

EVALUATION OF E-PUSKESMAS IMPLEMENTATION USING THE HOT-FIT METHOD

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A B S T R A C T

The implementation of electronic health information systems is crucial for supporting record-keeping, data management, and healthcare services at Community Health Centers (Puskesmas). E-Puskesmas assists staff in managing patient data and supporting service delivery; however, its implementation remains influenced by human, organizational, and technological factors. This study aims to evaluate the implementation of E-Puskesmas at the Lakudo Community Health Center using the Human-Organization-Technology Fit (HOT-Fit) model. A descriptive qualitative method with a case study design was employed. Six informants participated: the head of the health center, a medical records officer, a nurse, a pharmacist, a midwife, and a doctor. Data were collected through interviews, observation, and document review, with validity ensured via technique and source triangulation. The results indicate that the Human aspect is functioning reasonably well, as the system is easy to understand and accelerates workflows, although training distribution remains uneven. The Organization aspect is supported by leadership, facilities, and inter-staff communication, yet specific Standard Operating Procedures (SOPs) have not been established. The Technology aspect facilitates data access and retrieval, though issues such as network disruptions, system errors, power outages, and maintenance requirements persist. The Net-Benefit aspect yields advantages including time efficiency, faster service delivery, ease of data retrieval, and a reduction in manual documentation. Overall, the implementation of E-Puskesmas is proceeding well, but improvements are still needed regarding training, the development of SOPs, and network stability.

INTRODUCTION

Community health centers (Puskesmas) are first-level health care facilities that provide health services to the community by prioritizing promotive and preventive efforts. In providing these services, every patient service activity needs to be supported by proper documentation so that health information can be reused for services, reporting, and data management. Regulation of the Minister of Health of the Republic of Indonesia Number 19 of 2024 positions Puskesmas as health care facilities that provide and coordinate health services within their working areas. Meanwhile, Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 regulates the implementation of medical records, including electronic medical record management.

The success of information system implementation is influenced not only by technological capabilities, but also by users and organizational support. One method that can be used to evaluate health information systems is Human-Organization-Technology Fit (HOT-Fit). The HOT-Fit model evaluates the fit among human, organizational, and technological aspects, as well as the benefits generated by system use (Net Benefit). The Human aspect relates to system users, Organization relates to organizational support and environment, while Technology includes system quality, information quality, and service quality. These four aspects can be used to assess the success of information system implementation comprehensively (Yusof et al., 2006).

The development of information technology encourages health care facilities to shift from fully manual documentation toward electronic systems. Electronic medical records enable patient data to be recorded, stored, retrieved, and managed in a more structured manner. In the context of first-level health services,

E-Puskesmas is one form of information system used to support registration, patient data processing, service delivery, and health information management. The use of electronic systems is expected to reduce dependence on manual documents and make it easier for staff to obtain the information they need in a shorter time (Satriadi & Hayani, 2019). The implementation of electronic medical records can also improve ease of access to patient information and support the effectiveness and efficiency of healthcare services (Mega Ermasari Muzuh, Rika Setyowati, 2025).

Based on the preliminary study at UPTD Puskesmas Lakudo, E-Puskesmas has been used to support service activities. However, several problems are still encountered, including network disruptions that can cause system errors and hinder service processes. In addition, there is no specific SOP for E-Puskesmas use and no dedicated information technology personnel responsible for application-related problems. These conditions indicate that E-Puskesmas implementation needs to be evaluated from the perspectives of users, organization, technology, and the benefits generated.

The success of a health information system is not determined solely by the availability of an application. Human, organizational, and technological factors need to be considered together because they are interrelated with the benefits obtained from system use. The Human-Organization-Technology Fit (HOT-Fit) model was developed to assess the fit among human, organization, and technology in health information system implementation. The Human aspect includes system use and user satisfaction; Organization includes structure and organizational environment; Technology includes system quality, information quality, and service quality; while Net Benefit describes the benefits obtained after the system is used (Yusof et al., 2006).

The HOT-Fit model is relevant for evaluating information systems in Puskesmas because system implementation takes place in a service environment involving many staff members and service units. Good system quality can help staff complete their work, but these benefits may decrease if users have not received adequate training, the organization does not have work guidelines, or technical support does not function properly. From the perspective of information system success, (DeLone & McLean, 2003) also emphasize the importance of system quality, information quality, use, user satisfaction, and the net benefits generated.

