The Effectiveness of Claim Queue Services and Participant Reception on the Onsite Queue System

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ABSTRACT

The study specifically seeks to identify factors influencing participant acceptance, analyze the service load of the manual queuing system, and provide recommendations for effective claim service load management. A mixed-methods approach was used, combining quantitative surveys and qualitative in-depth interviews. Data were analyzed using the Technology Acceptance Model (TAM), Structural Equation Modeling–Partial Least Squares (SEM-PLS), and the Multiple Channel Queuing System framework. Results show that social influence does not significantly affect perceived usefulness, but has a significant effect on perceived ease of use. Furthermore, perceived ease of use significantly influences perceived usefulness and behavioral intention, while perceived usefulness does not significantly affect behavioral intention. Behavioral intention, in turn, has a significant effect on actual system use. While participants generally demonstrate high digital literacy, formal organizational communication channels remain underutilized. Analysis of the manual queuing system also indicates that service waiting times have not met established performance targets. This study provides an integrated analysis combining TAM, SEM-PLS, and Multiple Channel Queuing System modeling to evaluate public service performance. Findings offer strategic recommendations to optimize queue management and enhance service efficiency across branches.

***Keywords**: Public Service, Queuing System, Service Efficiency, Technology Acceptance Model.*

INTRODUCTION

BPJS Ketenagakerjaan is a public legal entity established under Law Number 24 of 2011 concerning the social security administering body for employment (*Badan Penyelenggara Jaminan Sosial*/BPJS), providing the legal foundation for the transformation of PT Jamsostek (Persero) into a public institution responsible for administering social security programs for workers. The employment social security administering body manages programs such as work accident, old-age, pension, death, and job loss insurance, strengthening the legal basis of social protection and mandating participation in the national system (Republik Indonesia, 2011). Previous studies by Sihombing and Ritonga (2024) and Tambunan et al. (2025) indicate that the agency plays a key role in improving workers' welfare, financial stability, and protection against employment-related risks. To enhance service quality, BPJS Ketenagakerjaan focuses on increasing participant penetration, improving service quality, and optimizing investment returns, supported by the PRIMA service principles: caring, concise, interactive, modern, and active.

Claim and information/complaint services are divided into three channels: onsite (in-person), hybrid (semi-digital), and fully digital (*Jamsostek Mobile*/JMO). The total service load for all channels from January to December 2024 reached 6,181,784, an increase from 6,142,550 in 2023, with channel distribution of onsite 53.41%, hybrid 29.40%, and full digital 17.19% (Direktorat Pelayanan BPJS Ketenagakerjaan, 2024). Claim services accounted for the largest share of onsite service costs, reaching 69.91% in 2024, up from 53.93% in 2023, with the number of cases rising from 1,192,111 to 2,074,416 and the monthly average increasing from 99,343 to 172,868. Information and complaint services

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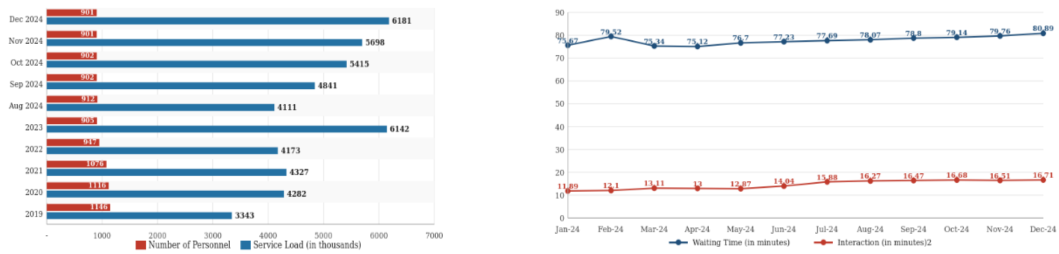
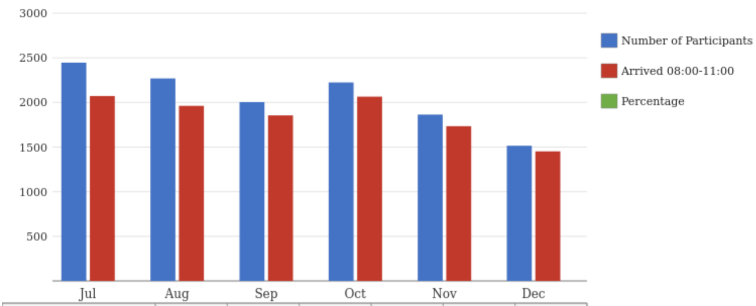
also increased from 986,921 to 1,202,695 cases. However, their proportion decreased to 40.53%, with the largest interaction categories including the JMO Application, Old Age Security (*Jaminan Hari Tua*/JHT) program, membership, follow-up services, and Death Benefit (*Jaminan Kematian*/JKM) program. In comparison, membership services recorded the smallest share at 0.83% or 24,598 cases (Direktorat Pelayanan BPJS Ketenagakerjaan, 2024). This transformation demonstrates BPJS Ketenagakerjaan's strategic efforts to expand coverage, enhance service quality, and provide sustainable social protection for workers and their families (Sutrisno, 2020).



