

Implementing a Web-Based Queue System to Improve Public Service Quality through Participatory Community Engagement

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Abstract

Public services in local government procurement units often face issues with queue order and uncertain service times due to reliance on manual processes, which reduces service efficiency and user satisfaction. This condition was observed in the Goods and Services Procurement Work Unit (UKPBJ) of the Pangkep Regency, where service processes remain conventional and lack information system support. This community service activity focused on implementing a web-based queue system integrated with socialization and assistance with system use for the public and service officers. A participatory approach was used, with stages of partner needs analysis, system design and implementation, and impact evaluation, using both qualitative and quantitative methods. Quantitative data were collected from 17 respondents, consisting of six UKPBJ employees and eleven community service users, then analyzed using descriptive statistics. The evaluation results showed an increase in perceptions of queue order, clarity of service information, and certainty of service times, with an average score in the very good category (score > 4.3). In addition, service documentation became more systematic and transparent, supporting data-based decision-making at the institutional level. The contribution of this activity lies in strengthening the technology-based community service model that emphasizes real-world application and social assistance, making it replicable in similar public service units across local government contexts, including developing countries.

Keywords: Community Service; Online Queue System; Public Services; UKPBJ; Web-Based System

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Introduction

The transformation of public services has become a global issue that has received serious attention in public-sector reform agendas, especially in developing countries that still face limitations in the efficiency, transparency, and accessibility of services (Chien & Thanh, 2022; Xiaolong & Christensen, 2023). Digitalization of services is seen as a strategic tool to improve the quality of interaction between the government and citizens, particularly in administrative services that involve physical queues and fixed service times (Opazo-Basáez et al., 2022; Wilson & Mergel, 2022). Various studies show that reliance on manual queue management systems contributes to decreased user satisfaction, increased staff workload, and low accountability in service processes (Carlo Bertot et al., 2012; Mamakou et al., 2024; Sadik-Zada et al., 2024; Skålén & Trischler, 2025; Wang & Ran, 2025).

Furthermore, in the context of government procurement services, the issue of queues has broader implications because it is directly related to bureaucratic efficiency, the certainty of administrative processes, and public trust in procurement management institutions. The Goods/Services Procurement Work Unit (UKPBJ), as a strategic node for regional procurement management, is required to provide orderly, transparent, and responsive consultation and assistance services. However, several studies in the local public sector indicate that procurement service management practices are still dominated by conventional procedures that have not been integrated with adequate information systems, making them vulnerable to irregular queues and uncertain service times (Hujran et al., 2023; Lindquist, 2022; Manta et al., 2022).

A similar situation was found at the Pangkep Regency Public Service Agency (UKPBJ), where registration and queue management were still carried out manually. Initial observations and discussions with partners indicated a buildup of visitors at certain times, unclear service sequences, and limited service documentation, all of which impacted staff

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efficiency. This situation not only affected service users' comfort but also limited the institution's ability to conduct data-driven evaluations and improve services.

Several previous studies have examined the development of web-based or mobile queuing systems in various public service contexts and have demonstrated the potential to increase efficiency and user satisfaction (Rashid et al., 2023; Tabuni, 2024). However, most of these studies focus on the technical aspects of system development or on experimental evaluation of system performance, with limited attention to the actual implementation process in public service environments and to social assistance for users. In the context of community service, this gap is significant because the success of technological innovation largely depends on the extent of adoption, understanding, and acceptance among service users (Barrios et al., 2023; Nariswari & Vargo, 2024; Prasetya et al., 2025; Quintana et al., 2022; Vikström et al., 2024).

Based on this gap, this community service activity is positioned to fill the gap between the development of technology systems and their practical application in regional public services. The main contribution of this activity lies in implementing a web-based queuing system that is not only functionally designed but also integrated with a socialization process and intensive mentoring for the community and service officers. The participatory approach used allows the system to be adapted to the UKPBJ work context and user characteristics, while simultaneously generating empirical evidence regarding the impact of system implementation on service regularity, service time certainty, and institutional capacity to manage services transparently. Therefore, this article makes a conceptual contribution to the literature on technology-based community service by emphasizing the importance of integrating digital innovation and social intervention in improving the quality of public services. Methodologically, this activity offers a community service model that can be replicated in other public service units facing similar challenges, particularly in local government areas and developing-country contexts.

Method

This community service activity was designed using an applied participatory approach, which positions partners and community service users as active actors at every stage of the activity, from identifying needs to evaluating the impact of system implementation. This approach was chosen because it is considered effective in public service innovation, which requires user involvement to ensure the relevance and sustainability of implemented solutions (Hu et al., 2025; Quintana et al., 2022; Tang et al., 2023). The activity design focuses on implementing technological solutions tailored to the needs of public service institutions and user characteristics, rather than on testing experimental hypotheses, as is common in applied, intervention-based community service practices.

