The Influence of QR Code-Based Socialization on Passenger Understanding of KM 39/2024 Regulations at Komodo International Airport

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ABSTRACT

The Minister of Transportation's Decree Number 39 of 2024 serves as an important reference in maintaining flight safety. However, there are still many violations by passengers regarding cabin baggage, reflecting a lack of understanding of regulations and minimal information dissemination. Digital media such as QR Codes are considered an efficient solution for delivering information.

This research uses a quantitative approach involving 233 domestic passengers at Komodo International Airport. A questionnaire was developed to measure the influence of QR Code media on passengers' understanding of KM 39 of 2024, with instruments that have been validated and tested statistically.

The analysis results show that QR Code has a significant impact on improving passenger understanding ($p < 0.05$). The recommended strategies based on PM 30 of 2020 and PM 77 of 2011 include placing QR Codes in strategic locations, presenting engaging content, and involving staff in assisting passengers to access information digitally in accordance with service regulations and carrier responsibilities.

Keywords: *aviation safety, passenger awareness, QR Code media, digital information delivery*

1. INTRODUCTION

Indonesia, as the world's largest archipelagic nation with over 17,000 islands, depends heavily on air transportation to support the mobility of its vast and diverse population. Airports not only serve as transportation hubs connecting regions domestically and internationally, but also act as crucial points in safeguarding aviation security. According to Law No. 1 of 2009, Article 1 Paragraph 33, airports are designated areas used for aircraft operations, passenger movements, cargo handling, and intermodal transitions, supported by facilities that ensure aviation safety and security.

Despite the existence of regulations such as Minister of Transportation Decree No. 39 of 2024 concerning the National Aviation Security Program, violations related to cabin and checked baggage remain prevalent. Field observations at Adi Soemarmo and Komodo International Airports show frequent incidents involving dangerous items brought by passengers, including excessive liquids, sharp objects, and power banks in checked baggage. These behaviors reflect a low level of passenger understanding about security procedures, further worsened by limited dissemination of information from airport and airline authorities. Research by Sulistyo (2016) emphasizes that effective safety information dissemination significantly influences passenger behavior, indicating the urgent need for more innovative communication strategies.

Technological advancements offer new opportunities to improve public awareness of aviation security. QR Codes, as practical and accessible media, have shown promise in delivering regulatory content interactively and efficiently. Studies by Wijaya (2016) and Riandita et al. (2023) confirm the effectiveness of QR Code applications in improving user comprehension in both public services and educational settings. By integrating QR Codes containing relevant content about KM 39/2024, airports can provide passengers with engaging information that promotes better compliance.

This research aims to analyze the influence of QR Code-based dissemination on passenger understanding of KM 39/2024 at Komodo International Airport. Additionally, it seeks to explore strategic approaches to enhance the effectiveness of this method, contributing to the improvement of aviation security practices and the creation of a safer air travel environment.

2. METHODOLODY

2.1. Research Design

This study employs a quantitative approach with a pre-experimental design, wherein external variables may contribute to changes in the dependent variable (Sugiyono, 2013:74). The research flow is systematically presented in Figure 1.

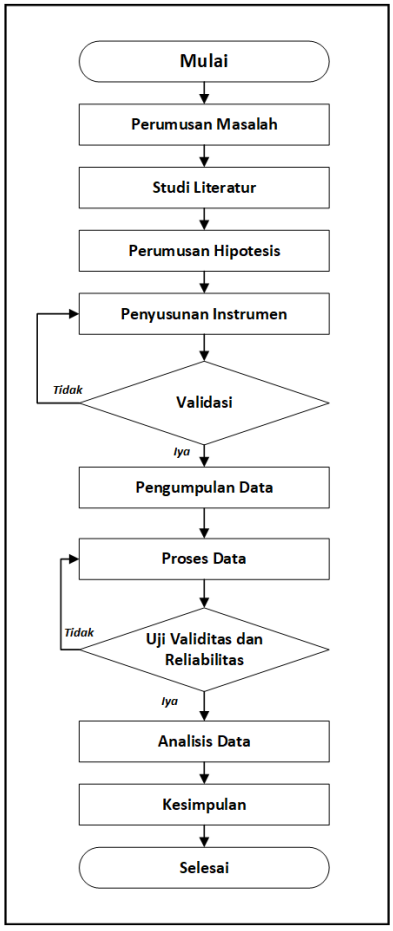

Figure 1. Research Flowchart Design

Based on Figure 1, the stages of the research are as follows:

