

# Analysis of the Utilization of the SI-PAS OKE Application for Synchronizing Data on Junior High School Education Facilities and Infrastructure in Mojokerto City

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This study aims to analyze the SI-PAS OKE application as a digital innovation to improve the accuracy and synchronization of data on all junior high school infrastructure facilities in Mojokerto City. The main problem found is the data mismatch between manual school recording and Regional Property Data, which causes low accuracy, slow reporting, and planning that is not based on factual data. This study uses a descriptive qualitative method. Data collection was carried out through library research to examine relevant theories, and was strengthened by in-depth interviews with application developers, observations, and documentation during the application implementation period, namely from August to October 2025. The main research instrument involved comparative data between BMD data, school manual data, and data synchronized in the SI-PAS OKE application, as well as trial results in three schools (SMPN 3, SMPN 7, and SMPN 4). Data analysis techniques were carried out by reviewing, grouping concepts, and interpreting the results of data collection to describe in depth the use of the application. This research shows that this application is able to eliminate the GAP DATA which previously reached more than 10% and produces full synchronization between BMD data, manual data, and application data. This finding is in accordance with the SCOT theory that technology develops in response to social needs, especially in the need for data integration.

**Keywords:** SI-PAS OKE, Data Synchronization, Infrastructure, Digitalization, SCOT

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## 1. Introduction

With the rapid development of the times and the seemingly never-ending technological advancements, the process of managing facilities and infrastructure has also evolved. Previously, the process was manual and took a relatively long time. Manual processing is also prone to errors in recording, resulting in data misalignment between field data and data from the education office. Therefore, the idea of creating technological tools is emerging, making the process of managing facilities and infrastructure more effective and efficient. According to Arwildayanto, Sukung, and Sumar (2018), education management, which was initially centered on the central government, has shifted from micro and macro levels to school-based management, where the schools/madrasahs manage the facilities and infrastructure themselves. This indicates that the management of facilities and infrastructure is fully managed by the schools/madrasahs themselves. (Prospek & Yang, 2024)

Ideally, every school and madrasah should undertake various transformations to improve the quality of education. One such improvement is the management of facilities and infrastructure using information and technology tools, which are currently being intensively developed. An application created for facility and infrastructure management can be useful for minimizing discrepancies between data obtained in the field

and data provided to the education office. Creating a facility and infrastructure management application has several benefits, including: (1) providing a digital system that schools and offices can use to record and report facility and infrastructure conditions quickly, accurately, and in real time; (2) eliminating discrepancies between manual reports and official data from the education office; and (3) facilitating monitoring and decision-making based on factual data. (Gontor & Gontor, 2003)

In Mojokerto City, facility and infrastructure management at the junior high school (SMP) level faces a number of serious challenges, particularly in terms of recording and documenting the physical condition of buildings, classrooms, equipment, and supporting utilities. One major issue that has recurred year after year is the lack of regularly updated and structured data on facility and infrastructure conditions, which is not documented in a centralized information system. The lack of an integrated database prevents policymakers at the Department of Education and Culture from quickly and accurately accessing information regarding the actual condition of school assets. (Suranto et al., 2022)

This problem inevitably results in a number of impacts, ranging from inaccurate budget allocation for rehabilitation and procurement, delays in handling damaged facilities, and difficulties in conducting comprehensive evaluations and audits of facilities and infrastructure. Manual data collection, using different formats across schools and lacking an online reporting system, makes the planning process less factually based. In the long term, this can lead to unequal distribution of educational facilities, low budget effectiveness, and a decline in the quality of educational services to the community. (Vol et al., 2025)

Enabling an educational institution requires adequate facilities and infrastructure, as both play a crucial role in supporting the continuity of the learning process. Existing facilities and infrastructure must be properly managed to maintain optimal condition and be ready for use. With the passage of time and advances in technology, the process of managing school facilities and infrastructure has also undergone changes (Irawan & Isnanto, n.d.). Previously, this process was carried out manually, which reduced efficiency. Now, the process of managing school facilities and infrastructure can be automated with the help of existing technology, reducing time and making the management process better and more precise. (Silitonga, 2024)

The goal of developing the SI-PAS OKE application is to provide a platform to facilitate the inventory and reporting of facilities and infrastructure across all public junior high schools in Mojokerto City. The web development phase includes inputting and updating data on the physical condition of buildings and assets, facilitating reporting of damage to facilities and infrastructure with photographic documentation, and providing real-time monitoring and evaluation. The development of this application also provides significant benefits for the Mojokerto City Education and Culture Office, including promoting accountability and transparency in the management of state assets within the educational environment and facilitating data synchronization between the Regional Government Agency (BMD) and junior high schools regarding facilities and infrastructure data.

