Jurnal Informatika: Jurnal pengembangan IT

Vol. 10, No. 3, 2025
ISSN : 2477-5126, DOI:10.30591/jpit.v10i3.8598

Developing a Web-based MSME Sales Revenue Data Management and Reporting Portal Using OAuth 2.0

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Info Artikel

Riwayat Artikel:

Received 2025-03-21
Revised 2025-08-02
Accepted 2025-08-04

Abstract *– The background of this study lies in the continued use of conventional methods for collecting MSME (Micro, Small, and Medium Enterprises) data. These methods result in data that is not real-time, lacks accuracy, and is difficult to analyze quickly and comprehensively. Additionally, DinKopUKM (Department of Cooperatives and MSMEs) is required to monitor MSME development and business activity, which serve as key indicators in determining eligibility for government assistance and facilities. Therefore, DinKopUKM requires monthly MSME sales revenue data. The objective of this study is to develop a portal for MSME data management and sales revenue reporting. The portal was built using Laravel for the backend and Next.js for the frontend, with a responsive web design to ensure accessibility across various devices. To support data integration and communication with previously developed resources, OAuth 2.0—a widely adopted protocol—was implemented. This facilitates easier integration with various systems and enhances security by using time-limited access tokens that grant specific permissions, thereby eliminating the need for users to share their passwords with third-party applications and minimizing the risk of credential exposure. The portal was tested using black-box testing, which confirmed that it functions according to system requirements and design specifications. Additionally, usability testing was conducted using the System Usability Scale (SUS), which resulted in a score of 77. This indicates that the portal falls within the ACCEPTABLE range of acceptability and received a GOOD rating for usability. Overall, the developed portal supports DinKopUKM in carrying out MSME data collection, monitoring MSME progress, and encouraging administrative compliance among MSMEs.*

Keywords: *Larave;, OAuth 2.0; Sales Revenue Report; MSME Profiling; Web Portal.*

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Abstrak *– Latar belakang penelitian ini adalah masih digunakannya metode konvensional dalam pendataan UMKM. Hal ini menyebabkan data yang terkumpul tidak real-time, kurang akurat, serta sulit dianalisis secara cepat dan menyeluruh. Selain itu, DinKopUKM juga perlu melakukan proses pengawasan terhadap perkembangan UMKM serta keaktifan bisnis UMKM yang menjadi salah satu indikator pemberian bantuan dan fasilitas dari pemerintah. Oleh karena itu, DinKopUKM membutuhkan data omzet UMKM setiap bulannya. Tujuan penelitian ini adalah untuk membangun portal pengelolaan data UMKM dan pelaporan omzet UMKM. Portal dibangun menggunakan teknologi Laravel untuk backend dan NextJS untuk frontend, dengan desain web yang responsif agar dapat diakses dari berbagai perangkat. Selain itu juga untuk mendukung integrasi data dan komunikasi data dengan sumber daya yang telah dibangun pada penelitian sebelumnya, diimplementasikan OAuth 2.0 yang merupakan protocol ang diadopsi secara luas sehingga memudahkan pengembang untuk berintegrasi dengan berbagai sistem. Dari sisi keamanan, OAuth 2.0 menggunakan token akses, yang dibatasi waktu dan memberikan izin khusus sehingga tidak mengharuskan pengguna membagikan kata sandi mereka dengan aplikasi pihak ketiga. Hal ini meminimalkan risiko terekspos nya kredensial pengguna. Portal yang dibangun diuji menggunakan metode blackbox testing dan didapatkan bahwa telah sesuai dengan kebutuhan dan perancangan sistem. Selain itu, juga dilakukan pengujian usability menggunakan System Usability Scale (SUS) dan didapatkan skor 77 sehingga dapat diinterpretasikan bahwa acceptability ranges portal adalah ACCEPTABLE dan adjective rating untuk usability portal adalah GOOD. Adapun portal yang dibangun membantu DinKopUKM dalam menjalankan tugas pendataan UMKM, monitoring UMKM, dan mendorong UMKM untuk tertib administrasi.*

Kata Kunci*: Laravel, OAuth 2.0, Sales Revenue Report, MSME Profiling, Web Portal.*

I. INTRODUCTION

In the context of the global economy, Micro, Small and Medium Enterprises (MSMEs) have an important role in driving the wheels of a country's economy. In Indonesia, MSMEs contribute more than 60% to Gross Domestic Product (GDP) and create jobs for millions of people [1], [2]. For this reason, the Department of Cooperatives and SMEs has a strategic role in supporting and strengthening MSMEs.

One of the functions of the Cooperatives and SMEs Service under the Ministry of Cooperatives and SMEs is coordinating the implementation of tasks, coaching and providing administrative support for MSMEs. The basis of MSME administrative support is MSME data collection. By collecting data on MSMEs, it can be used

as a reference for other support such as: 1) providing assistance or capital; 2) empowering MSMEs through certification; 3) empowering MSMEs through training; 4) monitoring the continuity and business development of MSMEs. Therefore, it is necessary to utilize digitalization for an effective MSME data collection process.

Several previous studies have emphasized the importance of MSME data collection applications. One such study is "*Perancangan Sistem Informasi Usaha Mikro Kecil dan Menengah (UMKM) Berbasis Web di Desa Bojongsari*" conducted by Yana Cahyana, which concluded that a web-based MSME information system can facilitate a faster data collection process and support structured data management. This, in turn, provides significant benefits to Bojongsari Village officials in making informed decisions. [3]. The second study, entitled "*Sistem Informasi Pendataan Usaha Mikro Kecil dan Menengah (UMKM) Kabupaten Kuantan Singingi*", conducted by Sela Erdanis, found that the developed information system improved the effectiveness of data processing and facilitated the Department of Industry and Trade in monitoring the development of MSMEs. [4].