Design and Subject of Activities

The activity was carried out at the Pangkep Regency Goods/Services Procurement Work Unit (UKPBJ) as a community service partner. The activity subjects consisted of two main groups: UKPBJ service officers and community users of procurement consultation and assistance services. The quantitative evaluation involved 17 respondents: six UKPBJ employees and eleven community users. Respondent selection was based on direct involvement in using the system during the implementation period, thus complying with the principle of purposive sampling in applied research and community service (Ahmad & Wilkins, 2025; Tajik et al., 2025).

System Development and Implementation

Based on the results of the partner needs analysis, a web-based online queuing system was developed to support online queue registration, queue status monitoring, and queue management by service officers. The system development emphasized compatibility with UKPBJ service workflows and ease of use for people with varying levels of digital literacy, in line with the principles of user-centered public service design (Equey et al., 2024; Hou, 2024). The system was then implemented directly in the UKPBJ operational environment during the service period, allowing for observation of actual use in the context of everyday services.

Socialization and Mentoring Procedures

The system implementation was accompanied by structured outreach and mentoring activities for service users and UKPBJ officers. The mentoring focused on understanding the new service flow, using the system's key features, and adjusting service procedures to align with the system's implementation. This mentoring approach is based on innovation

adoption theory, which emphasizes the importance of social support and hands-on learning in increasing users' acceptance of technology (Barrios et al., 2023; Nariswari & Vargo, 2024; Vikström et al., 2024). Thus, mentoring is integral to community service interventions, not merely a complementary activity.

Data Analysis Instruments and Techniques

The impact evaluation of the activity was conducted using a mixed approach. Quantitative data were collected using a five-level Likert-scale questionnaire to measure respondents' perceptions of system ease of use, queue orderliness, clarity of service information, and user satisfaction. (Li et al., 2022) Data were analyzed using descriptive statistics to illustrate trends in respondents' perceptions after system implementation, without using statistical inference, as is common in service-based community service evaluations. Qualitative data were obtained through verbal feedback from partners and community service users and were used to complement and interpret quantitative findings on the benefits and challenges of system implementation.

Results and Discussion

The implementation of community service activities through a web-based queuing system at the Pangkep Regency Goods and Services Procurement Work Unit (UKPBJ) resulted in measurable improvements in public service mechanisms, particularly in service access, queue order, and service process management. The findings in this section were obtained from the direct implementation of the system within the UKPBJ environment, from field observations during the implementation period, and from a quantitative evaluation of service users' and UKPBJ officers' perceptions. This approach aligns with the practice of evaluating public service-based community services, which emphasizes contextual observations and actual user experiences (Prasetya et al., 2025; Quintana et al., 2022).

Respondent Characteristics

The impact evaluation of the system implementation involved 17 respondents: six UKPBJ employees and eleven community service users. Respondent selection was based on direct involvement in system use during the implementation period, so the data obtained represent the actual experiences of both service providers and recipients. This respondent selection approach is consistent with the principle of purposive sampling in applied research and community-based program evaluation (South et al., 2024). The composition of respondents is presented in Table 1.

Table 1. Characteristics of Community Service Activity Respondents.

Respondent Group	Number of people)
UKPBJ employees	6
Community of service users	11
Total	17

The data in Table 1 shows that the evaluation involved two main groups of actors in the service process. Representing these two groups enables a more comprehensive analysis of the system's impact, both in service operations and user experience, as recommended in user-based evaluations of public service innovations (Hong et al., 2022; Hu et al., 2025; Tang et al., 2023).

Results of Implementing the Online Queue System

Field observations indicate that, after the system was implemented, the queue registration process no longer requires the public's physical presence at the service location. The public can register online by providing basic information, selecting the type of service, and specifying the date of their visit. The registration interface is designed to be simple and accessible via mobile devices and computers, making it easy for users with varying levels of digital literacy. This interface simplification principle aligns with the user-centered service design approach in digital public services (Prasetya et al., 2025; Quintana et al., 2022). The registration interface display is presented in Figure 1.

