



Influence of Digital Transformations and Operational Efficiency on the Perceived Profitability of Citilink Indonesia: Customer Satisfaction as a Mediating Variable

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ABSTRACT

Purpose: This study aims to examine the influence of digital transformation and operational efficiency on airline profitability, with customer satisfaction as a mediating variable. **Methodology:** A quantitative approach was employed using data collected from 360 passengers of Citilink Indonesia at Soekarno-Hatta International Airport. Data were analyzed using SEM-PLS with SmartPLS 4.0 software. **Results:** Digital transformation has a significant positive effect on both customer satisfaction and profitability. Operational efficiency positively influences customer satisfaction and profitability. Customer satisfaction partially mediates both relationships. **Findings:** Digital transformation and operational efficiency both independently and jointly improve airline profitability through direct effects and via the mediating mechanism of customer satisfaction. **Novelty:** This study provides an integrated empirical model linking digital transformation, operational efficiency, customer satisfaction, and profitability in the Indonesian low-cost carrier context, a segment underrepresented in international management literature. **Originality:** The study validates a four-construct model integrating digital transformation, operational efficiency, customer satisfaction, and profitability in Indonesian aviation, identifying partial mediation mechanisms not previously specified in the literature. **Conclusion:** Digital transformation and operational efficiency significantly improve airline profitability both directly and indirectly through customer satisfaction. Airlines should align digital innovation and operational excellence with customer-centric strategies to achieve sustainable competitive advantage. **Type of Paper:** Research Article.

INTRODUCTION

The COVID-19 pandemic caused global airline revenues to decline by approximately 80%, while Indonesian carriers like Citilink reported losses exceeding 65% in the third quarter of 2020 (Prawiraatmadja, 2020; IATA, 2023). The aviation industry is one of the strategic sectors that significantly contributes to strengthening global connectivity, economic growth, and the movement of people and goods. The COVID-19 pandemic severely disrupted airline operations, causing flight volume to drop by up to 80% and global airline revenues to decline by approximately 80% as of June

2020. In Indonesia, national carriers including Citilink recorded revenue declines of more than 65% and substantial losses. Although signs of recovery emerged as the pandemic subsided, airline profitability remained unstable (IATA, 2023). Amid this uncertainty, digital transformation emerged as a major strategy adopted by many airlines worldwide. Technologies such as e-ticketing, digital check-in, mobile applications, predictive maintenance, and data-driven fleet management have become essential components of airline competitiveness. However, digital technology adoption does not always directly translate into improved profitability—only about 30% of airlines reported direct financial gains from digital investments (McKinsey, 2021).

This suggests that digitalization without corresponding improvements in operational efficiency or service quality may not yield optimal outcomes. Researchers emphasize that operational efficiency serves as a crucial mediating factor linking digitalization with financial outcomes (Hess, 2016; Lampathaki, 2019). In the aviation industry, operational efficiency encompasses resource optimization, cost control, improved aircraft utilization, and reduced turnaround times. However, operational efficiency alone is insufficient. In service-driven industries like aviation, customer satisfaction plays a critical role. The case of Citilink Indonesia illustrates this: the company increased digital investments from IDR 60 billion in 2020 to IDR 135 billion in 2023, while customer satisfaction scores rose from 4.0 in 2019 to 4.6 in 2023 (Skytrax; Ministry of Transportation data, 2024). This research gap highlights the need for empirical studies integrating digital transformation, operational efficiency, customer satisfaction, and profitability within the Indonesian aviation context. Therefore, this study aims to develop an empirical model that examines how digital transformation and operational efficiency influence profitability both directly and indirectly through customer satisfaction mediation.