In addition to fulfilling its role in providing services to MSMEs, the background of this study lies in the continued use of conventional methods for MSME data collection. This practice results in data that is not real-time, lacks accuracy, and is difficult to analyze comprehensively and efficiently. Furthermore, DinKopUKM must carry out monitoring of MSME development and business activity, which are key indicators for determining eligibility for government assistance and support programs. Therefore, DinKopUKM requires monthly MSME revenue data to support this oversight function.

In this research, a portal for managing MSME data and sales revenue reporting was carried out to support transparent information management [5], monitoring MSME business implementation [6], and encouraging orderly administration in MSMEs so as to optimize efforts to empower MSMEs [7]. This portal is named SmartUMKM. The portal was built using Laravel technology for the backend and NextJS for the frontend, with a responsive web design so that it can be accessed from various devices. Laravel is a very interactive and intuitive PHP (Hypertext Preprocessor) based web development framework [8] using the MVC (Model View Controller) concept [9]. Laravel also creates standardized event processes, processes several non-business logic relationships automatically [10], and makes it possible to code in an elegant and simple way [11].

NextJS is used because it can improve user experience, has extraordinary performance, and can simplify the coding process [12]. With this application, it is hoped that the process of managing information and reporting MSME assets can become more efficient. In the development of this portal, OAuth 2.0 is also implemented for data communication with previously built resources [13]. This is a step for data communication security and data centralization [14], [15]. OAuth 2.0 enhances user security by utilizing access tokens, which are time-limited and grant specific permissions. This mechanism eliminates the need for users to share their passwords with third-party applications, thereby reducing the risk of credential exposure. [16], [17]. This minimizes the risk of user credentials being exposed in the event that a third-party application is compromised. From a standardization perspective, OAuth 2.0 is a widely adopted protocol, meaning it is supported by numerous services and platforms. This broad adoption facilitates easier integration for developers with various systems in the future. [14].

The state-of-the-art foundation of this study is based on previous research, which highlighted the need for digital MSME data collection to support more effective data management. The novelty of this research lies in the following contributions:1) The system architecture is designed to enhance communication efficiency and data security, thereby facilitating more efficient system development in the future; 2) The sales revenue reporting feature, which is not present in previous systems, supports the oversight function of DinKopUKM for mentored MSMEs and simplifies the assessment of MSME eligibility in the process of receiving government assistance or facilities.

II. METHODOLOGY

This research uses the Prototyping process model as shown in Figure 1. In the Prototyping process model, prototypes are built, tested, and modified successively until acceptable results are created, from which a complete system or product can be developed [10] [18]. This process model is suitable for developing systems that have a lot of interaction with end users and improves the quality of specifications requested by users [19], so that end users can get an "actual feel" even before the coding process is carried out [20].

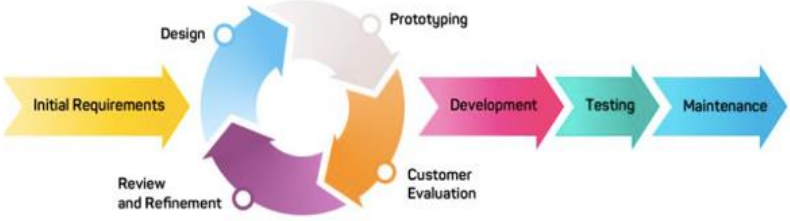

Figure 1. Prototyping process model

A. Initial Requirement

In this first stage, problem identification and needs definition are carried out using the focus group discussion method. The results of this phase are the scope of high-level requirements, business processes, confirmation of scope and indicators of the success of the portal being built as shown in Table 1.

TABLE 1
USER REQUIREMENT AND FUNCTIONAL REQUIREMENT

User Role	Functional Requirements
Public Users	View Announcement
	Check MSME mentorship membership status
	View MSME Statistics
MSME Users	Register
	Login
	Email verification
	Manage password
	Submit Profile (for MSME mentorship applicants)
	Monitor mentorship applications status
	Input Sales Revenue
	View Sales Revenue Graph
Admin	Login
	Dashboard
	Manage MSME mentorship applications (MSME Data collection)
	View MSME Sales Revenue per UMKM
	View total Sales Revenue based on filter (business sector, business type, sub-districts, villages)
	Send sales revenue entry notifications (blasting)
	Announce management
	Manage master data (additional attribution, units, business type, provinces, cities, sub-districts, villages)
	Manage users
	Manage passwords

B. Design

At this stage, a more in-depth analysis of each requirement obtained is carried out and solutions are explored. The result of this phase is a system design created using the Unified Modeling Language (UML) which consists of use case diagrams and activity diagrams, as well as system architecture. The portal architecture is seen in Figure 2. This architecture describes the plan or mapping of information needs in the system being built. Apart from that, it is also a blueprint that explains how the information technology elements used and management work together in one unit and provides an explicit description of this interaction in the system's business processes [21].