(a) (b)

Figure 1. (a) Service Load and Number of Personnel (b) Service waiting and interaction times

Figure 1 shows that service load and personnel numbers at BPJS Ketenagakerjaan have risen, with service demand increasing by 18.75% annually while staff numbers decline by approximately 6% due to retirement and resignation, affecting operational performance and service quality (Direktorat Pelayanan BPJS Ketenagakerjaan, 2024). In 2024, waiting times varied between 75.12 and 80.89 minutes, highlighting the need to maintain SLA targets. Two queuing systems operate for claims: the Lapak Asik digital platform and the manual onsite queue, limited by daily quotas. These systems can be analyzed using Queuing Theory, Multiple Channel Queuing (M/M/S), and the Poisson Process to optimize service capacity (Ng & Sim, 2008; Heizer & Render, 2011; Kardi, 2012; Berhan, 2015).



Number of Participants	2446	2269	2004	2224	1864	1515
Arrived 08:00-11:00	2072	1962	1855	2065	1734	1452
Percentage	84,71%	86,47%	92,56%	92,85%	93,03%	95,84%

Figure 2. Arrival Times of Participants at the Makassar Branch

Figure 2 illustrates that the social security administering body for employment evaluates the effectiveness of claim queue services through the PRIMA Self-Assessment, which sets service time standards of 15 minutes for claim services, 30 minutes for information and membership services, and 20 minutes for complaint services. The institution also targets a 60-minute waiting time in service rooms, but the current average reaches 77.83 minutes due to the manual queuing system, allowing participants to visit branch offices without appointments and causing congestion during peak hours. Participant arrival data at the Makassar Branch Office reflect nationwide behavior, with most arrivals concentrated in the first three hours of service. Claim and information/complaint services are delivered through onsite (53.41%), hybrid, and JMO channels, while claim services account for 69.91% of direct branch visits (Direktorat Pelayanan BPJS Ketenagakerjaan, 2024). The 14-day waiting period for online claims via the Lapak Asik platform has further driven participants to use the manual queue system. Arrival rates from July–December 2024 ranged from 84.71% to 95.84%.

Based on this context, the study examines factors influencing participants' acceptance of the onsite queuing system, evaluates claim service load in the manual system for JHT, JKM, and Pension Program (*Jaminan Pensiun*/JP) programs, and identifies strategies for effective load management to achieve target service waiting times. This research contributes academically by expanding literature on public service system acceptance and queue analysis, while offering practical insights for participants to understand the queuing system and for the social security administering body for employment to optimize onsite services, develop responsive policies, and improve service efficiency through better waiting time and load management.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Effect of Social Influence on Perceived Usefulness and Perceived Ease of Use

Social influence refers to the degree to which individuals perceive that important others believe they should use a technology (Venkatesh et al., 2003). Several studies indicate that social factors may weaken perceived usefulness when users experience external pressure or social comparison in technology adoption. For example, research by Gani et al. (2024) shows that social dynamics can shape users' perceptions of digital technology benefits in different ways depending on the level of perceived pressure and personal relevance. Similarly, Dwivedi et al. (2020) explain that social and contextual factors may negatively influence perceived usefulness when users feel that technology adoption is driven more by social expectations than by functional benefits. Therefore, it can be proposed that social influence may have a negative effect on perceived usefulness in certain technology adoption contexts.

Social influence also affects perceived ease of use. Individuals often learn to use technology through observation, recommendations, and support from their social environment. ElSaidy and Metwally (2022) showed that social interaction in workplaces or educational settings increases perceptions of ease of use of online systems. Likewise, Syafaastuti and Delfina (2024) found that social influence significantly improves perceived ease of use in digital payment adoption, while Zubir and Latip (2024) reported similar findings in e-government services. Social influence enhances perceived ease of use by providing information, assistance, and shared user experiences.

H1: Social influence has a positive effect on perceived usefulness.
H2: Social influence has a positive effect on perceived ease of use.

The Effect of Perceived Ease of Use on Perceived Usefulness

Previous studies explain that systems that are easier to use require less cognitive effort from users, allowing them to focus more on the benefits provided by the system. As a result, the perception that a technology is easy to use can enhance the perception that the technology is useful in supporting user activities and improving overall efficiency. When users do not face difficulties in understanding or operating a system, they are more likely to develop positive evaluations of its functionality and practical value. Empirical research also shows that perceived ease of use significantly influences perceived usefulness in various digital technology contexts because users tend to evaluate a system as more useful when it is simple, clear, and user-friendly (Ikwanto & Indriani, 2024).

Furthermore, several recent studies confirm that perceived ease of use positively affects perceived usefulness in technology adoption models. This relationship is consistently supported across different platforms, indicating that ease of interaction plays a crucial role in shaping user perceptions. For example, research on digital platforms and information systems found that when users perceive a system as easy to operate, they are more likely to believe that the system can improve efficiency, enhance productivity, and support task completion more effectively (Syamillah et al., 2024). This suggests that usability is not only a technical attribute but also a key determinant in strengthening users' confidence in the system's usefulness.

H3: Perceived ease of use has a positive effect on perceived usefulness.

Effect of Perceived Usefulness and Perceived Ease of Use on Behavioral Intention

Perceived usefulness refers to the degree to which an individual believes that using a particular system will enhance their performance. In the Technology Acceptance Model (TAM), perceived usefulness is a key factor influencing users' behavioral intention to adopt a technology (Davis, 1989). When users perceive that a system provides practical benefits, such as improving efficiency and productivity, they tend to develop a stronger intention to use the technology. However, in certain contexts, perceived usefulness may also have a negative effect on behavioral intention when users perceive that the benefits of the system do not outweigh its complexity or potential risks. Empirical studies have shown that perceived usefulness significantly influences users' intention to adopt digital technologies and information systems (Irda et al., 2024).

