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Implementation of the employment information system to optimize employment supervision in Jambi Province

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Abstract: Effective employment supervision is critical for ensuring compliance with labour regulations and protecting worker rights. However, traditional paper-based approaches face significant challenges in the context of Indonesia's decentralized governance and limited supervisory resources. This study investigates the implementation of the Employment Information System, an online employment information system developed by the Manpower and Transmigration Office of Jambi Province, to optimize employment supervision. Using a mixed-methods approach combining analysis of system documentation and interviews with key stakeholders, this research assesses the system's functional capabilities, user access levels, data management workflows, and alignment with information systems success models. The findings reveal that Employment Information System integrates essential features including company registration, P2K3 (Occupational Safety and Health Committee) data management, complaint handling, and report generation across three distinct user levels. However, challenges persist in achieving optimal utilization, including limited digital infrastructure, insufficient training, and varying user responsiveness. This study contributes to the literature on digital transformation in labour governance within developing country contexts and offers practical recommendations for enhancing system adoption through targeted capacity building, feature integration, and policy reinforcement.

Keywords: digital transformation; employment information system; employment supervision; occupational safety and health

1. Introduction

Effective labour inspection and employment supervision form the cornerstone of decent work agendas worldwide. In Indonesia, the Ministry of Manpower has reported 13,299 labour violations and 370,747 workplace accidents in 2023, underscoring the urgent need for robust enforcement mechanisms (Menteri Ketenagakerjaan Republik Indonesia, 2024). The government has committed to reducing workplace accidents by at least 10% annually from the 298,137 cases recorded in 2022 as part of its 2024–2029 National Occupational Safety and Health Program. Achieving these targets requires not only regulatory reform but also the modernization of supervisory systems through digital transformation (World Bank, 2021).

Digital technologies have emerged as powerful enablers for enhancing labour inspection efficiency, transparency, and coverage. A study of five European countries revealed that digitalization and data-driven targeting are maximizing the effectiveness of inspections, addressing persistent challenges related to inspector-to-workforce ratios and limited OSH resources (Charles et al., 2022; Ly et al., 2026). Similarly, the International Labour Organization (ILO) has championed the adoption of electronic case management systems and digital platforms to replace traditional paper-based workflows, enabling real-time data

collection, automated reporting, and improved compliance monitoring across supply chains (Amin & Ibrahim, 2025; Charles et al., 2022).

Indonesia has responded by introducing several digital initiatives, including the Norma 100 platform, the WLKP (mandatory employment report) system, and the broader Employment Information System (Hidayat Ur Rehman et al., 2023). However, adoption rates remain low; for example, compliance with WLKP in South Sulawesi Province reached only 14.43% by early 2025 (Mutiarin et al., 2019). These low utilization rates suggest that while technology offers potential, its successful implementation depends on addressing institutional, infrastructural, and capacity-related barriers (Amin & Ibrahim, 2025).

At the provincial level, the Manpower and Transmigration Office of Jambi Province developed Employment Information System, an online employment information system launched in 2019 to streamline company reporting, P2K3 (Occupational Safety and Health Committee) data management, and public complaint handling. The system was designed in response to the KPK's (Corruption Eradication Commission) directive to digitize services and minimize opportunities for illicit practices in SK P2K3 issuance. Given Jambi's vast geographical coverage encompassing five regencies/cities, Employment Information System was also intended to overcome physical accessibility constraints (Nuraeni et al., 2022).

Despite these innovations, there has been limited systematic analysis of how such systems function in practice and to what extent they optimize employment supervision (Satispi et al., 2023). Previous studies have examined national-level LMIS frameworks (World Bank, 2021), evaluated specific digital platforms like WLKP (Pujiastuti et al., 2023), and explored technology acceptance models in e-government contexts (Anityasari et al., 2024; Sabani et al., 2023). However, provincial-level implementations remain underexplored, particularly in the context of Indonesia's decentralized governance structure where local governments have significant autonomy over labour administration (Hudoarma et al., 2023). Therefore, this study aims to:

(1) Analyse the functional architecture and operational workflows of Employment Information System across its three user levels (company, worker/complainant, and administrator),
(2) Assess how the system addresses key challenges in employment supervision, and
(3) Identify factors influencing its effective adoption.

By bridging the literature on information systems success and digital governance, this research contributes practical insights for policymakers and system developers aiming to enhance labour inspection through technology.

