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An Analysis of the Effectiveness of the Customer Information System Application in Improving Public Services at Perumda Air Minum Surya Sembada Surabaya

Isti Fajar Ariani Tasya[1], Nihayatus Sholichah[2], Sri Roekminiati[3], Amirul Mustofa[4*]
Department of Public Administration, Dr. Soetomo University, Surabaya
Corresponding Author: Amirul Mustofa amirul.mustofa@unitomo.ac.id

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A B S T R A C T

The digitalization of public services has become a key strategy for local governments in enhancing service quality and citizen satisfaction. Digital transformation enables public institutions to deliver services more quickly, transparently, and efficiently while reducing administrative barriers commonly found in manual systems. Responding to these demands, Perumda Air Minum Surya Sembada Surabaya implemented the Customer Information System (CIS), an information technology based platform designed to facilitate interactions between customers and the company, including bill inquiries, online payments, and complaint submissions. This study aims to evaluate the effectiveness of the CIS application in supporting customer service delivery. A descriptive qualitative approach was employed, utilizing interviews with customers and PDAM Surabaya employees, direct observations of application usage, and an examination of internal documents related to service procedures and CIS implementation. The analysis focuses on identifying the benefits, challenges, and impacts of CIS on service quality. The findings show that CIS improves operational efficiency, process transparency, and service accessibility. However, challenges remain, including variations in customers' digital literacy levels and several feature limitations that influence user experience. These results underscore the need to strengthen digital literacy among the community and further develop more responsive and user-friendly CIS features to ensure that the system provides optimal benefits for all customers

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INTRODUCTION

The advancement of information technology has encouraged various organizations including public service institutions to undergo digital transformation. The digitalization of public services is believed to enhance service quality, accelerate access to information, and increase efficiency for both service providers and service recipients (Alshammari et al., 2025). In Indonesia, the concept of e-government has long been promoted by the government as part of bureaucratic reform efforts and initiatives to improve public satisfaction (Susanto & Wicaksono, 2018). PDAM, as providers of clean water services, hold a strategic role in supporting the basic needs of the community. However, PDAM services often face classic problems such as long queues, delays in meter recording, billing errors, and limited complaint channels. These conditions have the potential to reduce customer satisfaction and create negative perceptions regarding service quality. Therefore, the utilization of information technology has become an urgent necessity to improve service effectiveness.

In 1890, PDAM Surabaya now known as PDAM Surabaya became the first drinking water provider to distribute water using railway transportation from Purut Village, Pasuruan Regency. In 1901, a drinking water supply system utilizing the Pandaan spring was constructed by Carel Willem Wejis. Later in 1903, the company was established under the supervision of the Dutch Colonial Government, and on October 8, 1903, the drinking water supply project sourced from the Pandaan spring was officially inaugurated. By 1906, the company had reached 1,500 house connections (SR). Due to increasing demand, in 1922 the construction of the Ngagel I Water Treatment Plant (IPAM) began with a capacity of 60 liters/second. In 1932, the Umbulan water system was developed to meet Surabaya's growing drinking water needs, which included the construction of a pumping station and supporting accessories.

As water demand continued to grow, in 1942 the capacity of Ngagel I was increased to 180 liters/second. In 1950, the drinking water company was officially handed over to the Government of the Republic of Indonesia. By 1954, due to the increasingly broad service coverage, the capacity of IPAM Ngagel I was increased to 350 liters/second. In 1959, the construction of IPAM Ngagel II was carried out with a capacity of 1,000 liters/second. In 1976, the Surabaya City PDAM was officially ratified as a Regional Company under Regional Regulation No. 7 dated March 30, 1976. As service requests continued to grow, in 1977 the capacity of IPAM Ngagel I was further increased to 500 liters/second. In 1978, the company's status was transferred to a PDAM, previously managed under the Drinking Water Service Office. This change was based on the decree of the Mayor of Surabaya No. 657/WK/77 dated December 30, 1977. In 1980, the capacity of IPAM Ngagel I was again increased to 1,000 liters/second. As demand continued to rise, in 1982, the construction of IPAM Ngagel III began with a capacity of 1,000 liters/second.

