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Implementation of barokah farm business process modeling in kampar regency in accelerating digital transformation using business process model and nation (BPMN)

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ABSTRACT

Digital transformation is an important need for MSMEs in the livestock sector to increase efficiency and competitiveness. Barokah Farm, as an egg-laying chicken farming business in Kampar Regency, faces various business process challenges, most of which are still carried out manually. This study aims to map the Barokah Farm business process using the Business Process Model and Notation (BPMN), identify digitalization opportunities, and provide recommendations for process improvements. This study contributes to the scarce BPMN literature in agribusiness by being one of the first to model small-scale poultry farming processes in Indonesia, offering both theoretical insights on BPMN's adaptability to resource-constrained UMKM and practical guidance for improving efficiency, reducing costs, and supporting digital transformation initiatives. The method used is a case study with a qualitative and quantitative descriptive approach, through interviews, field observations for six months, and process simulations using the Bizagi Modeler application. The results of the study show that digitalization of the ordering process, procurement of raw materials, and product delivery can increase operational efficiency. The implementation of the recommended digital solution is estimated to reduce the total process duration by 38.89%. The highest efficiency occurs in the ordering process with a reduction in time of up to 66.67%, followed by product delivery within the city (44.44%), product procurement (40%), and product delivery outside the city (31.58%). The systematic application of BPMN not only helps in visualizing more effective business processes but also supports the acceleration of digital transformation at Barokah Farm.

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1. INTRODUCTION

The livestock sector in Indonesia plays an important role in providing food and driving the regional economy, including in Kampar Regency. Small and medium-scale livestock businesses, such as Barokah Farm, face various challenges in increasing productivity and competitiveness in the

current digital era (Supit & Pratasik, 2021). Many business processes in this sector are still carried out manually, making them less efficient and at risk of recording errors and information delays. The distribution factor of commercial animal feed for livestock from factories to farmers has a very long chain, so that the selling price at the sub-agent or feed seller level becomes expensive (Jati et al., 2017). Barokah Farm was chosen because it represents a livestock MSME with large market potential but still relies on manual processes, making it relevant as an example of BPMN implementation in formulating a digital transformation strategy. Indicators of current business process inefficiencies Long order-to-delivery time (long cycle time), frequent errors in stock/financial recording, delayed distribution due to bottlenecks and a long supply chain, high operational costs due to manual processes.

Digital business transformation is a series of shifts from conventional processes to a focus on technology and customers. Digital business impacts every work unit in an organization or company, from employee experience to customer service to maintenance and front-line management (Reza Aulia et al., 2022). However, in order for digital transformation to run optimally, a deep understanding of existing business processes is needed, so that digitalization is carried out in a structured and targeted manner. Digital transformation in the livestock sector includes the application of information technology in production management, inventory management, marketing, and financial management (Dayioğlu & Türker, 2021). Several studies have shown that the adoption of digital technology can increase production process efficiency by 20-30% and significantly expand market access (FAO, 2022). However, the adoption of this technology at the MSME farmer level is still low, mainly due to the lack of systematic business process mapping (Appio et al., 2024).

The importance of digital transformation at Barokah Farm is also increasing considering the increasing consumer demand for traceable products, hygienic production processes, and speed of service. Therefore, good business process modeling is the foundation for an effective digital transformation strategy. Business Process Model and Notation (BPMN) is an international standard used to model business processes in the form of diagrams that are easily understood by all stakeholders. BPMN helps identify inefficiencies, redundancies, and opportunities for digitalization in existing business processes (van der Aalst, 2013).

The use of BPMN in the context of agribusiness and livestock has been shown to provide benefits in increasing process transparency, accelerating decision-making, and supporting the development of process-based information systems (Kirikkayis et al., 2024). At Barokah Farm, the BPMN approach is expected to be a strategic initial step in formulating a digital transformation roadmap. Barokah farm is a livestock business engaged in livestock farming, especially laying hens, located in Salo District, Kampar Regency, Riau Province. The livestock business has been established since April 7, 2018, in the business process of developing the business there are several main operational stages, namely the ordering process, procurement of materials, and delivery of livestock to customers. According to (Yoppy Mirza Maulana, 2023), the business process is one of the main keys in managing activities and relationships between activities within an organization.

