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Artificial Intelligence-Supported Digitalization in Aviation: Analysis of Management Literature Using the PRISMA Method

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Abstract: This systematic review presents an original synthesis that systematically reveals the impact of AI-driven digitalization in the field of aviation on the management literature. The paucity of systematic studies conducted within the framework of the management discipline and based on the PRISMA protocol in the extant literature constitutes the rationale for this research. The objective of this study is to address this gap and thereby provide a foundation for future research. The articles published between 2015 and 2025 was reviewed in the research using the Web of Science database; the systematic review process was conducted in accordance with the PRISMA protocol. Out of the initial 752 publications identified during the first screening, 41 articles were selected for review based on eligibility criteria. A thematic analysis was conducted to evaluate the content. The literature was organized into three primary themes within the framework of management science: Human Factors in Aviation Management, Safety Culture and Organizational Practices, and Artificial Intelligence in Strategic and Operational Decision-Making Processes. The findings reveal that AI systems support both human-centered and data-driven approaches in managerial decision-making, improve operational efficiency, and transform strategic planning. These results offer guidance for both academic researchers and practitioners by highlighting current trends in the field, pinpointing key thematic areas, and suggesting directions for future research.
Keywords: Aviation, PRISMA, Artificial, Digitalization

1. Introduction

Research in artificial intelligence (AI) has progressed over more than 65 years thanks to the ongoing work of scientists and engineers (Jiang *et al*., 2022). The term "artificial" in AI refers to its origin and mode of creation through human design and ingenuity rather than arising from natural (particularly biological, or evolutionary) processes. In essence, entities with artificial intelligence are set apart from those with natural intelligence by displaying specific traits commonly linked to non-artificial beings. (Fetzer, 1990). Aviation is one of the most technologically advanced industries, which has led to growing interest among researchers in the application of artificial intelligence (AI) within the sector (Kabashkin *et al*., 2023). The industry's growth reflects significant potential to benefit from emerging technologies such as AI, which are becoming increasingly prevalent (Kumar, 2022). Examples of AI-driven digital transformation in aviation include its active use in flight planning, maintenance operations, air traffic management, safety, pilot simulation, and training. AI technologies are not merely regarded as technical automation tools; they are also considered strategic decision support systems and revenue management solutions. However, a review of the extant literature reveals a limited number of studies that systematically examine the impact of AI on the management discipline within the aviation sector. This gap contributes to the fragmentation of pertinent academic knowledge and hinders a comprehensive evaluation of the topic. The objective of this study is to address the identified gap by conducting a systematic review of the management literature to analyze the reflections of AI-supported digitalization in the aviation sector; this review will be conducted in accordance with the PRISMA protocol. A comprehensive review of studies published between 2015 and 2025 was conducted using the Web of Science database and thematically examined based on predefined eligibility criteria. Consequently, the extant body of knowledge has been methodically organized, thus providing a conceptual framework to guide future research for scholars and practitioners alike.

2. Materials and Methods

In this systematic review, academic publications published between 2015 and 2025 were retrieved using the Web of Science (WOS) database. The literature search was conducted using the Boolean expression: TS=("airline" OR "aviation" OR "air transport") AND ("digitalization" OR "artificial intelligence" OR "AI"). The resulting publications were initially filtered based on technical criteria such as publication type (article), language (English), access status (full text), and publication year. Subsequently, abstracts and keywords were examined to exclude studies not directly related to the aviation sector, artificial intelligence, or management. Excluded materials encompassed conference proceedings, book chapters, editorial articles, non-sectoral examples, and analyses confined exclusively to technical aspects such as algorithms or software. Initially, 752 publications were identified; after implementing a keyword filter **(Table 1)** and removing duplicate records, the final sample was narrowed down to 102 studies.

