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The Influence of Information Technology Utilization on Service Effectiveness at BPJS Employment

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Abstract

In this paper, the author considers the effects of information technology (IT) application on the service effectiveness at BPJS Employment, one of the major providers of social insurance in Indonesia. Quantitative method was used to collect data using structured questionnaires to 120 respondents, of which 120 are staff and the remaining are service users. Inferential statistical tests such as correlation and regression analysis have indicated that IT utilization and service effectiveness have strong and significant positive relationship. According to the regression model, the use of IT was used to explain the difference in the service effectiveness with a standardized coefficient of 0.742 and p-value of less than 0.001. The results indicate that online registration, automated claims, and mobile systems enhance greatly the value of service, efficiency, speed, and accuracy. The findings offer empirical information regarding e-governance procedures in Indonesia, which is important to supplement the current literature that mostly focuses on qualitative approaches. The study, with a quantitative analysis, contributes to the debate on the way digital tools can change the public service institutions. In general, the study shows that it is imperative to empower IT infrastructures, to train its users, and to advocate digital literacies to continue to streamline service delivery and to make the public sector institutions in Indonesia sustainable.

INTRODUCTION

In the modern centuries of digital transformation, information technology (IT) integration in the process of providing the citizens with various kinds of public services has been a foundational requirement, rather than strategic well-being. Such a transition can be especially noticed in the case of Indonesia as more public institutions are adopting digital tools to elevate the efficiency and responsibility of their operations (Aminah & Saksono, 2021). One of such institutions is the BPJS BPJS Employment (Social Security Administering Body in Employment), which is prominent in supporting the management of different social security programs embedded in employment. Since the institution handles the social protection rights of millions of workers in Indonesia, the quality and efficiency of its services play a

vital role in the confidence of the population of the state and the legitimacy of the institution (Sumadi, 2023).

It is clear that the Indonesian government, through the Presidential Regulation No. 95 of 2018, regarding the Electronic-Based Government System (SPBE), has openly required the public service agencies to use information technology to facilitate efficient service delivery, decrease bureaucracy, and maintain transparency. Such digital mandates encompass some institutions like BPJS BPJS Employment which will be providing fast and reliable services with ease of services through various IT applications such as registration online, mobile claim systems, and combined customer support systems (Arianto, 2023).

Nevertheless, regardless of such regulatory and infrastructural initiatives, there are still numerous service delivery issues (Mhlanga et al., 2021; Kulal et al., 2024)). Such issues as the delays in processing the claims, no clarity in the use of digital communication, inconsistencies between regional offices regarding service standards have been reported to happen by the participants. These considerations raise the possibility that there might exist a discrepancy between the deployment of IT systems on one hand and the enhancement of service effectiveness on the other hand. The issue is not only whether or not the technology was present or not but whether or not it has been applied well by the institution and the user (Ali et al., 2024).

Traditionally, service effectiveness in the field of public administration is achieved by such dimensions as accuracy, responsiveness, speed, accessibility, and user satisfaction (Widanti, 2022). Information technology implementations ought to improve these dimensions since they should lead to the replacement of manual procedures, minimizing the error that people make, as well as allowing real-time feedback (Behnke et al., 2021). IT is supposed to enhance claim services, registrations, communication among their participants, and data accuracy within the context of BPJS Employment because they are also the most significant contributors to the quality of services (Styrin et al., 2022). However, in most cases those expectations are not met because of the utilization of technology incorrectly, absence of training of the users, or prejudice to the change of personnel.

Furthermore, although BPJS Employment has established a number of digital services including the BPJSTKU mobile application, online ports and self-service kiosks, the degree of user experience usage and system reliability hold considerable differences across subjects (Pratistha & Mahyuni, 2024). A number of studies have shown that the quality of IT usage in the work of the authorities is predetermined not only by the presence of the system, but also by the organizational culture, digital literacy of employees, and the preparation of participants.

