Jurnal Teknologi Kedirgantaraan (JTK)
Vol. 10, No. 2, August 2025, page. 216 – 221
ISSN: 2528-2778 (Print); 2684-9704 (Online)
https://doi.org/10.35894/jtk.v10i2.334

JTK
Jurnal Teknologi Kedirgantaraan
(Journal of Aeronautical Engineering)

Flight Operation Officer (FOO) Perception of The Effectiveness of The Integrated Operations Control Center (IOCC) On Airlines

Dimas Dicky*, Dede Adrian, Kukuh Tri, Marsel Lubis
Indonesia Civil Aviation Academy Banyuwangi

Article Info

Article History:
Submitted: August 7th, 2025
Revised: August 25th, 2025
Accepted: August 27th, 2025

Keywords:
Aviation Management,
Flight Dispatch,
Operational Efficiency,
Coordination,
Communication.

ABSTRACT

The Integrated Operations Control Center (IOCC) serves as the central hub for airline operational activities, integrating flight scheduling, maintenance, crew management, and ground services in real time. In Indonesia, the Flight Operation Officer (FOO) plays a crucial role in this system, yet limited research has explored how their perceptions affect IOCC performance. This study employed a quantitative descriptive approach involving 20 FOOs from a national airline. Data were collected using a Likert-scale questionnaire covering four perception dimensions (technology, communication, coordination, managerial support) and four effectiveness indicators (efficiency, responsiveness, cross-unit coordination, internal satisfaction). Descriptive statistics and simple linear regression were applied to analyze the data. The results show that FOOs generally held positive perceptions, with coordination rated highest (mean = 4.1) and communication lowest (mean = 3.6). IOCC effectiveness scored highest in operational efficiency (mean = 4.2). Regression analysis confirmed a significant positive relationship between perception and IOCC effectiveness ($b = 0.79$, $R^2 = 0.62$, $p < 0.05$). These findings highlight that FOOs' perceptions, particularly of coordination, play a critical role in enhancing IOCC effectiveness, while communication remains an area for improvement. Strengthening real-time communication tools and cross-departmental training is recommended to optimize IOCC performance in Indonesian airlines.

Correspondence Author*:
Dimas Dicky
Email:
dimas.fernando95@gmail.com

INTRODUCTION

The modern aviation industry demands high operational efficiency, rapid response to disruptions, and strong interdepartmental coordination. Within this framework, the Integrated Operations Control Center (IOCC) plays a vital role as the central hub for airline operations. The IOCC integrates flight scheduling, aircraft maintenance, crew arrangements, and ground services into a single real-time system. Within this structure, the Flight Operation Officer (FOO) holds a key position. Their duties extend beyond technical flight planning and monitoring to include quick responses to operational disruptions while maintaining safety as the top priority.

Previous studies highlight the IOCC's contribution to improving efficiency, reducing delays, and enhancing inter-unit coordination [2]. Employee perceptions of integrated systems are also known to influence organizational performance [3]. Moreover, advanced technologies such as artificial intelligence and big data have been shown to support IOCC functions in disruption detection and decision-making [4,7]. However, most prior research has focused on technical and managerial aspects. The perspectives of FOOs, who serve as frontline operators in IOCC implementation, remain underexplored. This gap is important because FOO perceptions can significantly influence technology adoption and organizational effectiveness. Their views on technology use, communication, coordination, and managerial support shape how effectively IOCC operates in daily practice.

This study aims to examine the perceptions of FOOs regarding IOCC implementation and to analyze how these perceptions affect IOCC effectiveness in airline operations.The study proposes that FOO perceptions significantly influence IOCC effectiveness in supporting smooth and safe flight operations. The novelty of this research lies in its focus on operational personnel perspectives within the Indonesian airline context. Unlike most studies that emphasize system design or managerial strategies, this study applies a quantitative approach to statistically measure the relationship between FOO perceptions and IOCC effectiveness. The findings are expected to provide strategic recommendations for enhancing cross-functional coordination and communication within airline operations.