Table 1. Keywords

Operations	**AI-based prediction**
Operational	resource allocation
Scheduling	capacity planning
Planning	Maintenance
Strategy	predictive maintenance
Strategic	safety culture
decision-making	risk management
Managerial	organizational
Optimization	human factors
Efficiency	performance management
Forecasting	automation in operations
air traffic management	digital twin
scheduling algorithms	smart airport
flow control	AI integration

The remaining publications were meticulously examined by the author, with a particular emphasis on their content. While some studies incorporated keywords that appeared relevant from a management perspective, their content was found to be largely disconnected from managerial themes. Publications that focused on other disciplines were excluded, resulting in a final selection of 41 articles included in the systematic review. The studies were then methodically categorized based on their content and subsequently analyzed. The detailed selection process is illustrated in the PRISMA flow diagram **(Figure 1)**. The data extraction process was conducted by the author, and each study was systematically analyzed in terms of its objective, methodology, findings, thematic and disciplinary orientation, and contribution to the literature. The extracted data were then evaluated holistically, taking into account thematic similarities and complementarities.

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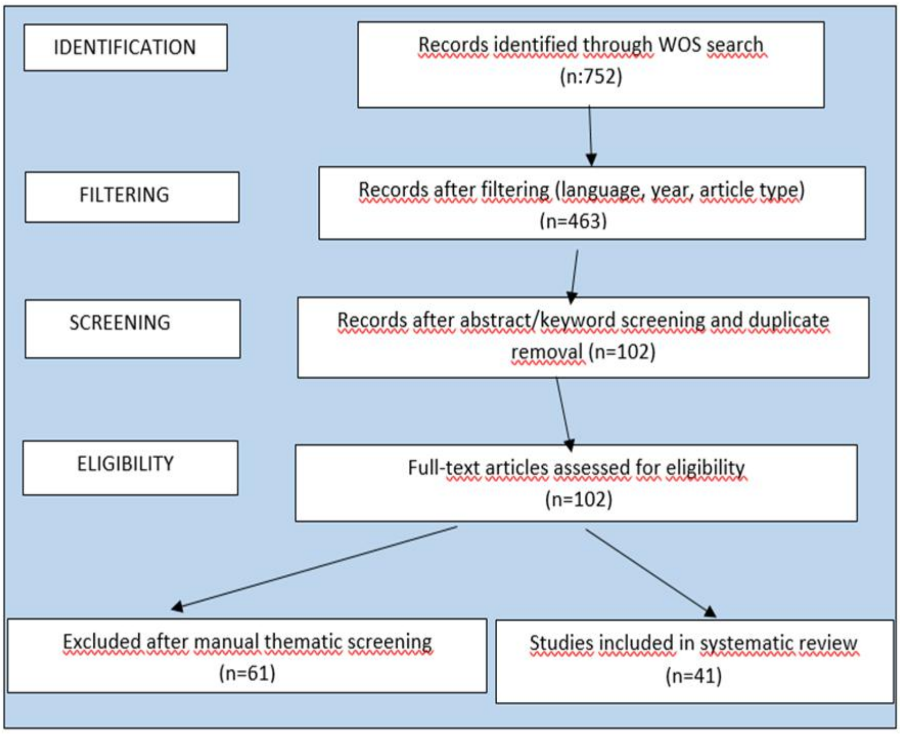

Figure 1. PRISMA FLOW DIAGRAM

3. Result and Discussion

3.1. Descriptive Statistics: The thematic distribution of the 41 articles selected for analysis in this study is presented in **Table 1**. Among the identified themes, the highest number of publications fall under the category of "AI and Technology in Strategic and Operational Decision-Making."

Management Themes	Frequency of Publications
Human Factors in Aviation Management	9
Safety Culture and Organizational Practices	11
AI and Technology in Strategic and Operational Decision-Making	21
Total	**41**

The findings related to the publication frequency by country are presented in **Table 2**.