The use of IT is more hindered in the public sector organizations as compared to the other sectors of the economy. They comprise the lack of technical capability, bureaucratic stiffness, lack of funding, and poor monitoring procedures (Zhu et al., 2024). In BPJS Employment, the issue is further complicated by the system downtimes, the lack of socialization of new technologies, along with the disparities in the IT infrastructure in various regions. This has led to the situation whereby, even as some regional offices are doing magnificently in service delivery owing to good use of IT, others are far much behind hence the discrepancy in performance of the government to the people (Mathonsi, 2024).

This research study can be said to have resulted due to the pressing demand to ascertain whether use of information technology has a statistically quantifiable effect on the effectiveness of services in BPJS Employment. Past studies accessed the relation between IT adoption and citizen satisfaction within the context of different government agencies (Alkraiji, 2021) however very little empirical research was done

in the context of BPJS Employment where the largest proportions of interactions between the agency and the citizenry happen, namely, at regional offices.

Moreover, the 2020-2024 National Mid-Term Development Plan (RPJMN) envisioned by Indonesia on the bureaucratic reform prioritizes the digitalization process as its main tool in enhancing the quality of its services in the public section (Alkaf, 2024). Institutions such as BPJS Employment will only achieve these objectives depending on their capacity to use information technology not only as an instrument but as an agent of effective service. Unless we assess the weight of its effects carefully, digitization of public services initiatives could turn into missionary, but not revolutionary, efforts.

Against this background, this paper presents quantitative research on how information technology use can determine service effectiveness, in BPJS Employment (Franque et al., 2021). The study will look into obtaining empirical data regarding whether the IT tools play a significant role in improving the delivery of services by analyzing the perceptions gained by the participants and the data related to the operations. The results would provide viable lessons concerning institutional enhancement, tactical policymaking, and gain in the public field.

METHODS

This study employed a quantitative explanatory survey design to investigate the effect of information technology (IT) utilization on service effectiveness within BPJS Employment, Indonesia's national social security agency. The methodological framework was developed to produce empirical evidence on how digital transformation initiatives influence institutional service delivery performance. Quantitative research was chosen because it enables the objective measurement of relationships among variables and the statistical testing of hypotheses derived from theoretical models (Pesämaa et al., 2021). The explanatory approach, in particular, allows for the identification of causal pathways, revealing how variations in IT usage contribute to differences in service outcomes. Such a design aligns with contemporary studies in digital governance that emphasize measurable indicators of technological adoption and performance enhancement (David et al., 2023).

Research Design

The study's explanatory survey design integrated perspectives from both internal and external stakeholders of BPJS Employment. Internal stakeholders included employees from service, information systems, and customer relations divisions, while external stakeholders comprised registered BPJS participants who regularly access digital platforms such as the *BPJSTKU* mobile application, online registration portals, and electronic claim submission systems. Incorporating both groups ensured that the research captured the dual dimensions of digital governance—administrative implementation and user experience. This dual-focus approach follows the recommendation of Franque et al. (2021), who argue that assessments of technological innovation in public institutions must include both service providers and beneficiaries to produce a valid measure of performance effectiveness.

Population and Sampling

The study population consisted of BPJS Employment staff and service users operating within regional offices where digital systems had been institutionalized. Because the research sought to obtain responses from individuals with direct experience using IT-based systems, a purposive sampling strategy was employed. Purposive sampling allows the selection of participants who possess specific knowledge and exposure relevant to the research objectives (Lim, 2025). A total of 120 respondents participated, comprising both employees and users. The sample size satisfied the general requirement for regression-based analysis, which

recommends at least ten observations for every independent variable included in the model (Behnke et al., 2021). This ensured statistical power while maintaining representativeness across organizational units.

Research Instrument

Primary data were collected through a structured questionnaire designed to operationalize two core variables: IT utilization and service effectiveness. The questionnaire consisted of three sections. The first collected demographic information, including gender, age, position, and length of service or membership. The second measured IT utilization through five dimensions: accessibility, ease of use, technological integration, infrastructure reliability, and digital competence. These indicators were derived from the Technology Acceptance Model (TAM), which identifies perceived usefulness and perceived ease of use as fundamental determinants of technology adoption (Franque et al., 2021). The third section measured service effectiveness using dimensions of accuracy, speed, responsiveness, accessibility, and user satisfaction based on validated service quality frameworks (Styrin et al., 2022; Widanti, 2022).