This study aims to analyze the SI-PAS OKE application's ability to address data accuracy and to what extent it can reduce the data gap between the data received by the Mojokerto City Education and Culture Office. This study also attempts to analyze the obstacles encountered during the launch of the SI-PAS OKE application, given that it is a relatively new application. This study not only analyzes the obstacles encountered during the development process but also the challenges encountered during its utilization.

Meanwhile, previous research conducted by Damdam Damiyana and Muhammad Akbar Maulana in 2025 also examined the management of infrastructure and asset documents at XYZ Public Junior High School in Jakarta. The study explained that the same problem was found in this study: the lack of a structured recording system for managing infrastructure and asset documents. Many documents are still managed manually, making them vulnerable to loss (Informatika et al., 2017). Therefore, this can hamper school

administration processes and lead to inaccurate decisions regarding the maintenance and procurement of infrastructure and facilities. Therefore, the authors provide several recommendations, including changes to document management procedures and training to improve human resources, technology, and system integration to achieve maximum efficiency. (Yunus et al., 2023)

Previous research was also conducted by I.GD.NGR.Wahyu Ananta. This study adopted the same concept, yielding results and solving problems by launching the "Lingkaran Sampurna" application. This name was adapted due to its more comprehensive report collection link service. This service is housed on a website, where it can display text information, still or moving images, animations, sound, or a combination of these. (M. A. Maulana, 2025)

Previous research was also conducted by Fitriani Yunus, where the research entitled "Infrastructure and Facilities Management Based on Technology and Information" in this study obtained research results that launched the application of the Infrastructure and Facilities Management Information System (SIM-SARPRAS) which functions to carry out the process of submitting proposals for assistance with madrasa facilities and infrastructure online. Meanwhile, the State Asset Management Information System (SIMAN) application is an application used to automate BMN governance activities starting from planning, use, maintenance, administration, utilization, transfer, destruction, deletion, to supervision and control of BMN. With this application, it can certainly save costs and time, because the madrasah does not need to prepare printed documents which certainly require a lot of costs and time. Meanwhile, the SIMAK-BMN application is intended so that the process of coding facilities and infrastructure can be organized systematically while the data of goods becomes more centralized and realizes an orderly administrative system of facilities and infrastructure management. (Aset et al., 2025)

## 2. Method

This study employed a descriptive qualitative method with the primary objective of an in-depth and comprehensive analysis of the use of the SI-PAS OKE application as a digital innovation tool for synchronizing facility and infrastructure data at junior high schools (SMP) in Mojokerto City. This approach was chosen to provide a detailed description of the social processes, challenges encountered, and the application's effectiveness in addressing data discrepancies between manual school records and Regional Property Data (BMD). This method was reinforced by a library research approach to examine the theoretical foundations, concepts, and relevant previous research findings, particularly those related to the social construction of technology (SCOT) theory in the context of educational data integration.

Data collection in this study was conducted through three main techniques: in-depth interviews, observation, and documentation, conducted during the application implementation period from August to October 2025. In-depth interviews were conducted with application developers and relevant parties to gain internal perspectives on the SI-PAS OKE creation and development process. Observations were conducted during the trial phase at three sample schools (SMPN 3, SMPN 7, and SMPN 4) to monitor human resource readiness, system stability, and infrastructure constraints. Meanwhile, the primary data documented included a comparison between BMD data, school manual data, and data generated by the SI-PAS OKE application.

Data analysis focused on reviewing and categorizing theoretical concepts and interpreting trial results. A key analytical step was comparing the three types of data to measure the application's success in achieving full synchronization and eliminating the data gap (GAP DATA), which previously exceeded 10%. The analysis results were then interpreted to provide a strategic overview of the added value provided by the

SI-PAS OKE application and to identify recommendations for continuous improvement for the agency and future application development.