Table 2. Distribution of Publications by Country

Country (Management)	Frequency (Management)
China	9
France	6
Latvia	6
Usa	5
Italy	3
Spain	3
England	3
United Arab Emırates	3
Australia	3
Germany	2
Turkiye	2
Azerbaijan, Colombia, Hungary, Ireland, Sweden, India, Croatia, Jordan, Moldova, Netherlands, Scotland, Brazil, Poland, Saudi Arabia, Slovkia, Israel	1 (Each)

The annual distribution of publications by theme is presented in **Table 3**. The table reveals a general upward trend in the number of publications over the years. It is noteworthy that the year 2024 was characterized by a significant increase in the volume of publications. However, a slight decline is predicted for 2025. This decline may be ascribed to the fact that not all publications from 2025 had been released or fully indexed in the databases at the time of data collection. Therefore, this dedline should be interpreted not as a definitive downward trend, but rather as a temporary delay in data availability.

Table 3. Distribution of Publications by Year and Research Theme (Management)

Management Themes	2018	2019	2020	2021	2022	2023	2024	2025
Human Factors in Aviation Management	1	1		1	1	2	2	1
Safety Culture and Organizational Practices			1		2	2	5	1
AI and Technology in Strategic and Operational Decision-Making		1		2	4	2	9	3
Total	1	2	1	3	7	6	16	5

3.2. Artificial Intelligence Applications in Aviation: A Management Science Perspective: Based on the reviewed articles, three main themes were identified within the scope of the management discipline. These themes are titled as follows: "Human Factors in Aviation Management" (n=9), "Safety Culture and Organizational Practices in Aviation Management" (n=11), and "AI in Strategic and Operational Decision-Making in Aviation Management" (n=21). A summary table of the included studies is presented in **Table 4**.

3.2.1 Human Factors in Aviation Management: In the aviation sector, which utilizes sophisticated systems reliant on advanced technology, the human element is paramount to operational safety, flight security, efficiency, and sustainability (Süzen, 2025). A review of the extant literature reveals a recurring theme: "Human Factors in Aviation Management." This theme pertains to the role of various individuals, including flight crews, aircraft maintenance personnel, air traffic controllers, and system designers. This theme encompasses a range of disciplines, including cognitive workload, ergonomics, interaction with automation, and decision-making. Recent technological advancements, the proliferation of automation and digital systems, and the integration of artificial intelligence necessitate a redefinition of the human role within aviation systems, requiring strategic alignment and planning from a managerial perspective. A total of nine articles were evaluated under the theme of "Human Factors in Aviation Management." Kistan *et al*. (2018) and Gutierrez Teuler *et al*. (2022) examined human-machine collaboration and workload management in air traffic control systems with the artificial intelligence. Dong *et al*. (2023) proposed an intent modeling framework capable of anticipating pilot actions in the context of future single-pilot operations. Hovanec *et al*. (2024) sought to minimize human error in maintenance processes through digital ergonomics. Zhang *et al*. (2025) aims to minimize human error in maintenance operations and enhance efficiency through the artificial intelligence and digital technologies, Insaurralde and Blasch (2024) in air traffic management and decision support processes, and Gisario *et al*. (2019) in production processes. These three articles reveal that human-machine interaction is being reshaped within the framework of Industry 5.0 through human-centered, supportive, and intelligent systems. Furthermore, studies by Ramakrishnan *et al*. (2023) and Feng and Zhang (2023) associate the operational decisions such as green performance evaluation and capacity forecasting with the human factor. They aim to improve managerial efficiency through AI-driven models. The articles include quantitative approaches (e.g., machine learning, neural networks, experimental simulations) and conceptual qualitative methodologies (e.g., DTSE, ergonomic evaluations). Authors such as Dong *et al*., Feng and Zhang, and Gutierrez Teuler have used data-driven quantitative techniques such as supervised learning, bidirectional long short-term memory (BiLSTM), and convolutional neural networks (CNN). The studies by Kistan, Zhang, and Insaurralde present models and strategic transformation frameworks that explain human-machine collaboration through qualitative analysis. This diversity underscores the interdisciplinary nature of the articles as well as quality which covers both technical and managerial dimensions.Under the theme of "Human Factors in Aviation Management," nine systematically analyzed articles shed light on management science in many aspects through artificial intelligence during its application domains. It has been discussed that AI-supported systems balance the workload and reduce operational risk, and they have potential to make managerial decision-making processes more transparent, data-driven, and human-centered (Kistan, Gutierrez-Teuler, Dong). The ability of AI systems to interpret human intent as decision partners facilitates responsibility sharing in safety-critical operations and enables proactive identification of risky situations in maintenance and operational processes, thereby allowing managers to prioritize occupational safety in their planning (Dong, Zhang). Moreover, it is emphasized that the selection, testing, and implementation processes of artificial intelligence algorithms should be subject to managerial oversight; within this framework, strategic guidance is provided to managers regarding technological evaluation and system integration (Gutierrez-Teuler, Hovanec). Conversely, the use of artificial intelligence in operational decision areas such as sustainability-oriented performance management and capacity forecasting offers significant managerial contributions by enhancing both environmental and organizational efficiency (Gisario *et al*., 2019; Ramakrishnan *et al*., 2023; Insaurralde & Blasch, 2024; Zhang *et al*., 2025). In summary, the necessity of managing the human factor alongside technology underscores the strategic importance of human-machine alignment within the field of management science, and it is evident that these elements directly influence operational success. The contributions of current studies to the literature are highly significant. However, the cultural dimension of technology use remains a particularly underexplored area; the outcomes of artificial intelligence and similar systems within diverse cultural contexts have yet to be sufficiently investigated. Future research is encouraged to pursue interdisciplinary studies that compare human factor implementations across varying cultural settings.