Each item employed a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Likert scaling is widely recognized for its reliability in quantifying perceptions and attitudes, facilitating the derivation of continuous data suitable for parametric analysis (Mhlanga et al., 2021). The operational definitions and item distribution for each construct are presented in Table 1.

Table 1. Structure of the Research Instrument

Variable	Dimension	No. of Items	Scale	Source
IT Utilization	Accessibility, Ease of Use, Integration, Reliability, Competence	12	Likert (1–5)	Franque et al. (2021)
Service Effectiveness	Accuracy, Speed, Responsiveness, Accessibility, Satisfaction	10	Likert (1–5)	Styrin et al. (2022)
Demographic Information	Gender, Age, Position, Tenure	5	Nominal/Ordinal	Self-constructed

Instrument Validation and Reliability

Prior to full deployment, the instrument underwent pilot testing with 20 respondents who met the inclusion criteria but were excluded from the main analysis. Content validity was examined through expert judgment to ensure conceptual clarity and contextual appropriateness. Construct validity was assessed using Pearson's product–moment correlation, and items with correlation coefficients exceeding the critical r value at $p < 0.05$ were retained. Reliability analysis employed Cronbach's alpha to determine internal consistency. The coefficients for IT utilization ($\alpha = 0.873$) and service effectiveness ($\alpha = 0.889$) exceeded the minimum benchmark of 0.70 (Zhu et al., 2024), confirming the reliability of the instrument.

Data Collection

Data collection combined online and offline modes to maximize inclusivity and participation. Electronic questionnaires were distributed through institutional email lists and digital communication channels, while printed versions were made available at regional service centers for respondents less comfortable with online surveys. Prior to participation, each respondent received a detailed briefing on the study objectives,

confidentiality assurances, and voluntary participation rights. Informed consent was obtained in accordance with ethical research standards. This hybrid approach minimized digital exclusion and ensured broader respondent engagement, consistent with recommendations by Arianto (2023) for studies involving varying levels of digital access. Data collection spanned a six-week period from June to July 2025.

Data Analysis

The data were analyzed using IBM SPSS Statistics version 26. The analysis began with descriptive statistics to summarize demographic variables and to compute means, standard deviations, and frequency distributions for all items. Descriptive results provided contextual understanding of how respondents perceive the effectiveness of IT utilization in BPJS Employment (Pratistha & Mahyuni, 2024). Prior to hypothesis testing, diagnostic procedures were conducted to ensure that regression assumptions were met. Normality was tested using the Kolmogorov–Smirnov statistic, linearity and homoscedasticity were examined through scatterplots, and multicollinearity was evaluated via variance inflation factors (VIF < 10).

The core hypothesis was tested using simple linear regression analysis to determine the predictive influence of IT utilization on service effectiveness. The model estimated the degree to which variation in the independent variable (IT Utilization) explains the variance in the dependent variable (Service Effectiveness). Statistical significance was assessed at $\alpha = 0.05$ using t and F tests. The standardized beta (β) coefficient indicated the strength and direction of the relationship, while R^2 represented the explanatory power of the model. Regression analysis is widely applied in examining digital transformation effects in public sector organizations because it quantifies direct relationships between innovation adoption and organizational outcomes (Chen et al., 2024; Kulal et al., 2024).

The conceptual model guiding this study is presented in Figure 1. It illustrates the hypothesized positive relationship between IT utilization and service effectiveness within BPJS Employment. IT utilization encompasses digital tools, system integration, and user competence, which collectively enhance operational efficiency and service delivery outcomes. The dependent variable, service effectiveness, is defined through multidimensional indicators reflecting both organizational performance and user satisfaction.