### **3. Results and Discussion**

#### **Results**

The SI-PAS OKE application at a public junior high school in Mojokerto City demonstrated a significant transformation in the accuracy and speed of reporting of facilities and infrastructure (sarpras) data, successfully addressing the main problem of data inconsistencies between platforms.

1. **Full Synchronization and Elimination of Data Gaps.** The SI-PAS OKE implementation, piloted at three sample schools (SMPN 3, SMPN 7, and SMPN 4), demonstrated success in achieving full data synchronization between Regional Assets (BMD) records, manual school records, and data recorded in the application. Previously, the manual recording process, which was prone to errors and delayed updates, often resulted in data gaps. Quantitative trial data demonstrated that data gaps, which initially reached more than 10% in some schools, were completely eliminated after the application was implemented. These results confirm the system's ability to integrate BMD and manual data in real time, making the data in the application a single source of accurate and transparent information.

2. **Reporting Efficiency and Increased Operational Transparency** Operationally, the SI-PAS OKE application has successfully accelerated the reporting cycle and improved administrative efficiency. Previously, reporting on infrastructure conditions, which was physically performed in stages and took several days on a weekly cycle, has now shifted to a near-instant daily frequency. School operators can input data and report damage directly through a digital interface at any time, supported by an automatic notification feature that ensures the Education Office receives instant updates. This improvement not only saves time and reduces the risk of administrative errors, but also provides strategic added value in the form of increased transparency in infrastructure management.

3. **Social Stability and Mitigation of Implementation Constraints** Although the initial implementation process faced several risks, including technical risks, low human resource (HR) readiness for digitalization, and limited infrastructure (internet network), the application has demonstrated strong social stability. Mitigation measures, such as intensive training and regular monitoring by the Education Office, have successfully encouraged user adoption. Thus, SI-PAS OKE has entered the social stabilization stage, where all related parties have begun to accept and rely on this digital system as an effective and legitimate solution for infrastructure data management.

#### **Discussion**

##### **Data Synchronization and Factual Accuracy**

The success of SI-PAS OKE in eliminating data gaps to 0% is a direct manifestation of the effectiveness of the data synchronization concept in asset management. Full synchronization between the BMD, manual records, and the application ensures that the data used for planning and decision-making is factual. Accurate and transparent data is essential because infrastructure management in educational settings requires the availability of credible information as a basis for planning, budgeting, rehabilitation, and facility procurement. Prior to this application, data inconsistencies often hampered administrative processes and led to inaccurate decisions regarding resource allocation. With full synchronization, the application not only resolves technical recording issues but also fundamentally supports decision-making based on factual data.

### **Information Technology (IT)-Based Infrastructure Management**

The implementation of SI-PAS OKE represents a transition in infrastructure governance from a conventional/manual model to Information Technology (IT)-based management. From a management perspective, management encompasses planning, organizing, directing, and supervising resources. This application addresses all these aspects; from structured data input (planning) to real-time reporting (monitoring). This IT utilization has proven to overcome the time constraints that previously existed, where reporting took days. This efficiency is crucial because infrastructure management is a systematic process that encompasses the entire asset lifecycle—from needs planning to disposal. By accelerating reporting and mitigating the risk of errors, SI-PAS OKE serves as a vital tool that enhances accountability and professionalism in the educational environment.

### **Innovation Analysis Through the Social Construction of Technology Theory (SCOT)**

The innovation of SI-PAS OKE can be analyzed in depth using the Social Construction of Technology Theory (SCOT). According to SCOT, technological development is not merely the result of technical innovation but also a response to social processes and needs that involve the interaction of various parties (relevant social groups). The development of this application was explicitly driven by the social need to address the data gap between schools and the Education Office, which resulted in inconsistencies in BMD data.

Although there were initial obstacles such as low human resource readiness and limited infrastructure, mitigation measures in the form of training demonstrated that the technology was successful through the adaptation and social intervention phases. The application's success in eliminating data gaps and its acceptance as a legitimate solution in the education sector (as evidenced by significant improvements in data accuracy and accelerated reporting) demonstrates that SI-PAS OKE has achieved social stability. Therefore, this innovation is seen not merely as a technical tool, but as the result of a collaborative effort to promote accountability and sustainable digital transformation in the education sector in Mojokerto City.