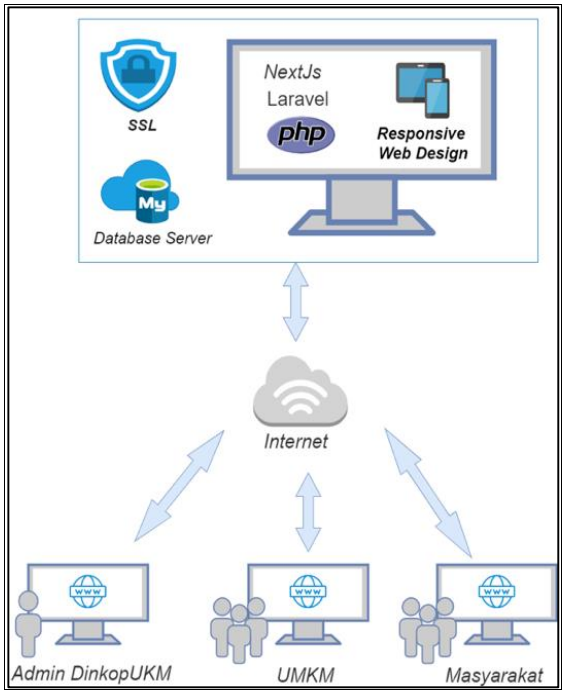

Figure 2. Smart UMKM architecture

This application serves as the foundational system for future applications to be developed in support of DinKopUKM functions related to the implementation of policies in the micro, small, and medium enterprises (MSME) sector, particularly in MSME empowerment. Therefore, an integration architecture must be prepared to ensure interoperability between applications, taking into account key security aspects such as authentication, authorization, confidentiality, data integrity, and non-repudiation to better safeguard user data. It is important to consider that the application stores sensitive personal information such as phone numbers, national ID numbers (KTP), family card numbers (KK), and others. To facilitate secure, user-friendly, and efficient data exchange between systems, OAuth 2.0 has been implemented. Accordingly, a resource server was developed using the RESTful OAuth 2.0 approach. The architecture of the authorization server and resource server is illustrated in Figure 3.

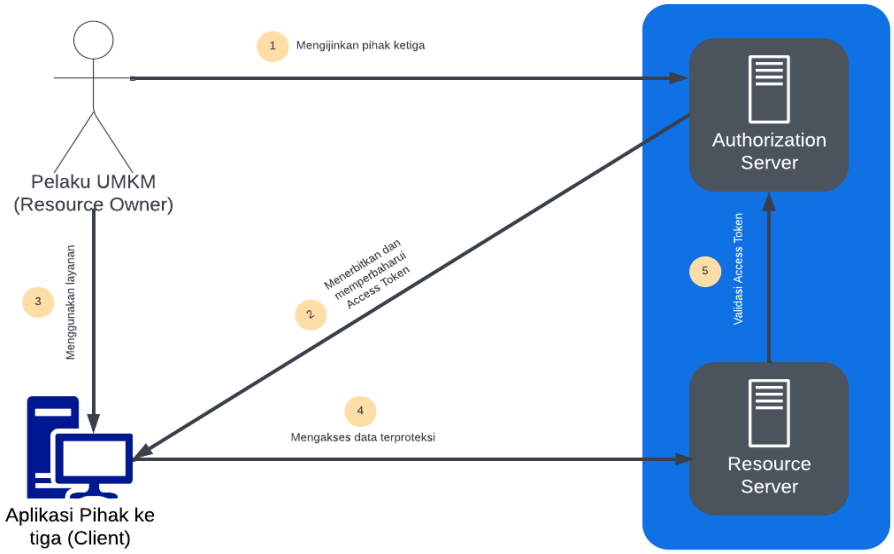

Figure 3. Authorization server dan resource server architecture

The interaction between users and the features in the portal is described using a use case diagram. This diagram is one of the important diagrams used to illustrate the requirements of the system [22] [23]. There are two main actors in this portal, namely MSMEs and admin as seen in Figure 4.

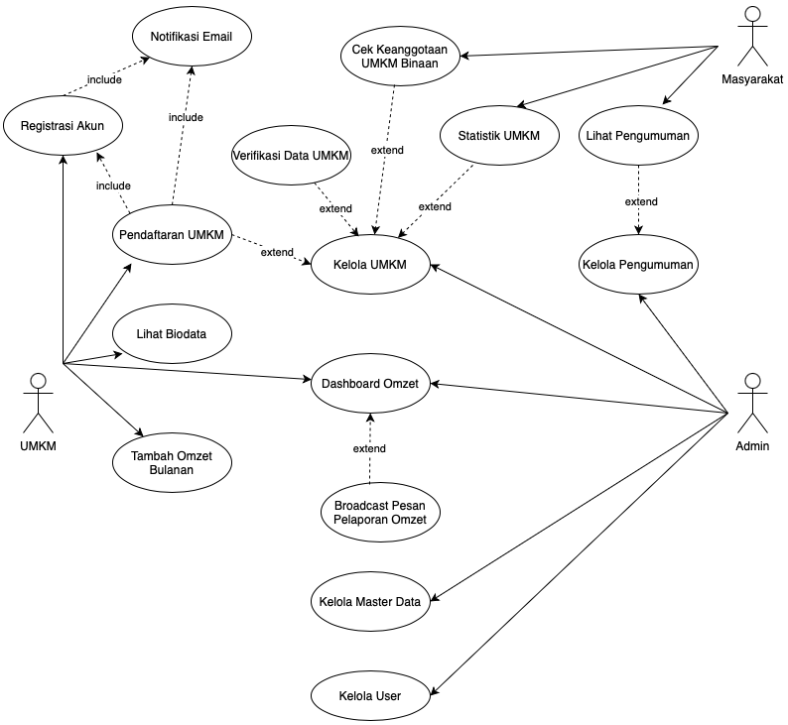

Figure 4. Use case diagram

User interactions with the system are depicted visually using use case diagrams, then modeled dynamically using activity diagrams. Figure 5(a) shows the activity diagram of the registration process for assisted MSMEs. Figure 5(b) shows the activity diagram of the sales revenue reporting process.