In addition, perceived ease of use, defined as the degree to which individuals believe that a system is easy to understand and operate, also plays an important role in shaping behavioral intention (Khan & Abideen, 2023). Systems that are simple and user-friendly require less effort to learn and operate, which encourages users to adopt and continue using the technology (Davis, 1989). Several recent studies confirm that perceived ease of use positively influences behavioral intention because users are more likely to use technologies that are easy to access and operate in their daily activities (Padmawidjaja, 2023; Sidabutar & Hanani, 2025). Therefore, both perceived usefulness and perceived ease of use are important determinants influencing users' behavioral intention in technology adoption.

H4: Perceived usefulness has a negative effect on behavioral intention.
H5: Perceived ease of use has a positive effect on behavioral intention.

The Effect of Behavioral Intention on Actual System Use

Behavioral intention refers to an individual's willingness or plan to use a particular technology in the future. In many technology adoption studies, behavioral intention is considered a strong predictor of actual system use because individuals who have a strong intention to use a system are more likely to translate that intention into real usage behavior. Behavioral intention reflects the level of user readiness and commitment to adopting and continuously using a technology in their daily activities (Alalwan et al., 2018).

Several recent studies have confirmed the positive relationship between behavioral intention and actual system use. For example, research on digital technology adoption shows that users with higher behavioral intention tend to demonstrate higher levels of actual usage because their intention motivates them to interact more frequently with the system (Venkatesh et al., 2012; Sallam et al., 2024). Furthermore, empirical studies on information systems and digital platforms also indicate that behavioral intention significantly influences actual system use, as users who intend to use a system are more likely to integrate it into their routine activities (Dwivedi et al., 2020; Tamilmani et al., 2021). These findings suggest that behavioral intention plays an important role in determining whether a technology is actually adopted and used by individuals.

H6: Behavioral intention has a positive effect on actual system use.

Figure 3 presents the conceptual framework of the study based on the TAM to explain users' acceptance of the online queue system. In this model, social influence affects both perceived usefulness and perceived ease of use. Furthermore, perceived ease of use also influences perceived usefulness, and both variables subsequently affect behavioral intention. Behavioral intention determines actual system use, which reflects the users' real utilization of the system.

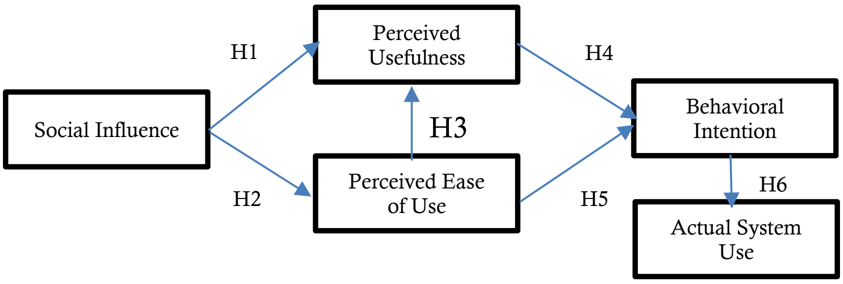


Figure 3. Conceptual Framework

RESEARCH METHODS

This study employs a quantitative research design to examine the effectiveness of claim queue services and participants' acceptance of the onsite queue system at BPJS Ketenagakerjaan. The research was conducted at the BPJS Ketenagakerjaan Makassar Branch Office and the Head Office, with the Makassar Branch selected as a representative of Class 1 Branch Offices. The study took place from April to July 2025, covering a four-month period.

The population of this study consists of participants who access claim services at the BPJS Ketenagakerjaan Makassar Branch Office through the online queue system. The sample is determined using a purposive sampling technique, specifically selecting participants who attend the office according to their scheduled online queue and have completed the claim service process. The sample size is calculated using the Slovin formula with a population of 160 participants, derived from the daily online queue quota of five queues over 32 working days during the April–May 2025 period. Based on this calculation, the minimum required sample size is 114 respondents.

Data are collected through questionnaires, operational data documentation, and in-depth interviews. The questionnaire uses a five-point Likert scale and is developed based on the constructs of the TAM, complemented by several additional questions to obtain deeper insights into the predetermined variables and indicators. Operational data related to queue management is obtained from the BPJS Ketenagakerjaan queue management system and monthly service reports, including information on the arrival rate of participants (λ), service rate (μ), and the number of service counters or servers. In addition, in-depth interviews are conducted with BPJS Ketenagakerjaan management to explore policies, constraints, and criteria related to the implementation of the onsite queue system. The interviews involve the deputy for operations and service channels, the assistant deputy for operations and branch performance, and the branch operations and performance manager.