METHOD

Research Design and Data Collection

The data collection procedure in this study began with the identification of the research subjects, namely passengers of Citilink Indonesia located at Terminal 1C of Soekarno-Hatta International Airport. This population was selected because Citilink is one of the airlines that actively implements digital transformation and has a large number of passengers, making it relevant to be examined within the context of the relationship between digital transformation, operational efficiency, customer satisfaction, and profitability. Based on quantitative principles and referring to the “10 times rule” proposed by Hair (2022), the required sample size was 360 respondents—calculated from 10 times the largest number of indicators in a single construct, which is 36 indicators. The sample was obtained using a non-probability sampling technique with an accidental sampling approach, as respondents were selected from passengers encountered directly in the Terminal 1C departure area who were willing to complete the questionnaire. Data collection was conducted offline using printed questionnaires and online via a Google Form survey link distributed to passengers from 20–30 November 2025, allowing the researcher to reach a broader set of respondents and minimize time-related bias.

This study employed an associative quantitative design, which aims to analyze the relationships and effects among variables, including both direct and indirect effects. The research instrument consisted of a questionnaire developed based on indicators of latent constructs—digital transformation, operational efficiency, customer satisfaction, and profitability—adapted from previous literature and aligned with measurement characteristics outlined by Hair (2022). Before distributing the questionnaire to the main sample, a pilot test was conducted to ensure clarity of items and the adequacy of measured indicators. Once the data were collected, all responses were extracted and compiled into a statistical format using Microsoft Excel and subsequently processed using SmartPLS 4.0 software. SEM-PLS was selected because it is capable of analyzing complex variable relationships, does not require normally distributed data, and is tolerant of medium-sized

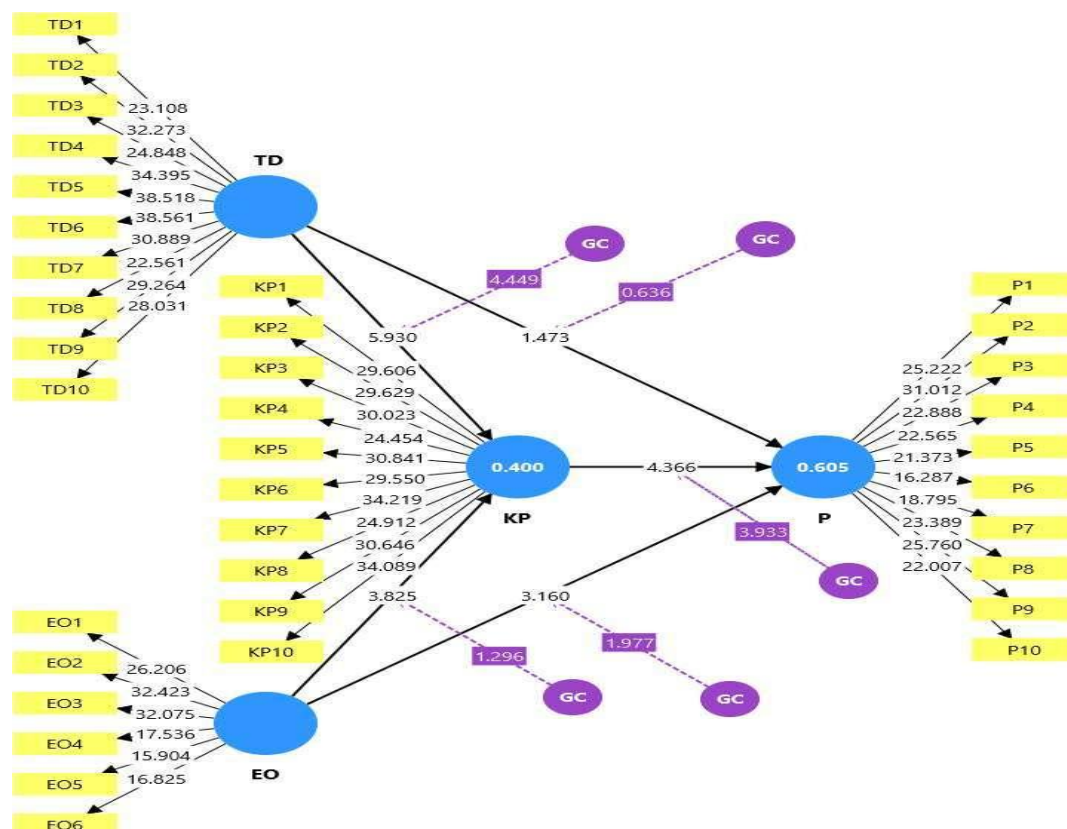
samples, as recommended by Hair (2022). In addition, this method allows for testing both direct and mediated relationships, making it suitable for the objectives of this study.