2. Material and methods

This study employed mixed-methods research design, combining qualitative document analysis and key informant interviews. The research was conducted over a three-month period from October to December 2025. To provide a clear understanding of the research procedures, a methodological flowchart is presented in Figure 1, which illustrates the sequential stages of data collection, analysis, and synthesis.

2.1 Research design and framework

Figure 1 presents the research methodology flowchart, which outlines the systematic approach adopted in this study. The research began with defining the research objectives, followed by parallel data collection from primary sources (Employment Information System user manuals, system databases, and key informant interviews) and secondary sources (literature review). Data analysis was conducted using document analysis for technical specifications, descriptive statistics for usage trends, and thematic analysis

for interview data. The findings were then synthesized and evaluated against established information systems success frameworks (DeLone and McLean IS Success Model and Technology Acceptance Model).

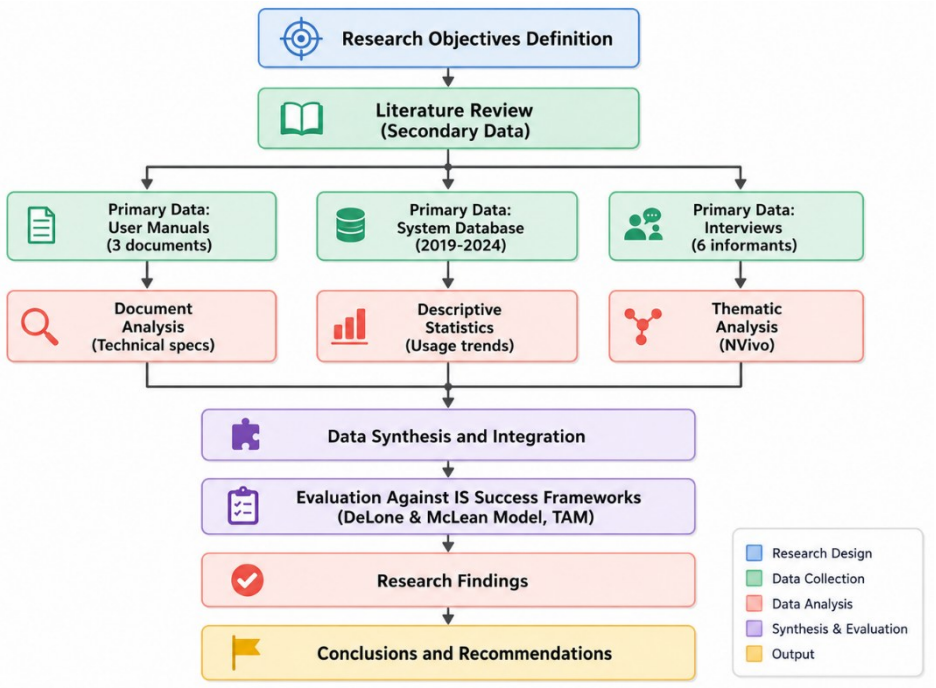


Figure 1. Research methodology flowchart showing the systematic approach from research design to conclusion formulation

2.2 Data sources and collection methods

The primary data sources consisted of three official user manuals for the Employment Information System, targeting the company level, administrator level, and front-end/complaint level, all developed by the system developer team in 2019. These documents provided detailed descriptions of login procedures, dashboard navigation, data entry workflows for each module, report generation functions, and user account management (Panjaitan, 2023). Secondary data sources included peer-reviewed journal articles from 2021–2025 focusing on e-government adoption, labour inspection digitalization, information systems success models, and occupational safety and health reporting. A systematic literature search was conducted using academic databases including Scopus, Web of Science, Google Scholar, and Semantic Scholar. The search keywords included "employment information system," "labour inspection," "e-government," "digital transformation," "P2K3," and "Indonesia." A summary of the research data sources and collection methods is presented in Table 1, which provides a comprehensive overview of the data types, collection approaches, and key information extracted from each source.