Table 1. Multiple Channel Queuing System (M/M/S) Formula

Formula	Description	Unit
$P_0 = \frac{1}{\left\{\sum_{n-0}^{M-1} \frac{1}{n!}\left(\frac{\lambda}{\mu}\right)^n\right\} + \frac{1}{M!}\left(\frac{\lambda}{\mu}\right)^M \frac{M\mu}{M\mu-\lambda}}$	Probability that there are no participants in the system (all servers are idle)	
$L_s = \frac{\lambda\mu\left(\frac{\lambda}{\mu}\right)^M}{(M-1)!\,(M\mu-\lambda)^M} Po + \frac{\lambda}{\mu}$	Average number of participants in the system	Participant
$W_s = \frac{Ls}{\lambda}$	Average time spent by participants in the system (queuing and service)	Minutes
$L_q = Ls - \frac{\lambda}{\mu}$	Average number of participants waiting in line	Participant
$W_q = Ws - \frac{1}{\mu}$	Average time spent by participants waiting in line	Minutes

Table 1 presents the formulas of the Multiple Channel Queuing System (M/M/S) used to evaluate queue performance, including the probability of an empty system (P_0), the average number of participants in the system (L_s), the average time spent in the system (W_s), the average number of participants waiting in line (Lq), and the average waiting time (Wq). Referring to Table 1, these indicators provide a concise assessment of service efficiency, where higher Lq and Wq values indicate congestion and longer waiting times, while lower values reflect a more efficient system, and P_0 shows server utilization. Based on this model, simulations are conducted to determine optimal service load settings for the JHT, JKM, and JP programs using various scenarios aligned with BPJS Ketenagakerjaan criteria and in-depth interview results, with the aim of achieving targeted waiting times and improving overall service effectiveness.

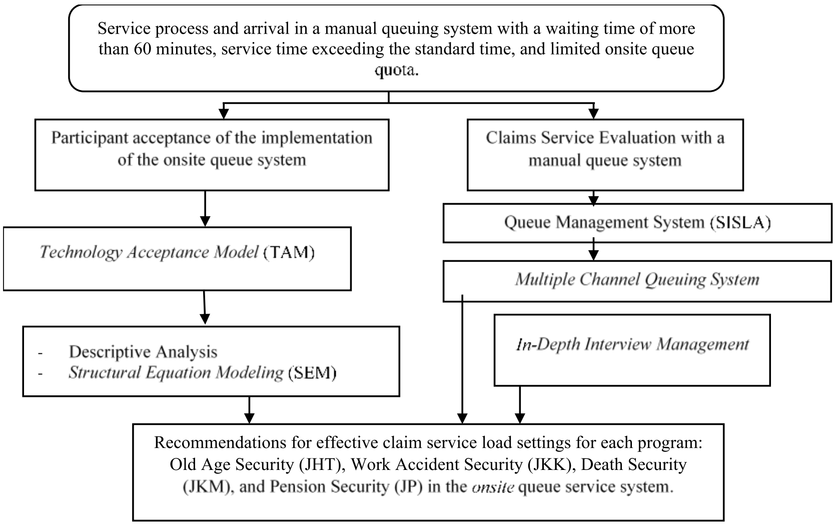


Figure 4. Mind Map

Figure 4 shows that data analysis is conducted using several quantitative techniques. Descriptive analysis is employed to describe the characteristics of respondents and the research variables. To examine the relationships among variables related to participants' acceptance of the online queue system, Structural Equation Modeling (SEM) based on Partial Least Squares (PLS) is applied. Furthermore, to analyze the workload of the manual claim queue system at the BPJS Ketenagakerjaan Makassar Branch, the Multiple Channel Queuing System model (M/M/S) is utilized by analyzing the average arrival rate of participants per hour (λ), the average service rate (μ), and the number of service counters. SEM analysis is performed using the SmartPLS software application, while the queuing system analysis is conducted using the POM-QM software, following the M/M/S model formulation proposed by Heizer and Render (2011).

RESULTS

Technology Acceptance Model (TAM) Analysis

This study involved 123 BPJS Ketenagakerjaan participants with inactive status who submitted claims through the Makassar Branch Office using the onsite queue system. Most respondents were aged 31–45 years (65.04%) and male (68.29%), with educational backgrounds dominated by high school and bachelor's degrees (86.99%), indicating a productive and relatively educated workforce. Respondents' occupations were mostly in the private sector (36.6%), and 95.93% visited BPJSTK only 1–5 times per year, suggesting that claims are generally made once after becoming inactive.

A total of 56.91% of respondents had used the manual queue system, while 43.09% had not, reflecting ongoing challenges in digital adoption. Although 60.16% had accessed online public services, usage frequency remained moderate, indicating a gradual transition toward digital systems. The main source of information about the online queue system was informal networks (43.09%), although recent studies show increasing reliance on official digital platforms (Aji et al., 2023; Ernungtyas et al., 2024). Despite improvements in accessibility and efficiency, e-government implementation still faces challenges related to the digital divide and user literacy (Susilawati et al., 2024; Dewi et al., 2025; Nurjannah et al., 2025). All respondents reported being comfortable using digital technology, with 87% rating their ability as good to very good, indicating adequate digital literacy readiness. This aligns with findings that digital innovation improves service delivery, although system quality and user readiness remain key factors in achieving user satisfaction (Ramadhan & Pribadi, 2024; Hediyati et al., 2025).

This validity test is important to ensure that the model used is reliable and valid in measuring the variables studied, as described in the theoretical framework of the Technology Acceptance Model (TAM). The outer loading validity test aims to assess the extent to which these indicators truly reflect the constructs being measured. In this study, these indicators include variables such as perceived usefulness, perceived ease of use, behavioral intention, actual system use, and social influence. Each indicator must have a high outer loading value to ensure that they significantly contribute to the measured construct, with an ideal value above 0.70 (Hair et al., 2017).

