed business process flowchart that is run through the Odoo open-source ERP-based fleet management system can be seen in Appendix 1.

3.4. Odoo Implementation Version 15

In the implementation of Odoo version 15, there are three main modules that are used to accommodate all SME business processes of transportation service providers. The three modules include the sales or sales module, the transport module, and the fleet module or fleet management. In addition, it is also supported by an invoice module because accounting is the backbone of an ERP system. The sales module is used to accommodate the sales process for transportation services. The process can be started by creating a Quotation and then a Sales Order. The data must include general data such as date, customer, payment deadline, vehicle data, and services used. This also includes the price of the service ordered. All data entry will support the transport fleet assignment planning process. The display of the Sales module can be seen in Figure 2.

The sales order that has been issued will be a reference in the process of distributing cargo and assigning the fleet. In addition, the sales order will be accompanied by a travel document as a reference in the loading and unloading process in the field.

The display of the Transport Module can be seen in Figure 3. The transport module has a menu to create transporter details, routes, and locations. The transport module accommodates the distribution of fleet assignments for each transport order from a customer. The fleet management and scheduling division will

assign several fleets to complete customer transportation orders. To view the queue order of the transport fleet, the person in charge can also open the Fleet Management module. The Entry Transport display in the Transport module consists of the transporter's name, delivery order number, customer name, driver's name, delivery vehicle identity, and destination address.
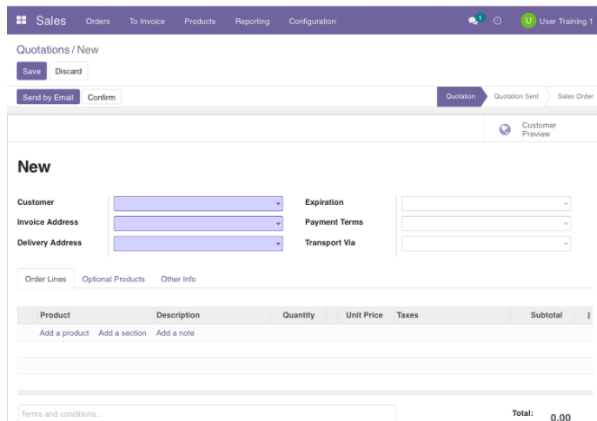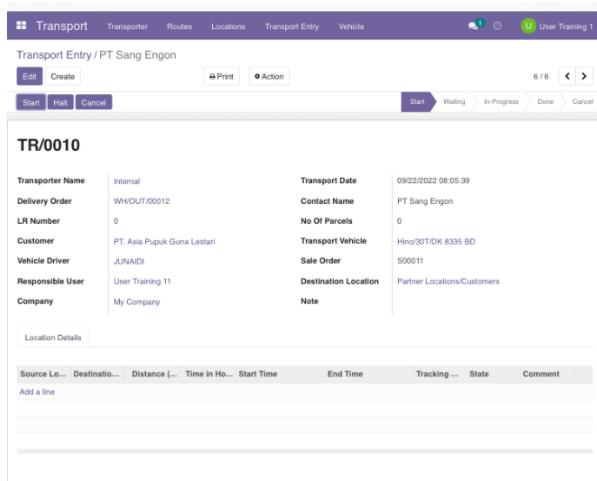

Figure 2. Sales Module

Figure 3. Transport Module

The fleet management module is used for vehicle data collection, which in this case is the transport fleet, starting from the model or type of vehicle, license plate, and driver. All transport fleets that have been registered in the system will appear on the dashboard of the fleet management module, the details of which can be seen in Figure 4. The dashboard of the fleet management module is also used instead of a whiteboard that shows vehicle queues. Dashboard shows vehicles used, available, or under maintenance. This fleet management module is also used for periodic odometer recording, vehicle maintenance, and repair history. Thus, all data related to the company's transportation fleet can be accessed in real-time and from any place. This module can also be set to remind each transport fleet's routine maintenance time based on the recorded odometer records.
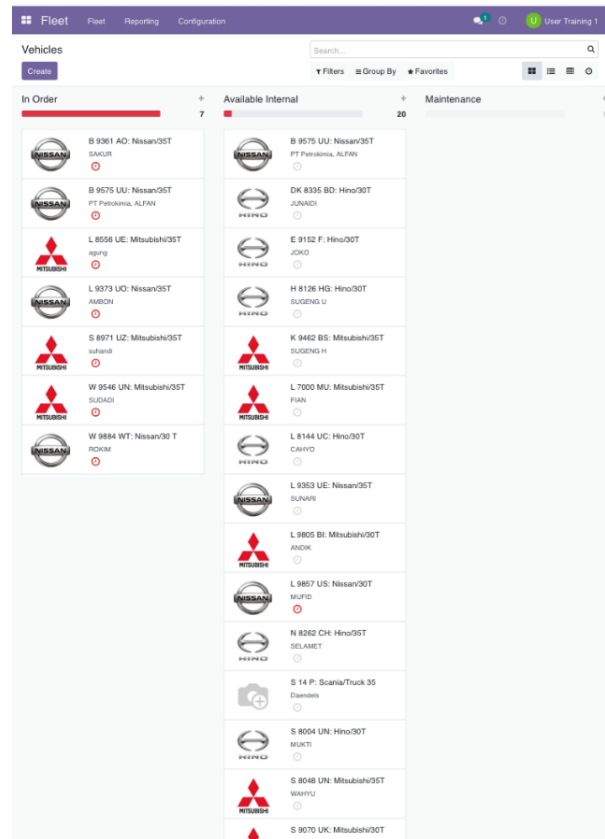