Barokah Farm's customers include restaurants, MSMEs, schools, Islamic boarding schools and even preparations for religious holidays that require its products such as eggs and chicken meat. Barokah Farm has a very significant business potential, although there is potential for growth, most processes are still carried out manually and not digitized. This causes Barokah Farm to face problems such as inefficiency and delays in distribution and reporting. This is in line with findings that show that MSMEs often lag behind in implementing digital technology compared to large companies, which can adapt more quickly to changes in the increasingly competitive market environment (Borštnar & Pucihar, 2021); (Appio et al., 2024)).Research also notes that limitations in systematic documentation of business processes are one of the main barriers to implementing digital technology (Brunetti et al., 2020).

To overcome these challenges, a systemic approach is needed in mapping and redesigning business processes, one of which is through the use of Business Process Model and Notation (BPMN). BPMN is known as an effective tool in visualizing and documenting business processes, allowing stakeholders to better understand flows and interactions (González-Varona et

al., 2021).The implementation of BPMN at Barokah Farm aims to create an ideal process model (to-be) that contributes to accelerating digital transformation, which not only optimizes documentation but also supports the development of more efficient and adaptive information systems to technological changes (Kumar et al., 2020).This effort is also in line with the government's program to accelerate the adoption of digital technology among MSMEs, encouraging them to be able to compete better in the industrial era 4.0 (Malesev & Cherry, 2021). The rapid development of information and communication technology in the context of the industrial revolution 4.0 creates challenges and opportunities for various sectors, including agriculture and animal husbandry. Digital transformation is now not just about adopting tools or software, but also leads to fundamental changes in business operations. This transformation requires micro, small, and medium enterprises (MSMEs) such as Barokah Farm to adapt to the new dynamics presented by digitalization. In the marketing process, digital transformation alone is not enough to run the business (Firmananda et al., 2024).

2. RESEARCH METHOD

This study uses a case study method with a qualitative and quantitative descriptive approach by combining several approaches to gain an in-depth understanding of what happens in the group. This study uses a quantitative descriptive design with a Business Process Management approach through BPMN modeling. Quantitative data was obtained from measuring business process efficiency indicators (cycle time, operational costs, recording error rates, and production throughput) which were processed using Bizagi simulations to compare the current conditions with the future model. The analysis was conducted using process performance analysis techniques through BPMN simulations in Bizagi. The simulation results yielded average values for cycle time, costs, and resource utilization. The data was then analyzed using a before-after comparison (as-is vs. to-be) to demonstrate differences in business process efficiency. Data collection techniques through interviews with the owner and 8 barokah farm staff. direct observation of business processes in the field for 6 months. Interviews were conducted with the owner and eight staff members. The owner was selected because he has strategic decision-making authority, while staff were selected based on their direct involvement in core processes (ordering, procurement, distribution) and support (administration and finance). The eight people were considered representative because they covered all key operational functions within the Barokah Farm business. Business process modeling with BPMN using Bizagi Modeler software. To ensure validity, this study used source triangulation (comparing the results of interviews with the owner, direct process observations, and internal documents such as production records and sales reports). Additionally, member checking was conducted with the business owner to ensure the interpretation of the results aligned with the actual conditions. Analysis of digitalization opportunities based on the process model in Figure 1. as follows:

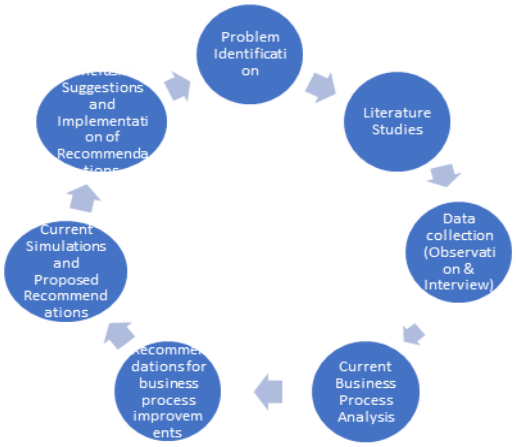

Figure 1. Analysis of digitalization opportunities based on the process model

The following is an explanation of the research methodology:

A. At the problem identification stage, the researcher understands the business processes that have been carried out by Barokah Farm and already understands the existing problems to formulate the problem. Problem solving is how the implementation of operational business process modeling can be explained by implementing BPMN and what recommendations are given in improving the business operations.
B. Literature study, in this study, a literature study was also carried out in searching for theories and relevant research results that will later strengthen the arguments and basic theories that are relevant in the context of the research.
C. At the following stage of the data collection process, the researcher prepares methods such as interviews and observations to obtain information. The steps that have been taken are preparing questions related to the business operations that have been carried out by Barokah Farm.
D. In the following stage, the analysis and business modeling that have been obtained and summarized by researchers in the results of interviews and observations. After the analysis and the formation of an as-is business process picture is then carried out by implementing it using the Business Process Model and Nation (BPMN). The ongoing activities will be displayed with BPMN standardization symbols so that business process communication can be understood and understood.
E. In the following stage, recommendations for improving the business process, the results of the analysis decision convey that there are activities that are considered less efficient so that there needs to be a recommendation for a new business model process based on a comparative analysis, which will later be given to Barokah Farm.
F. At this stage, the business process simulation carried out on activities using the bizagi modeler application, at this simulation stage to find ways to solve problems and to increase efficiency in terms of cost and time at Barokah Farm.
G. At the simulation result stage, there are results for each business process. With the conclusion of the recommendation results as an evaluation and input for future performance.

3. RESULTS AND DISCUSSIONS

Identification of Digitalization Opportunities

Based on BPMN modeling, several processes were found that can be optimized through digitalization, the digitalization opportunity identification table can be seen in table 1. Here:

Table 1. Identification of digitalization opportunities

Process	Current Issues	Digitalization Solutions
Feed recording	Manual, error prone	Feed recording mobile application
Vaccination schedule	Not well scheduled	Automatic reminder system
Marketing	Limited market, not online	Creating an online store (marketplace and website)
Financial statements	Not yet digitized	Simple accounting software

After carrying out several stages and then conducting interviews and observations as data collection methods, then obtained three main business processes as the main focus in this study, namely the aspect of the ordering process, the aspect of the livestock product procurement process, then the aspect of the livestock product delivery process to customers. The ordering business process is the initial stage in the series of the Barokah Farm business process. Each customer is required to make an initial payment as a down payment or dp. The second business process is the involvement of suppliers or other farms in producing and preparing the ordered livestock products. The final stage of the product is ready to be sent to the customer. Barokah Farm receives full payment and creates a settlement invoice as a sign that it has been paid in full to the customer.

Current Business Process Modeling

At this stage, the steps in carrying out the business process using the bizagi Modeler application. The image below explains the form of the ordering process, the process of purchasing livestock products, and the process of sending products to customers.

a. Livestock Product Ordering Process, at this stage, the activity in the ordering process begins with prospective customers contacting the Barokah Farm Admin via the telephone number listed/via WhatsApp chat and conveying their needs according to the order. The next step is for the admin to immediately confirm the availability or availability of livestock products such as Broiler Chickens, Laying Hens and Chicken Eggs, if the product is available, the confirmation is accepted, if not, the order is rejected. If the order is in accordance, the Customer is required to make a down payment at the beginning as a down payment, with a nominal amount according to the initial agreement. The following is an illustration of the BPMN process as follows:

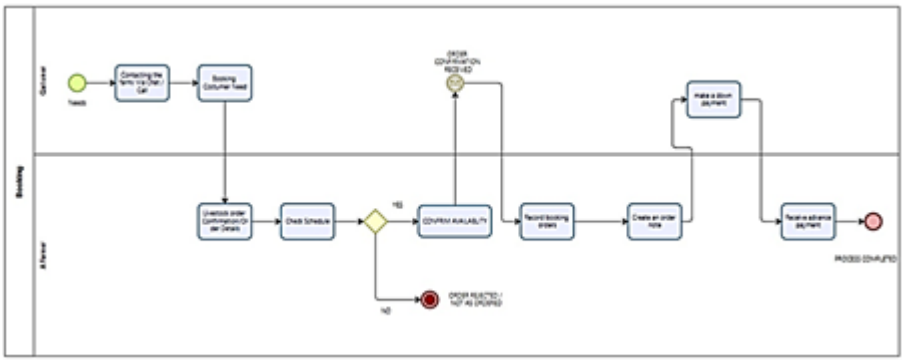

Figure 2. Livestock product ordering process

b. Livestock Product Availability Procurement Process, in this second stage, the next activity is in the procurement process for the availability of materials and raw materials from suppliers. Starting by asking about the availability of livestock products according to the shopping list of needs, then visiting the supplier's location, if the requested product is available, negotiate the price, if not available, then look for another supplier as an alternative. If that happens, the process will add time. The process is illustrated by the BPMN as follows:

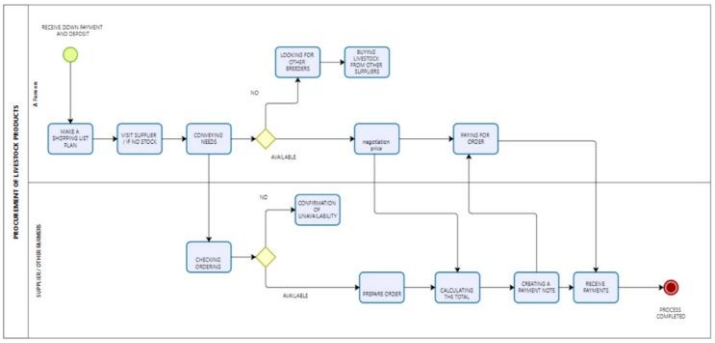

Figure 3. Procurement process for livestock product availability

c. Shipping process, in this third stage, Barokah Farm ensures that the order has been completed, so the order is ready to be delivered to the customer's address. Barokah Farm provides labor and transportation for sending the order. The process is illustrated by BPMN as follows:

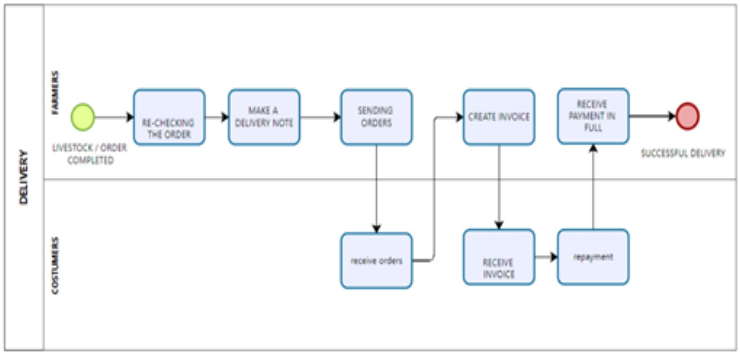

Figure 4. Livestock product delivery process

Business Process Problem Identification Table

At this stage, the steps in identifying business process problems. This table provides an overall picture of the problems that need to be addressed to improve the efficiency and quality of business processes at Barokah Farm. The following is illustrated in the table:

Table 2. Identification of business process problems

Findings	Risk
Order recapitulation is rated as Poor	There are errors in the ordering process resulting in loss of customer data.
Dependence on Suppliers	Can result in delays in obtaining Livestock Product Availability
Less Efficient Shipping Management Process	There is a decrease in customer loyalty and no real-time order tracking

Recommended Business Process.