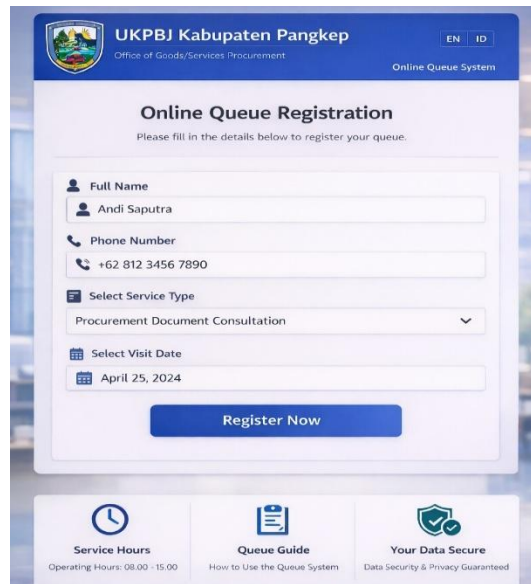


Figure 1. Online queue registration interface.

After registration, the system automatically assigns the user a queue number and provides a queue status monitoring feature before arrival at the service location. Queue status information is displayed in real time, giving users confidence in service times and the ability to adjust their arrival times accordingly. This mechanism helps reduce wait-time uncertainty, which public service literature identifies as a major factor in decreasing user satisfaction (Rashid et al., 2023; Tabuni, 2024). The queue status monitoring mechanism is shown in Figure 2.

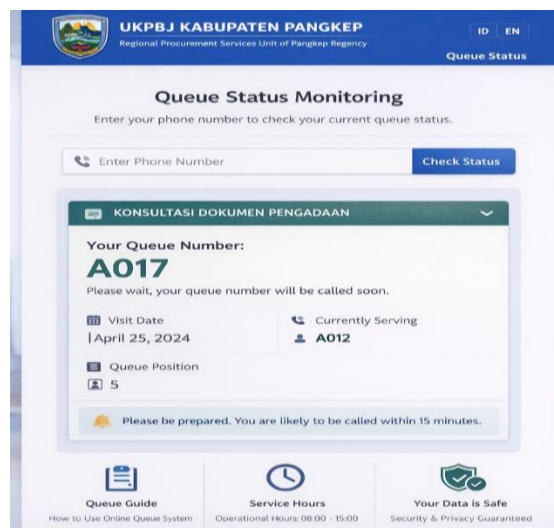


Figure 2. Queue status monitoring interface

From a service officer's perspective, the online queuing system supports more structured queue management. Officers can monitor the active queue list, call queues in order, and update service status in real time via the administration panel. All service activities are digitally documented, simplifying the monitoring and recapitulation of daily services. This digitalization of processes aligns with efforts to increase accountability and transparency in public procurement governance (Nokhaili & Ait Lemqeddem, 2025; Tariq, 2025). The officer panel display is shown in Figure 3.

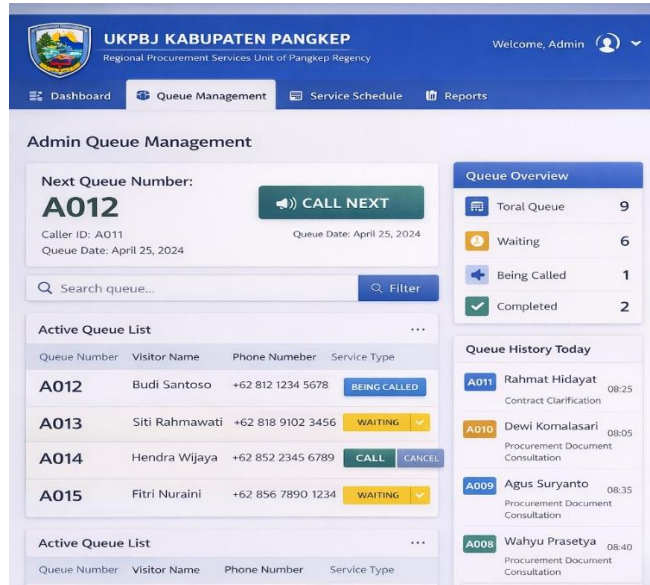


Figure 3. Service status update and call panel

Quantitative Data Analysis Results

A quantitative evaluation was conducted to measure respondents' perceptions of the implementation of a web-based online queuing system. The analysis used descriptive statistics on questionnaire data using a five-point Likert scale, as commonly used to evaluate public service satisfaction. The results are presented in Table 2.

Table 2. Results of Analysis of Respondents' Perceptions of the Online Queue System

Rated aspect	Average Score	Category
Ease of use of the system	4.41	Very good
Regularity of service queues	4.53	Very good
Clarity of service information	4.35	Very good
User satisfaction of services	4.47	Very good

The average score across all evaluated aspects was excellent. High scores for service queue orderliness and user satisfaction indicate that the system improves the user experience and service process effectiveness. This finding is consistent with previous research that found digital queuing systems improve perceptions of service orderliness and fairness (Rashid et al., 2023; Sadik-Zada et al., 2024; Tabuni, 2024). To clarify the changes resulting from the system's implementation, a comparison of service conditions before and after the community service activities was conducted. The results of this comparison are presented in Table 3.