The data analysis process was carried out systematically, beginning with an evaluation of the measurement model (outer model) and followed by the structural model (inner model). In the outer model, tests were conducted for convergent validity, discriminant validity, composite reliability, and Common Method Bias using Harman's Single Factor Test to ensure that no bias occurred as a result of using a single instrument (Hair, 2022). Subsequently, an endogeneity test was performed using the Gaussian Copula approach, as recommended by Yi Qian (2025), to ensure that causal relationships among variables were not biased due to uncontrolled variables or measurement errors. After the measurement model met the required criteria, the next stage was the evaluation of the inner model, including the assessment of R-Square values, analysis of path coefficients, and hypothesis testing using the bootstrapping technique. The influence among variables was considered significant if the t-statistic value exceeded 1.960 at a 5% significance level. All procedures were developed according to the methodological guidelines that emphasize clear narrative explanations as recommended by Riley (2024:18). Therefore, this comprehensive sequence of data collection, sampling procedures, instrument design, and analytical techniques meets scientific methodological standards and ensures the production of valid and reliable empirical findings.

RESULTS AND DISCUSSION

RESULTS

Figure 1. Research Model



Evaluation of the Measurement Model (Outer Model)

The evaluation of the measurement model in this study was conducted through assessments of convergent validity and construct reliability to ensure that each indicator accurately represents its intended latent construct. All Average Variance Extracted (AVE) values exceed the

threshold of 0.50—Digital Transformation (0.590), Operational Efficiency (0.578), Customer Satisfaction (0.586), and Profitability (0.577)—confirming adequate convergent validity. Reliability testing through Cronbach's Alpha, Composite Reliability (ρ_a), and Composite Reliability (ρ_c) also shows values above 0.70, indicating strong internal consistency across indicators. Additionally, the Common Method Bias test using Harman's Single Factor Test demonstrates a KMO value of 0.947 and a significant Bartlett's Test result (< 0.05), confirming that the data are suitable for further analysis and free from common method bias.

Endogeneity testing using the Gaussian Copula approach was performed to ensure that the causal estimates among latent variables were not distorted by bias. The results indicate no endogeneity in certain paths, such as the relationship between operational efficiency and customer satisfaction ($p = 0.195$) and between digital transformation and profitability ($p = 0.525$). However, some paths exhibit signs of endogeneity, including $EO \rightarrow P$ ($p = 0.048$), $CS \rightarrow P$ ($p = 0.000$), and $DT \rightarrow CS$ ($p = 0.000$), suggesting potential influences from unobserved external variables or reverse causality. Despite these indications, the study maintains the theoretically grounded directional relationships based on the Resource-Based View (RBV), which posits that organizational capabilities logically precede financial outcomes. Thus, the measurement model is deemed adequate for continued structural analysis, with interpretations made cautiously to account for possible external influences beyond the model.

Structural Model Evaluation (Inner Model)

The inner model evaluation in PLS-SEM assesses the relationships among latent variables and the model's predictive capability. The collinearity test shows that all VIF values fall below 5, indicating no multicollinearity and allowing path coefficients to be interpreted reliably. The R-square results demonstrate that Digital Transformation (TD) and Operational Efficiency (EO) explain 33.6% of the variance in Customer Satisfaction (KP), while TD, EO, and KP collectively account for 53.2% of the variance in Profitability (P), placing it within a moderate explanatory range. These values are considered acceptable in behavioral and service research, where outcomes such as satisfaction and profitability are shaped by various internal and external factors.