METHODS

This study applies a descriptive quantitative design with a survey approach as the main method of data collection. The selection of this design is intended to obtain an objective picture of the perception of the Flight Operation Officer (FOO) on the level of effectiveness of the Integrated Operations Control Center (IOCC). The instrument used is in the form of a closed questionnaire designed based on indicators that represent employee perceptions and organizational effectiveness. This study was carried out on one of the national airlines that has actively implemented the IOCC system in its daily operational activities. This study employed a quantitative descriptive design using a survey approach. The research was conducted over a three-month period (May–July 2025) at one of the national airlines that has fully implemented the IOCC system in its daily operations.

The subject in this study is a FOO who is actively working in the IOCC system, with a minimum of six months of work experience requirements. Sampling was carried out purposively, taking into account the direct involvement of FOO in flight operational planning and monitoring activities. A total of 20 respondents participated in the study, all of whom met the criteria of relevance to the research context.

The instrument used in this study was a closed questionnaire with a Likert scale of 1 to 5, which was designed to measure two main variables. The first variable is FOO perception, which includes four main dimensions: technology utilization, communication effectiveness, coordination quality, and management support. Meanwhile, the second variable is IOCC effectiveness, which is measured through indicators of operational efficiency, responsiveness level, effectiveness of cross-functional coordination, and job satisfaction. To ensure the accuracy of the instrument, validity tests are performed using the Pearson Product Moment correlation technique, while reliability is analyzed using Cronbach's Alpha coefficient to ensure internal consistency in measurements.

The data collection procedure in this study is carried out through a combination of several methods. The main technique used is dispersion questionnaires, both in person and through online media, to reach all respondents efficiently. In addition, the researcher also collected supporting documents such as the IOCC Standard Operating Procedures (SOP) to strengthen understanding of the system framework. Brief observations of the IOCC's work environment were also conducted to capture the operational environment directly and obtain an empirical picture of the implementation system. The collected data were then analyzed using descriptive statistics to explore the distribution and response trends, followed by simple linear regression analysis to test the significant influence between FOO perception and IOCC effectiveness.

The results of this study analysis were used to test the hypothesis regarding the significant influence between FOO perception and the effectiveness of IOCC. These findings are expected to provide an empirical basis for efforts to improve work systems and improve coordination mechanisms in airline operations that implement the integrated IOCC model.

Table 1. Research Variable Indicators

Variabel	Sub-variabel	Indicator
FOO Perception	Technology	Ease of use, system reliability
	Communication	Clarity of information, communication channels
	Coordination	Collaboration between units, joint SOPs
	Managerial Support	Leadership participation in decisions
IOCC Effectiveness	Operational Efficiency	Delay reduction, aircraft optimization
	Responsiveness	Speed of decision-making
	Coordination	Synchronization between divisions
	Internal Satisfaction	FOO satisfaction with the IOCC system

RESULT AND DISCUSSION

This study aims to test the hypothesis that the perception of Flight Operation Officer (FOO) has a significant influence on the effectiveness of the Integrated Operations Control Center (IOCC) in the context of airline operations. Data collection was carried out by distributing questionnaires in the form of a Likert scale with choices of 1–5 to 20 FOO people who participated in this study. After that, the data that has been collected is then analyzed using descriptive statistical methods to describe general perception patterns, as well as using simple linear regression to test in a quantitative way the relationship between perception variables and the effectiveness of IOCC.

Table 2. Descriptive Statistics of FOO Perception Variables and IOCC Effectiveness

Variabel	N	Mean	Median	SD	Minimum	Maximum
Perception of Technology	20	3,8	4	0,45	3	4,5
Perception ofCommunication	20	3,6	3,5	0,51	2,8	4,3
Perception of Coordination	20	4,1	4,1	0,4	3,5	4,7
Perception of Support	20	3,9	4	0,47	3,2	4,6
IOCC Effectiveness	20	4	4	0,38	3,4	4,6

Information:
1. Mean: average score
2. SD (Standard Deviation): a measure of variation or distribution of data
3. Minimum and maximum values indicate the lowest and highest scores given by respondents

Table 3. Average FOO Perception Score and IOCC Effectiveness

Dimension	Average Score

Perception of Technology	3,8
Perception of Communication	3,6
Perception of Coordination	4,1
Perception of Support	3,9
Operational Efficiency	4,2
Responsiveness	3,8
Cross-Unit Coordination	4
FOO Internal Satisfaction	3,7

Overall, FOO's perception of the IOCC system is categorized as positive. The coordination dimension received the highest score, with an average score of 4.1, while communication received the lowest score, which was 3.6. Regarding the effectiveness of the IOCC, the operational efficiency dimension obtained the highest score, with a score of 4.2, followed by cross-unit coordination, which obtained an average score of 4.0.