Table 1. Summary of research data sources and collection methods

Data source	Type	Collection method	Key information extracted
Employment Information System user manuals (3 documents)	Primary	Document analysis	System functions, user roles, workflow procedures
System database	Primary	Data extraction	Usage statistics (2019–2024)
Key informant interviews	Primary	Semi-structured interviews	User experiences, challenges, perceptions
Journal articles (n=22)	Secondary	Literature review	Theoretical frameworks, comparative cases

2.3 Theoretical framework

The system evaluation framework was informed by the DeLone and McLean IS Success Model and the Technology Acceptance Model, which have been widely applied in e-government contexts (Abdulkareem & Mohd Ramli, 2022; Hidayat Ur Rehman et al., 2023). These models emphasize information quality, system quality, service quality, user satisfaction, and net benefits as key dimensions of information system success.

2.4 Data analysis procedures

Semi-structured interviews were conducted with six key informants: two system administrators, two company operator representatives, and two worker complaint users. All interviews were audio-recorded, transcribed verbatim, and analysed using thematic analysis with NVivo software to identify recurring themes related to system usability, data accuracy, training adequacy, and perceived benefits. Quantitative data on system usage statistics, including the number of registered companies, submitted P2K3 reports, and processed complaints, were obtained from the system's backend database for the period 2019–2024. Descriptive statistics were calculated using Microsoft Excel to identify trends in adoption rates and feature utilization.

3. Results and discussion

3.1 System architecture and user access levels

The Employment Information System operates as a web-based application accessible at the designated portal, designed to serve three distinct user categories: companies (for reporting and P2K3 management), administrators (for oversight and verification), and workers (for complaints and employment information). This multi-level access structure aligns with the collaborative governance model proposed for OSH accountability, emphasizing digitalized reporting and inter-institutional data integration (Lionardo et al., 2025). Figure 2 illustrates the high-level architecture of the Employment Information System, showing the three user interfaces (Company Portal, Worker Portal, and Admin Dashboard), the core modules (Company Data Management, P2K3 Reporting, Work Accident Recording, Complaint Management, Report Validation, User Management, and Content Management), and the integrated database. The architecture diagram demonstrates how different user levels interact with the system's core functionalities and highlights key external interoperability points with the Ministry of Manpower's SISNAKER platform as a future integration target. This comprehensive architecture enables centralized data management while maintaining role-based access control, ensuring data security and appropriate workflow segregation.

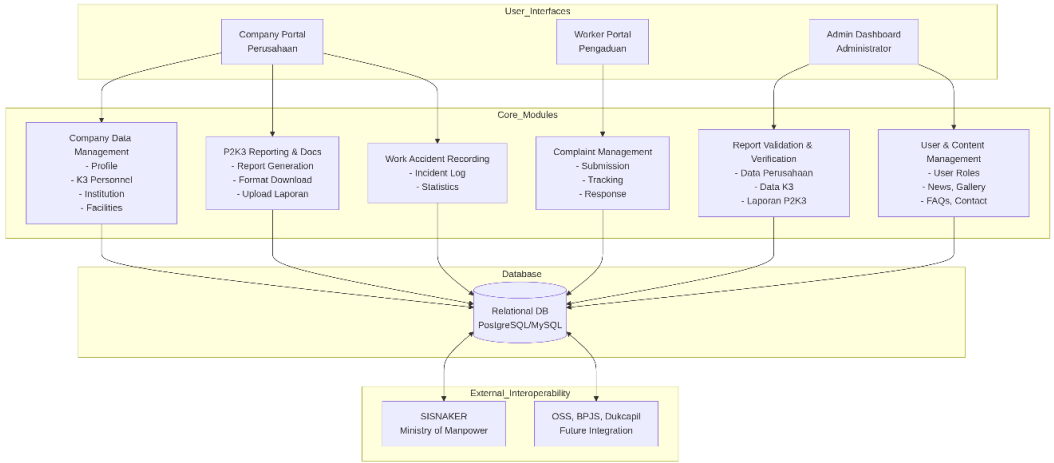


Figure 2. High-level architecture of Employment Information System showing the three user interfaces, core modules, and external interoperability and other platforms

The access levels and functionalities within the Employment Information System are systematically organized to support different stakeholder needs. As detailed in Table 2, each user level is equipped with specific functions and features tailored to their operational requirements. This structure facilitates efficient data flow from companies through the validation process to administrative oversight, creating a transparent and accountable employment supervision ecosystem.