Figure 4. Fleet Management Module

5. Conclusion

This study succeeded in implementing an open-source ERP fleet management system for SME transportation service providers. Previously, an analysis of existing business processes was carried out to ensure that the system to be implemented was able to accommodate the business processes of the SME transportation service provider under study. In the existing condition, all business activities are still done manually without any information system. This results in a high number of recording errors and time-wasting repetitive work. GAP analysis was conducted to determine managerial expectations in the implementation of an open-source ERP-based fleet management system compared to existing conditions. Analysis of the system's functional requirements was carried out, and Odoo ERP version 15 was chosen as the basis for the development of the fleet management system. The Sales, Transport, Fleet Management, and Invoice modules are proposed to be used in an integrated manner to accommodate all SME business processes of transportation service providers. Through user acceptance tests, all functional components are tested. The test results show 98% according to user needs. So, based on the user acceptance test, it can be stated that the system developed is in accordance with the company's managerial expectations. Most of the business activities that were previously carried out manually have been

able to be carried out using the developed system. In addition, all data is stored automatically and integrated. Travel documents such as travel documents and invoices that were previously created manually using forms can now be printed automatically through the system. On the other hand, the system is also capable of displaying a vehicle queue dashboard that can be accessed from anywhere in real time. This is in line with the expectations and needs of the company's management to support fleet management operations. In addition, the system has also succeeded in accommodating the recording of vehicle maintenance and damage history. It can be concluded that the implementation of an open-source ERP-based fleet management system is very helpful in managing the business processes of SME transportation service providers more effectively and efficiently.

In future research, it is possible to test cycle time on the company's business processes to compare before and after using the implemented ERP system in order to see the time and cost efficiency that could be achieved.

Acknowledgment

Reference

[1] S. Magal and J. Word, *Integrated business processes with ERP systems*. Wiley Hoboken, NJ, 2012.

[2] A. Asif, D. AlFrraj, and M. A. Alshamari, "A Comprehensive Approach of Exploring Usability Problems in Enterprise Resource Planning Systems," vol. 12, no. 5, p. 2293, 2022.

[3] S. Sancar Gozukara, B. Tekinerdogan, and C. Catal, "Obstacles of On-Premise Enterprise Resource Planning Systems and Solution Directions," *Journal of Computer Information Systems,* vol. 62, no. 1, pp. 141-152, 2022/01/02 2022.

[4] P. Ruivo, B. Johansson, T. Oliveira, and M. Neto, "Commercial ERP Systems and User Productivity: A Study Across European SMEs," *Procedia Technology,* vol. 9, pp. 84-93, 2013/01/01/ 2013.

[5] O. Alaskari, R. Pinedo-Cuenca, and M. M. Ahmad, "Framework for implementation of Enterprise Resource Planning (ERP) Systems in Small and Medium Enterprises (SMEs): A Case Study," *Procedia Manufacturing,* vol. 55, pp. 424-430, 2021/01/01/ 2021.

[6] B. P. Statistik. (2016, 01/08/2022). *Sensus Ekonomi 2016*. Available: https://se2016.bps.go.id/umkumb/

[7] I. Antoniadis, T. Tsiakiris, and S. Tsopogloy, "Business Intelligence During Times of Crisis: Adoption and Usage of ERP Systems by SMEs," *Procedia - Social and Behavioral Sciences,* vol. 175, pp. 299-307, 2015/02/12/ 2015.

[8] P. D. Deshmukh, G. T. Thampi, and V. R. Kalamkar, "Investigation of Quality Benefits of ERP Implementation in Indian SMEs," *Procedia Computer Science,* vol. 49, pp. 220-228, 2015/01/01/ 2015.

[9] V. Majstorovic, G. Jankovic, S. Zivkov, and S. Stojadinovic, "Digital Manufacturing in SMEs based on the context of the Industry 4.0 framework – one approach," *Procedia Manufacturing,* vol. 54, pp. 52-57, 2021/01/01/ 2021.