Previous studies show that problems in implementing Puskesmas information systems are still found in several components. (Jambago et al., 2022) reported limitations in information technology personnel, uneven staff capabilities, the absence of SOPs, and network disruptions in E-Puskesmas implementation. (Suharjo et al., 2025) found that E-Puskesmas was easy to use and could accelerate services, but training was not evenly distributed and network disruptions and limited supporting facilities remained. (Rokim et al., 2023) also showed that technical problems such as application errors could affect the smooth implementation of information systems in Puskesmas.

Findings from other studies demonstrate that human and organizational aspects play important roles. (Feny Amelia Nining Ade Ningsih, 2024) showed that Puskesmas management information systems can make staff work more effective and efficient, but user capabilities still need to be strengthened through training. (Anggita Pramesti Putri Cahyani & Fahmi Hakam, 2020) found that leadership support and facilities support information system implementation, while usage guidelines still need improvement. Therefore, system evaluation needs to examine not only whether the application can be used, but also whether users receive adequate support and whether the organization has clear work mechanisms.

The preliminary study at UPTD Puskesmas Lakudo on February 6, 2026, showed that E-Puskesmas socialization had been conducted in November 2023 and data entry began to be implemented in December 2023. In its implementation, network disruptions were still found, which could cause system errors and hinder services. When disruptions occurred, staff could temporarily switch to manual documentation. In addition, there was no specific SOP for E-Puskesmas use and no dedicated information technology personnel to handle application problems. These conditions indicate a need to examine system implementation more comprehensively from the perspectives of users, organization, technology, and benefits.

Based on these conditions, this study was conducted to evaluate E-Puskesmas implementation using the HOT-Fit method at UPTD Puskesmas Lakudo. The evaluation focused on four aspects: Human, Organization, Technology, and Net Benefit. The results are expected to provide an overview of E-Puskesmas implementation from the perspective of staff users and serve as input for the Puskesmas to improve system use quality and service sustainability.

METHOD

This study used a qualitative method with a descriptive approach and a case study design. This approach was selected because the study sought to obtain an in-depth description of staff experiences in using E-Puskesmas, as well as the organizational and technological conditions accompanying its implementation. The study was conducted at UPTD Puskesmas Lakudo, Lakudo Subdistrict, Lakudo District, Central Buton Regency, in January–February.

There were six informants selected based on their direct involvement in E-Puskesmas use. The informants consisted of the head of the Puskesmas as a source for triangulation, a medical record officer, a nursing officer, a pharmacist, a midwifery officer, and a general practitioner. Informants were selected so that the data obtained represented experiences from several service units interacting with the system.

Data were collected through in-depth interviews, observation, and documentation studies. Interviews used a guide developed based on the HOT-Fit components. Questions addressed system ease of use and use as well as training under the Human aspect; leadership support, facilities, SOPs, communication, and coordination under the Organization aspect; system quality, information quality, and service quality under the Technology aspect; and system use benefits under the Net-Benefit aspect. Observation was conducted using a checklist to directly assess system implementation, while documentation was used as supporting data.

Data validity was established through technical triangulation and source triangulation. Technical triangulation was conducted by comparing interview, observation, and documentation results concerning the same information. Source triangulation was conducted by comparing information from user staff with information provided by the head of the Puskesmas. Triangulation was intended to increase the credibility of and understanding of the phenomena identified in the field (Dawis et al., 2023).

Data analysis followed qualitative analysis stages consisting of data reduction, data display, and conclusion drawing/verification as described by (Miles et al., 2014). Interview data were reviewed and grouped according to the four HOT-Fit components. Information with similar meanings was combined into themes and then compared with observation and documentation results. The final results were presented narratively by linking field findings with the HOT-Fit concept and previous studies.

RESULTS & DISCUSSION

Human Aspect

The results showed that the Human aspect of E-Puskesmas implementation at UPTD Puskesmas Lakudo was generally fairly good. Staff stated that the E-Puskesmas interface and menus were relatively simple and understandable, especially after they became accustomed to using the system. The system was also considered helpful in accelerating services compared with manual documentation and facilitating patient data retrieval. These findings were supported by the observation checklist, which showed that staff could access the required menus and features, understand the workflow, and perform general tasks using the system.