1. **Problem Formulation:** Identification and formulation of the research problem serve to define the direction and objectives of the study.
2. **Literature Review:** A thorough review of relevant literature is conducted to establish a theoretical foundation and clarify the variables studied.
3. **Hypothesis Development:** Based on literature and problem formulation, a hypothesis is constructed as a provisional assumption about variable relationships to be tested empirically.
4. **Instrument Design:** Research instruments (questionnaires) are designed based on indicators of each operationally defined variable.
5. **Instrument Validation:** Content validation ensures clarity, readability, and relevance of the instrument; revisions are made until the instrument meets validation criteria.
6. **Data Collection:** Once validated, data is collected from designated respondents in line with the research design.
7. **Validity and Reliability Testing:** Collected data undergoes validity and reliability testing to ensure accurate and consistent measurement.
8. **Data Analysis:** Valid data is analyzed using appropriate statistical techniques, aligned with research objectives and data types.
9. **Conclusion Drawing:** Conclusions are drawn from the analysis to address the research problem and evaluate the hypothesis.
10. **Completion:** Marks the final stage of the research process.

2.2 Instrument Development

Instruments are tools used to measure social phenomena being observed (Sugiyono, 2013:102). In this study, the instrument was developed to create an educational medium in the form of a QR Code containing aviation security regulations in accordance with KM 39 Year 2024. The stages of instrument preparation, including:

1. **Problem Identification:** The issue of passengers' low understanding of aviation security regulations—particularly baggage regulations—was identified.
2. **Information Gathering:** Relevant educational information was gathered from KM 39 Year 2024 on the National Aviation Security Program.
3. **Product Design:** The QR Code structure was designed with three components: questionnaire for variable X, core material on baggage regulations, and questionnaire for variable Y. Indicators for both variables were developed based on aspects outlined in KM 39 Year 2024.
4. **Product Creation:** The QR Code was developed for mobile access, directing users to content covering the dissemination method (QR Code), baggage regulations, and passenger understanding of KM 39 Year 2024.
5. **Limited Trial:** A small-scale pilot test was conducted with selected respondents.
6. **Product Refinement:** Based on trial outcomes, revisions were made to finalize the product for primary research implementation.

2.3 Research Variabels

According to Sugiyono (2013:38), research variables are defined elements to be studied and concluded upon. This study includes two variables:

- **Variable X** – Dissemination Method via QR Code
- **Variable Y** – Passenger Understanding of KM 39 Year 2024

2.4 Population and Sample

The study population comprises all domestic passengers departing from Komodo International Airport, Labuan Bajo on February 10, 2025, totaling 669 individuals. Based on Sugiyono's (2013:87) sample determination table, the sample size is calculated through interpolation as follows:

$$n = n_1 \frac{(N - N_1)}{(N_2 - N_1)} \times (n_2 - n_1)$$
$$n = 227 \frac{(669 - 650)}{(700 - 650)} \times (233 - 227) \quad (1)$$
$$n = 233$$

Thus, the sample size used in this study is 233 respondents.

2.5 Instrumen Testing

2.5.1 Expert Validation

Prior to implementation, instruments were validated by subject matter experts in aviation security and digital media to ensure content relevance and presentation accuracy.