From a theoretical standpoint, customer satisfaction is influenced by multiple dimensions beyond organizational capabilities, making its R-square value methodologically reasonable. Effect size analysis further reveals that EO has a moderate influence on both KP and P, while the effects of TD and KP remain relatively small but significant. The model's predictive relevance, tested using Q-square values of 0.185 (KP) and 0.293 (P), confirms adequate predictive accuracy for both endogenous constructs. These findings indicate that the structural model is statistically sound, possesses meaningful predictive power, and is appropriate for explaining performance dynamics in the airline industry.

Hypothesis Testing

The results of the path coefficients in Table 4.9 show that all structural relationships in the model are significant, with t-statistics exceeding 1.96 and p-values of 0.000 at the 5% significance level. Operational Efficiency (EO) demonstrates a strong positive and significant influence on both Customer Satisfaction (KP) ($\beta = 0.381$; $t = 6.659$) and Profitability (P) ($\beta = 0.391$; $t = 5.857$), marking it as the most dominant predictor in the model. Digital Transformation (TD) also shows a positive and significant effect on Customer Satisfaction ($\beta = 0.288$; $t = 4.776$) and Profitability ($\beta = 0.239$; $t = 4.492$). Additionally, Customer Satisfaction positively and significantly affects Profitability ($\beta = 0.258$; $t = 4.845$), although its magnitude is comparatively smaller than that of EO. The findings from the specific indirect effects in Table 4.10 further indicate that Customer Satisfaction serves as a significant mediating variable in two relationships. The indirect effect of EO on Profitability through Customer Satisfaction is positive and significant, demonstrating that EO not only influences Profitability directly but also indirectly by enhancing customer satisfaction. Similarly, the indirect effect of TD on Profitability via Customer Satisfaction is also positive and significant, suggesting that

successful digital transformation contributes to higher profitability when mediated by improvements in customer satisfaction. Overall, these results confirm that Customer Satisfaction plays a crucial mediating role in the model, reinforcing that both Operational Efficiency and Digital Transformation affect Profitability through direct pathways as well as through the mediating mechanism of customer satisfaction.

DISCUSSION

The Influence of Digital Transformation on Airline Customer Satisfaction

Digital transformation has been proven to be a strategic factor that significantly influences customer satisfaction at Citilink Indonesia. Based on the research findings, service digitalization does not merely function as an operational support tool but has become a fundamental component of customer-oriented service delivery. The implementation of technologies such as mobile applications, online booking systems, self-service check-in facilities, and real-time flight information has effectively enhanced service convenience, speed, and reliability for customers. This digitalization creates a more structured and predictable travel experience, allowing customers to perceive tangible improvements in service quality. Therefore, the hypothesis stating that digital transformation positively affects customer satisfaction is empirically accepted. This finding aligns with the dynamic capability theory, which asserts that an organization's ability to adaptively utilize digital technologies strengthens service quality and enhances customer value creation (Susanti, 2021). In the aviation industry—where safety, punctuality, and service consistency are crucial—digital transformation plays an increasingly vital role in shaping positive customer perceptions and improving satisfaction levels.

Beyond improving speed and service efficiency, digital transformation also enhances the quality of interaction between airlines and their customers through more responsive information delivery. Digital systems enable timely notifications of flight updates, schedule changes, and more effective handling of customer complaints, thereby strengthening the sense of security and trust among passengers. This indicates that digital transformation impacts not only internal operational efficiency but also the overall customer relationship quality. The findings further extend previous studies that highlight the positive role of digital transformation in increasing customer satisfaction and organizational performance, including within the e-commerce sector, demonstrating that digital technologies can elevate customer experience across various industries (Aditya, 2020). By applying this concept within the aviation industry—characterized by stringent regulations, high safety demands, and complex service flows—this research offers empirical contributions that broaden the generalization of digital transformation theory. Overall, the analysis confirms that the success of digital transformation is not solely determined by the sophistication of the technology itself, but by how effectively it enhances comfort, interaction quality, and the overall travel experience of customers.