In terms of use, staff capabilities were not developed entirely through formal training. Training from the Health Office or application manager had been provided, but most training was attended only by staff representatives. Staff who did not attend the training directly received explanations and assistance from colleagues who had attended. This condition demonstrates that internal knowledge transfer became an important mechanism for maintaining continued system use.

This situation is consistent with (Darji Darmo Suharjo & Mohammad Taufan Asri Zaen, 2025) who reported that E-Puskesmas was relatively easy to use and helped accelerate services, but training had not been evenly provided to all staff. (Ningsih, 2024) also showed that Puskesmas information systems can support work effectiveness and efficiency, but user capabilities need to be strengthened through continuous training. Within the HOT-Fit framework, user capability and acceptance are important because system quality will not produce maximum benefits if users do not possess sufficient knowledge to utilize available features (Yusof et al., 2006).

Thus, the ease of E-Puskesmas use is a strength of the Human aspect, while equal distribution of training remains an area requiring improvement. Training attended only by representatives may serve as an initial solution, but it can potentially create differences in capability among users. Scheduled training, written materials, and mentoring for new staff can help ensure that all users have relatively uniform understanding.

Organization Aspect

The Organization aspect was assessed based on leadership support, availability of supporting facilities, SOPs, communication, and coordination among staff. The results showed that the leadership of UPTD Puskesmas Lakudo had provided support for EPuskesmas implementation. This support was reflected in the provision of devices such as computers or laptops, printers, and internet networks required for service activities. Facility support indicates that system implementation has become part of the Puskesmas work process and does not depend solely on individual staff initiative.

Nevertheless, the study found that no specific SOP for E-Puskesmas use was available. The absence of an SOP is an organizational weakness because staff do not yet have a formal document explaining the system-use workflow consistently. So far, knowledge of system use has largely been obtained through training, socialization, work experience, and assistance from colleagues. This approach can function when experienced staff are available, but it can create dependence on individuals when staff changes occur or new problems arise.

This finding supports the view of (Ifinedo, 2006) that organizational support in information system implementation includes not only resources and infrastructure, but also policies and work procedures that support system use. (Rokim et al., 2024) also showed that leadership support and facilities can facilitate health information system implementation, while the absence of SOPs can become an obstacle. (Anggita Pramesti Putri Cahyani, Fahmi Hakam, 2020) demonstrated a similar condition, in which leadership and facility support were available, but usage guidelines still needed strengthening.

Regarding the organizational environment, communication and coordination among staff worked well. Service information contained in the system enabled staff from several units to access the required information without depending on paper documents. E-Puskesmas implementation also made the service flow more structured because information from registration, examination, and pharmacy could be interconnected. This condition is consistent with the HOT-Fit concept, which positions communication and relationships among organizational units as part of the organizational environment (Yusof et al., 2006).

Overall, the Organization aspect can be considered fairly good because there is leadership commitment, supporting infrastructure, and functioning coordination. However, the existence of a specific SOP needs to be prioritized. An SOP can establish responsibilities at each stage, procedures when the system is operating normally, steps to take when the system experiences disruptions, and temporary documentation mechanisms when staff must switch to manual procedures.

Technology Aspect

The Technology aspect in this study was analyzed through system quality, information quality, and service quality. In terms of system quality, E-Puskesmas was considered helpful in accelerating services and facilitating patient data retrieval. Staff could find patient histories and information through the search feature without having to search for documents manually. Medical record officers, physicians, nurses, pharmacists, and midwives reported relatively similar experiences that the system supported their work and accelerated service processes.

Observation results showed that the available features were relatively easy to understand and patient information could be found through the search function. With electronic documentation, staff did not need to rely on searching physical files to obtain information already available in the system. This finding is consistent with (Manullang et al., 2025), who showed that Puskesmas management information systems can help accelerate services and data processing. (Oktaviotika et al., 2024) also reported that the quality of Puskesmas information systems sufficiently supported ease of data access and service delivery.