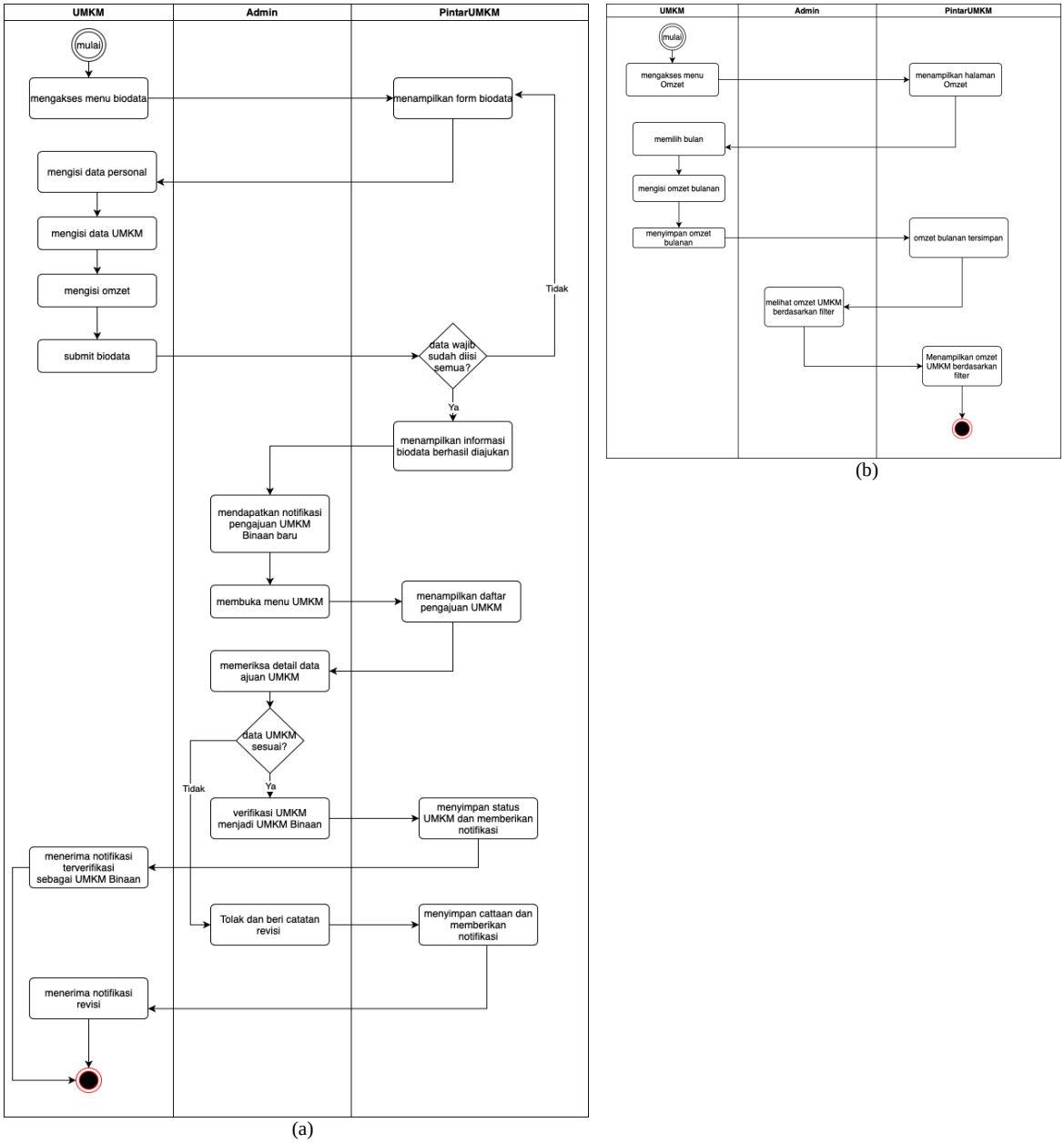

Figure 5. (a) Activity diagram of the registration process for assisted MSMEs, (b) Activity diagram of the sales revenue reporting process

C. Prototyping

At this stage, a prototype is built from the solution that has been formulated. Prototyping begins with designing a mockup that can provide a real picture of the concept being built, where the mockup that is built is given a transition to become a high fidelity prototype.

D. Customer Evaluation

At this stage, testing of the prototype produced in the previous stage is carried out.

E. Review and Refinement

At this stage, reviews and improvements are carried out if there are prototypes that need to be revised from the results of the previous evaluation.

F. Development

At this stage, the system will be developed following the development standards that have been created based on the prototype that has been approved by the Salatiga City Cooperatives and SMEs Service.

G. Testing

At this stage, system testing is carried out to ensure that the functionality created meets the requirements and design. Functional testing was conducted using black-box testing, while usability evaluation was carried out using the System Usability Scale (SUS).

H. *Maintenance*

At this stage, maintenance is carried out on the system that has been built.

III. RESULT AND DISCUSSION

The result of this research is an MSME data management portal which consists of MSME registration features and monitoring MSME sales revenue. Figure 5 is the registration page for fostered MSMEs. On this page, applicants must fill in three groups of data, namely personal data, MSME data and sales revenue data for the last three months. After the registrant submits the data that has been filled in, the Admin will carry out a data verification process. Registrants can monitor the status of the verification process as shown in Figure 6.