Table 2. Access levels and functionalities in Employment Information System

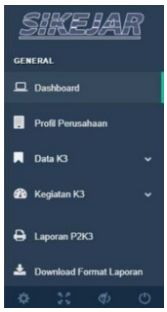
User level	Primary functions	Key features
Company	Complete company profile; Manage P2K3 data; Submit K3 activity reports; Generate P2K3 reports; Download report formats	Dashboard; Profile management; Data K3 (Personnel, institutions, facilities); Activity K3 (guidance, services, evaluation); Occupational Safety and Health Committee Report
Administrator	Validate company data; Manage user accounts; Oversee report submissions; Manage public content (news, announcements, FAQs, gallery); Respond to complaints	Dashboard; Company data; Data K3 validation; Complaints handling; Management Report; Settings; Report Template; Gallery; News; Announcements; FAQs; User messages
Worker (complaint)	Submit K3 complaints; Track complaint status; Manage profile; Access employment information	Dashboard; make a Complaint; Complaint Data; Edit profile

The administrator dashboard provides comprehensive oversight across 14 sub-menus, enabling monitoring of all company-submitted data, from personnel and institutional information to facility and equipment testing records. This centralized approach facilitates data-driven targeting, identified as a best practice in European labour inspectorates by allowing supervisors to prioritize inspections based on risk indicators (Amin & Ibrahim, 2025).

3.2 Company-level data management

Figure 3 presents the user interface perspectives of the Employment Information System, showing both the public-facing and operational components. Figure 3(a) displays the landing page of the Employment Information System website, which serves as the primary entry point for all users. The landing page features intuitive navigation, quick access to system login, public announcements, frequently asked questions, and general employment information resources. Figure 3(b) illustrates the company dashboard after login, showing the comprehensive sidebar menu that provides access to various data management modules including company profile, P2K3 data entry, work accident reporting, and report generation functions. The dashboard interface is designed with user-friendly navigation to facilitate efficient data entry and management tasks.

(a)



(b)

Figure 3. Employment Information System interface: (a) Landing page of the Employment Information System website, and (b) Company dashboard showing the sidebar menu for data management functions

The company interface requires operators to first complete company and operator profiles upon initial login. Subsequent features include eight data categories under Data K3, covering:

1. Personnel (with classification types and member management)
2. Institutional/Organizational data
3. Facilities and infrastructure
4. Equipment testing records
5. Workplace environment testing
6. Work accident reports
7. Awards received
8. K3 activities (guidance, services, evaluation)

For each category, the system supports creating, reading, updating, and deleting operations. Notably, for institutional and organizational data, users can either enter new data or copy data from previous periods, a feature that reduces redundant data entry while ensuring temporal comparability.

The system also integrates P2K3 reporting requirements. Companies can generate P2K3 reports by specifying report numbers, periods, and adding narratives on obstacles and suggestions before printing. Additionally, completed reports can be uploaded back to the system, creating a closed-loop documentation process that supports audit trails and accountability.

3.3 Administrative oversight and data validation

Administrators possess granular visibility across all registered companies. The data validation workflow, as illustrated in Figure 4, demonstrates the systematic approach to quality control within the Employment Information System. Figure 4 presents an example of the data validation page for K3 personnel, showing the detailed interface that administrators use to review and validate company submissions. The validation workflow requires administrators to: (1) select a specific company from the registered list, (2) view detailed information for each data category with all submitted fields visible for review, (3) choose "Yes" (validate) or "No" (reject with reason) for each submission based on completeness and accuracy criteria, and (4) provide mandatory rejection reasons when applicable to guide companies in correcting their submissions. This validation mechanism ensures data quality while maintaining transparency, as companies receive feedback on submissions requiring revision. The interface design supports efficient review processes while maintaining comprehensive documentation of all validation decisions.