Table 3. Comparison of Service Conditions Before and After System Implementation

Service Aspects	Before Implementation	After Implementation
Queue registration	Manual and must be present in person	Online and accessible from anywhere
Certainty of service time	Not sure	More predictable
Queue order	Disorderly	Orderly and systematic
Service documentation	Unstructured	Digitally documented

The data in Table 3 demonstrates a shift in service mechanisms from unpredictable manual systems to more orderly, transparent, and documented system-based services. This shift supports the view that digital transformation in the public sector serves as a tool to increase efficiency and strengthen service governance (Sadik-Zada et al., 2024; Skálén & Trischler, 2025; Wang & Ran, 2025). These findings indicate that implementing a web-based queuing system can address fundamental issues in public services, particularly those related to queue irregularities and uncertain service times. The improved service regularity, as demonstrated by quantitative results and field observations, indicates that

the system is not only technically functional but also socially accepted by users and service personnel. This strengthens the argument that the success of public service innovation is heavily influenced by user acceptance, not solely by technological aspects (Barrios et al., 2023; Nariswari & Vargo, 2024; Vikström et al., 2024).

The high perceived ease of use score indicates that the system design aligns with the users' needs and abilities. In the context of community service, this finding underscores the importance of mentoring as part of the intervention, as technology adoption tends to accelerate when users receive direct training (Demir, 2022; Hong et al., 2022; Jain et al., 2026). Mentoring during implementation helps minimize resistance to change and ensure the system's continued use.

Furthermore, the system's data-driven service documentation provides institutional added value to UKPBJ. Documented queue data can serve as a basis for service evaluation and evidence-based decision-making, in line with the data-driven public management approach increasingly emphasized in global public-sector reforms. Thus, this community service activity not only provides short-term benefits to service users but also enhances the institutional capacity of partners.

Conclusions

The results of this community service activity indicate that the implementation of a web-based online queuing system at the Pangkep Regency Goods/Services Procurement Work Unit (UKPBJ) has resulted in significant improvements in public service mechanisms, particularly in aspects of service access, queue order, certainty of service times, and documentation of the service process. These findings indicate that service transformation through digital technology can overcome the limitations of the manual queuing system, which previously caused irregularity and uncertainty for service users. Substantively, this activity demonstrates that the success of technology interventions in community service is not determined solely by system development, but by the integration of user-centered system design and a mentoring process that ensures effective technology adoption. A participatory approach involving partners and community service users from the implementation stage through evaluation has been shown to contribute to the system's social acceptance and its continued use in daily service practices.

In terms of scientific contribution, this activity enriches the study of technology-based community service by providing empirical evidence that a service model emphasizing applied implementation and user-experience-based evaluation can produce measurable service impacts, even without using an experimental design. These findings strengthen the argument that descriptive-participatory evaluation is a relevant and valid approach to assessing the success of public service innovations at the local government level. In practice, the implemented online queuing system provides a foundation for UKPBJ to develop more transparent and data-driven service governance. Digitally stored queue documentation opens up opportunities to utilize service data as a basis for decision-making and future service procedure improvements. Thus, this community service activity not only improves short-term service quality but also strengthens the institutional capacity of partner institutions.

Suggestions

Based on the findings and limitations of this activity, several recommendations can be put forward. First, future system development can focus on integrating with internal local government information systems to support data interoperability and improve efficiency across service units. Second, a broader evaluation with a longer implementation period can be conducted to better understand the medium- and long-term impacts of implementing an online queuing system. Third, the mentoring approach implemented in this activity can be developed into a continuous training model for service officers, so that technology adoption is not dependent on a single period of service. Finally, the digital system-based community service model developed in this activity has the potential to be replicated in other public service units with similar problem characteristics, with adjustments to the institutional context and user needs.

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Contribution

The first author was responsible for the conceptual design of the community service activities, the development and implementation of the online queuing system, quantitative and qualitative data analysis, and the preparation of the main draft of the article manuscript. The second author contributed to field data collection, provided socialization and mentoring to partners and service users, and validated empirical findings. The third author contributed to the review of the methodological framework, strengthening the theoretical foundation and discussion, and editing the manuscript's substance to ensure academic consistency and compliance with scientific publication standards. All authors have read, revised, and approved the final version of the article.

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