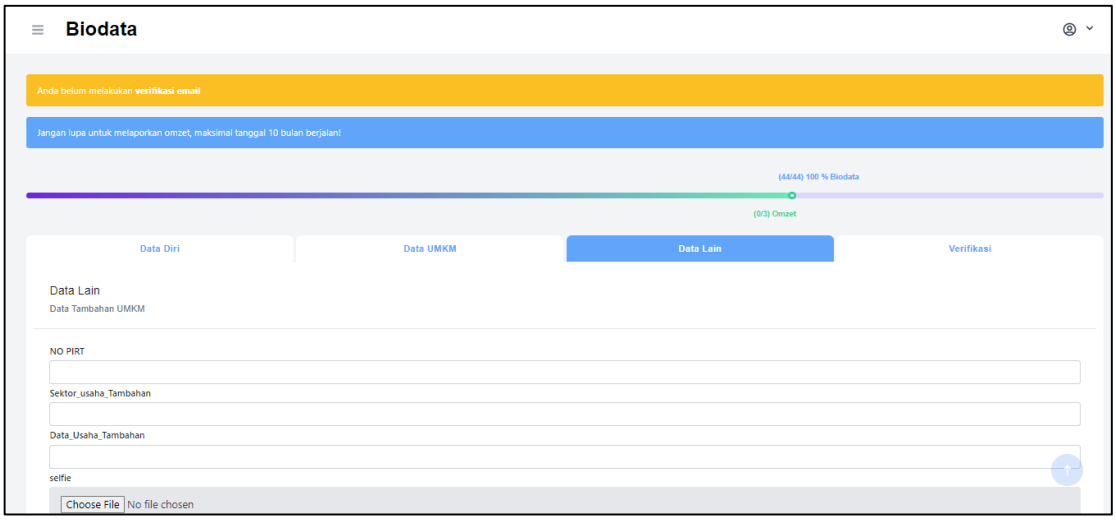

Figure 5. MSME registration page

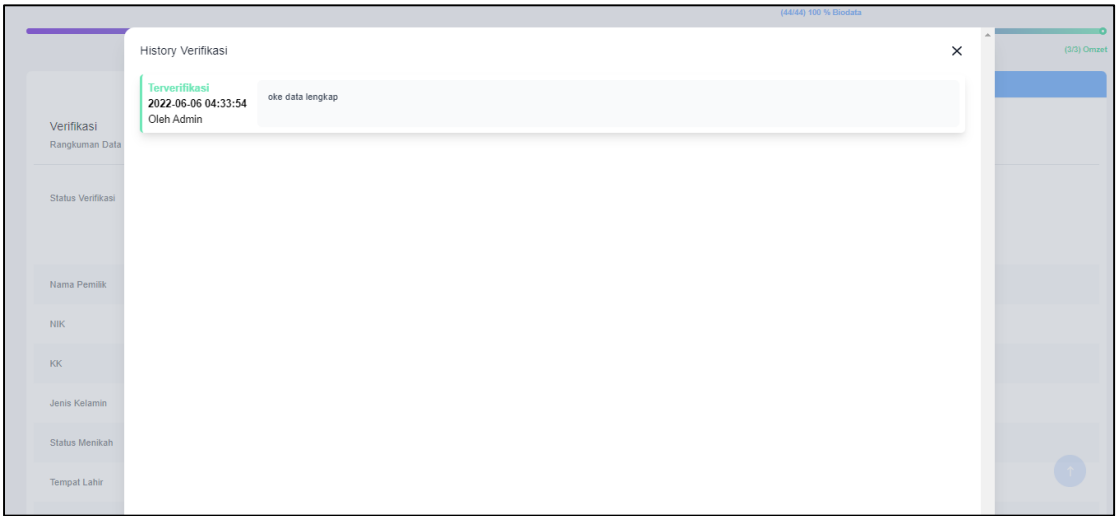

Figure 6. MSME registration verification history

Figure 7 shows the MSME dashboard page after registering as a fostered MSME, where a monthly sales revenue graph will be visible. MSMEs must report their monthly sales revenue using the sales revenue reporting feature, as shown in Figure 8 and Figure 9.