Regarding information quality, informants considered patient data generated by EPuskesmas sufficiently accurate as long as input was based on correct identity and data. Anamnesis, prescriptions, and service data were stored in the system and could be retrieved. The observation checklist also showed that entered data corresponded to the documents used as the basis for data entry and that the system provided warnings for certain errors. Information quality is an important part of system success because accurate, relevant, and timely information is more useful for staff in providing services (DeLone & McLean, 2003).

However, technology service quality was not yet fully optimal. Problems identified included internet network disruptions, power outages, system errors, and application maintenance or updates by the system manager. When disruptions occurred, service processes dependent on the system could be delayed, requiring staff to wait or temporarily use manual procedures. The head of the Puskesmas also explained that access speed was strongly influenced by network stability.

These findings are consistent with Rokim et al., (2024), who identified application errors as one of the obstacles to implementing Puskesmas information systems. (Suharjo, 2025) also reported network disruptions and limited supporting facilities. From a service quality perspective, technical support should be able to provide a rapid response and maintain service reliability. (Richard T. Watson, 2012) explained that information system service quality relates to the service provider's ability to provide reliable support.

The difference between system quality and service quality is clearly visible in this study. In terms of features and functions, E-Puskesmas supports staff and is relatively easy to use. However, these benefits can be disrupted when the network is unstable or the application is undergoing maintenance. Therefore, improving technology quality is not sufficient merely by adding devices; it also requires network management, planned maintenance mechanisms, communication regarding maintenance schedules, and rapid technical support.

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Net-Benefit Aspect

The Net-Benefit aspect describes the benefits perceived after E-Puskesmas is used in daily work. The results showed that staff experienced benefits in the form of time efficiency, faster services, easier data retrieval, reduced use of manual documents, and a more structured workflow. These benefits were not limited to one unit but appeared across several stages of service delivery.

Medical record staff stated that using E-Puskesmas made service processes faster than manual methods. Physicians could view patient history information more easily, nurses found assessment easier, pharmacists could view prescriptions through the system, while midwifery staff could access and retrieve data in a more structured manner. The head of the Puskesmas considered that system use could make services more orderly, shorten waiting times, and make service documentation more organized, thereby supporting evaluation.

These findings are consistent with the Net-Benefit concept in HOT-Fit, namely the benefits arising from system use for individuals and organizations. Benefits can be seen in increased work effectiveness and efficiency, reduced errors, easier communication, and positive impacts on work (Yusof et al., 2006). (DeLone & McLean, 2003) also position net benefits as an important outcome of information system use. Thus, the success of E-Puskesmas in Lakudo is not only demonstrated by the system's ability to operate, but also by tangible changes in staff work processes.

Overall, the Net-Benefit aspect of E-Puskesmas implementation at UPTD Puskesmas Lakudo can be categorized as good. The system has provided direct benefits to work and service delivery, particularly by accelerating processes and facilitating access to information. However, sustaining these benefits requires improvements in the Human, Organization, and Technology aspects so that the system continues to support services when disruptions occur.

CONCLUSION

Overall, E-Puskesmas implementation based on the HOT-Fit method at UPTD Puskesmas Lakudo has been fairly good. In the Human aspect, implementation is fairly good. Staff are generally able to operate the system, consider the interface easy to understand, and perceive that E-Puskesmas accelerates services and facilitates data retrieval. The main challenge is that training has not been provided evenly to all users.

The Organization aspect is fairly good because there is leadership support, provision of supporting facilities, and good communication and coordination among staff. The main weakness is the absence of a specific SOP that can serve as a uniform guide for E-Puskesmas use.

The Technology aspect supports service delivery through easy access and data retrieval, and the information is considered sufficiently accurate. However, technical service quality is not yet optimal because network disruptions, power outages, system errors, and application maintenance can hinder services.

The Net-Benefit aspect is good. E-Puskesmas provides benefits in the form of time efficiency, faster services, easier patient data retrieval, reduced use of manual documents, and a more structured

service flow. These benefits need to be maintained through continuous improvements in human resources, organization, and technology.

Nevertheless, this study is limited to E-Puskesmas implementation and focuses on the experiences of E-Puskesmas user staff at one health care facility. Therefore, the results describe the contextual conditions of UPTD Puskesmas Lakudo and are not intended to be generalized to all Puskesmas. The study data emphasize user perspectives and field observations; future research could consider system log data, service-time measurements, or the perspectives of patients and technology managers to obtain a broader picture.

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