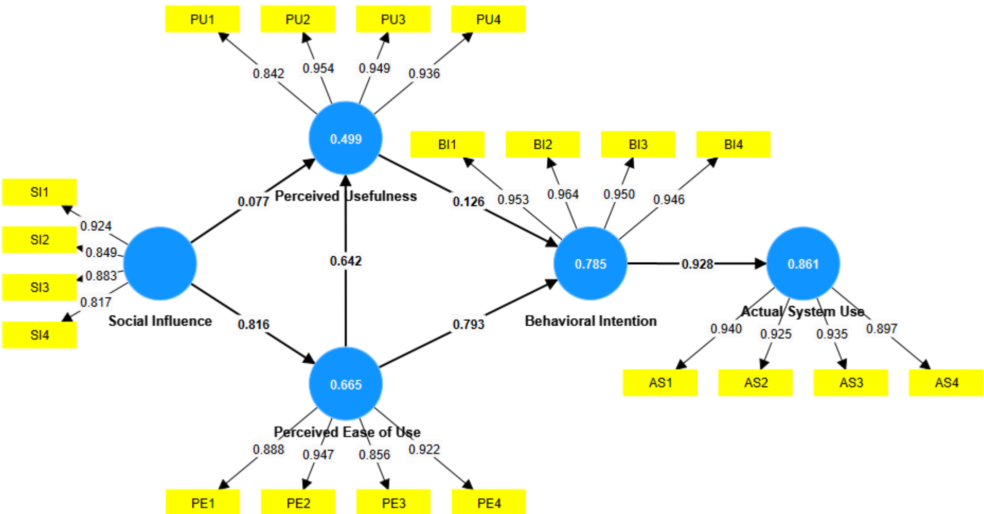


Figure 5. Results of the Outer Model Validity Test

Table 2. Outer Loading Validity, Construct Reliability, and Average Variance Extracted

Variable	Item	Factor Loading	Cronbach's Alpha	Composite Reliability	Composite Reliability	AVE
Actual System Use	AS1	0.940	0.943	0.946	0.959	0.855
	AS2	0.925				
	AS3	0.935				
	AS4	0.897				
Behavioral Intention	BI1	0.953	0.966	0.967	0.975	0.909
	BI2	0.964				
	BI3	0.950				
	BI4	0.946				
Perceived Ease of Use	PEOU1	0.888	0.925	0.928	0.947	0.817
	PEOU2	0.947				
	PEOU3	0.856				
	PEOU4	0.922				
Perceived Usefulness	PU1	0.842	0.940	0.952	0.957	0.849
	PU2	0.954				
	PU3	0.949				
	PU4	0.936				
Social Influence	SI1	0.924	0.891	0.898	0.925	0.755
	SI2	0.849				
	SI3	0.883				
	SI4	0.817				

Based on Figure 5 and Table 2, all statement indicators are considered valid, as their loading factor values exceed the recommended threshold of ≥ 0.70, indicating a strong correlation between the indicators and their respective constructs. Convergent validity is further supported by the Average Variance Extracted (AVE), where all constructs meet the minimum requirement of ≥ 0.50, suggesting that each construct explains more than half of the variance in its indicators (Hair et al., 2017). In addition, reliability is confirmed by Cronbach's alpha and composite reliability values, all of which are above 0.70, indicating good internal consistency. The cross-loading results also demonstrate satisfactory discriminant validity, as each indicator loads higher on its respective construct than on others. Referring to Table 2, the measurement model is both valid and reliable, confirming its adequacy in assessing participants' acceptance of the online queueing system.

Table 3. Cross Loading

Variable	Items	Actual System Use	Behavioral Intention	Perceived Ease of Use	Perceived Usefulness	Social Influence
Actual System Use	AS1	0.940	0.887	0.868	0.635	0.801
	AS2	0.925	0.867	0.851	0.675	0.824
	AS3	0.935	0.885	0.844	0.658	0.805
	AS4	0.897	0.785	0.817	0.623	0.727
Behavioral Intention	BI1	0.908	0.953	0.834	0.637	0.777
	BI2	0.881	0.964	0.844	0.650	0.780
	BI3	0.865	0.950	0.829	0.658	0.747
	BI4	0.882	0.946	0.854	0.667	0.751
Perceived Ease of Use	PEOU1	0.768	0.759	0.888	0.661	0.699
	PEOU2	0.877	0.844	0.947	0.670	0.776
	PEOU3	0.800	0.752	0.856	0.558	0.700
	PEOU4	0.857	0.827	0.922	0.656	0.770
Perceived Usefulness	PU1	0.533	0.511	0.536	0.842	0.431
	PU2	0.652	0.632	0.673	0.954	0.590
	PU3	0.699	0.695	0.675	0.949	0.574
	PU4	0.681	0.667	0.698	0.936	0.600
Social Influence	SI1	0.850	0.807	0.790	0.574	0.924
	SI2	0.686	0.659	0.674	0.535	0.849
	SI3	0.752	0.703	0.697	0.531	0.883
	SI4	0.670	0.601	0.666	0.440	0.817

Table 3 shows the cross-loading values used to assess discriminant validity. The results indicate that each indicator has the highest loading on its respective construct compared to other constructs. Indicators of actual system use, behavioral intention, perceived ease of use, perceived usefulness, and social influence all display stronger correlations with their corresponding variables than with other variables. This confirms that each construct is empirically distinct and that the discriminant validity requirement of the measurement model has been satisfied.