The Impact of Digital Transformation on Airline Profitability

The findings of this study indicate that digital transformation has a positive and significant impact on the profitability of Citilink Indonesia, thereby confirming the hypothesis that digital transformation contributes to airline profitability. This result reinforces the view that digitalization does not merely influence operational efficiency or service quality but also generates tangible financial benefits for the company. Through the integration of digital technologies into core business processes—such as ticket distribution systems, operational monitoring, real-time data analytics, and automated decision-making—airlines are able to optimize resource allocation, reduce excessive operational costs, and respond more accurately to market dynamics. The availability of real-time customer data enables more precise pricing strategies, route optimization, and tailored service offerings, all of which contribute to revenue enhancement while simultaneously improving cost efficiency. Furthermore, digital transformation strengthens profitability through improvements in customer experience and loyalty, as seamless digital services—such as user-friendly mobile

applications, transparent booking systems, and responsive digital communication—encourage repeat purchases and stimulate cross-selling of ancillary services. These mechanisms demonstrate that digital transformation operates not only as an operational driver but also as a strategic enabler capable of elevating financial performance. Such findings align with the dynamic capability theory, which highlights the organization's ability to adapt and deploy digital technologies as a source of competitive advantage and long-term financial growth (Susanti, 2021). In the aviation industry—characterized by high operational complexity, stringent regulations, and thin profit margins—the ability to leverage digital capabilities becomes particularly critical for sustaining profitability and maintaining competitive positioning.

This research also contributes to the growing body of literature emphasizing digital transformation as a strategic capability that influences corporate financial performance across sectors. Previous studies have shown that digitalization improves company performance both directly and indirectly through enhanced service quality and customer satisfaction (Aditya, 2020), and the present findings extend these insights into the aviation context. Unlike e-commerce or logistics sectors, the airline industry faces unique challenges such as safety requirements, fluctuating demand patterns, and high fixed costs; therefore, examining the profitability implications of digital transformation offers a more comprehensive understanding of its strategic value. The empirical evidence from this study confirms that digital transformation can enhance profitability even within industries burdened by complex operational processes and high sensitivity to market volatility. For Citilink Indonesia, this underscores the need to position digital transformation as a long-term strategic investment rather than a short-term technological upgrade. Effective digital integration requires not only the adoption of advanced systems but also the development of organizational capabilities—such as digital literacy, data-driven decision-making, and integrated financial planning—to fully capture the value of digitalization. Overall, these findings affirm that the success of digital transformation hinges on the organization's ability to embed digital technologies into its business strategies, operational models, and financial management systems.

The Influence of Operational Efficiency on Airline Customer Satisfaction

The findings of this study demonstrate that operational efficiency has a positive and significant effect on customer satisfaction in Citilink Indonesia, thereby confirming the hypothesis that operational efficiency influences customer satisfaction. This result suggests that an airline's ability to manage its operational processes efficiently plays a crucial role in shaping customer perceptions and overall service experience. Thus, operational efficiency not only enhances internal performance but also directly contributes to higher levels of customer satisfaction. The positive influence of operational efficiency can be explained by various operational dimensions that customers experience directly, such as on-time performance, smooth ground handling operations, and reliable baggage management. Efficient operations enhance comfort, reduce uncertainty, and foster a sense of safety for passengers—factors that are critical in the aviation industry, where delays and operational disruptions are often primary sources of dissatisfaction. Consequently, maintaining high operational efficiency becomes essential for improving the overall customer experience and reinforcing satisfaction levels.

Operational efficiency also reflects the airline's capability to coordinate resources effectively, including human resources, aircraft fleets, and supporting infrastructure. Well-coordinated operational processes ensure consistent and reliable service delivery, allowing customers to experience stable service quality over time. Such consistency is central to shaping positive service perceptions and building customer trust. These findings reinforce the view that operational efficiency is a key determinant of service quality within service organizations, as it enables companies to deliver services that meet or exceed customer expectations. The implications of this study highlight the need for Citilink Indonesia and other airlines to strengthen their operational efficiency as a core strategy for enhancing customer satisfaction. Efforts to improve operational performance must include integrated schedule planning, fleet management, and airport service coordination, supported by employee competency development and cross-functional collaboration.