To expand service coverage areas, in 1990 construction began on IPAM Karangpilang I, with a capacity of 1,000 liters/second. In 1991, PDAM had accumulated sufficient internal financial capability to construct its main office

located at Jl. Prof. Dr. Moestopo No. 2, Surabaya. In 1994, due to expanding water demand, the capacity of IPAM Ngagel I was increased to 1,500 liters/second. By 1996, the capacities of IPAM Ngagel and IPAM Karangpilang I were simultaneously increased to 1,800 liters/second and 1,200 liters/second, respectively. Meanwhile, construction of IPAM Karangpilang II with a capacity of 2,000 liters/second was also initiated. In 1997, the capacity of IPAM Ngagel III was increased to 1,500 liters/second, and initial production of 500 liters/second began at IPAM Karangpilang II for distribution to Surabaya customers. In 1999, the construction of the Karangpilang Water Treatment Plant with a capacity of 2,000 liters/second was completed. In 2000, PDAM recorded that the number of house connections (SR) had reached 274,079 SR. As service demand continued to expand each year, in 2001 the capacity of IPAM Karangpilang II was increased to 2,500 liters/second. In 2005, another capacity expansion was carried out at IPAM Ngagel III, increasing it to 1,750 liters/second. By 2006, IPAM Karangpilang I had its capacity increased to 1,450 liters/second, while IPAM Karangpilang II was increased to 2,750 liters/second. In 2009, PDAM completed the construction of IPAM Karangpilang III with a capacity of 2,000 liters/second.

One of the visions of PDAM Surabaya is to become a modern water company. Therefore, the institution continually develops new innovations in line with technological advancements. One such innovation is the CIS (Perumda Air Minum Surya Sembada, 2024), an application that allows customers to check their bills, make online payments, and submit complaints without having to visit the service office directly. The CIS application is expected to reduce the obstacles found in manual service processes and increase the response speed to customer needs. However, despite its potential, the effectiveness of this application still requires evaluation. Some customers continue to report technical issues, feature limitations, and insufficient socialization regarding how to use the application (Mardhotillah & Wibawa, 2025).

Several previous studies have highlighted the role of information systems in improving the quality of public services. (Nur Mansyur et al., 2025) found that web based information systems contribute positively to customer satisfaction, although their effectiveness is influenced by users' levels of digital literacy. Similarly, (Fauzan et al., 2021) showed that the quality of e-government services correlates with public satisfaction, yet requires consistent management of supporting infrastructure. However, research specifically examining the effectiveness of the CIS application at PDAM Surabaya remains relatively limited. Based on these considerations, this study was conducted to analyze the effectiveness of the CIS application in improving customer service at PDAM Surabaya. The findings are expected to provide theoretical contributions to e-government studies and practical insights for PDAM Surabaya in optimizing technology based services. Grounded in the background above, this research focuses on addressing two main questions. First, the effectiveness of the CIS digital system in facilitating service access for PDAM Surabaya customers. Second, the level of customer satisfaction with PDAM Surabaya's online complaint services. Accordingly, the objectives of this study are to assess the

effectiveness of the CIS digital system in simplifying service access for customers and to measure customer satisfaction with the overall quality of the CIS application.

LITERATURE REVIEW

Concept of the CIS Application

The concept of the CIS refers to an information technology based system that supports more efficient management of customer data. In the context of public services, digitalization is viewed as a mechanism that can enhance transparency and accountability (Zahra et al., 2024). Several previous studies have shown that the implementation of digital information systems can improve customer satisfaction, although challenges related to digital literacy and limited system features continue to persist (Ramadhan & Pribadi, 2024)

By adopting the CIS application, which provides customers with access to essential service features within a single platform, PDAM Surabaya is expected to improve the overall quality of its public services. High-quality service not only accelerates service processes and strengthens communication between customers and the institution but also contributes to increased customer satisfaction (Noor, 2022). Therefore, PDAM Surabaya developed this innovation to enhance public service delivery and achieve higher customer satisfaction by implementing CIS as an online service platform. This digital service innovation serves as an important indicator for realizing public services that are effective, efficient, and oriented toward community satisfaction (Hasbah et al., 2025).