Table 4 presents the results of the structural model analysis using path coefficients to examine the relationships between variables in the technology acceptance model. The results show that social influence does not have a significant effect on perceived usefulness ($\beta = 0.077$; $t = 0.744$; $p = 0.457$), indicating that suggestions or encouragement from friends, family, or colleagues do not directly influence participants' perceptions of the usefulness of the onsite queue system. However, social influence has a significant positive effect on perceived ease of use ($\beta = 0.816$; $t = 15.208$; $p < 0.001$), suggesting that support from others can increase participants' perceptions that the system is easy to use. Furthermore, perceived ease of use significantly affects perceived usefulness ($\beta = 0.642$; $t = 5.536$; $p < 0.001$), meaning that when participants perceive the system as easy to use, they are more likely to consider it useful.

Table 4. Path Coefficients

Variable	Original Sample	Sample Mean	Standard Deviation	t-statistics	p-values	Description
Social Influence -> Perceived Usefulness	0.077	0.080	0.104	0.744	0.457	Not Significant
Social Influence -> Perceived Ease of Use	0.816	0.811	0.054	15.208	0.000	Significant
Perceived Ease of Use -> Perceived Usefulness	0.642	0.638	0.116	5.536	0.000	Significant
Perceived Usefulness -> Behavioral Intention	0.126	0.142	0.073	1.730	0.084	Not Significant
Perceived Ease of Use -> Behavioral Intention	0.793	0.771	0.077	10.356	0.000	Significant
Behavioral Intention -> Actual System Use	0.928	0.923	0.027	34.890	0.000	Significant

The analysis also indicates that perceived usefulness does not significantly affect behavioral intention (β = 0.126; t = 1.730; p = 0.084), suggesting that although participants recognize the usefulness of the onsite queue system, this perception does not necessarily lead to a stronger intention to use it. In contrast, perceived ease of use has a significant positive effect on behavioral intention (β = 0.793; t = 10.356; $p < 0.001$), indicating that ease of use plays a key role in encouraging participants' intention to adopt the system. Behavioral intention significantly affects actual system use (β = 0.928; t = 34.890; $p < 0.001$), demonstrating that participants with stronger intentions to use the onsite queue system are more likely to use it in practice.

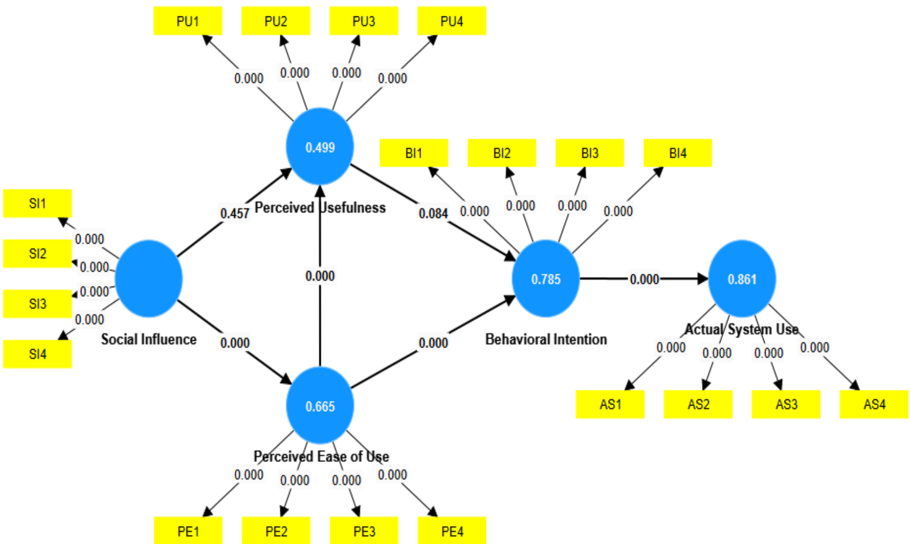


Figure 6. Inner Model

Figure 6 shows the coefficient of determination (R^2) for each endogenous variable in the model. The R^2 value of perceived usefulness is 0.499, indicating that 49.9% of its variance is explained by the influencing variables, which can be considered moderate. Perceived ease of use has an R^2 value of 0.665, meaning that 66.5% of its variance is explained, reflecting a strong explanatory power. Behavioral intention shows an R^2 value of 0.785, indicating that 78.5% of the variance is explained by its predictors, which is substantial. Meanwhile, actual system use has the highest R^2 value of 0.861, meaning that 86.1% of its variance is explained by the model, demonstrating very strong predictive accuracy. These results indicate that the model has good explanatory power, particularly in predicting behavioral intention and actual system use.

Result of the Analysis of Claim Service Load on the Manual Queuing System

The researchers collected observational data in June 2025 and focused on participant arrivals in the first week. The data obtained by the researchers was participant arrival data divided by hour from 08:00 to 15:00. A queueing system is considered effective if it meets three conditions: maximum service time of 15 minutes, maximum service waiting time or time spent by participants waiting in line of 60 minutes, and productivity of each customer service representative of at least 36 interactions per day. These standard values are set out in the PRIMA Self-Assessment document and the BPJS Ketenagakerjaan monthly operational report.