[10] W. Muchaendepi, C. Mbohwa, T. Hamandishe, and J. Kanyepe, "Inventory Management and Performance of SMEs in the Manufacturing Sector of Harare," *Procedia Manufacturing,* vol. 33, pp. 454-461, 2019/01/01/ 2019.

[11] S. Amelia and I. D. Sintawati, "Penerapan Enterprise Resource Planning Penjualan Aksesoris Berbasis Odoo," *JSiI (Jurnal Sistem Informasi),* vol. 6, no. 1, pp. 69-74, 2019.

[12] N. Limantara and F. Jingga, "Open source ERP: ODOO implementation at micro small medium enterprises: (A case study approach at CV. XYZ in module purchasing and production)," in *2017 International Conference on Information Management and Technology (ICIMTech)*, 2017, pp. 340-344.

[13] A. Ridho, R. Rispianda, and G. P. Liansari, "Implementasi Sistem Material Requirement Planning (MRP) dan E-Commerce Berbasis Enterprise Resource Planning (ERP) di PT. XYZ Menggunakan Software Odoo," *Reka Integra,* vol. 3, no. 3, 2015.

[14] R. Akbar and J. Juliastrioza, "Penerapan Enterprise Resource Planning (ERP) untuk Sistem Informasi Pembelian, Persedian dan Penjualan Barang pada Toko EMI Grosir dan Eceran," *Jurnal Nasional Teknologi dan Sistem Informasi,* vol. 1, no. 1, pp. 7-17, 2015.

[15] F. Akbar and R. Akbar, "Implementasi Openbravo pada Proses Transaksi Penjualan, Produksi dan Sistem Inventory (Studi Kasus PT. Nusantara Beta Farma)," *Jurnal Nasional Teknologi dan Sistem Informasi,* vol. 1, no. 1, pp. 1-6, 2015.

[16] N. B. Fitrah, R. Rispianda, and G. P. Liansari, "Rancangan Implementasi Enterprise Resource Planning Berbasis Open Source Menggunakan Software Odoo Pada Lini Bisnis Modul Surya di Perusahaan Elektronika," *Reka Integra,* vol. 4, no. 1, 2016.

[17] A. M. AM and R. Akbar, "Penerapan Sistem Informasi Penjualan dan Inventori Handphone serta Aksesorisnya Menggunakan Enterprise Resource Planning (ERP)(Studi Kasus: Toko Nahda Cell)," *Jurnal Nasional Teknologi dan Sistem Informasi,* vol. 2, no. 2, pp. 63-76, 2016.

[18] H. Putra and R. Azhari, "Penerapan Enterprise Resource Planning (ERP) Pengadaan Bahan Baku dan Pengelolaan Produksi Pada Perusahaan Furniture Menggunakan ADempiere (Studi Kasus: CV Roland Kencana)," *Jurnal Nasional Teknologi dan Sistem Informasi,* vol. 2, no. 3, pp. 117-128, 2016.

[19] C. Hardjono, E. Darwiyanto, and G. Wisudiawan, "Perancangan dan Implementasi ERP (Enterprise Resource Planning) Modul Sales dan Warehouse Management Pada Perusahaan Cv. Brada," *eProceedings of Engineering,* vol. 4, no. 3, 2017.

[20] A. Terminanto, R. Hidayat, and A. N. Hidayanto, Implementation of enterprise resource planning using Odoo module sales and CRM. Case study: PT Ecosains Hayati," *IOP Conference Series: Materials Science and Engineering,* vol. 277, p. 012034, 2017/12 2017.

[21] M. I. Fauzi, A. Y. Ridwan, and M. Saputra, "Perancangan Sistem ERP Manajemen Rantai Pasok Halal Untuk Industri Makanan Modul Manufacturing Dengan Metode Asap (studi Kasus: Vannisa Brownies)," *eProceedings of Engineering,* vol. 6, no. 2, 2019.

[22] S. Aziza and G. H. N. N. Rahayu, "Implementasi sistem enterprise resource planning berbasis Odoo modul sales dengan metode RAD pada PT XYZ," *Journal Industrial Servicess,* vol. 5, no. 1, pp. 49-57, 2019.

[23] N. K. Y. Ristyawati, I. K. A. Purnawan, and G. M. A. Sasmita, "The Implementation of Enterprise Resource Planning ERP on Sales Management Module using Odoo 11," *International Journal of Trend in Scientific Research and Development,* vol. 4, no. 4, pp. 1-4, 2020.

[24] A. P. E. Wibowo, A. H. Ismanto, and S. A. Bagaskara, "Implementasi Enterprise Resource Planning (Erp) Pada Sistem Pembelian, Persediaan, Penjualan, Dan Crm Menggunakan Dolibarr (Studi Kasus: Pt Karya Tani Indonesia)," *Nusantara Journal of Community Engagement,* vol. 2, no. 1, pp. 127-132, 2021.

Appendix

Appendix 1. To-Be Business Process