### **SI-PAS OKE Application**

The SI-PAS OKE application, an abbreviation for Mojokerto School Infrastructure and Facilities System, is a web-based or mobile-based digital platform specifically designed to help manage the inventory and reporting of facilities and infrastructure in junior high schools in Mojokerto City. Its purpose is to support digital transformation in education services. This application is designed to resolve a common problem: the discrepancy between data submitted manually by schools and data stored in the Regional Property (BMD) system of the Education and Culture Office. The following describes the data management process within the SI-PAS OKE application.

This digital system is expected to accommodate damage reporting, asset condition data updates, and regular mapping of school facility and infrastructure needs. With support for real-time updates, dashboard monitoring, and automated reporting, the construction and maintenance planning process can be carried out more measurably and effectively. Furthermore, data integration between schools and the education office will accelerate decision-making, avoid overlapping programs, and ensure that every need is addressed based on a measurable priority scale. (Rahayu et al., 2019)

Through this transformation, the Mojokerto City Education and Culture Office is committed to building a digital system for managing facilities and infrastructure that is adaptive, collaborative, and sustainable. It is hoped that this system will not only serve as a technical tool but also become an integral part of the overall strategy for improving the quality of education services. With full support from all stakeholders, this digital transformation in facility and infrastructure management will be a concrete step towards more modern, transparent, and data-driven education governance.

In today's digital era, manual approaches to data collection and reporting of facilities and infrastructure are no longer relevant. The government, particularly in the education sector, is required to develop an information technology-based asset management system to improve efficiency, transparency, and accountability in management. One strategic solution that can be implemented is the digitization of the school facility and infrastructure inventory and reporting system. Through a centralized digital system, information on the condition of school assets can be collected, updated, and accessed quickly, precisely, and accurately by all stakeholders. (Novianto et al., 2023)

The implementation of digitalization in the management of facilities and infrastructure is also in line with national policies that encourage digital transformation in public services, including in the education sector. Presidential Instruction Number 3 of 2003 concerning e-Government development policies and strategies and Ministerial Regulation of Education, Culture, Research, and Technology Number 40 of 2021 concerning Education Quality Assurance serve as the normative basis that reinforces the urgency of this change. (Aset et al., 2025)

In general, the goal of good innovation is to improve quality, which can create added value. Innovations designed today must meet current needs. In other words, innovations must have added value and enhance excellence and quality compared to previous service improvements. This change is designed to address the main challenges in managing junior high school (SMP) facility and infrastructure data, namely the lack of updated information and the lack of centralization of infrastructure data, through the implementation of an integrated, application-based digital system. These changes provide various added values that directly impact the quality of governance and public services in education.

With the SI-PAS OKE application, the physical condition of buildings, classrooms, equipment, and supporting utilities can be recorded in real time and integrated. Advanced features such as digital data input accessible to school operators, visual documentation in the form of damage photos for easy verification, an interactive monitoring dashboard that can be used to periodically monitor asset conditions, and connected, automated reporting make asset management more accurate, transparent, and efficient. Furthermore, the application also facilitates data-driven decision-making for planning, procurement, maintenance, and rehabilitation of infrastructure. Implementation of SI-PAS OKE involves collaboration between various parties, including school principals, infrastructure managers, the School Administration Team, and the school committee, to ensure data alignment and reduce the risk of administrative errors.

### **Results of the SI-PAS OKE application implementation and trials**

The application launch by the education office also provided added value to human resource capacity development. Through system usage training, this also helped improve digital literacy and technical competency. This directly encouraged professionalism and a more structured and modern work culture.

From a managerial perspective, the SI-PAS OKE application development fully supported transparency and accountability. All input data was recorded and could be audited and verified at any time. Thus, this application can contribute to more orderly and accountable management of Regional Assets (BMD). Furthermore, the application development is also part of an effort to encourage digital transformation in public education services. This is stated in Presidential Regulation No. 95 of 2018, which outlines key points related to government administration regarding the use of information and communication technology to improve public services.