Table 5. Queue System Performance Results on June 2–5, 2025 (Monday–Thursday)

Time	Parameter	Value	Parameter	Value	Minutes	Second
QSPR (Monday and Wednesday, June 2 and 4, 2025)	M/M/s with a Finite System Size		Average server utilization	1		
	Arrival rate (lambda)	40	Average number in the line queue (Lq)	55.33		
	Service rate (mu)	4	Average number in the system (L)	59.33		
	Number of servers	4	Average time in the queue (Wq)	3.46	207.50	12450
	Maximum system size	60	Average time in the system (W)	3.71	222.50	13350
QSPR (Tuesday, June 3, 2025)	M/M/s with a Finite System Size		Average server utilization	1		
	Arrival rate (lambda)	42	Average number in the line queue (Lq)	55.38		
	Service rate (mu)	4	Average number in the system (L)	59.38		
	Number of servers	4	Average time in the queue (Wq)	3.46	207.69	12461.54
	Maximum system size	60	Average time in the system (W)	3.71	222.69	13361.54
QSPR (Thursday, June 5, 2025)	M/M/s with a Finite System Size		Average server utilization	1		
	Arrival rate (lambda)	35	Average number in the line queue (Lq)	56.48		
	Service rate (mu)	4	Average number in the system (L)	59.48		
	Number of servers	3	Average time in the queue (Wq)	4.71	282.39	16943.43
	Maximum system size	60	Average time in the system (W)	4.96	297.39	17843.43

Table 5 shows the results of the multiple channel queuing system calculation using the POM-QM Software application show that the queuing system at BPJS Ketenagakerjaan Makassar is ineffective because the average time spent by participants waiting in line (Wq) is 3.46 hours or 207.5 minutes, even though the service time has met the maximum time of 15 minutes and the productivity of each customer service has also met a minimum of 36 interactions. The transformation of services from manual to digital systems, as implemented by several local governments, can improve the speed, transparency, and responsiveness of public services (Hasanah et al., 2025). The same thing also happened in the observation of the queuing system on June 3 and 5, with the average time spent by participants waiting in line (Wq) being 3.46 hours or 207.69 minutes and 4.71 hours or 282.39 minutes, respectively.

Table 5 presents the results of the queuing system performance analysis at BPJS Ketenagakerjaan Makassar on Tuesday, June 3, 2025, using the M/M/s model with a finite system size. The arrival rate (λ) is 42 participants per hour, while the service rate (μ) is 4 participants per hour with four servers available. The analysis shows that the average server utilization reaches 1, indicating that the service capacity is fully utilized. The average number of participants waiting in the queue (Lq) is 55.38 people, and the average number in the system (L) is 59.38 people. In terms of waiting time, participants spend an average of 3.46 hours (207.69 minutes) in the queue before receiving service, while the average total time spent in the system (W) reaches 3.71 hours (222.69 minutes). These results indicate that the manual queuing system experiences significant congestion, as the waiting time far exceeds the service standard target of 60 minutes.

Table 6 presents the results of the queuing system performance analysis at BPJS Ketenagakerjaan Makassar on Thursday, June 5, 2025, using the M/M/s model with a finite system size. The arrival rate (λ) was recorded at 35 participants per hour, while the service rate (μ) was 4 participants per hour with three service officers (servers) available. The analysis shows that the average server utilization reached 1, indicating that the service capacity was fully utilized. The average number of participants waiting in the queue (Lq) was 56.48 people, while the average number of participants in the system (L) reached 59.48 people. In terms of waiting time, participants spent an average of 4.71 hours (282.39 minutes) waiting in the queue before receiving service, while the average total time spent in the system (W) reached 4.96 hours (297.39 minutes). These findings indicate that the manual queuing system experienced severe congestion, as the waiting time significantly exceeded the established service standard of 60 minutes.

Recommendations for Claim Service Lord Management

Researchers recommend the full implementation of scheduled onsite queues JHT and apply this to all membership status and claim conditions with eligibility verification by the system, while for non-JHT claims, such as JKM, Work Accident Security (*Jaminan Kecelakaan Kerja*/JKK), and pension program, the manual queue system should continue to be used. These recommendations are based on the results of variable classification calculations regarding participant acceptance of the onsite queue system at BPJS Ketenagakerjaan Makassar, with the average falling within the "agree" and "strongly agree" intervals. JKM claim eligibility, JKK, and JP still require manual verification, and the arrival rate of non-JHT claim participants is lower than that of JHT claims, with an average of 72.03% compared to 26.02%.

In-depth interviews also explained changes in service effectiveness targets and standards that differed from the specified PRIMA Self-Assessment standards, namely service time from 15 minutes to 10 minutes, interaction productivity changed from 36 to 42 interactions per customer service, but still with a maximum service waiting time target of 60 minutes. From the determination of 12 daily service quotas for Lapak Asik online per CS per day, the researchers recommended setting the onsite queue load with service interactions at the branch office to a minimum of 30 interactions for all types of claim and information services. From the minimum of 30 remaining interaction targets, the distribution of non-JHT services is 8 participants per CS, and JHT services is 22 participants per CS. This is in accordance with the results of the average CS service calculation upon the arrival of participants during the study, which was 7.93 non-JHT participants and 21.97 JHT participants. This recommendation will also make the service waiting time reach the set target of 0.4 hours or 23.73 minutes in accordance with the Multiple Channel Queuing System simulation in the following POM-QM Software application.