3.2.2 Safety Culture and Organizational Practices in Aviation Management: Safety culture in the aviation sector is directly linked to how the entire organizational structure and individuals perceive and implement safety. Based on the article reviews, the clustered studies have been evaluated under the theme of "Safety Culture and Organizational Practices." This theme encompasses how safety is internalized as an institutional priority by all members of the organization, the governance models adopted, and the impact of organizational practices on flight safety. The safety culture cannot be defined solely as a post-crash assessment in aviation; rather, it is vital to establish preventive strategies, plan training programs, and ensure digital alignment within this context. In particular, the integration of artificial intelligence, the digitalization of maintenance processes, and how safety culture is being shaped during the development of new products underscore the strategic relevance of this theme. A total of 11 articles have been evaluated under the theme of "Safety Culture and Organizational Practices". While Kirwan (2024) examines the impact of artificial intelligence on safety culture, Naor *et al*. (2020) demonstrate how the neglect of psychological safety in the context of the 737 MAX incident led to catastrophic outcomes. Although this study does not directly analyze AI systems, it discusses the interaction between "automated control systems and human behavior". Degas *et al*. (2022) and Çınar and Tuncal (2024) discuss the relation of the workload and professional competencies of controllers with safety management. Çınar and Tuncal do not directly investigate artificial intelligence systems in their study, but they discuss the potential future implications of artificial intelligence on air traffic control competencies. Perez-Castan *et al*. (2022) analyze how safety can be assured in the certification processes of artificial intelligence systems, while Alomar and Yatskiv (2023) highlight the integration of digitalization in maintenance processes and its implications for safety. Demir *et al*. (2024) conduct a systematic review of AI-based research in aviation safety, and identify current trends and challenges. Chen *et al*. (2024) strengthens the decision support systems by visualizing accident causes through LLM-based knowledge graphs, thereby facilitating learning from incidents. Wang *et al*. (2023) investigate automated analysis solutions for safety reports, and Gu *et al*. (2025) propose methods to reduce user information overload by prioritizing NOTAM data. Additionally, they introduce a monitoring architecture aimed at improving the reliability of AI components in unmanned aerial systems. Kirwan (2025) focuses on workload management within the context of human-AI collaboration.The eleven articles examined under the theme of "Safety Culture and Organizational Practices" offer important contributions to the field of management science. Particularly noteworthy are studies that explore the anticipation of technological changes which may either threaten or reinforce existing safety cultures, and the development of preventive measures in this context (Naor *et al*., 2020; Demir *et al*., 2024; Kirwan, 2024). Additionally, research focusing on educational policies and human-machine coordination—both of which are highly relevant to management science—provides strategic guidance for human resource management (Degas *et al*., 2022; Çınar & Tuncal, 2024; Kirwan, 2025). The studies emphasizing proactive strategies for identifying safety risks in advance especially in high-risk sectors such as aviation offer critical contributions to the discipline of management (Naor *et al*., 2020; Demir *et al*., 2024).The reviewed articles employ both qualitative (Kirwan, Naor, Alomar) and quantitative (Degas, Demir, Gu, Çınar) research methodologies. Chen *et al*. (2024) present an experimental application through the development of an LLM-based knowledge graph, and due to its interpretive analysis of accident causes, the study is considered a hybrid example. Quantitative studies utilize methods such as AHP-TOPSIS, AI-based classifiers, statistical analysis frameworks, and survey-based measurement tools. In contrast, qualitative studies emphasize case analysis (e.g., the 737 MAX incident), conceptual framework development (e.g., Cooper model, XAI integration), and expert opinion analysis. Notably, studies involving artificial intelligence systems highlight regulatory compliance and explainability, which reinforce methodological integrity. Based on the findings derived from the reviewed articles, it is evident that managers should approach safety culture not merely as a legal obligation, but as a strategic investment in sustainability, efficiency, and institutional reputation. Future research would benefit from examining how safety culture evolves alongside emerging technologies across different cultural contexts, and from exploring the role of organizational learning in this transformation. Longitudinal studies investigating the temporal dynamics of safety culture could significantly enrich the existing body of literature. Moreover, an increase in academic research that integrates both qualitative and quantitative methodologies would foster a more holistic understanding, thereby providing a stronger foundation for informed managerial decision-making (Adam, 2024; Ernst & Weber, 2024; Nguyen Ha *et al*., 2024; Yen *et al*., 2024; Barkani & Allouani, 2025; Docallas, 2025; Eidenmüller *et al*., 2025; Kajanova & Danihel, 2025; Muttaqin *et al*., 2025; Süzen, 2025; Yakupoğlu, 2025).