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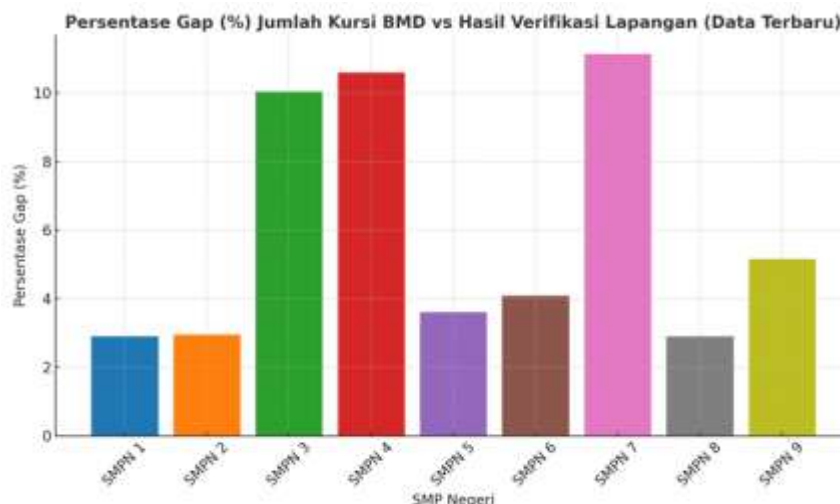
The development of this application addresses the main challenges in managing junior high school (SMP) facility and infrastructure data: outdated information and the lack of centralized infrastructure data. Through its implementation in an integrated, application-based digitalization system, this application creates added value that directly impacts the quality of governance and public services in the education sector.

This digitalization of infrastructure data management also improves the accuracy and validity of data and helps expedite the process of inputting facility and infrastructure data. Currently, manual recording is prone to errors and delays in data updates. With the creation of this digital system, data can be easily updated in real time by schools and directly accessed by the education office, ensuring that the information provided is always up-to-date and its validity is guaranteed. This system was designed to create efficiency in time and work processes, both at the school and office levels.

With the development of this application, it is hoped that data held by schools and offices can be effectively controlled. The education office itself will have easier data-based monitoring, evaluation, and planning. Information on the number, condition, and infrastructure needs of all junior high schools in Mojokerto City can be quickly and easily accessed on a single platform, enabling more targeted and responsive decision-making. (Supriana & Pramarta, 2025). The following are the results obtained after conducting a trial at SMPN 3, SMPN 4, and SMPN 7.

**Table 1.** Bmd Data For Junior High Schools In Mojokerto City

No	SMP Negeri	Jumlah Kursi ( BMD )	Jumlah Hasil Verifikasi Lapangan/ Data Manual	Selisih	Persentase Gap (%)
1	SMPN 1	865	840	24	2,77%
2	SMPN 2	1123	1090	43	3,82%
3	SMPN 3	897	807	90	10,03%
4	SMPN 4	1606	1436	170	10,58%
5	SMPN 5	1194	1151	43	3,60%
6	SMPN 6	1252	1201	51	4,07%
7	SMPN 7	494	439	55	11,13%
8	SMPN 8	346	336	10	2,89%
9	SMPN 9	1164	1104	60	5,15%



**Figure 1.** Data Gap Percentage Diagram

The diagram above shows that between SMPN 1 and SMPN 9, there is a significant gap between the number of seats recorded in the Regional Assets (BMD) and the results of field verification at each public junior high school. This difference is due to the school infrastructure department manually calculating all school assets, resulting in discrepancies between the items recorded in the BMD and those recorded at the school. Furthermore, the school often delays in sending updates on the condition and quantity of items to the education office.

Based on the calculation, SMPN 7 has the highest gap at 11.13%, followed by SMPN 4 with 10.58%, and SMPN 3 with 10.03%. This suggests a possible discrepancy in asset condition or delays in updating inventory data at these schools.

Conversely, SMPN 1, SMPN 2, SMPN 5, and SMPN 8 have gaps below 4%, indicating that the asset data recording system at these schools is quite accurate. The discovery of discrepancies and disparities in actual figures indicates issues with data accuracy, reporting delays, and suboptimal regular monitoring processes.

The implementation of digitalization in the management of facilities and infrastructure is also in line with national policies encouraging digital transformation in public services, including in the education sector. Presidential Instruction Number 3 of 2003 concerning e-Government development policies and strategies and Ministerial Regulation of Education, Culture, Research, and Technology Number 40 of 2021 concerning Education Quality Assurance serve as the normative basis that reinforces the urgency of this change. (Aset et al., 2025)

Overall, the development of this application not only resolves technical issues related to infrastructure data but also provides strategic and sustainable added value in supporting transparent, efficient, responsive, and technology-based education governance.