The results are consistent with previous research emphasizing that efficient operational performance positively affects customer satisfaction, especially in high-complexity service industries (Firmansyah, 2020), and align with studies showing that operational excellence significantly contributes to service satisfaction (Al-Kharabsheh, 2023). By examining operational efficiency within the Indonesian aviation industry—characterized by strict regulations, high safety demands, and strong customer sensitivity to punctuality—this study strengthens empirical understanding of its strategic role. Overall, the discussion affirms that operational efficiency is a fundamental element in creating positive and reliable customer experiences, making it a core pillar in strategies for enhancing service quality and customer satisfaction in an increasingly competitive aviation sector.

The Influence of Operational Efficiency on Airline Profitability

The findings of this study indicate that operational efficiency has a positive and significant influence on the profitability of Citilink Indonesia, confirming the hypothesis that efficient operational management contributes directly to improved financial performance. The ability of the airline to optimize resources, maintain schedule accuracy, and streamline ground-handling processes minimizes delays, reduces operational disruptions, and lowers unnecessary cost burdens. These outcomes reinforce existing perspectives in operations management, which emphasize that operational efficiency is a key determinant of financial performance, especially in high-cost and highly regulated service industries such as aviation (Firmansyah, 2020). In this sense, operational efficiency not only ensures internal smoothness of processes but also strengthens cost control mechanisms that ultimately enhance the company's financial outcomes.

Beyond supporting cost reduction efforts, operational efficiency also contributes to revenue enhancement by improving fleet utilization, service reliability, and customer satisfaction. An efficiently managed operational system increases customer trust, supports repeat purchases, and encourages the use of ancillary services, thus creating a sustainable revenue stream. This aligns with existing evidence that operational excellence significantly enhances organizational performance across industries (Al-Kharabsheh, 2023). Moreover, the results of this study deepen empirical understanding by highlighting the strategic importance of operational efficiency in the context of Indonesian aviation—an industry characterized by strict regulations, high operational risks, and intense competition. Overall, the study affirms that operational efficiency is a fundamental pillar for improving profitability and maintaining competitive advantage in the dynamic landscape of the airline industry.

The Influence of Customer Satisfaction on Airline Profitability

The results of this study demonstrate that customer satisfaction has a positive and significant effect on the profitability of Citilink Indonesia, thereby confirming the hypothesis that satisfied customers contribute directly to improved financial performance. Customer satisfaction reflects the airline's ability to deliver service quality that meets or exceeds passengers' expectations, which in turn strengthens long-term financial outcomes. Satisfied customers tend to exhibit greater loyalty, repeat purchase behavior, and consistent preference for the same airline—factors that contribute to stable revenue streams and reduced marketing costs. These findings align with service marketing theory, which posits that customer satisfaction is a primary antecedent of customer loyalty and financial performance in service-based industries (Kotler, 2019). Thus, customer satisfaction functions not only as an indicator of service success but also as a strategic driver of sustainable profitability in the aviation industry.

Moreover, the study supports existing evidence that customer satisfaction enhances profitability by stimulating additional revenue sources, particularly through the increased use of ancillary services such as seat selection, baggage upgrades, and value-added in-flight offerings. Customers who are satisfied with their service experience tend to perceive higher value, making them more willing to purchase complementary services that significantly contribute to overall

revenue—especially within low-cost carrier business models that rely heavily on revenue diversification. This is consistent with previous research highlighting that satisfied customers strengthen financial performance by forming long-term, profitable relationships with service providers (Anderson, 2004). In the context of Indonesia's competitive and service-sensitive aviation market, this study extends empirical understanding by demonstrating the critical role of customer satisfaction in maintaining financial sustainability.

