

## The Examination System Quality and Information Quality in the Use of the JKN Mobile App

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### ABSTRACT

**Background:** The Mobile JKN application enables BPJS Kesehatan participants to access health services, including online outpatient registration. At Jampangkulon Hospital, 13,021 of 28,896 outpatient visits (44.92%) were registered through Mobile JKN between January and June 2025. Despite increasing use several system related issues persist underscoring the need to evaluate the system and information quality supporting the application. **Objective:** This study aimed to assess the association of system quality and information quality on the utilization of the Mobile JKN. **Methods:** The study adopted a cross-sectional analytical design and involved 388 Mobile JKN users selected through accidental sampling. The data were collected using a validated and reliable questionnaire with a four-point Likert scale and analysed through multiple linear regression. The Mobile JKN use was evaluated using five indicators: frequency, duration, intensity, nature, and pattern. **Results:** The result showed that system quality ( $b = 0.204$ ; 95% CI: 0.11–0.29;  $p < 0.001$ ) and information quality ( $b = 0.547$ ; 95% CI: 0.47–0.63;  $p < 0.001$ ) were positively and significantly associated with application use. **Conclusion:** The model explained 71.2% of the variance in application use ( $R^2 = 0.712$ ). **Suggestion:** Hospital Manajemen and BPJS Kesehatan should continue improving the system to encourage wider adoption.

**Keywords:** Health Information Systems; Mobile Applications; Outpatients; Patient Registration; Technology Acceptance

### INTRODUCTION

Digital transformation in the healthcare sector is one of the key strategies for improving the quality, efficiency and accessibility of healthcare services in Indonesia (1). BPJS Kesehatan has developed the Mobile JKN application as a digital service enabling participants in the National Health Insurance (JKN) scheme to access various services digitally, including online outpatient registration, updating membership details, searching for healthcare facilities, checking membership status, obtaining queue numbers, administrative enquiries, and accessing a digital BPJS Kesehatan card without having to visit a healthcare facility in person (2). The implementation of Mobile JKN is expected to improve accessibility, reduce waiting times and support the efficiency of digital healthcare services (3).

Although Mobile JKN is an innovative breakthrough its use among community members remains limited (4). Data from BPJS Kesehatan indicate that JKN card coverage stands at 241.75 million participants or 88 per cent of Indonesia's total population. However Mobile JKN is currently used by only 16.03 million participants or approximately 4.15 per cent of eligible participants currently use Mobile JKN (5). The successful adoption of technology depends not only on access but also on users perceptions and readiness to use new systems (6).

Several studies have attributed the limited use of Mobile JKN to low digital literacy and inadequate internet coverage in some areas (7). Technical problems including application malfunctions, data verification errors, and system failures may also reduce users trust (8). In addition the information provided is not always up to date for example the schedule of doctor consultations (9).

According to DeLone and McLean system quality and information quality are important dimensions in evaluating the success of an information system (10,11). System quality describes the characteristics that facilitate effective system use, whereas information quality concerns the usefulness and meaningfulness of the system's outputs. System quality and information quality are thought to be related to the level of use of the information system (12). Research examining the relationship between system quality, information quality, and Mobile JKN use in outpatient registration remains limited. Most previous studies have focused on user satisfaction, acceptance, and intention to use the application, while actual usage has received less attention (13).

Most of the research on the effect of system quality and information quality on the level of use of digital systems was conducted in the field of e commerce and banking (14, 15). Therefore it is necessary to test the influence of system quality and information quality on the use of the Mobile JKN application in outpatient registration. This is the main rationale for this study which examines the DeLone and McLean information system success model in the context of the Mobile JKN application. (16).

Several studies on Mobile JKN applications at various hospitals in Indonesia have shown conflicting results. Some studies found that users are quite satisfied with the use of the application compared to conventional face to face services at BPJS Kesehatan (17). Other studies found that it is necessary to increase awareness of the use of the application (18). Meanwhile the applications effectiveness was considered insufficient at several hospitals (19). Thus it is essential to conduct more in-depth studies on the factors influencing the use of the Mobile JKN application including system quality and information quality.

The Jampangkulon Regional General Hospital Sukabumi has implemented Mobile JKN for outpatient registration. Between January and June 2025, 13,021 patients used Mobile JKN, representing 44.92% of all outpatients. There are still several technical problems including unresponsiveness, forced closure, and failures in verifying membership data. Thus, it is necessary to evaluate the system quality and information quality of this application.