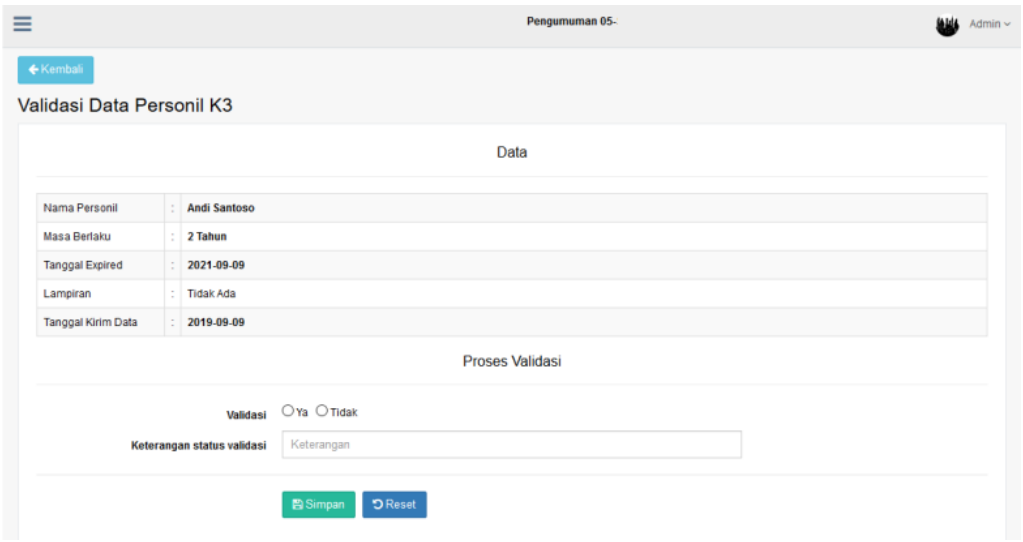


Figure 4. Data validation page for K3 personnel showing the administrator review interface with validation options and feedback mechanism

This validation mechanism ensures data quality while maintaining transparency, as companies receive feedback on submissions requiring revision. The approach reflects findings from the extended TAM literature, where system quality and ease of use strongly influence perceived effectiveness (Kurniadi et al., 2025).

3.4 Complaint handling mechanism

Worker users can submit anonymous or attributed complaints regarding workplace safety violations, unpaid wages, or other labor norm infringements. The complaint workflow follows a structured process:

1. Worker completes profile and verification
2. Submits complaint via the "*Make a Complaint*" form
3. Administrator reviews and changes status to "*Being processed*"
4. Administrator may request additional information or close the complaint with resolution notes
5. Workers can track status through "*Complaint Data*" dashboard

Figure 5 presents the worker dashboard interface for complaint management, demonstrating the transparency and accountability features built into the system. The dashboard allows workers to view all their submitted complaints with clear status indicators (e.g., "*Being processed*" for in-progress, "Finished" for resolved), access detailed responses from administrators including resolution notes and any requested follow-up actions and track the timeline of each complaint from submission to resolution. This interface design empowers workers by providing visibility into the complaint handling process and ensuring that their concerns are formally documented and addressed within the employment supervision framework.

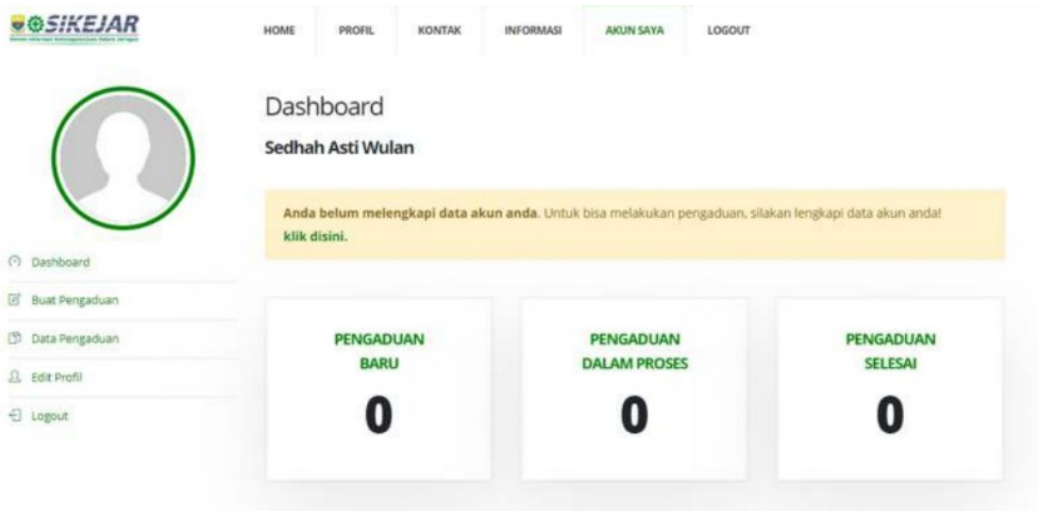


Figure 5. Worker dashboard for tracking submitted complaints, showing status and the ability to view detailed responses from the administrator

This digital complaint channel addresses the fragmentation of inter-agency coordination and limited safety literacy identified in previous studies (Lionardo et al., 2025). However, effectiveness depends on timely administrative response and adequate follow-up investigation capacity, a common constraint given limited inspector resource.