2.5.2 Validiting Testing

Validity means measuring what we are going to measure (Darwin et al., 2021:143). This research uses construct validity to ensure that the instrument in the form of a QR Code can measure passengers' understanding of flight safety education, with the validity test conducted using SPSS and the Pearson Product Moment correlation formula:

$$r_{hitung} = \frac{n(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{(n\Sigma X^2 - (\Sigma X)^2)(n\Sigma Y^2 - (\Sigma Y)^2)}} \quad (2)$$

Each item is tested against the r table value at a significance level of 5% (df = N - 2), where the test item is declared valid if the calculated r is greater than the r table, and this test is conducted before the distribution of the instrument with a sample size of 233 respondents, taken on different days to avoid bias.

2.5.3 Reliability Testing

Reliability, defined as the consistency of an instrument under similar conditions (Widodo et al., 2023:60), was tested using Cronbach's Alpha via SPSS:

$$\propto = \frac{k}{k-1}\left(\frac{\Sigma\sigma^2}{\sigma_t^2}\right) \quad (3)$$

'An instrument is considered reliable if 0 *Cronbach's Alpha* $\geq$ 0,70. This test uses the same sample as the validity test.

2.6 Data Collection

Data were collected via two questionnaires representing variables X and Y, distributed through QR Code access at Komodo International Airport. All responses were quantified and statistically analyzed using SPSS.

2.7 Data Analysis

2.7.1 Descriptive Analysis

Descriptive statistics were used to systematically present data without extrapolation to the broader population (Sugiyono, 2013:148).

2.7.2 Inferential Analysis

Inferential statistics is a method for analyzing sample data and generalizing the results to the population (Sugiyono, 2013:148).

1. **Normality Test:** Conducted using the Kolmogorov-Smirnov method with SPSS on 344 respondents. Data is deemed normally distributed if the significance value ≥ 0.05.
2. **Simple Linear Regression Test:** Used to assess the effect of variable X on Y using the equation:

$$Y=a+bX \quad (4)$$

Hypotheses:

- If **b = 0,** means there is no significant effect (H_0 is accepted)
- If **b ≠ 0,** then there is a significant effect (H_0 is rejected)

2.8 Location and Duration

The research was conducted at Komodo International Airport, Labuan Bajo during the On the Job Training period from January 6 to July 2025.

3. RESULT

3.1 Instrument Development Outcomes

The development stages of the research instrument resulted in a final product in the form of a QR Code, which served as the primary medium of socialization in this study. Figure 2 illustrates the QR Code that was implemented in the data collection process.

Upon scanning the QR Code shown in Figure 2, participating passengers were directed to a five-page interactive website designed to deliver regulatory information effectively. The structure of the digital content was organized as follows:
Page 1 – Welcome message and explanation of the socialization objectives.
Page 2 – Pre-test questionnaire measuring baseline knowledge (Variable X).
Page 3 – Eight illustrated infographics explaining baggage regulations based on KM 39 Year 2024.
Page 4 – Post-test questionnaire measuring passengers' understanding (Variable Y).
Page 5 – Closing message thanking participants and reinforcing the importance of aviation safety.

Figure 2. QR Code Product

This interactive structure was created to provide clear, structured information and assess passengers' learning progression through visual and textual engagement.

3.2 Instrument Evaluation

3.2.1 Expert Validation

Content and media validation was conducted by two experts:

1. **Content Expert –** By Mrs. Dr. Laila Rochmawati, S.S., M.Pd., assessed the clarity and relevance of the questionnaire items. Her evaluation yielded a score of 24 out of 30 and recommended the refinement of item linkage between Variable X and Variable Y. The instrument was deemed "usable with revision".

2. **Media Expert –** By Mrs. Lady Silk Moonlight, S.Kom., M.T., evaluated the digital interface and presentation of the QR Code media. Her score of 46 out of 50 led to the conclusion that the media was "usable without revision".

Based on both assessments, the instrument was considered valid and suitable for deployment in the main data collection phase.

3.2.2 Validity Test Results

Table 1 presents the results of the item-total correlation test for each questionnaire item.