Based on the background this study aims analyze the relationship between system quality, information quality, and Mobile JKN use among outpatients at the Jampangkulon Regional General Hospital Sukabumi. The findings are expected to provide useful input for BPJS Kesehatan and the hospital when improving system quality, information quality, and digital outpatient-registration services.

## METHOD

This study is a cross-sectional analytical study which is an observational study design that simultaneously examines independent variables (system quality and information quality) and dependent variables (use of the Mobile JKN application). Thus this study only describes the relationship between the variables of interest (20). This study was conducted at the Jampangkulon Regional General Hospital Sukabumi in August-October 2025.

The population of this study was all outpatients using the Mobile JKN application at the Jampangkulon Regional General Hospital during the study period. This study used accidental sampling in which respondents were selected based on accidental encounters during the data collection process. The inclusion criteria were outpatients who had used the Mobile JKN application at least once for outpatient registration, were aged  $\geq 17$  years, and were willing and able to fill out the questionnaire. Outpatients who had never used the Mobile JKN application, those whose registration was done by family members or other people, and those who had participated as respondents in the instrument's validity and reliability test were excluded from this study.

The sample size was calculated using the Slovin formula with a population of  $N=13,021$  (the number of Mobile JKN users from January-June 2025) and a margin of error of  $e=5\%$  (0.05). The sample size obtained was 388 respondents. To avoid double counting respondents only filled out the questionnaire once during the data collection process under the supervision of the researcher. In addition, respondents who had participated in the instruments validity and reliability test were excluded from the main study sample. The questionnaire was checked for its completeness immediately after being filled. Thus, there were no respondents whose questionnaire was incomplete and became part of the research data. Consequently there were no missing data among the 388 questionnaires used as research data.

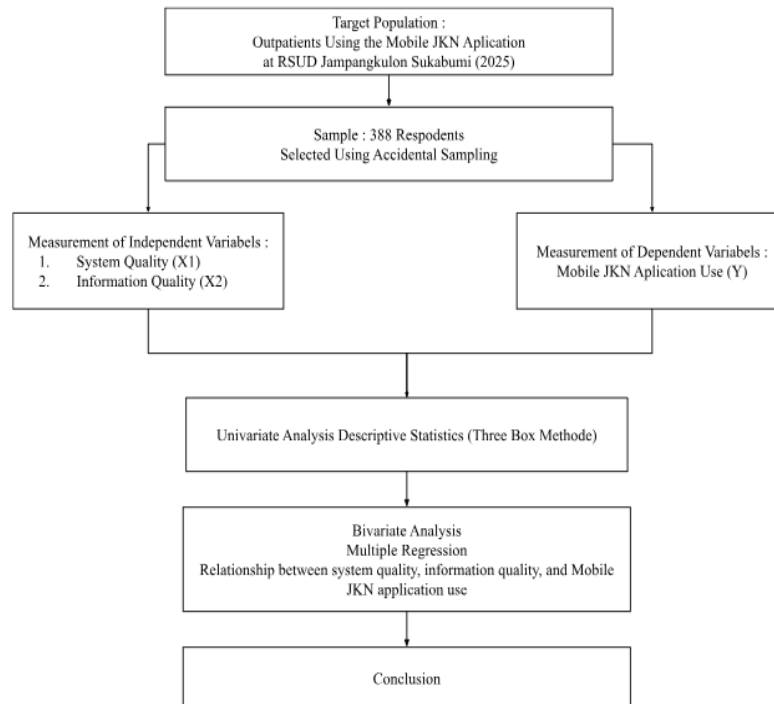
The questionnaire was developed based on the indicators of DeLone and McLeans information system success model that were adapted to the context of the Mobile JKN application. The instrument was tested for validity and reliability. Validity was tested using the Pearson product moment test with a criterion that the calculated  $r$  was  $\geq$  table  $r$  ( $df=n-2=28$ ;  $\alpha=5\%$ ; table  $r=0.374$ ). All items of the three variables were declared valid with calculated  $r$  values ranging from 0.662 to 0.944. Reliability was tested using Cronbachs Alpha in which reliability was achieved if the alpha value was  $> 0.6$ . The result showed that system quality had  $\alpha = 0.891$  (6 items), information quality had  $\alpha = 0.915$  (5 items), and application usage had  $\alpha = 0.700$  (5 items). Thus the instrument was considered reliable.