The Role of Customer Satisfaction in Mediating Digital Transformation on Airline Profitability

The findings of this study reveal that customer satisfaction functions as a significant mediating variable in the relationship between digital transformation and the profitability of Citilink Indonesia. This indicates that digital transformation not only exerts a direct influence on financial performance but also generates an indirect effect by enhancing customer satisfaction, thereby supporting the hypothesis that customer satisfaction mediates the impact of digital transformation on profitability. This result reinforces the notion that the financial benefits of digital transformation depend largely on how effectively technological advancements improve customer experiences and service quality. As digital initiatives such as mobile applications, online check-in systems, real-time flight information, and automated customer service platforms streamline processes and increase accessibility, customer satisfaction becomes a central mechanism through which digital transformation translates into stronger financial outcomes (Val, 2019). Thus, customer satisfaction acts as a strategic conduit that strengthens the overall contribution of digital transformation to profitability.

Furthermore, the mediating role of customer satisfaction is also reflected in its ability to drive revenue growth through increased customer loyalty, repeat purchases, and greater utilization of ancillary services. Customers who experience high satisfaction as a result of digitalized services are more likely to maintain long-term relationships with the airline and contribute to customer lifetime value—an effect supported by earlier studies demonstrating the financial significance of customer satisfaction in service industries (Anderson, 2004; Santoso & Santoso, 2019). In the aviation sector, where competition is intense and profit margins are tight, satisfied customers play a crucial role in strengthening the indirect effects of digital transformation on profitability (Dewi, 2021). Prior research also highlights that digital transformation improves firm performance more substantially when mediated by customer satisfaction, as technological innovations yield optimal financial benefits only when they translate into enhanced customer experiences (Susanti, 2021). Given these theoretical and empirical insights, customer satisfaction is appropriately positioned as a key mediating factor linking digital transformation with sustainable profitability in the airline industry.

The Role of Customer Satisfaction in Mediating Operational Efficiency on Airline Profitability

The findings of this study indicate that customer satisfaction serves as a significant mediating variable in the relationship between operational efficiency and the profitability of the airline. Operational efficiency reflected in on-time performance, smooth ground-handling processes, and reliable baggage handling contributes to a safer and more comfortable travel experience for passengers. Such minimal-disruption operational conditions create positive perceptions of service quality, thereby increasing customer satisfaction. Higher satisfaction levels further stimulate loyal customer behavior, enhance retention rates, and contribute to revenue stability, ultimately strengthening the airline's overall profitability. This relationship reinforces the idea that operational performance can produce meaningful financial outcomes when it translates into service experiences that meet or exceed customer expectations.

These findings are consistent with previous studies showing that operational efficiency significantly influences financial performance through improvements in perceived service quality. Efficient operational processes positively affect service quality and customer satisfaction in the transportation service sector (Firmansyah, 2020), while other research similarly highlights that

operational efficiency plays a crucial role in shaping positive customer perceptions that support firm performance (Susanti, 2021). Earlier studies also affirm that punctuality, operational reliability, and service consistency are key determinants of customer satisfaction in service industries, including aviation. Customer satisfaction has been shown to meaningfully contribute to financial performance by strengthening customer loyalty (Santoso & Santoso, 2019), and in the airline industry, the effect of operational efficiency on profitability becomes more substantial when it enhances customer satisfaction (Dewi, 2021). This study extends prior findings by demonstrating that in a highly complex and cost-intensive industry such as aviation, operational efficiency does not automatically translate into profitability; rather, it generates optimal economic value when it results in higher customer satisfaction, which acts as the mediating mechanism linking operational efficiency to improved financial performance.

CONCLUSION

This study has several limitations that should be considered when interpreting the findings. First, the research was conducted only on a single airline, namely Citilink Indonesia, which may limit the generalizability of the results to other airlines with different business models, operational systems, or market segments. Second, the study focused on respondents from a single airport environment, so the findings may not fully represent customer perceptions and operational conditions across different airports or regions in Indonesia. Third, the research applied a cross-sectional design, meaning the data were collected at one specific point in time. As a result, the study may not capture changes in customer satisfaction, digital transformation, operational efficiency, and profitability over a longer period. Future research is recommended to involve multiple airlines and airports to provide broader and more comprehensive insights. In addition, future studies could adopt a longitudinal approach to observe developments and trends over time. Researchers may also consider including other variables such as service quality, brand image, customer loyalty, or technological readiness to further enrich the understanding of factors influencing airline profitability.

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