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The Impact of Artificial Intelligence Capabilities on Organisational Performance: The Mediating Role of Organisational Excellence in the UAE Aviation Sector

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Abstract

This study formulates and empirically models a research framework examining the impact of Artificial Intelligence Capabilities on Organisational Performance through the mediating role of Organisational Excellence in the UAE aviation sector. Drawing on the Resource-Based View, AI Capabilities are conceptualised as strategic organisational resources that combine technological infrastructure, data assets, human expertise, and organisational routines. The study argues that AI Capabilities do not generate performance outcomes in isolation; rather, their value is partly transmitted through excellence-oriented organisational practices that strengthen process discipline, strategic alignment, innovation, service quality, and continuous improvement. A quantitative research design was adopted, and data were collected from 318 mid-to-senior level professionals working across airlines, airport operators, regulatory bodies, and aviation service providers in the UAE. Partial Least Squares Structural Equation Modelling was used to assess the measurement model and structural model. The results confirmed satisfactory indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. The structural model showed that AI Capabilities have a significant positive effect on Organisational Excellence and Organisational Performance. Organisational Excellence also had a significant positive effect on Organisational Performance. Furthermore, the mediation analysis confirmed that Organisational Excellence partially mediates the relationship between AI Capabilities and Organisational Performance, with 41.0% of the total effect transmitted through the mediating pathway. The findings indicate that AI investments in the UAE aviation sector are more likely to generate sustainable performance outcomes when they are embedded within strong organisational excellence systems. The study contributes to theory by integrating AI capability, organisational excellence, and performance into a single empirically tested framework. It also contributes to practice by providing aviation leaders with a validated model for aligning AI initiatives with excellence-driven management practices and measurable organisational outcomes.

Keywords: artificial intelligence capabilities, organisational excellence, organisational performance, UAE aviation sector, PLS-SEM, mediation analysis

1. Introduction

The aviation industry represents one of the most strategic sectors in the United Arab Emirates (UAE), contributing significantly to economic diversification, international connectivity, tourism development, logistics integration, and national competitiveness. As the UAE continues to reduce its reliance on oil-based revenues, aviation has become a central pillar of the country's knowledge-based and service-driven economy. The presence of globally recognised carriers such as Emirates and Etihad Airways, combined with advanced airport infrastructure in Dubai and Abu Dhabi, has strengthened the UAE's position as a major international aviation and logistics hub. Recent industry estimates indicate that the aviation sector contributes approximately US$47.4 billion to the UAE's gross domestic product, representing about 13.3% of national GDP, and supports nearly 777,000 jobs (IATA, 2024; Zawya, 2025). However, the sector's economic importance also places aviation organisations under increasing pressure to sustain high levels of operational efficiency, safety, service quality, innovation, and global competitiveness.

The increasing complexity of aviation operations has intensified the need for advanced digital capabilities. In high-reliability and service-intensive industries such as aviation, organisations must manage large volumes of operational data, passenger flows, aircraft maintenance requirements, safety systems, regulatory obligations, and real-time decision-making processes. Artificial Intelligence (AI) has therefore emerged as a strategic technological capability with the potential to enhance predictive analytics, automation, operational responsiveness, safety monitoring, customer experience, and managerial decision-making (Abduljabbar et al., 2019; Shmelova, Sterenharz, & Dolgikh, 2020). Within aviation specifically, AI applications have been increasingly associated with predictive maintenance, air traffic management, passenger processing, safety analytics, visual inspection, intelligent scheduling, and operational optimisation (Degas et al., 2022; Doğru, Bouarfa, Arizar, & Aydoğan, 2020; Kabashkin, Misnevs, & Zervina, 2023).

In the UAE, the strategic importance of AI is reinforced by national policy initiatives such as the UAE Artificial Intelligence Strategy 2031, which reflects the country's ambition to become a leading global hub for AI-enabled transformation. It has been projected that AI could contribute approximately 13.6% to the UAE's national GDP by 2030 (PwC, 2018). In line with this national agenda, aviation organisations in the UAE have adopted AI-enabled technologies such as biometric facial recognition, autonomous baggage handling, predictive maintenance algorithms, passenger-flow analytics, intelligent customer service systems, and data-driven decision-support platforms (SITA, 2023; Techx, 2025). These developments indicate that AI is no longer merely a technological enhancement; rather, it is increasingly viewed as a strategic organisational capability that may influence performance outcomes when effectively deployed.