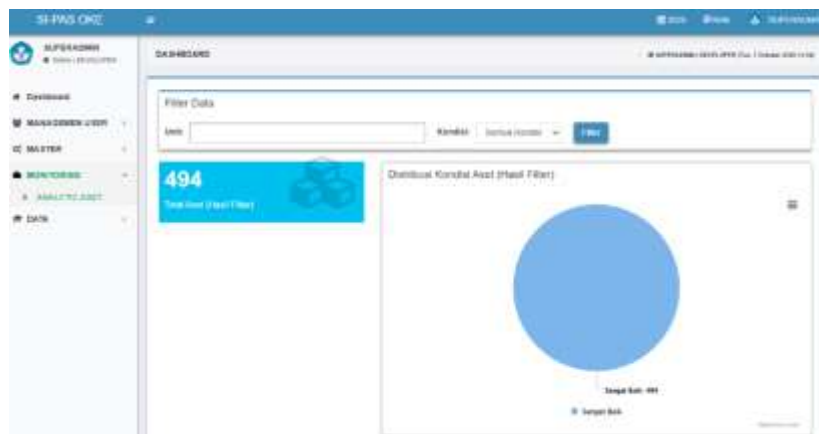
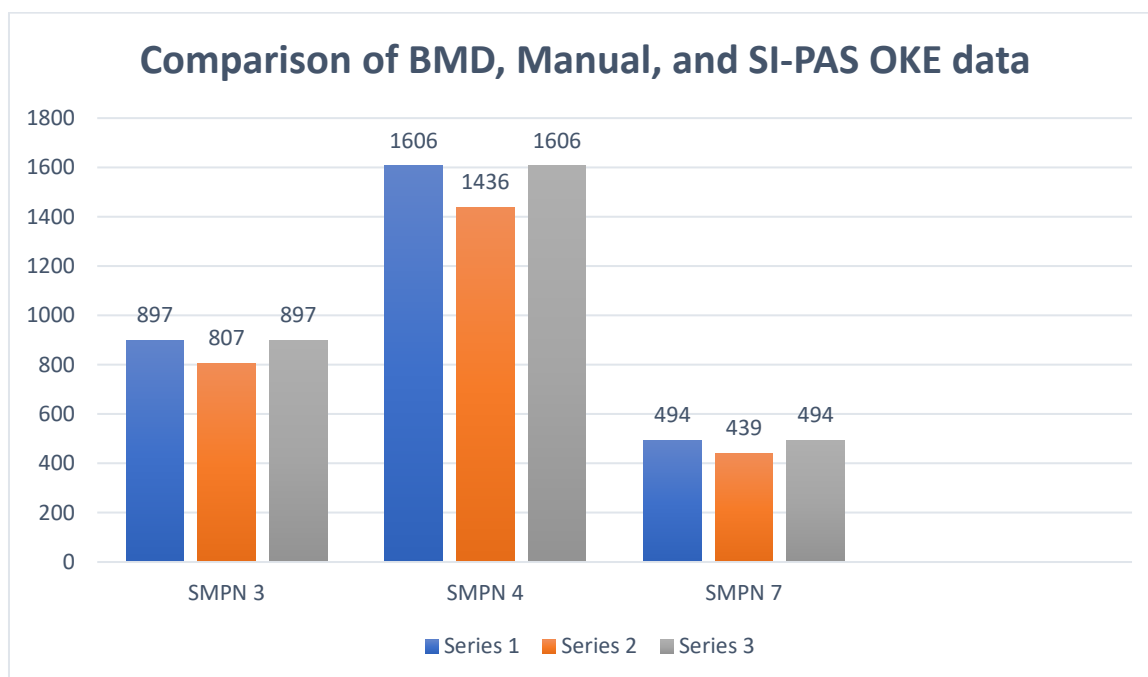


Figure 5. SMPN 7 Seat Data

SMPN 7 saw an improvement from 494 in the BMD and 439 in the manual data to 494 in SI-PAS OKE. This significantly eliminated a data gap of 11.13% at SMPN 7 and ensured greater information integration to support more effective infrastructure management.