In this stage of the process after identifying the problems of the ongoing business process. There are suggestions and input from researchers to improve the effectiveness and efficiency of the business process. The following are recommended inputs that are in accordance with some that have been identified:

1. The following are the stages of the Barokah Farm ordering process recommendations, the recommendations given are in the form of using information technology, namely the need for connectivity using Google Form, and also using a website, on the website there is an order format feature that has been provided. The format provided is very detailed and detailed such as Name, date of purchase type, number of buyers, customer address and shipping recommendations. Such as selecting the date, details of the product ordered, quantity, shipping address and easier transfer payment method (Tukino et al., 2020). Payment can use a virtual code. The process is illustrated by BPMN as follows:

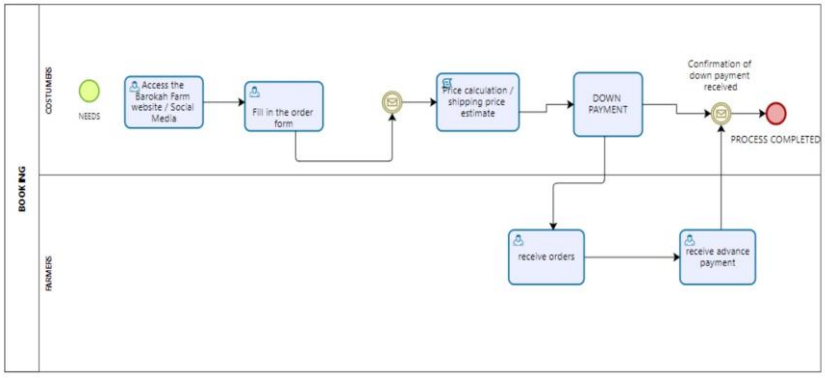

Figure 5. Recommendation Process for Ordering Livestock Products

2. The following are the stages of the raw material process recommendation, the raw material management process at Barokah Farm includes procurement, storage, and distribution of materials to production units. Raw material inventory planning is very important to ensure that the production process can run smoothly (Tukino et al., 2020). Based on the results of business process modeling with BPMN, the following are the stages of recommendations that can be applied to improve the efficiency and accuracy of raw material management: a) Raw Material Requirements Planning, at the beginning of each month, an estimate of raw material requirements is made based on production projections. Historical data and consumption trends are used for automatic calculations through a simple ERP system; b) Raw Material Procurement, the procurement process is carried out digitally through an e-procurement platform or business communication application (eg WhatsApp Business or livestock marketplace). All transactions are recorded in the system. The recommendations given are in the form of using information technology, namely the need for connectivity using Google Form, and also using a website, on the website there is an order format feature that has been provided. The format provided is very detailed and detailed such as Name, date of purchase type, number of buyers, customer address and shipping recommendations. Payment can use a virtual code; c) Receipt and Quality Inspection, every incoming raw material is verified for quantity and quality. The inspection results are directly recorded in the inventory application; e) Storage and Stock Management, raw materials are stored according to standards (eg temperature, humidity). The digital inventory system provides automatic warnings if stock approaches the minimum limit; d) Internal Distribution to Production Units, the taking of raw materials for production is recorded in real time to avoid errors in stock issuance.