Table 6. Service Load Simulation Results

Parameter	Value	Parameter	Value	Minutes	Second
M/M/s with a Finite System Size		Average server utilization	0,92		
Arrival rate (lambda)	22	Average number in the line queue (Lq)	8.70		
Service rate (mu)	6	Average number in the system (L)	12.36		
Number of servers	4	Average time in the queue (Wq)	0.40	23.73	1423.95
Maximum system size	60	Average time in the system (W)	0.56	33.73	2023.95

Table 6 shows the simulation results, which show a service utilization rate (ρ) of 0.92 or 92%, and an average number of participants in the system (Ls) of 12.36 or 12 participants in the system. Meanwhile, the average time spent by participants in the system (Ws) is 0.56 hours or 33.73 minutes, the average number of participants waiting in line (Lq) is 8.7 or 9 participants in line, and the average time spent by participants waiting in line (Wq) is 0.4 hours or 23.73 minutes.

DISCUSSION

The findings of this study provide important insights into participant acceptance of the onsite queue system and the operational performance of the manual queuing system at BPJS Ketenagakerjaan Makassar. Based on the Technology Acceptance Model (TAM) analysis, perceived ease of use plays a central role in influencing both perceived usefulness and behavioral intention to use the onsite queue system. The results show that perceived ease of use has a significant positive effect on perceived usefulness and behavioral intention, indicating that participants who perceive the system as easy to use are more likely to consider it beneficial and are more willing to adopt it. These findings are consistent with previous TAM studies, which emphasize that ease of use is a critical determinant in the adoption of digital systems (Davis, 1989; Venkatesh et al., 2003). In the context of public services, research has shown that user-friendly digital platforms significantly increase citizens' willingness to utilize e-government services because they reduce perceived effort and technological barriers (Susilawati et al., 2024; Ramadhan & Pribadi, 2024).

However, the results indicate that social influence does not significantly affect perceived usefulness, although it significantly influences perceived ease of use. This suggests that recommendations or encouragement from colleagues, family members, or friends mainly affect participants' perceptions regarding how easy the system is to operate rather than their perception of its benefits. Similar findings were reported in studies on technology adoption in public service systems, where social influence primarily affects initial perceptions of system accessibility rather than long-term perceptions of usefulness (Aji et al., 2023; Abdalla, 2024; Ilieva et al., 2024). Furthermore, the relationship between perceived usefulness and behavioral intention was found to be insignificant, implying that recognizing the benefits of the onsite queue system does not necessarily translate into a stronger intention to use it. Instead, perceived ease of use appears to be a more decisive factor in shaping behavioral intention. The strong relationship between behavioral intention and actual system use confirms that participants with stronger intentions to use the system are highly likely to adopt it in practice, which supports TAM theory that behavioral intention is the most direct predictor of technology usage (Davis, 1989; Harsono et al., 2021).

From an operational perspective, the queuing system analysis reveals significant inefficiencies in the manual queue system. The results of the Multiple Channel Queuing System calculations indicate that the average waiting time ranged from 3.46 hours to 4.71 hours during the observation period, far exceeding the service standard target of 60 minutes. These findings indicate that the existing service capacity is insufficient to accommodate participant arrival rates during peak hours. Previous studies on queue management in public services also found that manual queue systems often lead to congestion because participant arrivals are not evenly distributed and tend to concentrate during specific service hours (Berhan, 2015; Hussain et al., 2025).

The simulation results further demonstrate that implementing a scheduled on-site queue system could significantly improve service performance. By regulating participant arrivals and adjusting service capacity, the average waiting time can be reduced to approximately 23.73 minutes, which meets the institutional service standard. This finding supports previous research indicating that digital queue scheduling systems can improve service efficiency, transparency, and responsiveness in public institutions (Hasanah et al., 2025; Al-Muttaqin & Nugroho, 2025). Therefore, integrating a digital scheduling system for JHT claim services while maintaining manual verification for certain claims, such as JKM, JKK, and JP, represents a practical strategy for balancing technological adoption with operational requirements. The findings highlight the importance of combining technology acceptance analysis with queue system modeling to improve public service efficiency and enhance participant satisfaction.

CONCLUSION

This study examines participant acceptance of the onsite queue system and evaluates the performance of the manual claim service queue at BPJS Ketenagakerjaan Makassar. The findings indicate that participants generally show positive acceptance of the onsite queue system, particularly when the system is perceived as easy to use. Ease of use plays a central role in shaping participants' perceptions of system usefulness and their intention to adopt the system. In contrast, social influence does not directly shape participants' perceptions of system benefits. From an operational perspective, the manual queuing system demonstrates significant inefficiencies due to high service demand and uneven participant arrival patterns, resulting in long waiting times. The simulation results suggest that implementing a scheduled on-site queue system could improve service performance by distributing participant arrivals more evenly and optimizing service capacity. These findings imply that integrating digital queue management with existing service mechanisms can enhance service efficiency, improve participant experience, and support more effective public service delivery.

The results of this study provide practical implications for public service institutions, particularly BPJS Ketenagakerjaan, in developing more efficient queue management systems through the integration of digital scheduling and onsite services. However, this study has several limitations. First, the research focuses on a single branch office, which may limit the generalizability of the findings to other branches with different service characteristics. Second, the analysis mainly examines the acceptance of the onsite queue system and operational queue performance without considering broader organizational or technological factors that may influence system adoption. Future research could expand the scope by including multiple branch offices, comparing different queue management models, and examining additional variables such as service quality, user satisfaction, and digital infrastructure readiness to provide a more comprehensive understanding of queue system optimization in public service institutions.

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