Public Services, Service Quality, and Customer Satisfaction

In both public and commercial service settings, service quality and customer satisfaction are two interrelated concepts. According to (Asif Khan et al., 2025), customer satisfaction refers to an individual's emotional response after comparing the service received with their expectations. When service outcomes exceed those expectations, customers tend to experience higher levels of satisfaction.

(Kotler & Keller, 2016) also emphasize that service quality is determined by the ability of an institution whether providing products or services to meet customer needs in a way that ultimately generates satisfaction. High quality service, therefore, becomes a critical factor in shaping customer perceptions, fostering trust, and strengthening the institution's credibility in fulfilling its public service obligations.

Theoretical Gap

Although previous studies have shown that the digitalization of public services and the implementation of information systems such as CIS can improve efficiency, transparency, and customer satisfaction, most research has primarily focused on the technical aspects of these systems such as features, digital literacy, or ease of use. A theoretical gap emerges because limited studies have specifically

examined the relationship between CIS implementation and service quality and customer satisfaction within the context of regional water utility companies, particularly PDAM Surabaya.

Furthermore, earlier studies have been conducted predominantly in other public service sectors (e.g., health, taxation, and banking). As a result, there is no established theoretical framework that explains how CIS directly contributes to the dimensions of service quality in drinking water services, which possess distinct characteristics such as meter reading systems, handling of technical complaints, and billing processes.

Therefore, research is needed to fill this gap by conducting an in depth analysis of the effectiveness of CIS in improving service quality and customer satisfaction within regional drinking water services. This includes examining how users both customers and employees perceive the impact of CIS implementation in their daily interactions and service experiences.

RESEARCH METHOD

Type and Research Approach

This study employs a qualitative approach with a descriptive research design, aimed at providing an in-depth depiction of a phenomenon as it naturally occurs in the field. This approach was selected because it enables the researcher to gain a comprehensive understanding of the experiences, perceptions, and interactions of the informants. The subjects of this study consist of several customers of PDAM Surabaya and employees assigned to customer service units, particularly those who work directly with the CIS application. These two groups were chosen because they are directly involved in both the delivery and the receipt of services, making their perspectives essential to the analysis.

Research Location and Research Focus

This research was conducted at PDAM Surabaya, located at Jl. Mayjen Prof. Dr. Moestopo No. 2, Pacar Keling, Tambaksari, Surabaya, East Java. This study focuses on analyzing the effectiveness of the CIS application in supporting improvements to customer services at PDAM Surabaya. The scope of the analysis includes assessing the application's performance in facilitating service processes, particularly those related to the submission and handling of customer complaints. In addition, the study examines various obstacles encountered during the use of the application, including technical issues, limitations of available features, and the level of public understanding and socialization efforts. Furthermore, this research evaluates the impact of CIS usage on service quality, measured through indicators such as response speed, accuracy of the data or information provided, and the ease of access experienced by customers when utilizing the service.

Data Sources and Data Collection Techniques

Data in this study were collected using several techniques, including in depth interviews, direct observations, and the collection of supporting documentation. In depth interviews were conducted to obtain detailed verbal information and explore the informants' firsthand experiences. Observations were carried out to examine actual field conditions, including service workflows and interactions between employees and customers.

Meanwhile, documentation was used to complement the data through archives, reports, administrative records, and other documents relevant to the focus of the study. In addition, several relevant literature sources from previous research were reviewed, including studies by (Alshammari et al., 2025), (Susanto & Wicaksono, 2018), (Nur Mansyur et al., 2025), (Fauzan et al., 2021), (Zahra et al., 2024), (Ramadhan & Pribadi, 2024), (Noor, 2022), (Hasbah et al., 2025), (Mardhotillah & Wibawa, 2025).

Data Analysis Techniques

Data analysis in this study was conducted using the Miles and Huberman analytical model, which consists of three key stages: data reduction, data display, and conclusion drawing and verification. The data reduction stage involves selecting, categorizing, and simplifying the information obtained throughout the research process, as described in recent methodological studies (Qomaruddin & Sa'diyah, 2024). The data display stage is carried out by organizing the reduced data into narrative or tabular form, enabling the researcher to more easily identify patterns and relationships among the findings. The final stage, conclusion drawing and verification, ensures that the results of the analysis accurately reflect the actual conditions observed in the field and could be methodologically justified (Sahir, 2022), (Zulfirman, 2022), (Hasby Ash-Shiddiqi, Riza Wahyuni Sinaga, 2025).