With the implementation of this digital process, it is hoped that the management of raw materials will be more efficient, accurate, and can be monitored by management periodically. The following are the recommended stages of the ordering process at Barokah Farm. The process is illustrated by BPMN as follows:

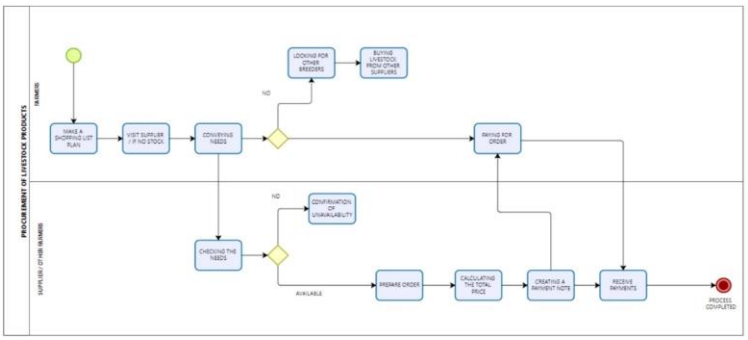

Figure 6. Recommendation Process for Purchasing Livestock Products

f. The following are the stages of the recommendation for the shipping process, The following are the recommended stages of the shipping process at Barokah Farm. These recommendations are compiled based on the analysis of the results of previous business processes that indicate the need for increased efficiency in product distribution. The recommendations provided include the use of information technology as the main means of optimizing shipping services. The use of digital communication networks and information technology systems in the field of shipping services, both locally and inter-regionally, is the main strategy in accelerating the logistics process. Digital platforms such as Gojek, Grab, and Maxim can be used for fast and flexible city deliveries, while J&T, Lion Parcel, and other Cargo Logistics shipping services can support distribution outside the city and between provinces with a wider reach.

With the integration of these digital services, both consumers and business owners can track the shipping status in real-time through the available applications, thereby increasing transparency and customer satisfaction. In addition, the payment system can also be automated using virtual codes or other digital methods that are safer and more efficient, reducing the potential

for transaction errors and speeding up the administration process. According to (Reza Aulia et al., 2022) the use of digital technology-based information systems in the supply chain has been proven to increase accuracy, data accuracy, and speed of service in product distribution.

The use of this technology also allows all stages of logistics—from order processing, delivery scheduling, to confirmation of receipt of goods—to be managed in an integrated manner. Thus, the delivery process at Barokah Farm is not only faster and more efficient, but also more adaptive to consumer needs in the digital era. This recommended delivery process is visualized through the Business Process Model and Notation (BPMN) as follows:

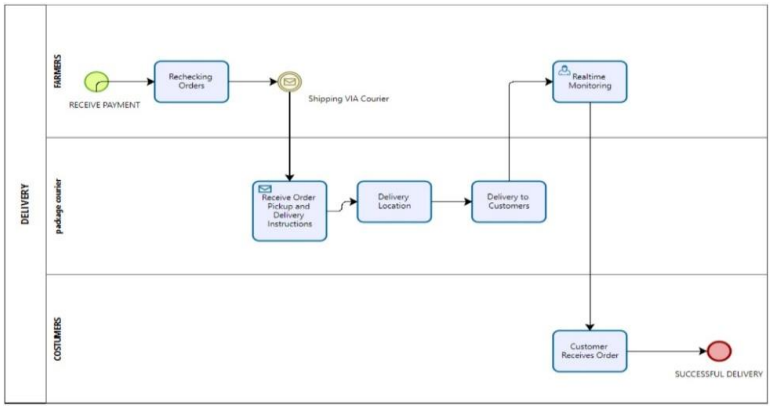

Figure 7. Recommendation Process for Purchasing Livestock Products

Results of Modeling Analysis Using BPMN with Business Process Simulation. Based on the results of the analysis, the modeling recommendation using BPMN (Business Process Model and Notation) is a visual and logistical representation of how a business process is run, including workflows, actors, decisions, and interactions between elements in the organization. BPMN provides a notation standard that is easily understood by various stakeholders, both from the technical and non-technical side, thus facilitating the communication process and system analysis (Kirikkayis et al., 2024). However, to obtain more accurate and implementable results, BPMN modeling should not stand alone, but rather be combined with business process simulation. Simulation allows users to test system performance in real conditions through modeling based on time, cost, and resource capacity. Simulation can also be used to analyze various scenarios, such as changes in activity duration, additional workforce, or reduction in the number of process steps, to obtain data-based decisions. According to (Laguna & Marklund, 2013), integrated simulation in business process analysis allows organizations to validate and verify system planning before it is implemented, thereby reducing the risk of errors in implementation. In the context of MSMEs, this approach is very important because it can improve operational efficiency at minimal cost. In addition, simulation also supports the process of continuous improvement in operational management (Pidd, 2024). Table 2 in this report presents a comparison between the actual duration and the recommended duration based on the results of the business process simulation. The actual duration used in BPMN modeling and entered into the Bizagi Modeler application is data obtained directly from interviews with MSME owners. Meanwhile, the recommended duration is obtained from the results of a literature review and previous journal references (Dewantari, 2018), which shows an estimate of the ideal time based on best practices in process management. This comparison provides important information regarding the time efficiency that can be achieved if the business process is run based on the results of modeling and simulation. Thus, these results can be used as a basis for consideration for MSMEs in redesigning business processes to increase productivity and competitiveness.

Table 2. Comparison of duration

No	Sub Business Process	Current duration	Recommended Duration	Duration difference
1	Booking	1 H 30 M	30 M	1 H
2	Product Procurement	2 H 30 M	1 H 30 M	1 H 30 M

No	Sub Business Process	Current duration	Recommended Duration	Duration difference
3	Product Delivery within the City	4 H 30	2 H 30 M	2 H 30 M
4	Overseas Product Delivery	9 H 30 M	6 H 30 M	4 H
	Total	3 H 3 M	3 H 3 M	3 H 3 M

Based on the analysis of modeling recommendations using BPMN, it can be concluded that there is an increase in the efficiency of the recommended business process when compared to the current business process.

The results of the current study are consistent with previous research highlighting the potential of digital technologies to improve efficiency and competitiveness in agribusiness. Similar to the findings of Dayioğlu & Türker (2021) and FAO (2022), the BPMN-based simulation in this study demonstrates that digital adoption can reduce cycle times, minimize operational costs, and increase transparency across processes. However, unlike prior studies that often focused on large-scale enterprises or advanced economies, this research provides empirical evidence from a small-scale poultry farm (UMKM) in Indonesia, where digital adoption remains limited. In line with Brunetti et al. (2020) and Appio et al. (2024), the study confirms that the absence of systematic business process documentation is a major barrier to digital transformation. At the same time, it extends existing literature by showing how BPMN modeling can be used not only to identify inefficiencies but also to design a practical roadmap for digitalization in resource-constrained environments.

4. CONCLUSION

Based on the results of interviews and observations, it was found that there are business processes that have not been clearly defined as follows: the ordering process at Barokah Farm is currently still done manually, so it needs to be improved through the implementation of an online ordering system to make it easier for customers and speed up order recording. In the raw material procurement process, an integrated system is not yet available; the use of a digital inventory system is expected to help plan needs and monitor stock in real time. Meanwhile, in the product delivery process, there is no adequate tracking system; the implementation of a shipping tracking application will increase the transparency of the distribution process and customer satisfaction. Based on the analysis of the duration of the business process, the implementation of digital solutions at Barokah Farm is estimated to reduce the total process duration by 38.89%. The highest efficiency occurs in the ordering process with a reduction in time of up to 66.67%, followed by product delivery within the city (44.44%), product procurement (40%), and product delivery outside the city (31.58%). This increase in efficiency is expected to accelerate customer service, reduce operational costs, and increase business competitiveness. This study is among the first to apply Business Process Model and Notation (BPMN) in the context of small-scale poultry farming (UMKM) in Indonesia, providing a systematic process mapping that highlights inefficiencies and formulates a digital transformation roadmap—a domain where existing BPMN literature remains scarce.

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