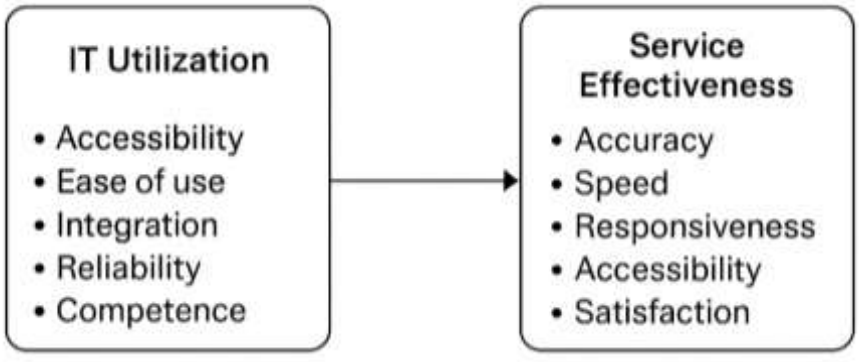

Figure 1. Conceptual Framework of the Study

The model draws from e-governance and public service innovation theory, which posit that digital transformation enhances service quality by improving accessibility, reducing transaction costs, and increasing responsiveness (Behnke et al., 2021; Styrin et al., 2022). It also reflects the Technology Acceptance Model's assumption that perceived usefulness and ease of use influence behavioral intention and actual system utilization (Franque et al., 2021). Accordingly, improvements in IT

accessibility, infrastructure reliability, and user competence are expected to result in greater service effectiveness.

RESULTS AND DISCUSSION

The results of this study present a comprehensive analysis of the relationship between information technology (IT) utilization and service effectiveness at BPJS Employment in Indonesia. This section reports the empirical findings derived from descriptive statistics, reliability and validity testing, and hypothesis testing through regression analysis. The presentation of results adheres to academic standards emphasizing transparency and interpretative clarity. Supporting literature is referenced to contextualize the findings within broader discourses on digital transformation and public sector performance.

Respondents' Demographic Characteristics

A total of 120 valid responses were collected from BPJS Employment staff and participants across selected regional offices. The demographic composition of the sample provides insight into the representativeness and contextual scope of the findings. As shown in Table 1, female respondents constituted 58.3% of the sample, while male respondents accounted for 41.7%, reflecting the gender balance typical in administrative and service-oriented agencies in Indonesia. The majority of respondents (65%) were aged between 26 and 45 years, a demographic group often characterized by high digital literacy and adaptive capacity toward new technologies (Franque et al., 2021).

Regarding educational attainment, 56% of respondents held a bachelor's degree, 30% a diploma, and 14% a postgraduate qualification, suggesting a generally well-educated workforce and user base. The length of employment or service participation ranged from less than two years (21%) to more than five years (37%), indicating that most respondents had sufficient experience interacting with the BPJS digital system. The distribution supports the validity of the data, as participants possessed relevant exposure to IT platforms.

Table 1. Demographic Profile of Respondents

Variable	Category	Percentage (%)
Gender	Male	41.7
	Female	58.3
Age	≤25 years	15
	26–45 years	65
	>45 years	20
Education	Diploma	30
	Bachelor's Degree	56
	Postgraduate	14
Length of Service/Participation	<2 years	21
	2–5 years	42
	>5 years	37

The demographic characteristics of the respondents reflect patterns commonly observed in public sector digitalization research, where age, education, and professional experience significantly influence technology adoption and utilization (Styrin et al., 2022; Lim, 2025). The predominance of respondents in the 26–45 age group suggests a workforce that is both digitally literate and adaptable to technological change, aligning with the demographic profile typically associated with higher engagement in e-governance systems. Moreover, the balanced gender representation and diverse tenure distribution strengthen the study's representativeness, allowing for more nuanced insights into how different user

groups interact with digital systems. These characteristics collectively contribute to a realistic depiction of BPJS Employment's operational environment, where generational and experiential factors shape patterns of digital behavior and system responsiveness.

The dominance of respondents with moderate to high educational backgrounds further enhances the credibility of the perceptual data collected on IT utilization and service efficiency. Individuals with higher education levels generally possess stronger cognitive and analytical capacities to assess system performance objectively, thereby improving the reliability and validity of self-reported measures. This finding is consistent with Styrin et al. (2022), who emphasized that education facilitates technological competence and confidence in digital work environments. However, it also highlights a potential equity concern: employees or users with lower educational attainment may face greater barriers to effective system engagement. Addressing this disparity through targeted digital literacy initiatives could enhance inclusivity and ensure that the benefits of BPJS's digital transformation are equitably distributed across all user groups.