Table 1. Validity Test Results

Variabel	Item No.	*Corrected Item-Total Correlation* (r hitung)	r tabel	Status
Socialization via QR Code (X)	1	0,485	0,138	Valid
	2	0,627	0,138	Valid
	3	0,588	0,138	Valid
	4	0,521	0,138	Valid
	5	0,593	0,138	Valid
	6	0,537	0,138	Valid
	7	0,479	0,138	Valid
	8	0,615	0,138	Valid
	9	0,572	0,138	Valid
	10	0,590	0,138	Valid
Passenger Understanding of KM 39/2024 (Y)	1	0,510	0,138	Valid
	2	0,620	0,138	Valid
	3	0,603	0,138	Valid
	4	0,572	0,138	Valid
	5	0,631	0,138	Valid
	6	0,572	0,138	Valid
	7	0,485	0,138	Valid
	8	0,658	0,138	Valid
	9	0,613	0,138	Valid
	10	0,631	0,138	Valid

Based on Table 1, all 20 items exceed the critical r value (0.138) at a significance level of 5% with 231 degrees of freedom, indicating strong construct validity for both instruments.

3.2.3 Reliability Test Results

Internal consistency was measured using Cronbach's Alpha. Results are presented in Table 2.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha Value	Status
X	0,759	Reliabel
Y	0,792	Reliabel

Based on Table 2, nilai Both values exceeded the threshold of 0.70, signifying that the instruments are statistically reliable and consistent for repeated use under similar conditions.

3.3 Results of Descriptive Statistical Analysis

From Table 3, it shows that passengers' understanding of socialization through QR Code (variable X) is relatively good, indicated by high scores on certain items such as carrying electronic goods (63%),

Table 3. Results of the Questionnaire Variable X

Item No.	Total Scor	Percentage
1	144	62%
2	112	48%
3	125	54%
4	134	58%
5	137	59%
6	121	52%
7	116	50%
8	146	63%
9	126	54%
10	145	62%

Table 4. Results of the Questionnaire Variable Y

Item No.	Total Scor	Percentage
1	133	57%
2	151	65%
3	165	71%
4	144	62%
5	134	58%
6	173	74%
7	165	71%
8	126	51%
9	159	68%
10	148	64%

Meanwhile, the understanding of the contents of KM 39 of 2024 (variable Y) is generally better, with the highest score on the regulation of alcohol content (74%) and the lowest on electronic devices and batteries (51%).

Overall, the clearer the information conveyed through QR Code, the higher the passengers' understanding of the applicable regulations.

3.4 Results of Inferential Statistical Analysis

3.4.1 Normality Test Results

Normality tests are measured using the Kolmogorov-Smirnov test. The results are presented in Table 5.

Table 5. Normality Test Results

Type of Test	Data	N	Statistics	Sig.	Status
Kolmogorov-Smirnov	Socialization Method through QR Code	233	0,095	0,000	Not Normal
Kolmogorov-Smirnov	Passenger Understanding of KM 39 Year 2024	233	0,107	0,000	Not Normal

Based on Table 5, the Kolmogorov-Smirnov normality test shows that the data on both variables are not normally distributed ($p = 0.000 < 0.05$). However, based on the Central Limit Theorem, with a sample size of 233 respondents ($n > 30$), the data is considered to be approximately normal, so simple linear regression analysis can still be performed. (Sugiyono, 2013:178).

3.4.2 Results of Simple Linear Regression Test

Table 6 presents the results of the simple linear regression correlation test to see the effect of QR Code in enhancing passenger understanding.

Table 6. Results of Simple Linear Regression Test

Variabel	B (Koefisien Regresi)	Std. Error	t Count	Sig. (p)	Status
(constant)	1,734	0,249	6,962	0,000	Significant
QR Code Socialization Method	0,840	0,041	20,422	0,000	Significant, influential

Based on Table 6, the regression results show the equation $Y = 1.734 + 0.840X$, where the QR Code-based socialization method has a positive effect on passenger understanding. The significance value ($p = 0.000 < 0.05$) indicates a significant effect, thus H_1 is accepted. This finding answers the research objective, which is that socialization through QR Code effectively enhances understanding of KM 39 of 2024 at Komodo Labuan Bajo International Airport.