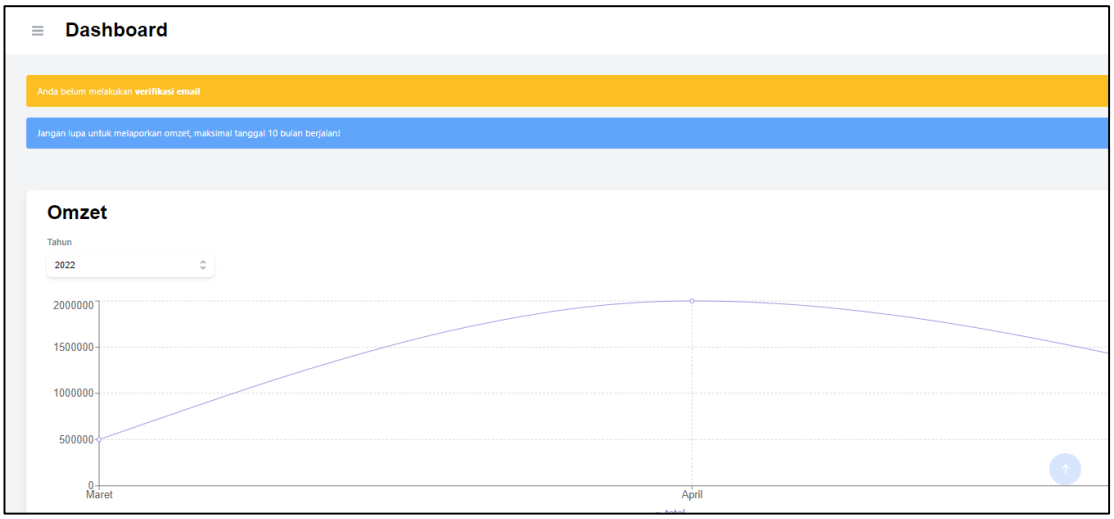

Figure 7. Dashboard display if registered as a fostered MSME

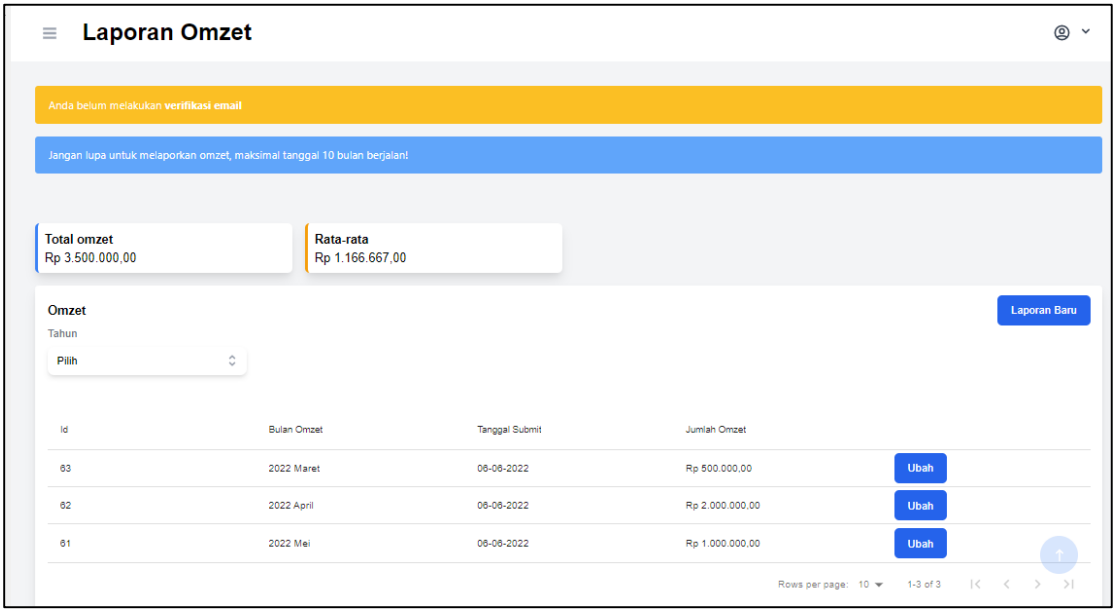

Figure 8. Monthly sales revenue reporting menu display

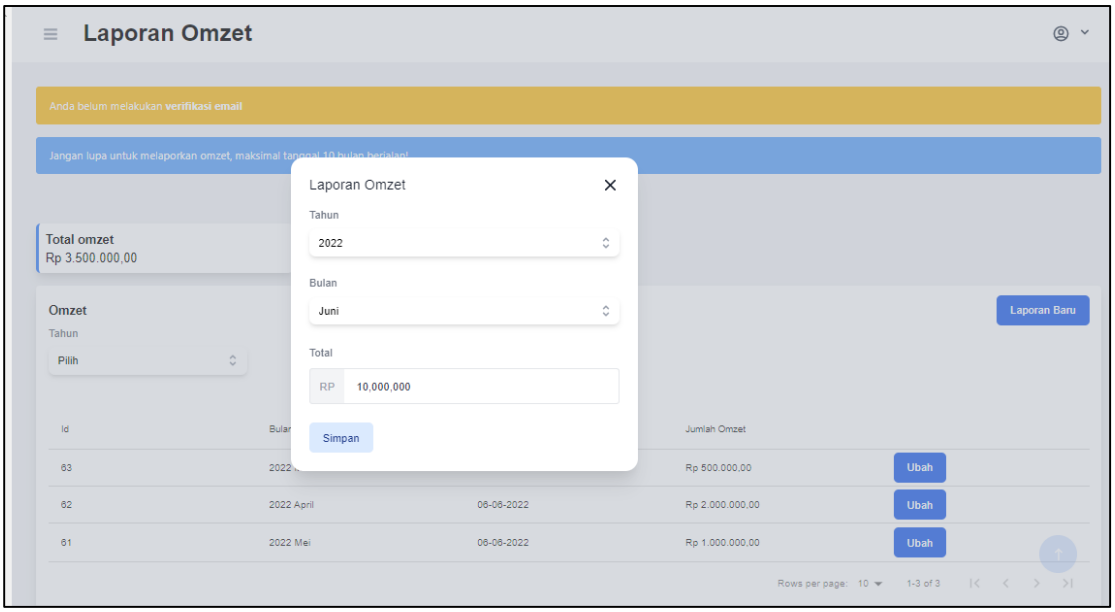

Figure 9. Monthly sales revenue data input display

In the Admin module, there are several features. Apart from the features for viewing MSME data and verifying MSME registration, Admin can also see a list of MSME Sales Revenue as shown in Figure 10. On this page, Admin can also see a list of MSMEs that have not reported Sales Revenue. Periodic Sales Revenue reporting is part of DinKopUKM's monitoring in ensuring that MSMEs are still active. If there are MSMEs that have not reported their Sales Revenue, the Admin can remind them by sending a broadcast reminder message as shown in Figure 11.