Table 2. Comparison of BMD, Manual, and SI-PAS OKE data

No.	School's Name	BMD Data	Manual Data	SI-PAS OKE Data
1.	SMPN 3	897	807	897
2.	SMPN 4	1606	1436	1606
3.	SMPN 7	494	439	494



In the context of increasing reporting speed, the process, which previously relied on manual methods and often slow data input, making it difficult to regularly update infrastructure counts due to the physical data collection, multi-step verification, and submission of reports through conventional channels, has now shifted to the SI-PAS OKE application, which allows school operators to input infrastructure condition data directly through a digital interface at any time, significantly reducing wait times and ensuring that up-to-date information is always available without delay. Furthermore, the integrated automatic notification feature allows the Mojokerto City Education and Culture Office to receive instant updates on data changes

or damage reports, which not only expedites response to infrastructure issues but also improves overall operational efficiency.

Based on the SCOT theory, the application trial results at three schools—SMPN 3, SMPN 7, and SMPN 4—in Mojokerto City demonstrated improved data accuracy and consistency between manual records, BMD data, and the data in the SI-PAS OKE application. The data demonstrated full synchronization after using the application, eliminating the data gap (GAP) that previously exceeded 10%. These results indicate that the SI-PAS OKE application has entered a social stabilization phase, where all parties are beginning to adapt to accept and rely on the system as a legitimate and effective solution.

Monitoring results during the implementation phase showed a drastic reduction in reporting times, from a weekly cycle that took days to a near-instant daily frequency. These results empirically demonstrate that the application successfully overcomes temporal barriers in the management of junior high school infrastructure and facilities, thus supporting more timely and responsive decision-making to the educational needs of Mojokerto City.



**Figure 6.** SI-PAS OKE Application Socialization

### **Obstacles in Developing the SI-PAS OKE Application**

The development of the SI-PAS OKE application presents several risks that need to be identified and managed from the outset. These risks often arise from technical, human resource, institutional, and supporting infrastructure perspectives. (1) Technical risks in application development are crucial and must be minimized to reduce data entry failures. If these risks are not addressed from the outset, they will significantly impact the development process and the time it takes for the application to be further developed. (2) Low levels of readiness of school human resources for digitalization, given that this application is newly released, schools will undoubtedly encounter new challenges related to reporting infrastructure data. To manage these risks, the Education Office is monitoring and providing training to three pilot schools to test the SI-PAS OKE application. (3) Technological infrastructure constraints, such as internet connections and devices, are crucial issues for users of each application. Therefore, it is necessary to conduct limited trials to find out how many system weaknesses need to be repaired and monitored periodically in the creation of this application. (4) Inconsistencies in data inputted by users, in this case, need to be minimized further and in stages so that data gaps do not occur again. Considering that the creation of this application was also carried out to reduce the occurrence of data gaps that often occurred before the launch of this application.

#### 4. Conclusion

Based on an in-depth analysis of the use of the SI-PAS OKE application to synchronize educational infrastructure data at junior high schools in Mojokerto City, this study demonstrates that this application is an effective digital innovation in addressing the challenges of manual data management. It utilizes a humanistic approach that emphasizes social needs and collaboration between stakeholders. This approach not only resolves technical issues but also fosters a more streamlined transformation in educational governance. Accurate and transparent data can improve the quality of life for students and educators. Key findings indicate that data gaps between Regional Assets (BMD) and manual records in junior high schools often arise due to inconsistent recording processes, prone to errors, and delayed updates. This gap percentage variation is evident in several schools. However, the implementation of the SI-PAS OKE application has significantly improved data accuracy through full synchronization of BMD, manual, and application data, as well as accelerating real-time reporting and increasing transparency in infrastructure management. This provides added value in the form of time efficiency, reduced risk of errors in administrative processes, and support for factual data-based decision-making. In line with social construction theory (SCOT), this innovation arose from a social need to collaboratively integrate data, thereby promoting accountability and professionalism in the educational environment. However, the application's development and testing process faced technical risks, low human resource readiness for digitalization, and limited infrastructure, such as internet connectivity. However, through mitigation measures such as intensive training and regular monitoring, the SI-PAS OKE application has demonstrated strong social stability. Overall, this innovation not only resolves technical issues related to data synchronization but also provides strategic added value in driving digital transformation in the education sector. It is hoped that it can serve as a model for other regions to improve the quality of public services and education sustainably. (F. Maulana et al., 2022).

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