3.2.3 AI in Strategic and Operational Decision-Making in Aviation Management: Artificial intelligence (AI) and digital technologies are reshaping both strategic and operational decision-making processes in the aviation industry. The articles examined within this theme encompass research on data-driven and automated decision support systems across various decision domains, including route optimization, maintenance processes, air traffic management, and capacity planning. Given the increasing complexity and competitive pressure in the aviation sector, the integration of AI applications has become not merely a choice but a managerial necessity for ensuring decisions are made rapidly, accurately, and sustainably. The selection of articles evaluated under this theme was based on the inclusion of both artificial intelligence technologies (e.g., machine learning, deep learning, digital twins, decision support systems) and direct applications within the aviation sector as core subjects of the studies. Accordingly, works that merely referenced artificial intelligence in general terms, or those solely related to aviation without a specific focus on AI, were excluded from the review. A total of 21 original and thematically integrated articles were included in the analysis. Several articles within this theme examine the application of artificial intelligence in maintenance and repair decision-making processes. These studies provide valuable insights into various aspects, such as the integration of large-scale AI models into maintenance workflows (Tao *et al*., 2025), enhancement of fleet monitoring and maintenance decision-making (Sadeghi *et al*., 2024), prediction of engine temperature using AI techniques (Apostolidis *et al*., 2022), and the adoption of emerging technologies—including 6G, blockchain, and AIoT—for proactive decision-making aimed at identifying potential issues and improvements (Kabashkin, 2024a; Kabashkin, 2024b; Kabashkin & Shoshin, 2024); additionally, the development of decision support models based on aircraft component life cycles (Kabashkin & Susanin, 2024) contributes significantly to reducing aircraft failures, lowering maintenance costs, and improving coordination across maintenance operations. In addition to maintenance and repair processes, the use of artificial intelligence has also been examined in strategic and operational decision-making areas such as flight delays and operational planning. These studies examine the creation of data-driven decision support systems aimed at predicting flight delays (Pineda-Jaramillo *et al*., 2024; Alfarhood *et al*., 2024), optimizing air traffic (Reitmann & Schultz, 2022), managing passenger circulation effectively (Xiong *et al*., 2022), and forecasting accidents and incidents earlier (Caetano, 2023). The complex and multifactorial nature are intense because of nature of aviation. There are several studies recommend leveraging Artificial intelligence models to automate or support decision-making processes in both strategic and operational contexts. For instance, the use of autonomous systems is proposed in scenarios where disruptions occur (Ogunsina & DeLaurentis, 2022). In their study, Sun, Liu, and Nian (2025) propose an algorithm that enhances flexibility and optimization in flight planning for military aviation training. One of the most important areas of strategic and operational decisions is the decisions about the sustainability. Paprocki (2021) addresses topics such as environmental sustainability and carbon emission reduction and develops a virtual airport model. Xiong *et al*. (2022) introduce an artificial intelligence model for forecasting passenger demand, while Sadou and Njoya (2023) conduct a systematic review of AI applications in air transportation, organized under key themes including prediction and optimization, human experience, sustainability, safety and ethics, and cross-sectoral collaborations.