The respondents' perceptions of the indicators were explained using the Three Box Method. The index of each indicator was calculated by dividing the total score of all respondents' answers to that indicator by the highest score of the Likert scale (4). Thus, the range of the index was  $n \times 1/4$  (the lowest index) and  $n \times 4/4=n$  (the highest index where  $n=$  the total number of respondents and  $n=388$ ). This range (97-388) was divided into three equal parts (each having a range of 97) to define the lowest, medium, and highest categories. The lowest category was 97-194, the medium category was 194.01-291, and the highest category was 291.01-388.

The relationship between system quality and information quality and the use of the Mobile JKN application was examined using multiple linear regression analysis at a significance level of  $\alpha=0.05$ . Before interpreting the results of the regression analysis, a test of the classical assumptions of normality of residuals (P-P plot), heteroscedasticity (scatterplot), multicollinearity (tolerance and Variance Inflation Factor/VIF), and

autocorrelation (Durbin Watson) was carried out with the decision criteria explained in the results section. All data analyses were performed using IBM SPSS Statistics version 26.

This study has received ethical approval from the Esa Unggul University Health Research Ethics Committee with certificate number 037/KEPK-FIKES/UEU/VI/2025. This study was conducted following the principles of informed consent, anonymity, and confidentiality of respondent's data.



**Figure 1. Flowchart of the Research Stages**

## RESULTS

Respondent characteristics based on gender, age, highest level of education and occupation are described in the following Table 1.

**Table 1. Distribution of Respondent Characteristics at Jampangkulon Regional General Hospital, Sukabumi**

| Variable                   | Category               | Frequency (Patients) | Percentage (%) |
|----------------------------|------------------------|----------------------|----------------|
| Gender                     | Male                   | 168                  | 43.3           |
|                            | Female                 | 220                  | 56.7           |
| Age (years)                | 17–25                  | 78                   | 20.1           |
|                            | 26–35                  | 73                   | 18.8           |
|                            | 36–45                  | 105                  | 27.1           |
|                            | 46–55                  | 85                   | 21.9           |
|                            | 56–65                  | 36                   | 9.3            |
|                            | > 65                   | 11                   | 2.8            |
| Highest level of education | No formal education    | 34                   | 8.8            |
|                            | Primary school         | 144                  | 37.1           |
|                            | Lower Secondary School | 33                   | 8.5            |
|                            | Upper Secondary School | 170                  | 43.8           |
|                            | Higher education       | 7                    | 1.8            |
| Occupation                 | Unemployment           | 98                   | 25.3           |
|                            | Students               | 35                   | 9              |
|                            | Civil servants         | 65                   | 16.8           |
|                            | Teachers               | 9                    | 2.3            |
|                            | Farmers                | 110                  | 28.4           |
|                            | Miscellaneous          | 71                   | 18.3           |

Table 1 shows that the most respondents were female (56.7%), aged 36–45 (27.1%), and had completed upper secondary school (43.8%). By occupation, the largest groups were farmers (28.4%) and unemployment (25.3%), followed by other occupation (18.3%).

### Univariate Analysis

Univariate analysis was performed to describe the respondents' perceptions of statements regarding the studies variables including system quality, information quality, and the use of the JKN Mobile application. Respondents perception levels were measured using the Three Box Method Index (Table 2, 3 and 4).

**Table 2. Frequency Distribution of the JKN Mobile App System Quality Variable at Jampangkulon Regional General Hospital**

| Indicator                | Total Score | Index          | Category    |
|--------------------------|-------------|----------------|-------------|
| Ease of Use              | 1345        | 336.25         | High        |
| Response Speed           | 1328        | 332            | High        |
| Reliability              | 1369        | 342.25         | High        |
| Security                 | 1405        | 351.25         | High        |
| User Interface           | 1392        | 348            | Height      |
| Accessibility            | 1370        | 342.5          | High        |
| <b>Total Score Index</b> |             | <b>2052.25</b> | <b>High</b> |
| <b>Average Score</b>     |             | <b>342.04</b>  |             |

The system quality index has an average score of 342.04 (high category) with the security indicator having the highest index value of 351.25 (Table 2). This suggests that respondents had a positive perception of the security of the Mobile JKN application including the use of FRISTA and OTP which theoretically contribute to building user trust in the information system (21, 22).