Descriptive Analysis of IT Utilization

The analysis of IT utilization revealed generally positive perceptions among both internal and external stakeholders. As presented in Table 2, the highest mean score was recorded for accessibility (mean = 4.21, SD = 0.64), followed by *ease of use* (mean = 4.12, SD = 0.67) and infrastructure reliability (mean = 4.08, SD = 0.70). The lowest mean score was observed in technological integration (mean = 3.82, SD = 0.74), suggesting room for improvement in inter-system connectivity and interoperability across BPJS service units.

Table 2. Descriptive Statistics for IT Utilization Dimensions

Dimension	Mean	SD	Interpretation
Accessibility	4.21	0.64	High
Ease of Use	4.12	0.67	High
Technological Integration	3.82	0.74	Moderate
Infrastructure Reliability	4.08	0.70	High
User Competence	4.05	0.72	High
Composite Mean	4.06	—	High

The high average scores indicate that IT systems implemented by BPJS Employment are perceived as accessible, user-friendly, and dependable. These findings are consistent with Franque et al. (2021), who observed that perceived accessibility and ease of use significantly determine users' satisfaction with e-governance platforms. However, the moderate score for technological integration suggests that, despite successful digitalization, BPJS still faces challenges in harmonizing data across platforms an issue widely noted in digital governance literature (David et al., 2023).

Descriptive Analysis of Service Effectiveness

Service effectiveness was evaluated through five indicators: accuracy, speed, responsiveness, accessibility, and user satisfaction. As summarized in Table 3, mean scores for all dimensions were relatively high, indicating that BPJS Employment's digital systems have positively influenced service performance.

Table 3. Descriptive Statistics for Service Effectiveness

Indicator	Mean	SD	Interpretation
Accuracy	4.15	0.63	High
Speed	4.10	0.66	High
Responsiveness	4.04	0.71	High

Accessibility	4.09	0.68	High
User Satisfaction	4.18	0.61	High
Composite Mean	4.11	—	High

The composite mean of 4.11 suggests a strong perceived effectiveness of services. The results affirm that IT adoption enhances operational efficiency and client satisfaction through real-time data processing and automation. Similar outcomes were reported by Styrin et al. (2022), who found that digitalized administrative systems improve transparency and response time in public institutions. However, the relatively higher standard deviation for responsiveness implies variability in user experience, possibly due to uneven digital infrastructure across regions.

Instrument Validity and Reliability

Table 4. Results of Validity and Reliability Testing

Variable	Number of Items	Range of Item–Total Correlation	Significance (p)	Cronbach's Alpha (α)	Interpretation
IT Utilization	12	0.432 – 0.761	< 0.05	0.873	Reliable
Service Effectiveness	10	0.451 – 0.794	< 0.05	0.889	Reliable

Following pilot testing, all measurement items achieved acceptable validity and reliability levels. Pearson correlation analysis showed significant item–total correlations ($p < 0.05$) across variables, confirming construct validity. Cronbach's alpha coefficients for IT utilization ($\alpha = 0.873$) and service effectiveness ($\alpha = 0.889$) exceeded the minimum threshold of 0.70, indicating internal consistency. These findings are aligned with methodological recommendations by Zhu et al. (2024), which assert that reliability coefficients above 0.70 demonstrate satisfactory stability of measurement instruments.

Correlation Analysis

The Pearson correlation test examined the strength and direction of the relationship between IT utilization and service effectiveness. As displayed in Table 4, the correlation coefficient ($r = 0.678$, $p < 0.01$) indicates a strong, positive, and statistically significant relationship. This implies that increased IT usage corresponds with higher levels of service effectiveness within BPJS Employment.

Table 4. Correlation between IT Utilization and Service Effectiveness

Variable	r	Sig. (p)	Relationship
IT Utilization – Service Effectiveness	0.678	0.000	Strong Positive

This result substantiates earlier theoretical assumptions that IT adoption enhances organizational efficiency and service quality by enabling data integration and reducing manual processing (Chen et al., 2024). It also supports empirical evidence from Behnke et al. (2021), who documented similar findings in digital government contexts, demonstrating that technological accessibility and user competence directly improve public service outcomes.