An examination of the methodologies employed in the articles reveals a notable diversity in research approaches. A group of studies (Paprocki, 2021; Sadou & Njoya, 2023; Kabashkin, 2024a; Razzaghi *et al*., 2024; Sadeghi *et al*., 2024; Tao *et al*., 2025) conducted literature reviews and proposed conceptual models to analyze existing knowledge and introduce new frameworks. Another set of studies Ogunsina and DeLaurentis, Kabashkin and Shoshin, Kabashkin and Perekrestov, Kabashkin and Susanin focused on the development of system architectures and decision support models, with their feasibility assessed through theoretical or scenario-based evaluations. A third group of studies (Apostolidis *et al*., 2022; Reitmann & Schultz, 2022; Xiong *et al*., 2022; Caetano, 2023; Alfarhood *et al*., 2024; Pineda-Jaramillo *et al*., 2024)applied various artificial intelligence and machine learning techniques for data analysis and tested predictive applications. These studies predominantly employed quantitative data analysis methods. Zha, Kovynyov, and Ng *et al*. propose a learning-based algorithm derived from expert systems, while Sun, Liu, and Nian employ mathematical modeling techniques for flight training planning. Finally, Alketbi *et al*. utilize a qualitative research approach, conducting field interviews to explore the role of artificial intelligence in aviation infrastructure projects (Adam, 2024; Ernst & Weber, 2024; Homayoun *et al*., 2024; Kariri *et al*., 2024; Komov *et al*., 2024).The articles reviewed under this theme have made significant contributions to the use of artificial intelligence in strategic and operational decision-making within the field of management. They provide guidance for accelerating maintenance processes and reducing associated costs, while also enhancing managerial decision-making capabilities through proactive measures in fault detection and system improvements. Valuable recommendations have been offered for resource planning, and predictive models developed for passenger demand, flight delays, and air traffic have contributed to improved service quality. Overall, this body of literature presents managers with a comprehensive, flexible, and data-driven framework for decision-making at both operational and strategic levels. Future research would benefit from an increase in multidisciplinary studies, as the integration of AI models and solutions into managerial processes requires not only technical adaptation but also organizational and cultural transformation.