3.5 Usage trends and adoption patterns

Analysis of system usage data from 2019–2024 reveals gradual but uneven adoption patterns, as summarized in Table 3. Table 3 presents the Employment Information System usage statistics over a six-year period, demonstrating the growth trajectory and utilization patterns across different system features. The number of registered companies increased from 45 in 2019 to 278 by December 2024, representing

a significant expansion in system reach. However, the proportion of companies submitting complete P2K3 reports remained below 30% throughout the observation period, indicating persistent challenges in achieving full compliance. The data show that the top utilized features were company profile completion (100%), followed by P2K3 report generation (28%), and work accident recording (12%). Complaint submissions showed an encouraging increasing trend, rising from 18 in 2022 to 74 in 2024, suggesting growing worker awareness and trust in the digital complaint mechanism.

Table 3. Employment Information System usage statistics (2019–2024)

Year	Registered companies	Complete P2K3 reports	Work accident records	Complaints submitted
2019	45	8	3	N/A
2020	87	17	9	N/A
2021	126	29	14	12
2022	172	41	23	18
2023	224	57	31	41
2024	278	78	46	74

These figures indicate that while registration has grown steadily, active utilization of advanced features remains limited. The compliance rates mirror findings from South Sulawesi, where WLKP utilization reached only 14.43% by early 2025 (Amin & Ibrahim, 2025). These persistent low adoption rates across multiple platforms suggest systemic barriers rather than platform-specific issues.

3.6 Challenges and barriers to effective adoption

Interviews with key informants and analysis of the user manuals identified several persistent challenges. First, digital infrastructure gaps remain significant. Second, insufficient training for both company operators and labour inspectors limit effective use of advanced features (Ronconi & Raphael, 2025). Third, data accuracy concerns arise from manual data entry without automated validation checks. Fourth, company responsiveness varies widely, with some firms delaying submissions or providing incomplete information. Fifth, limited system integration with national databases forces duplicates data entry and prevents automated cross-validation.

These findings align with the WLKP evaluation in South Sulawesi, which identified "socialization, data accuracy, company responsiveness, digital infrastructure, and system integration" as key obstacles (Amin & Ibrahim, 2025). Similarly, the SRIKANDI evaluation in Indonesian government institutions identified technical disruptions (mean score 3.8) and insufficient training (3.9) as major concerns, with regression analysis indicating ease of use ($\beta = 0.55$, $p < 0.001$) as the strongest predictor of perceived effectiveness (Kurniadi et al., 2025). From a technology acceptance perspective, the findings confirm that effort expectancy and facilitating conditions significantly influence adoption. Companies with dedicated HR personnel and reliable internet access demonstrated higher completion rates, while smaller firms with limited administrative capacity struggled to comply with reporting requirements. This disparity suggests that targeted technical assistance for smaller enterprises may yield disproportionate improvements in overall compliance rates.

3.7 Comparative analysis with other digital inspection systems

Comparison with international cases reveals both strengths and areas for improvement. Fiji's Paperless Labour Inspection System (PLIS) increased inspection coverage from 4,500–5,000 to an expected significant increase through digital case management and direct tablet-based data entry (Abdulkareem & Ramli, 2021). Ghana's Safety and Compliance Monitoring App facilitates real-time verification and seamless data sharing among multiple enforcement agencies (Lionardo et al., 2025). The ILO's LIFT tool

has created centralized digital repositories covering thousands of economic units across multiple sectors (Charles et al., 2022). These cases suggest that mobile-optimized field data collection, multi-agency integration, and automated risk-based targeting represent key maturity features that Employment Information System could adopt in future versions (Feng et al., 2025; Fischer-Preßler et al., 2024). However, the Jambi system's comprehensive focus on P2K3 documentation and reporting, addressing a specific regulatory requirement, remains a distinctive strength compared to more generalized compliance platforms.