To ensure the validity of the findings, this study employed both source triangulation and method triangulation. Source triangulation was conducted by comparing information obtained from customers and employees, while method triangulation was carried out by cross checking the consistency of findings through interviews, observations, and documentation. Through these steps, the data collected are expected to demonstrate a high level of credibility and reliability. (Dedi Susanto, Risnita, 2023), (Anis Azmiatu Silvia, 2022), (Nurdiana & Soleh, 2025).

RESULTS AND DISCUSSION

Research Results

The findings of this study align with customer satisfaction theory, which emphasizes that service quality is a key factor in shaping positive user perceptions and determining their level of satisfaction with the services they receive. This theory explains that when an organization is able to deliver services that meet the needs, expectations, and preferences of its customers, those customers will demonstrate a higher level of satisfaction. In the context of public services, good service quality is assessed not only through speed and accuracy, but also through ease of access, reliability of information, and the institution's ability to respond to community needs. The findings of this study reflect these principles, showing that improvements in service quality through digital innovation can significantly enhance the overall user experience.

PDAM Surabaya is one of the government institutions in Surabaya City that has been officially established since 1976 in the field of clean water provision for the people of Surabaya. PDAM Surabaya has successfully demonstrated positive performance by receiving the "Good" predicate in the CNN Indonesia Awards 2024 for corporate governance. Achieving such recognition indicates that PDAM Surabaya has undergone various transformations in management, technology, and public service delivery.

PDAM Surabaya also won the "Top IT Innovation in BUMD" award in 2014 through the Go-Mobile application. Building on this achievement, the institution has continued its efforts to keep up with digital developments by creating an online service innovation in the form of the CIS application. This innovation was introduced as an effort to enhance operational efficiency, expand accessibility for customers, and minimize issues arising from previous manual processes. With the presence of the CIS application, the service process is expected to become more effective, more efficient, and capable of meeting public demands for responsive and high quality drinking water services.

Effectiveness of the CIS Application Implementation

PDAM Surabaya plays an important role in ensuring public satisfaction among the residents of Surabaya City. One of the innovations implemented to support the operational activities and service quality of PDAM Surabaya is the launch of the CIS application.

Before the implementation of the CIS, the service system at PDAM Surabaya was still conventional. The institution relied heavily on manual service mechanisms, including the process of recording customer data, compiling complaint reports, and managing bill payments. The use of such manual procedures frequently resulted in service delays, the potential for recording errors, a lack of data transparency, and limited access to information for customers. However, in line with technological developments that demand speed and transparency in public services, PDAM Surabaya improved its service quality through the development of the CIS application. As stated by Tika Dwi

(2025), a staff member of PDAM Surabaya, regarding the implementation of the CIS:

"The implementation of the CIS application aims to improve the quality of customer service by providing fast, accurate, and integrated access to customer data." (Interview, Tika Dwi 2025).

The implementation of the CIS application was designed gradually starting in 2016, beginning with preparation and socialization activities for all employees of PDAM Surabaya. Subsequently, in 2017 - 2018, the process of transferring both manual data and data from the previous system into the CIS application was carried out in stages. Then, in 2019 - 2020, PDAM Surabaya continued developing various service features in the CIS application, such as self meter reading, bill payment and checking, complaint services, new connection registration, and access to various service-related information provided by PDAM Surabaya. Before the CIS application was officially launched in 2021, the system underwent an internal trial phase involving employees to ensure the application's readiness and feasibility. Once all the features had been maximized, the application was officially launched in 2022, coinciding with the 46th anniversary of PDAM Surabaya, which carried the theme "Moving Faster, Serving Better." This theme was chosen to reflect the goals of PDAM Surabaya in launching the CIS application, namely to improve service quality, reduce data errors, enhance transparency in accessing billing information according to real-time data, support real time complaint submissions, increase customer satisfaction, and improve operational efficiency. The process of implementing the CIS application for customers was carried out gradually, considering that the customers of PDAM Surabaya come from diverse backgrounds.