Table 4. Summary Table of Included Studies in Management

No	Author (Year)	Theme	Method	Focal Point
1	Kistan *et al.* (2018)	Human Factors in Aviation Management	Conceptual / Qualitative	Human-machine collaboration in air traffic management, workload management
2	Gutierrez Teuler *et al.* (2022)	Human Factors in Aviation Management	Supervised learning, CNN, simulation	Workload management and ethical use with artificial intelligence
3	Dong *et al.* (2023)	Human Factors in Aviation Management	Experimental Study + Deep Learning (BiLSTM)	Human intent modeling for single-pilot operations
4	Hovanec *et al.* (2024)	Human Factors in Aviation Management	Digital Ergonomics, Conceptual Analysis	Reducing human error in maintenance processes
5	Zhang *et al.* (2025)	Human Factors in Aviation Management	Conceptual / Qualitative	Efficiency and error reduction with artificial intelligence in maintenance
6	Insaurralde and Blasch (2024)	Human Factors in Aviation Management	Conceptual / Qualitative	Decision support systems in air traffic management
7	Gisario *et al.* (2019)	Human Factors in Aviation Management	Technical / Conceptual	Increased efficiency in production, reduction of human errors, and human-machine interaction
8	Ramakrishnan *et al.* (2023)	Human Factors in Aviation Management	Quantitative Analysis / Data Analytics + Decision Support Model	Green performance assessment, management decision support
9	Feng and Zhang (2023)	Human Factors in Aviation Management	CNN, Data-Driven Predictive Models	Capacity estimation, sustainability, and efficiency
10	Kirwan (2024)	Safety Culture and Organizational Practices	Qualitative (conceptual analysis)	The impact of artificial intelligence on safety culture
11	Naor *et al.* (2020)	Safety Culture and Organizational Practices	Qualitative (case study - 737 MAX)	Safety culture deficiencies and leadership behind the 737 MAX crashes
12	Degas *et al.* (2022)	Safety Culture and Organizational Practices	Quantitative (statistical analysis)	The relationship between controller competency and safety management
13	Çınar and Tuncal (2024)	Safety Culture and Organizational Practices	Quantitative (survey, scenario)	The future impact of artificial intelligence on control competency
14	Perez-Castan *et al.* (2022)	Safety Culture and Organizational Practices	Qualitative (certification framework)	Safety assurance in the certification process of artificial intelligence systems
15	Alomar and Yatskiv (2023)	Safety Culture and Organizational Practices	Qualitative (application analysis)	Digitalization integration in maintenance processes and the safety dimension
16	Demir *et al.* (2024)	Safety Culture and Organizational Practices	Quantitative (systematic review)	Trends and challenges in AI-based safety research
17	Chen *et al.* (2024)	Safety Culture and Organizational Practices	Hybrid (LLM + interpretive analysis)	Visualization of accident causes, decision support with information graphics
18	Wang *et al.* (2023)	Safety Culture and Organizational Practices	Quantitative (automated text analysis)	Automatic classification of safety reports