Regression Analysis

To test the hypothesis regarding the causal influence of IT utilization on service effectiveness, a simple linear regression model was applied. The analysis revealed that IT utilization significantly predicts service effectiveness ($\beta = 0.678$, $t = 9.97$, $p < 0.001$). The model yielded an R^2 value of 0.460, meaning that 46% of the variance in service effectiveness can be explained by the extent of IT utilization. The overall model was significant, as indicated by an F-value of 99.38 ($p < 0.001$), confirming the robustness of the relationship.

Table 5. Regression Analysis Summary

Model	β	t-value	Sig. (p)	R^2	F-value	Sig. (F)
IT Utilization → Service Effectiveness	0.678	9.97	0.000	0.460	99.38	0.000

The positive and significant beta coefficient confirms that greater IT utilization directly contributes to improvements in service delivery performance. This supports theoretical propositions from the Technology Acceptance Model (TAM), which states that perceived usefulness of digital systems influences behavioral intention and actual system adoption (Franque et al., 2021). Moreover, the model's explanatory power (R^2 = 0.460) aligns with findings from Pratistha and Mahyuni (2024), who observed similar effect sizes in studies examining digital service systems in Southeast Asian public institutions.

The statistical evidence clearly indicates that digital transformation within BPJS Employment has produced measurable improvements in service effectiveness. Elevated levels of perceived accessibility and reliability demonstrate that the institution's IT infrastructure and user interface design have reached an advanced operational maturity. These findings reinforce the argument by Mhlanga et al. (2021) that accessibility and integration are central determinants of both efficiency and public trust in e-governance environments. Yet, the moderate score observed for system integration reveals a persistent structural challenge in achieving full data interoperability. This aligns with the observation of David et al. (2023), who contended that fragmented digital subsystems often undermine the continuity of service delivery in government organizations. In the BPJS context, such fragmentation may stem from heterogeneous data architectures and asynchronous system development across regional and departmental units. Addressing this limitation will require not only technical refinement but also institutional policy alignment and sustained investment in integrated data management systems.

Beyond technological dimensions, the strong positive correlation between IT utilization and service performance underscores the human and behavioral aspects of digitalization. The respondents' high levels of competence and positive attitudes toward technology suggest the emergence of an adaptive and innovation-oriented organizational culture. This aligns with Lim (2025), who emphasized that digital literacy and user readiness are as critical as infrastructural sophistication in determining the effectiveness of digital transformation. Thus, human capability acts as both a catalyst and a moderating factor in the relationship between technological adoption and service outcomes.

Furthermore, the high level of user satisfaction indicates that BPJS Employment's digital initiatives have achieved not only operational efficiency but also legitimacy and trust among users. As Behnke et al. (2021) observed, sustained public confidence is a fundamental prerequisite for institutionalizing digital service innovation. Nevertheless, the slight variation in responsiveness scores suggests that the human element remains indispensable in maintaining service quality. Even within automated systems, timely communication, empathy, and problem-solving capacities continue to shape user experience. As Pratistha and Mahyuni (2024) assert, effective digital governance depends on striking a balance between automation and human engagement to preserve transparency, accountability, and perceived fairness in public service delivery.

CONCLUSION

This study concludes that information technology (IT) utilization has a significant and positive effect on service effectiveness at BPJS Employment in Indonesia. The

results demonstrate that higher accessibility, reliability, and user competence in digital systems are strongly associated with improved service accuracy, responsiveness, and user satisfaction, while moderate technological integration reflects ongoing challenges in data interoperability and system coordination. These findings affirm that digital transformation enhances public service performance when technological innovation is supported by institutional coherence, policy alignment, and human capability development. The evidence also underscores the need to balance automation with human responsiveness to preserve inclusiveness and fairness in service delivery. By integrating empirical analysis with theoretical perspectives on e-governance, this research contributes to the broader understanding of digital transformation in the public sector, particularly in developing-country contexts. Future research should explore cross-institutional and longitudinal assessments to examine the sustainability of digital reform outcomes and identify pathways for achieving a more integrated, adaptive, and citizen-centered digital governance system in Indonesia.

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