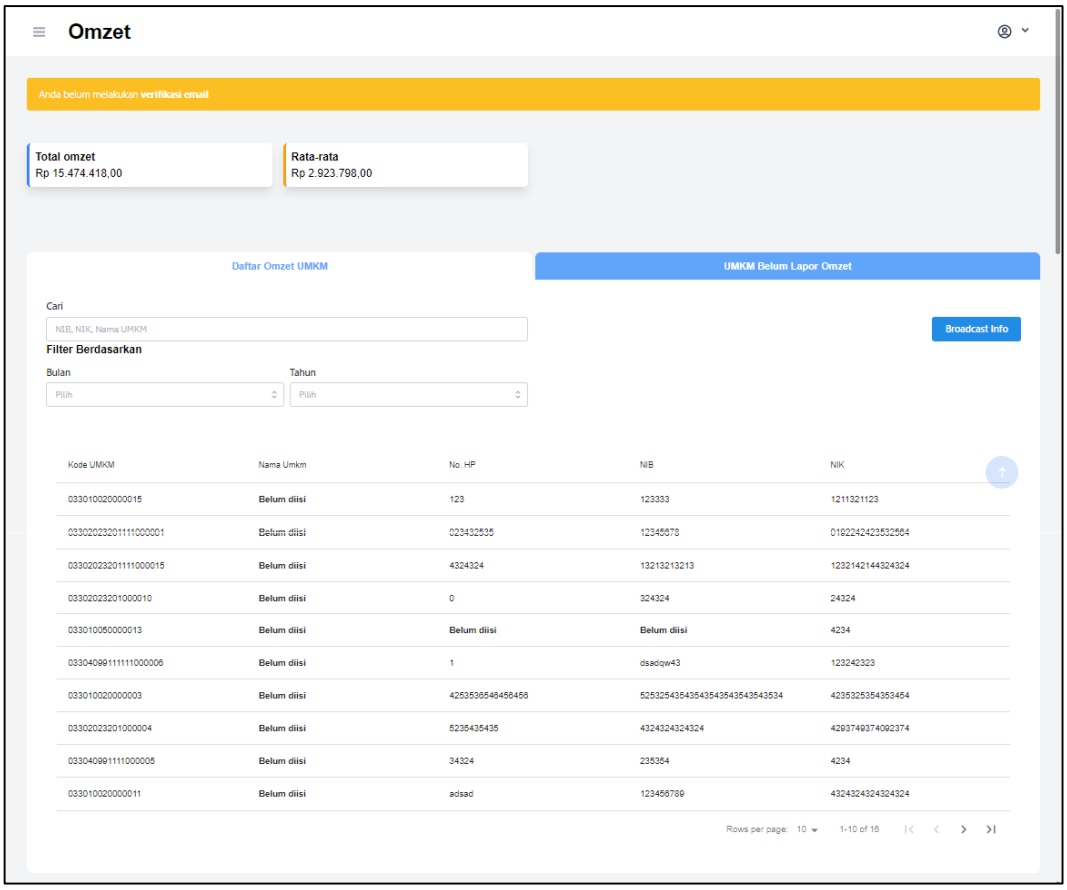

Figure 10. Sales revenue page display as Admin

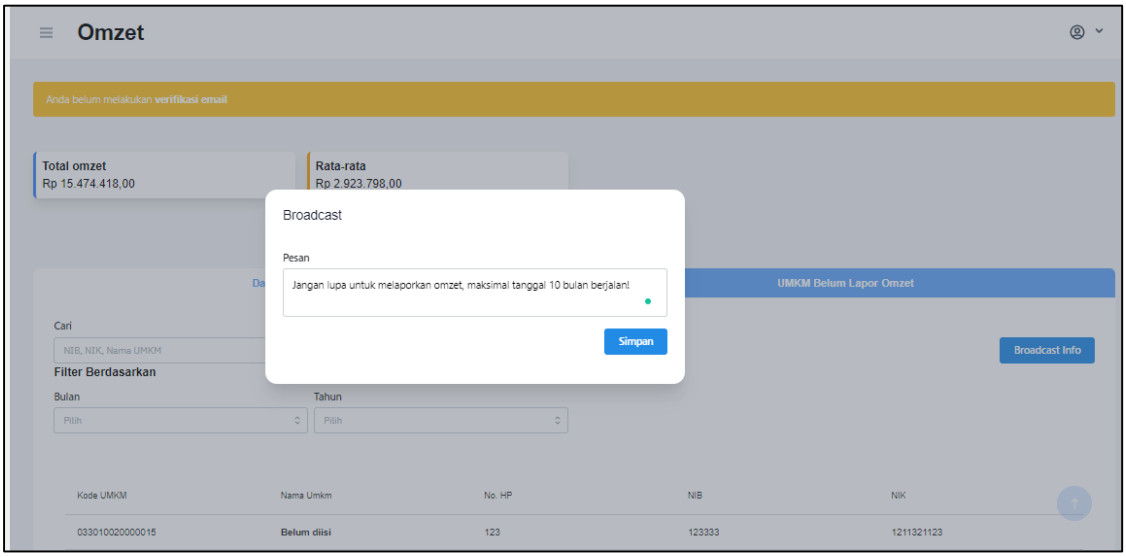

Figure 11. Sales revenue reporting reminder broadcast display

A. Application Testing

The portal that has been built is tested using black box testing. This testing is carried out to ensure that the function and output of the system are in accordance with the requirements specifications set at the beginning[24], [25], [26]. In addition to black-box testing, usability evaluation was also conducted using the System Usability Scale (SUS). The results of this evaluation are presented in Table 3.

TABLE 2
RESULTS OF BLACKBOX TESTING OF THE MSME MODULE

Function	Condition	Expected Output	Output	Testing Results
Sign Up Account	All fields are filled	Successfully registered	Successfully registered	Valid
	Some empty fields	Registration Failed	Registration Failed	Valid
Login	Correct Username & password	Successfully login	Successfully login	Valid
	Incorrect Username & password	Login Failed	Login Failed	Valid
List of Assisted MSMEs	All fields are filled on Personal & MSMEs Data, including Sales Revenue	Successfully submitted registration for Fostered MSMEs	Successfully submitted registration for Fostered MSMEs	Valid
	All fields are empty on Personal & MSMEs Data, including Sales Revenue	Failed to submit registration for Fostered MSMEs	Failed to submit registration for Fostered MSMEs	Valid
	Some fields are empty on Personal & MSMEs Data, including Sales Revenue	Failed to submit registration for Fostered MSMEs	Failed to submit registration for Fostered MSMEs	Valid
Monitoring Applications for Fostered MSMEs	Click the Information text link	Displays the information page	Displays the information page	Valid
	Click the Log text link	Displays the submission status history page	Displays the submission status history page	Valid
	Chip Status information	Displays information & colors according to the latest submission status	Displays information & colors according to the latest submission status	Valid
Fill in Sales Revenue	All fields are filled	Successfully fill monthly Sales Revenue	Successfully fill monthly Sales Revenue	Valid