3.4.3 Strategy for Enhancing Passenger Understanding through QR Code

The strategy to enhance passenger understanding through QR Code shows that most passengers have received information about KM 39 Year 2024, although understanding of certain aspects is still limited. To optimize socialization, it is recommended: improvement of digital content (interactive videos, quizzes), involvement of airport staff and cabin crew, integration of QR Code into airline apps and e-tickets, and

educational campaigns on social media. This strategy supports a more comprehensive understanding relevant to PM 30 Year 2021 and PM 77 Year 2011 regarding the provision of accurate and easily accessible information.

4. DISCUSSION

The results of the study indicate that the use of QR Code as a socialization medium significantly enhances passenger understanding of KM 39 Year 2024, which governs national aviation safety regulations. This finding directly addresses the first research objective: to evaluate the effectiveness of QR Code-based dissemination in improving passenger comprehension at Komodo Labuan Bajo International Airport.

Based on the simple linear regression analysis, the significance value of 0.000 (< 0.05) and a positive regression coefficient of 0.840 demonstrate a strong and positive impact of QR Code-based socialization on passenger understanding. This supports Sulistyo's (2016) assertion that the quality of dissemination influences safety-related passenger behavior. The QR Code's structured and interactive design was instrumental in facilitating comprehension, consistent with Riandita et al. (2023), who emphasized the effectiveness of multimedia platforms in educational settings.

Descriptive statistical findings show that post-socialization comprehension scores were higher than baseline knowledge, particularly on topics like alcohol content regulations (74%). In contrast, the lowest understanding was observed for regulations concerning electronic devices and batteries (51%), revealing areas where further clarification is needed. While most passengers received the information, comprehension gaps suggest that certain content areas require more engaging and detailed visual representation.

In response to the second research objective, several strategic improvements can be recommended: enriching digital content with interactive videos and quizzes; actively involving airport staff and flight crew to guide passengers in using QR Codes; integrating QR Code features into airline mobile applications and e-tickets; and implementing educational campaigns via social media. These strategies align with PM 30 Year 2020 on minimum service standards and PM 77 Year 2011 regarding carrier responsibilities, which mandate the delivery of accurate and accessible information to aviation users.

Thus, QR Code emerges not only as a practical tool for information dissemination but also as an effective medium for learning, capable of enhancing aviation safety literacy among passengers in a structured and impactful manner.

AUTHORS' CONTRIBUTIONS

This article was collaboratively developed through distinct roles and responsibilities fulfilled by each author and academic supervisor. The following contributions reflect the involvement of all parties throughout the research and publication process:

1. **Study Design and Conceptualization**: Author 1 developed the initial research idea, formulated the research questions, defined the research objectives, and designed the methodology and research instruments.
2. **Data Collection and Analysis**: Author 1 conducted field observations, distributed questionnaires, processed the data using a quantitative approach supported by SPSS software, and prepared the interpretation of research findings.
3. **Educational Media Development**: Author 1 designed QR Code-based learning media that visualized information related to KM No. 39 of 2024, and created digital content as an educational tool.
4. **Academic Supervision and Guidance**: Author 2 and Author 3 provided scientific guidance throughout the research process, validated the instruments and procedures, and offered input on the structure and content of the research report.
5. **Manuscript Writing and Revision**: Author 1 prepared the entire journal manuscript, from introduction to conclusion, and revised it based on feedback from advisors and examiners.
6. **Final Approval**: All authors and supervisors have reviewed and approved the final version of the manuscript for publication.

This study presents a practical and innovative approach to increasing passenger awareness of aviation safety regulations through the development of QR Code-based educational media. The structured collaboration between the author and supervisors played a key role in delivering impactful findings and ensuring academic integrity throughout the research journey.

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