**Table 3. Frequency Distribution of Information Quality Variables for the JKN Mobile App at Jampangkulon District General Hospital**

| Indicator                | Total Score | Index          | Category    |
|--------------------------|-------------|----------------|-------------|
| Accuracy                 | 1398        | 349.5          | High        |
| Precision                | 1371        | 342.75         | Height      |
| Completeness             | 1368        | 342            | High        |
| Relevance                | 1382        | 345.5          | High        |
| Consistency              | 1242        | 310.5          | High        |
| <b>Total Score Index</b> |             | <b>1690.25</b> | <b>High</b> |
| <b>Average Score</b>     |             | <b>338.05</b>  |             |

The information quality index had an average score of 338.05 (high category) with the accuracy indicator having the highest index value of 349.5 (Table 3). This suggests that respondents perceived the information provided by the Mobile JKN application including membership data, schedules, and queue status, to be accurate and meet user needs (12, 23).

**Table 4. Frequency Distribution of Variables Relating to the Use of the JKN Mobile App at Jampangkulon Regional General Hospital**

| Indicator                | Total Score | Index         | Category    |
|--------------------------|-------------|---------------|-------------|
| Frequency                | 1411        | 352.75        | High        |
| Duration                 | 1372        | 343           | High        |
| Intensity                | 1207        | 301.75        | High        |
| Nature                   | 1262        | 315.5         | Height      |
| Pattern                  | 1374        | 343.5         | High        |
| <b>Total Score Index</b> |             | <b>1656.5</b> | <b>High</b> |
| <b>Average Score</b>     |             | <b>331.3</b>  |             |

Table 4 shows that the use index for the Mobile JKN application had an average score of 331.3 (high category) with the frequency of use indicator having the highest index value of 352.75. This suggests that the Mobile JKN application had become one of the channels used by respondents to access outpatient registration services at (24).

### Multivariate Analysis

Before conducting multiple linear regression analysis, the study tested the data for the four classical assumptions. The normality test results using the P-P plot indicated that the data were normally distributed as most points fell on the diagonal line. The heteroscedasticity test results using the scatterplot also showed that the data were free from heteroscedasticity as the points fell randomly around the diagonal line. The multicollinearity test results showed that the tolerance value was 0.307 ( $> 0.1$ ) and the VIF value was 3.261 ( $< 10$ ) for both independent variables, suggesting that there was no multicollinearity among the predictors. Finally, the autocorrelation test results using the Durbin Watson statistic showed that the value of  $d = 2.121$  fell between  $du=1.715$  and  $(4-du)=2.285$  there was no autocorrelation in the model.

**Table 5. Model Summary**

| R     | R-squared | Adjusted R-squared | Standard Error of the Estimate |
|-------|-----------|--------------------|--------------------------------|
| 0.844 | 0.712     | 0.711              | 1.076                          |

The R squared value of 0.712 suggests that 71.2% of the variance in the use of the Mobile JKN application was explained by the variance in system quality and information quality while the remaining 28.8% was explained by other variables not included in the model (Table 5). The standard error of the estimate is 1.076 which was calculated using the square root of the mean squared residuals.

**Table 6. Results of the Partial Regression Coefficient Test (t-test) and 95% Confidence Interval**

| Model                    | <i>b</i> | Standard Error | <i>t</i> | Sig.  | 95% CI      |
|--------------------------|----------|----------------|----------|-------|-------------|
| Constant                 | 3.218    | 0.552          | 5.834    | 0.000 | 2.13 – 4.30 |
| System Quality (X1)      | 0.204    | 0.046          | 4.427    | 0.000 | 0.11 – 0.29 |
| Information Quality (X2) | 0.547    | 0.041          | 13.231   | 0.000 | 0.47 – 0.63 |

Table 6 shows that the regression equation is therefore  $Y = 3.218 + 0.204X_1 + 0.547X_2$  ( $X_1$  = system quality,  $X_2$  = information quality,  $Y$  = app usage). The results showed that all  $\beta$  values were positive and the confidence interval did not include zero, suggesting that system quality and information quality each had a significant positive effect on the use of the Mobile JKN application ( $p < 0.001$ ).