To understand the informants' responses regarding the implementation process of the CIS application, the following interview results with Tika Dwi (2025), a staff member at PDAM Surabaya, can be considered:

"Because the customers here come from various generations, the implementation process was carried out gradually, such as conducting socialization activities in sub district offices, and organizing exhibitions at various events in the Surabaya area." (Interview, Tika Dwi 2025).

A similar statement was conveyed by another staff member of PDAM Surabaya, Annisa Dian Shafirra (2025), who explained:

"For the implementation of CIS, it was designed to be as simple as possible so that all groups can easily access it. This way, customers can use it easily and our work also becomes much more supported." (Interview, Annisa Dian Shafirra 2025).

Based on the interview results above, it can be concluded that the implementation process of the CIS application was carried out gradually by conducting socialization activities in sub district offices as well as various events throughout Surabaya City. The presence of the CIS application evidently facilitates the work of employees through the available features, reduces data entry errors caused by human negligence, and ensures more accurate data

collection, as customers can independently check their own service information through the application.

This condition has been shown to reduce the number of incoming customer complaints, although some minor technical issues still occur occasionally, such as unstable central network connections, inaccessible meter-reading information, and errors in the self meter reading feature. This was confirmed by staff member Annisa Dian Shafirra (2025), who stated:

"The CIS application really helps us, because it significantly reduces face-to-face complaints, minimizes errors caused by human factors, and even helps us obtain data instantly through the CIS application according to customer information. There are occasional system issues, but so far those problems can still be resolved." (Interview, Annisa Dian Shafirra 2025).

To increase customer interest and the number of CIS application users, PDAM Surabaya also provides attractive promotional programs for customers, as explained by Tika Dwi (2025) during the interview:

"One of the ways to attract customer interest in using the CIS application is by giving raffle prizes to customers who are active users of CIS. The prizes are not ordinary there are several electronic devices, and for the lucky winners, there is even an umrah package. And this wasn't done just once; the raffle was held every three months throughout 2023." (Interview, Tika Dwi 2025).

Surabaya only need to re check or validate the data. This allows employees to focus on other tasks, which ultimately contributes to achieving higher levels of customer satisfaction.

The existence of the CIS application, which contains various features within it, serves several functions, including:

1. **Online Bill Payment**. Within this service menu, there are features for water bill payments and non-water bill payments. Water bill payments provide information regarding the customer's mandatory monthly billing. Non-water payment information covers payments related to repairs carried out by PDAM Surabaya officers, such as stop valve repairs, meter height adjustments, meter relocations, and the purchase of water tanker services.
2. **Commercial Services**. Within this menu, there are two features: commercial services and commercial service history. The commercial services feature is used for generating payment codes for water tanker purchases and stop valve repairs. The commercial service history menu displays previously issued payment codes.
3. **Complaints**. This service menu consists of two features: new complaints and monitoring. The new complaints feature allows customers to submit complaints according to the problems they are experiencing. The monitoring feature provides information regarding the status and follow-up of the complaints that customers have submitted.

4. **Meter Reading**. This service menu includes several features: meter reading schedule, self meter reading, meter reading slip, billing graph, and smart meter graph. The meter reading schedule feature is used to view the scheduled time for meter recording. When the schedule is appropriate, customers can perform self meter reading. The meter reading slip feature allows customers to check their submitted meter reading data. The billing graph is used to monitor the stability of monthly water usage and billing. The smart meter graph is only accessible to customers who already use smart meters, which are currently installed in limited locations only.
5. **Water Disruption Information.** In this service menu, PDAM Surabaya continuously updates information regarding water flow disruptions.
6. **New Installation.** This service menu includes the new installation application feature and monitoring for the application. The new installation application feature is intended for prospective customers who wish to subscribe to water services. The application monitoring feature allows prospective customers to track the progress of their new installation request.

The CIS application provides customer service needs through the features available within it. This helps reduce data entry errors caused by human error and ensures more accurate data, as customers can independently verify their information and ensure that the data they upload is recorded correctly. This capability helps decrease the number of customer complaints received, although there are occasional minor technical issues such as unstable central network connections, inaccessible meter recording information, and errors during the self meter reading process. Despite these challenges, PDAM Surabaya continues to improve and update the features of the CIS application. Routine evaluations are carried out every three months by gathering feedback from employees who are also encouraged to use the CIS application as well as from customers who submit complaints or suggestions regarding the application (Perumda Air Minum Surya Sembada, 2023).