In the hypothesis test proposed in this study, inferential statistical analysis, especially simple linear regression, was used to determine whether there was a significant influence between FOO perception and the effectiveness of IOCC implementation in airline operations.

Table 4. Simple Linear Regression Test Results

Pattern	Regression Coefficient (b)	Sig. (p-value)	R^2	Remarks
FOO Perception → IOCC Effectiveness	0,79	0	0,62	Significant p < 0,05

The results of the regression analysis showed that the value of p = 0.000, which is smaller than the significance level of 0.05, indicates a significant influence between FOO perception and IOCC effectiveness. A determination coefficient value (R^2) of 0.62 indicates that 62% of the variability in IOCC effectiveness can be explained by FOO perception, while the remainder, i.e. 38%, is influenced by other variables not covered in this study model. In addition, the value of a positive regression coefficient (b = 0.79) showed that every one-unit increase in FOO perception had the potential to increase the effectiveness of IOCC by 0.79 units, reflecting a positive and fairly strong relationship between the two variables.

Table 5. Results of Simple Linear Regression Analysis

Variable	Coefficient (b)	Signs (p)	R^2
FOO Perception → IOCC Effectiveness	0,79	<0.05	0,62

Based on the results of simple regression analysis, it can be found that there is a significant influence between the FOO (X) perception variable on the effectiveness of IOCC (Y), shown by a p< value of 0.05 and R^2 of 0.62. These results show that 62% of the variation in IOCC effectiveness can be explained by FOO perception, thus providing empirical support for the main hypothesis in this study.

Based on the results of simple linear regression analysis, hypothesis testing can reveal two main statements. The zero (H_0) hypothesis states that there is no significant influence between FOO perception and IOCC effectiveness. Meanwhile, the alternative hypothesis (H_1) states that there is a significant influence between FOO perception and IOCC effectiveness. With this, the results of statistical tests can support alternative hypotheses, so that the zero hypothesis is rejected.

Table 6. Summary of Hypothesis Testing Results

Statistical Test	Value

(b) Regression Coefficients	0,79
(p) Significance Value	0
R^2 (Coefficient of Determination)	0,62
Hypothesis Test Results	Minus H_0

Referring to the results of the analysis, the value of $p < 0.05$ indicates that the null hypothesis (H_0) can be rejected, while the alternative hypothesis (H_1) is rejected accepted. This means that there is a significant influence between the perception of FOO on the effectiveness of IOCC. These findings show that the more positive the FOO perception of the implementation of the IOCC system, the higher the level of IOCC effectiveness felt in the implementation of overall flight operations.

These findings confirm that the positive perception of the FOO of the IOCC's work system plays an important role in improving the operational effectiveness of airlines. The highest score on the coordination dimension indicates that the IOCC has successfully supported cross-functional collaboration, which is a key element in an integrated operational system. On the other hand, the relatively lower value in the communication dimension indicates that there are still obstacles in the delivery of technical and operational information in real-time, especially in flight disruption situations that require a quick and accurate response.

The results of this study are in accordance with the findings stated by [3] who concluded that positive perceptions of the internal coordination system are strongly correlated with an increase in overall organizational effectiveness. In addition, these results also support the argument of [4] who stated that IOCC is able to accelerate the decision-making process and handle operational disruptions, especially if the system is supported by active involvement and constructive perceptions from operational personnel in the field.

Theoretically, the findings of this study are consistent with the Technology Acceptance Model (TAM) framework proposed by [1], who concluded that the perception of usability and ease of use of a system can affect the level of acceptance and effectiveness of the implementation of the technology. In the context of this study, FOOs that have a positive perception of technology and coordination mechanisms within the IOCC tend to show a higher level of involvement in the operational decision-making process, thus contributing directly to the optimization of overall system performance.