**Table 7. Results of the Simultaneous Regression Coefficient Test (F-test)**

| Model        | Sum of Squares   | df         | Mean Square | F       | Sig.  |
|--------------|------------------|------------|-------------|---------|-------|
| Regression   | 1103.710         | 2          | 551.855     | 476.408 | 0.000 |
| Residual     | 445.971          | 385        | 1.158       |         |       |
| <b>Total</b> | <b>1,549,680</b> | <b>387</b> |             |         |       |

The F-test results showed that the F-value was 476.408 with  $p=0.000$  ( $< 0.05$ ) suggesting that system quality and information quality simultaneously and significantly predicted the use of the Mobile JKN application.

### DISCUSSION

The study found that system quality had a positive and significant association on the use of the Mobile JKN application ( $b = 0.204$ ;  $p < 0.001$ ) with the security indicator contributing the most. The security features of the Mobile JKN application including FRISTA and OTP, probably made users feel safe and increased their trust in the information system. Which was consistent with the notion that information system security was one of the factors influencing users trust and willingness to continue using the system (10,21). This result was also consistent with studies reporting a positive relationship between app security and loyalty and the continued use of other digital services (22).

Information quality also had a positive and significant association on the use of the Mobile JKN application ( $b=0.547$ ;  $p<0.001$ ) with a greater contribution than that of system quality with accuracy being the most critical predictor. This finding suggests that the accuracy of the information provided by the Mobile JKN application including membership data, schedules, and queue status was positively related to the level of use of the application by outpatients. This result was consistent with the findings that information accuracy influenced users evaluation of the reliability of the information system (12, 23), and that the sustainability of electronic health record use was associated with the quality of information generated by the system (25, 26).

System quality and information quality explained 71.2% of the variance in the use of the Mobile JKN application ( $R^2 = 0.712$ ). This finding was consistent with the results of several studies on other health information

systems in which system quality and information quality were significantly related to the level of system use. For example similar results were found in studies on Hospital Information Systems (27,28), electronic medical records (29), and online queuing applications at primary health care facilities (30). Information system studies outside the health sector also showed similar results including digital banking and human resources information systems (14, 31). These findings highlighted the relevance of the DeLone McLean framework in understanding the use of various information systems. Other studies on digital information systems also showed similar results, including the association between the use of the village finance application (32), and the DeLone McLean model based followup monitoring system (33), mobile banking services (34), and digital banking services (35). In addition a literature review on the use of the Mobile JKN to improve health care services also found similar results (36).

Nevertheless, caution should be exercised in interpreting these results because the study used a cross-sectional design which limited the ability to establish a temporal relationship between the variables. First, the cross-sectional design of this study did not allow the researchers to determine the causal relationship between the variables. For example reverse causation was possible, whereby the frequency of use of the Mobile JKN application predicted users perception of system quality and information quality rather than the other way around (20). Second, this study used a convenience sampling strategy and the variables were measured using the same instrument. Thus the results might be biased due to common method variance which was a possibility when measuring independent and dependent variables using the same method at the same time (37). Third, this study did not control for possible confounding variables such as digital literacy and internet access which other studies have shown to be associated with the use of the Mobile JKN (7).

Based on the descriptive analysis the use of the Mobile JKN application fell within the high category, with the frequency of use being the highest among the indicators, suggesting that the Mobile JKN had become one of the channels for outpatient registration (24). However, the findings from this study could not be generalized to all users of the Mobile JKN application because the sample was selected using a convenience sampling strategy at one hospital. Thus, selection bias was possible for example, if some patients were more available to participate in the study than others at specific times.

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## CONCLUSION

This study concluded that system quality and information quality had a positive and significant associations on the use of the Mobile JKN application by outpatients at Jampangkulon Regional General Hospital, Sukabumi with the two variables explaining 71.2% of the variance in app usage. This study had several limitations including the cross-sectional design which did not allow the researchers to determine the causal relationship between the variables and the convenience sampling strategy which might have resulted in selection bias. In addition, this study used self-reported measures which might have introduced subjective bias and the variables were measured using the same instrument which might have led to common method variance. Lastly, this study did not control for possible confounding variables such as digital literacy and internet access which might have influenced the results. In line with these limitations this study made several recommendations including evaluating user's perceptions of the security and accuracy of the information provided by the Mobile JKN application and monitoring technical problems with the app periodically. These recommendations were relevant to the study's findings and would help optimize the use of digital based outpatient registration services. Further studies with a longitudinal design and a larger sample size are needed to build on the findings of this study.

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