	Some fields are empty	Failed to fill monthly Sales Revenue	Failed to fill monthly Sales Revenue	Valid

TABLE 2
RESULTS OF BLACKBOX TESTING OF THE ADMIN MODULE

Function	Condition	Expected Output	Output	Testing Results
Login	Correct Username & password	Successfully login	Successfully login	Valid
	Incorrect Username & password	Login Failed	Login Failed	Valid
List of MSME Sales Revenue	Select filters	Successfully displays the Sales Revenue list according to the selected filter	Successfully displays the Sales Revenue list according to the selected filter	Valid
MSMEs have not yet reported the Sales Revenue	Click the Broadcast Info button	Successfully sent information to MSME emails that have not yet reported Sales Revenue	Successfully sent information to MSME emails that have not yet reported Sales Revenue	Valid

TABLE 3
CALCULATED SUS SCORE

RESPONDENTS	AGE	GENDER	CALCULATED SCORE										TOTAL	SCORE
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
Respondent 1	28	Man	2	4	2	4	3	3	3	2	3	2	28	70
Respondent 2	42	Woman	4	3	4	2	4	2	4	2	2	2	29	73
Respondent 3	33	Woman	3	3	3	3	2	3	2	3	3	3	28	70
Respondent 4	24	Man	4	2	4	2	4	3	4	2	4	2	31	78
Respondent 5	25	Man	3	3	3	3	3	3	3	3	3	3	30	75
Respondent 6	27	Man	3	3	3	3	4	2	4	3	4	3	32	80
Respondent 7	25	Man	3	3	3	3	4	3	3	3	2	2	29	73
Respondent 8	23	Man	4	3	4	3	4	2	3	3	2	3	31	78
Respondent 9	24	Man	3	3	3	3	4	4	4	3	3	3	33	83
Respondent 10	25	Man	2	2	2	4	4	3	2	2	2	2	25	63
Respondent 11	41	Woman	3	3	3	3	3	1	3	3	3	3	28	70
Respondent 12	22	Woman	3	3	3	3	3	2	3	3	3	3	29	73
Respondent 13	23	Woman	2	4	4	2	4	4	4	3	3	4	34	85
Respondent 14	24	Woman	3	3	3	3	4	3	4	3	4	3	33	83
Respondent 15	25	Woman	3	3	3	3	3	3	3	3	3	3	30	75
Respondent 16	31	Woman	4	4	4	4	3	3	3	4	3	2	34	85
Respondent 17	22	Woman	3	3	3	3	4	3	4	3	3	3	32	80
Respondent 18	43	Woman	4	4	4	3	4	4	4	3	4	3	37	93
Respondent 19	54	Woman	3	4	2	3	3	3	3	2	3	3	29	73
Respondent 20	37	Woman	4	4	4	3	3	3	3	2	4	3	33	83
Mean Score (Final Results)														**77**

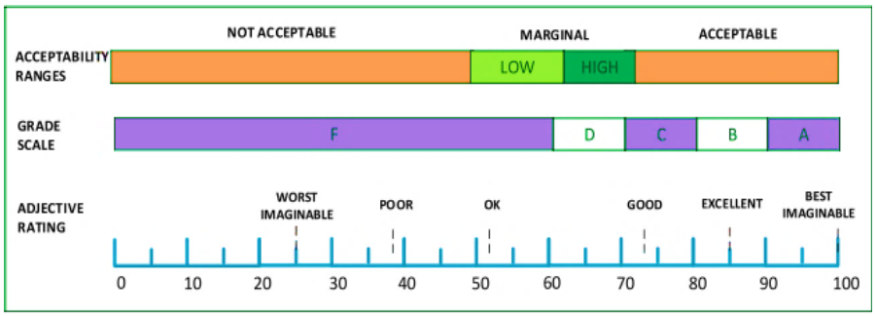

Figure 12. SUS interpretation score

Table 3 presents the results of the System Usability Scale (SUS) evaluation, in which the portal obtained a score of 77. The SUS assessment was conducted with 20 Respondentts, comprising administrators from the Department of Cooperatives and MSMEs (DinKopUKM) and MSME actors. Based on the SUS score interpretation illustrated in Figure 12, it can be concluded that the MSME data management and sales revenue reporting portal falls within the ACCEPTABLE category. The portal's usability is classified as GOOD, corresponding to a Scale C rating. This score indicates that, on average, Respondentts provided positive feedback, although there is still room for improvement and feature enhancement to achieve optimal usability. Several previous studies have also applied SUS testing to public service applications, including: 1) A study by Sukma et al. (2023), which evaluated the usability of the BAZNAS Management Information System (SIMBA), resulting in a SUS score of 63.38 [27]; 2) A study by Aji et al. (2025), which assessed the usability of the M-Paspor application, yielding a score of 62 [28]; 3) A study by Rokhim et al. (2025) on the SMART application, which obtained a SUS score of 70 [29].

IV. CONCLUSION

This research produces a portal for managing MSME data and Sales Revenue reporting which helps DinKopUKM in carrying out MSME monitoring tasks and encouraging MSMEs to have orderly administration. From the black box testing carried out, it was found that the functional portal that was built was running in accordance with the needs and expected system design. Based on the results of the System Usability Scale (SUS) evaluation, the portal achieved a GOOD usability rating and was positively received by end-users. This outcome indicates that the portal delivers an efficient and intuitive user experience, demonstrates a low learning curve, and meets user satisfaction criteria in terms of functionality and interaction design.

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