3.8 Recommendations for system enhancement

Based on the analysis, several actionable recommendations can be proposed. First, capacity-building programs should be expanded through regular technical guidance sessions, the development of video tutorials, and the establishment of a dedicated helpdesk. Second, system enhancements should focus on improving mobile accessibility, implementing automated data validation, enabling pre-filled forms based on previous submissions, and providing real-time notification features. Third, institutional measures should include the enforcement of sanctions for non-compliance, the provision of compliance incentives or awards, the integration of the system with OSS and BPJS databases, and the strengthening of inter-agency coordination. Fourth, monitoring and evaluation efforts should be enhanced through the use of quarterly utilization dashboards, periodic user satisfaction surveys, complaint resolution tracking, and regular impact assessments.

3.9 Theoretical implications

This study contributes to the literature on information systems success in the public sector by extending the DeLone and McLean IS Success Model to a provincial labour inspection context (Kilani, 2020). The findings confirm that system quality (evidenced by interface design and workflow logic), information quality (reflected in data accuracy and completeness), and service quality (manifested in administrative responsiveness and training availability) jointly influence user satisfaction and net benefits. Moreover, the results support the technology acceptance model's emphasis on perceived ease of use as a critical determinant of adoption, consistent with prior e-government studies in Indonesia. The identification of digital infrastructure and institutional capacity as facilitating conditions further validates the extended UTAUT framework (Karnsomdee, 2026).

4. Conclusion

The implementation of Employment Information System in Jambi Province has demonstrated notable strengths, including a multi-level access architecture, comprehensive P2K3 data management, integrated complaint handling, and public engagement features, leading to an increase in registered companies from 45 to 278 and complaint submissions from 18 to 74 between 2019 and 2024. However, persistent challenges such as digital infrastructure gaps, insufficient user training, data accuracy concerns, and limited integration with national databases have resulted in low utilization of advanced features, only 28% of registered companies submitted complete P2K3 reports, mirroring adoption barriers observed in other Indonesian platforms like WLKP. Optimizing employment supervision through Employment Information System therefore requires a multi-pronged approach combining technical enhancements (mobile optimization, automated validation), capacity building (training programs, helpdesk support), institutional reinforcement (enforcement of sanctions, integration with OSS and BPJS databases), and ongoing evaluation. Future research should formally assess user acceptance, evaluate the system's impact on actual inspection outcomes, and explore interoperability with SISNAKER and other national platforms.

Author's declaration

Author contribution

Pariyadi: conceptualized the system, methodology, analysed the data, and writing-original draft, writing-review and editing, supervision. **Nanang Maulana Syarif**: Investigation, formal analysis, validation, writing-review and editing. **Rizki Ramadhan**: Resources, data curation, validation. **Fikri Al Hakim**: performed technical review of the application modules and finalized the document.

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Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Primary data collected from interviews are not publicly available to protect informant confidentiality. All referenced documents, including the Employment Information System user manuals, are accessible through official sources indicated in the reference list.

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The authors were part of the initial development team on the Employment Information System; however, this relationship did not influence or influence the conclusions presented.

Ethical clearance

The study involved interviews with key informants who provided informed consent prior to participation. Participation was voluntary, and confidentiality was maintained throughout the research process. The study was conducted in accordance with institutional research ethics guidelines and the ethical principles of the Declaration of Helsinki.

AI statement

This article is the original work of the authors. The grammatical structure of this article was improved by using Grammarly and the authors have rechecked the accuracy and correctness of the generated sentences with the topic and data of this study. The data and language use in this article have been validated and verified by an English language expert and none of the AI-generated sentences are included in this article.

Publisher's and Journal's Note

Researcher and Lecturer Society as the publisher, and Editor of Journal of Computer-based Instructional Media state that there is no conflict of interest towards this article publication.

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Nomenclature

ICT	: Information and Communication Technology
ILO	: International Labour Organization
KPK	: Corruption Eradication Commission
LMIS	: Labor Market Information System
MoM	: Ministry of Manpower
OSH	: Occupational Safety and Health
OSS	: Online Single Submission
P2K	: Occupational Safety and Health Committee
PLIS	: Paperless Labor Inspection System
SEM	: Structural Equation Modeling
SISNAKER	: Employment Information System
SK	: Letter of Decision
SPBE	: Electronic-Based Government System
TAM	: Technology Acceptance Model
UTAUT	: Unified Theory of Acceptance and Use of Technology
WLKP	: Mandatory Corporate Employment Report