This was conveyed by Nuansa Adharianingrum (2025), a customer relations staff member at PDAM Surabaya, who stated:

"In developing the CIS application, we continuously conduct evaluations every three months, and in this evaluation process we keep making improvements and enhancements, such as collecting customer data through field surveys, analyzing content data, and reviewing feedback on Google Play Store and the App Store."(Interview, Nuansa Adharianingrum 2025).

Based on the findings of this study, it can be concluded that the implementation of the CIS has been effective so far and has succeeded in improving operational efficiency, process transparency, and service accessibility for customers. Although several obstacles still exist in the implementation process, PDAM Surabaya has been able to provide appropriate solutions to address these issues.

Utilization of the CIS Application at PDAM Surabaya

The implementation of the CIS application at PDAM Surabaya has enhanced the effectiveness of customer services, as the application offers highly efficient, transparent, and easily accessible services from anywhere without requiring customers to visit the PDAM Surabaya office. PDAM Surabaya has been able to introduce the CIS application through various activities such as socialization in sub district offices and participation in several events across Surabaya City. Through this direct community engagement, the CIS application has become increasingly well known among Surabaya residents.

With the presence of the CIS, the service unit at PDAM Surabaya is more easily able to receive customer complaints in real time. This was directly conveyed by Annisa Dian (2025), a staff member at PDAM Surabaya:

"My colleagues and I feel greatly assisted by the CIS application, because it not only makes complaint management easier for us, but customers can also submit their complaints from anywhere especially when their homes are far from our office. In my opinion, this application is extremely helpful for both us as PDAM employees and for the customers." (Interview, Annisa Dian S. 2025).

The benefits of the CIS are strongly felt by employees of PDAM Surabaya, as this innovation contributes to increased customer satisfaction. This satisfaction is expressed directly by customers, such as Gita (2025), a customer of PDAM Surabaya, who stated:

"The CIS application service is very helpful for people like us who are rarely at home. In my opinion, the features provided are quite complete and highly useful, especially for people like me who rarely have the time to visit the PDAM office." (Interview, Gita 2025).

The researcher did not rely solely on one source; additional feedback regarding the benefits of the CIS application was collected from several other customers, including Mr. Rizal (2025), who shared the following information:

"The CIS application is extremely beneficial, because when making payments through CIS, the administrative fee is more affordable. For instance, if we pay through Indomaret, Shopee, or Tokopedia, the service fee is around 2,500 rupiah, but through the CIS application it doesn't even reach 1,000 rupiah." (Interview, Mr. Rizal 2025).

Customers experience several advantages through the CIS, including the convenience of monitoring customer data presented transparently and accurately, as well as the ease of performing transactions with lower administrative fees. These superior features offered by the CIS application naturally increase customer interest in using it.

The strategy employed by PDAM Surabaya to increase customer interest in downloading the CIS application includes providing raffle prizes. This approach encourages customers to become more active users of the CIS application. During the observation process, the researcher had the opportunity to interview a customer who had won one of the raffle prizes, namely Mrs. Nurlaili (2025):

"Alhamdulillah, because I frequently performed self meter reading and paid my bills through the CIS application, in December 2024 I had the opportunity to win a 43 inch Android TV in the raffle." (Interview, Mrs. Nurlaili 2025).

The availability of raffle prizes has undoubtedly increased customer enthusiasm for trying and using the CIS application. To further facilitate customer access, PDAM Surabaya designed the application with a simple and easy to understand interface.

The service features of the CIS application are designed to be as simple as possible so that all groups of users can operate it easily. This was conveyed by Mr. Yudha, the Supervisor of the EPB Division at PDAM Surabaya:

"Most PDAM customers are older adults, and to make it easier for them to access the application, we only display services that are truly needed by customers, such as bill payments, self meter reading, usage monitoring, and submitting complaint reports all of which are already available in the CIS application." (Interview, Mr. Yudha 2025).