19	Gu *et al.* (2025)	Safety Culture and Organizational Practices	Quantitative (AI algorithms)	Reducing information overload by prioritizing NOTAM data
20	Kirwan (2025)	Safety Culture and Organizational Practices	Qualitative (workload analysis)	Human-AI collaboration in workload management
21	Tao *et al.* (2025)	Strategic and Operational Decisions	Literature review	Integration of maintenance processes with AI
22	Sadeghi *et al.* (2024)	Strategic and Operational Decisions	Literature review	Digital twin systems for aircraft maintenance and condition monitoring applications
23	Apostolidis *et al.* (2022)	Strategic and Operational Decisions	Numerical data analysis	Engine temperature prediction
24	Kabashkin (2024a)	Strategic and Operational Decisions	Literature review - Conceptual model + Comparative analysis	Proactive decisions with AIoT and blockchain
25	Kabashkin (2024b)	Strategic and Operational Decisions	Literature review - Conceptual model proposal	Integration of new technologies into MRO processes and operational improvement recommendations
26	Kabashkin and Shoshin (2024)	Strategic and Operational Decisions	System architecture, scenario analysis	Part life with decision support model
27	Kabashkin and Susanin (2024)	Strategic and Operational Decisions	Case analysis + System architecture	Aircraft component life cycle management and maintenance optimization (cost, reliability, safety)
28	Pineda-Jaramillo *et al.* (2024)	Strategic and Operational Decisions	Machine learning	Flight delay prediction
29	Alfarhood *et al.* (2024)	Strategic and Operational Decisions	Machine learning	Flight delay prediction
30	Reitmann and Schultz (2022)	Strategic and Operational Decisions	Data analysis + Machine learning + Meta-heuristic optimization	Air traffic optimization, boarding time prediction, delay classification
31	Xiong *et al.* (2022)	Strategic and Operational Decisions	Machine learning	Passenger demand prediction, circulation
32	Caetano (2023)	Strategic and Operational Decisions	Data analysis	Incident/accident prediction
33	Ogunsina and DeLaurentis (2022)	Strategic and Operational Decisions	Scenario analysis	Autonomous system proposal
34	Zheng *et al.* (2019)	Strategic and Operational Decisions	Algorithm development	Scheduling recommendation
35	Sun, Liu, Nian (2025)	Strategic and Operational Decisions	Mathematical modeling	Military flight planning
36	Paprocki (2021)	Strategic and Operational Decisions	Literature review	Virtual airport, carbon reduction
37	Sadou and Njoya (2023)	Strategic and Operational Decisions	Systematic review	Ethics, security, human experience, optimization, collaboration in AI applications
38	Jiezhuoma and Heiets	Strategic and Operational Decisions	Econometric analysis	Effects of digitalization on air transport performance
39	Kabashkin and Perekrestov	Strategic and Operational Decisions	System architecture - Model proposal, quantitative analysis	Health monitoring systems and modular design integrated with life cycle management
40	Razzaghi *et al.*	Strategic and Operational Decisions	Literature review	Digitalization in strategic planning
41	Alketbi *et al.*	Strategic and Operational Decisions	Qualitative (field interview)	Role of AI in infrastructure projects

4. Conclusion

The findings obtained from the study indicate that publications utilizing artificial intelligence in the field of management within aviation are categorized into three distinct thematic areas: “Human Factors in Aviation Management,” “Safety Culture and Organizational Practices in Aviation Management,” and “Artificial Intelligence in Strategic and Operational Decision-Making in Aviation Management.” Within the theme of human factors, the reviewed studies focus on AI-supported systems that place the human element at the center of aviation management, examining how to improve the relationship between humans and machines. Among the most striking topics are the effective management of workload, minimization of human-induced errors, decision support systems, and the efficiency gained from operational activities. Particularly in technical maintenance operations, production, and air traffic control, artificial intelligence has been utilized to strengthen the human-machine relationship, emphasizing improvements in both safety and efficiency. In this context, incorporating the human factor into decision-making which is one of the management processes and strategically enhancing productivity through AI has become an important target. Addressing ethical considerations and human–machine collaboration in future research will further enhance the impact of these technologies in aviation. When examining the studies conducted under the theme of safety culture and organizational practices, they have demonstrated that the use of AI-supported systems holds critical importance for aviation safety. Artificial intelligence systems have power in automation, correct management of workload, and enhancement of safety in decision support processes. However, because of their interaction with human factors, the integration of AI into safety culture must be approached with caution. Therefore, the design of AI-supported systems should embrace human-centered approaches, ensure balanced workload distribution, and provide collaboration. If future research should focus on developing strategies that strengthen the synergy between humans and artificial intelligence, this is vital for the sustainability of aviation safety. When examining the studies conducted under the theme of artificial intelligence in strategic and operational decision-making, the use of AI in the aviation sector enhances both efficiency and safety across various domains—from maintenance and operational planning to sustainability. AI systems and pioneering decision-making technologies which supported by new technologies, ensure to minimize errors, reduce costs, and improve operational performance (Alshehhi *et al*., 2025; Marhana *et al*., 2025; Nguyen *et al*., 2025; Suwannakij *et al*., 2025; Zamirovna *et al*., 2025).

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