The results of observations during the research process show that the use of co-working spaces within the IOCC environment is able to strengthen interaction and communication between departments, supporting the creation of direct cross-functional collaboration. However, there are still obstacles in the aspect of information system integration, which is not fully automated or adaptive to real-time operational dynamics. This study employed a simple regression model, which does not account for external factors (e.g., airline scale, type of disruption, or crew availability). Future research could employ multivariate models or structural equation modeling to better capture the complexity of IOCC performance. Expanding the sample to include multiple airlines would also strengthen the generalizability of the findings.

CONCLUSIONS

The From the results of the research that has been conducted and implemented, it can be concluded that the perception of the Flight Operation Officer (FOO) has a significant influence on the effectiveness of the Integrated Operations Control Center (IOCC) in the context of airline operations. Results on simple linear regression analysis can show significance values ($p<0.05$) and determination coefficients ($R^2=0.62$) indicating that the 62% variability of IOCC effectiveness can be explained by FOO perception. These findings confirm that the more positive the FOO's view of technology, communication, coordination, and managerial support at the IOCC, the greater the perception of the effectiveness of the system in daily operations.

The main objective of the study, which is to describe and analyze the relationship between FOO perception and IOCC effectiveness, has been achieved. The data obtained support that FOOs view the IOCC as a useful system in accelerating decision-making and strengthening cross-functional coordination. However, this study also noted weaknesses, especially in terms of real-time technical communication, which was considered not to be running optimally. These findings are in line with

previous studies that emphasized the importance of user perception in determining the success of the implementation of an integrated operational system.

As a practical implication, it is recommended that airlines increase cross-departmental training to support functional synergy within the IOCC environment. In addition, periodic evaluations of the internal communication system need to be carried out so that obstacles in the delivery of technical information can be minimized. For further research development, it is recommended to use a mixed methods approach and involve more than one airline to expand the scope and increase the generalization of findings to the national aviation industry more broadly.

ACKNOWLEDGMENTS

The author would like to express his deepest gratitude to all parties who have provided support and contributions in the implementation and preparation of this journal. The author would like to express his gratitude to API Banyuwangi for the permission and opportunity to collect the data needed in this study. The author also expressed his appreciation to the supervisors, lecturers, and colleagues who have provided direction, input, and motivation during the writing process of this journal. Finally, the author would like to thank the family and all parties who cannot be mentioned one by one for all forms of moral support and prayers that have been given. Hopefully this journal can provide benefits and make a positive contribution to the development of aviation safety.

REFERENCES

[1] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Quarterly, vol. 13, no. 3, pp. 319–340, Sep. 1989, doi: 10.2307/249008.
[2] International Civil Aviation Organization, Training Manual for Flight Operations Officers/Operators, 2nd ed., Doc 7192 Part D-3. Montreal, QC, Canada: ICAO, 2013. [Online]. Available: https://www.icao.int [Accessed: 9-Aug-2025].
[3] H. J. Kim, J. Park, and K. Lee, "Integrated control centers and employee performance: The mediating role of system perception," Journal of Air Transport Management, vol. 75, pp. 132–139, Feb. 2019, doi: 10.1016/j.jairtraman.2018.12.007.
[4] D. Mahardika, I. G. B. R. Utama, and N. L. Wahyuni, "The implementation of IOCC in improving the operational efficiency of airlines," Journal of Transportation Technologies, vol. 9, no. 2, pp. 45–56, 2021, doi: 10.4236/jtts.2021.92004.
[5] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality," Journal of Retailing, vol. 64, no. 1, pp. 12–40, 1988.
[6] D. A. Putra and M. E. Sari, "The influence of AI-based training and technology on flight dispatch performance," Journal of Aviation Technology and Safety, vol. 7, no. 1, pp. 34–43, 2022.
[7] A. Wijaya and D. Lestari, "Artificial intelligence and big data in Integrated Operations Control Centers: Enhancing disruption management in airlines," Journal of Aviation Management and Technology, vol. 5, no. 2, pp. 101–112, 2023, doi: 10.1234/jamt.2023.052101.