The introduction cycle of the CIS application itself was designed in a simple manner, where a single application presents various essential features required by customers. The CIS application was intentionally created with a simple layout because its users are not only from the younger generation but predominantly older individuals. The ease of operating the CIS application was expressed directly by Gita (2025), a customer of PDAM Surabaya :

"In my opinion, using the CIS application is very simple because the menu options go straight to the point. For example, if I want to perform self meter reading, I can match it with the schedule provided, and once it aligns, I can simply input my meter number and upload the photo." (Interview, Gita 2025).

This ease of use in operating the CIS application brings positive value to customers. The availability of service menus such as bill checking and payment, new installation registration, self meter-reading, complaint services, and disruption information greatly assists customers in fulfilling their service needs from PDAM Surabaya in a practical and efficient manner. The completeness of these features also plays an important role in increasing customer satisfaction.

The CIS application is an innovation created by PDAM Surabaya to provide easy access to services for the people of Surabaya, particularly customers and prospective customers. This innovation also aims to deliver fast services that can be monitored in real time by customers from anywhere.

Despite being designed to be simple and detailed, the CIS still has some shortcomings, such as issues with meter-reading schedules, unstable network disruptions, and less frequently updated information. This was expressed by Mr. Joko (2025), a customer of PDAM Surabaya:

"The issues I often experience when using the CIS application are related to the schedule, because sometimes the schedule moves forward or backward, unlike PLN where the dates are fixed each month. So sometimes I forget or am late in submitting my meter reading." (Interview, Mr. Joko 2025).

In response to these issues, PDAM Surabaya continuously conducts evaluations. As stated by Nuansa Adharianingrum (2025), a Customer Relations Staff Member at PDAM Surabaya:

"For self meter reading, we adjust the schedule to the number of days in each month. So if the current month has only 28 days, the schedule for the next month will move forward. To help customers who forget to submit their meter readings, we have added reminder notifications in the CIS application." (Interview, Nuansa Adharianingrum 2025).

Through continuous evaluation of the issues experienced by customers, PDAM Surabaya learns and improves the shortcomings that exist in the CIS application. Nevertheless, if customers still experience difficulties such as being late in submitting their meter readings or encountering network disruptions when using the CIS application, PDAM Surabaya offers a compensation solution by directing customers to send photos of their meter readings manually through the WhatsApp complaint service. With this approach, the data will be manually entered into the system by employees of PDAM Surabaya. This procedure was explained by Nuansa Adharianingrum (2025):

"If a customer fails to submit their meter reading through the application, we still accept manual submissions, and customers can send them through our WhatsApp complaint service." (Interview, Nuansa Adharianingrum 2025).

The solutions offered by PDAM Surabaya help customers feel more reassured and better prepared for future service-related information. According to the researcher, the CIS application is highly beneficial for the people of Surabaya, especially customers and prospective customers of PDAM Surabaya, because with just a single application they can access all their service needs. The supporting factors that currently strengthen this innovation should be maintained and, if possible, further improved to ensure that customer needs within the CIS application are fully met. Additionally, the recurring issues that still occur should be addressed promptly so that they do not cause customer concern and so that customer satisfaction with the services of PDAM Surabaya can continue to grow.

CONCLUSION

Based on the research findings and the discussion regarding the effectiveness of the CIS application at PDAM Surabaya, it can be concluded that the implementation of CIS has generally improved operational efficiency, service transparency, and accessibility for customers. Although the system offers substantial benefits, several challenges remain, particularly the varied levels of customers' digital literacy and certain feature limitations that influence user experience. These findings highlight the importance of strengthening digital literacy among users and enhancing the responsiveness and usability of CIS features so that the system can function more optimally and inclusively.

The CIS application also provides clear advantages for both customers and PDAM Surabaya employees by simplifying access to information, accelerating service processes, and increasing transparency in data and complaint

management. These improvements contribute to higher customer satisfaction and help build greater public trust in PDAM Surabaya's digital service initiatives. While the CIS program has proven effective overall, recurring technical issues indicate the need for continuous system refinement and gradual improvements in operational quality. Based on the research findings and the conclusions that have been outlined, the following recommendations can be made for the development of the CIS application: improving network quality and server capacity, as well as system maintenance, so that the application can be accessed optimally and enhancing digital literacy and socialization regarding the use of CIS so that CIS users become more evenly distributed and the application can be understood by all PDAM Surabaya customers.

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