Nevertheless, the adoption of AI does not automatically result in improved organisational performance. Although AI can support efficiency, innovation, prediction, and automation, its value depends on the organisational context in which it is implemented. Prior research suggests that AI capabilities create business value when they are combined with complementary organisational resources, managerial capabilities, data governance, human expertise, and process integration (Mikalef & Gupta, 2021; Wamba, 2022; Wamba-Taguimdje et al., 2020). This argument is consistent with the Resource-Based View, which proposes that organisational performance is influenced by the ability of firms to acquire, organise, and deploy valuable, rare, inimitable, and non-substitutable resources (Barney, 1991, 2000, 2007). From this perspective, AI capabilities may represent a strategic resource; however, such capabilities are unlikely to generate superior performance unless they are embedded within effective organisational systems and managerial practices.

This issue reflects the broader "AI productivity paradox" in which substantial investment in advanced technologies does not necessarily translate into measurable performance improvement (Brynjolfsson et al., 2019). In the UAE aviation sector, infrastructure and technological investment are often highly advanced, yet the organisational conditions required to convert AI potential into performance outcomes may not develop at the same pace. These conditions include leadership alignment, employee readiness, data quality, organisational learning, cross-functional collaboration, process discipline, governance systems, and continuous improvement culture. Without these supporting conditions, AI initiatives may remain fragmented, underutilised, or disconnected from strategic and operational outcomes. Consequently, aviation organisations may experience a gap between the expected benefits of AI and the actual performance gains achieved (Davenport & Ronanki, 2018; Enholm, Papagiannidis, Mikalef, & Krogstie, 2022).

This study argues that Organisational Excellence may provide an important mechanism for addressing this gap. Organisational Excellence refers to the structured organisational practices, leadership systems, strategic alignment, process management, continuous improvement, innovation orientation, and stakeholder-focused approaches through which organisations pursue superior and sustainable performance. Excellence frameworks, including the European Foundation for Quality Management model and the UAE Government Excellence Model, are designed to align organisational resources with strategic objectives, operational discipline, innovation, customer value, and continuous improvement (Abu Laban, 2022; Kanji, 1998, 2012; Oakland & Tanner, 2008). In the UAE context, excellence models have been widely associated with public sector transformation, service quality, institutional performance, and strategic development (Abu Laban, 2022; Ahrens, 2014; Al-Dhaafri, Al-Swidi, & Al-Ansi, 2016).

Previous studies have demonstrated that Organisational Excellence can enhance organisational performance by strengthening leadership, strategic planning, process effectiveness, quality management, innovation, and organisational learning (Al-Dhaafri et al., 2016; Al-Dhaafri & Alosani, 2021; Al-Dhaafri & Alosani, 2023; Akanmu et al., 2023). However, much of the existing literature treats excellence frameworks as administrative, evaluative, or compliance-oriented systems rather than as dynamic mechanisms capable of supporting AI-enabled transformation. This creates a conceptual and empirical gap. While AI capabilities are increasingly studied as drivers of performance, and organisational excellence is widely recognised as a driver of organisational effectiveness, limited research has integrated these two perspectives into a single framework within the aviation sector.

The research problem addressed in this study emerges from this gap. Despite the growing deployment of AI within the UAE aviation sector, limited empirical evidence explains how AI Capabilities can be organised into a coherent framework and modelled to predict Organisational Performance. Existing studies have often examined either the technical dimensions of AI adoption or the managerial role of excellence frameworks, without sufficiently integrating both perspectives into a single empirically testable model. Consequently, the mediating role of Organisational Excellence in the relationship between AI Capabilities and Organisational Performance remains underexplored, particularly within the high-reliability, technology-intensive, and globally competitive context of UAE aviation.

This gap has theoretical, methodological, and practical significance. Theoretically, there is a need to extend understanding of how AI capabilities function as strategic organisational resources and how their influence on performance may be transmitted through excellence-oriented organisational practices. Methodologically, there is a need to formulate and validate a structural framework that explains the direct and indirect relationships among AI Capabilities, Organisational Excellence, and Organisational Performance. Practically, aviation leaders require evidence-based models that can guide the alignment of AI investments with excellence frameworks, operational priorities, and measurable performance outcomes. Without such alignment, AI investments may remain technologically impressive but strategically underutilised.

Accordingly, the purpose of this study is to formulate and model a research framework that explains the impact of AI Capabilities on Organisational Performance through the mediating role of Organisational Excellence in the UAE aviation sector. The proposed framework positions AI Capabilities as the independent construct, Organisational Performance as the dependent construct, and Organisational Excellence as the mediating construct. The study adopts Partial Least Squares Structural Equation Modelling (PLS-SEM) to assess the measurement and structural components of the framework. PLS-SEM is appropriate for predictive and exploratory modelling, particularly when the research objective is to examine complex relationships among latent constructs and assess direct, indirect, and mediating effects (Chin, 1998; Hair, Hult, Ringle, & Sarstedt, 2017; Ringle, Wende, & Becker, 2015; Urbach & Ahlemann, 2010).

Through PLS-SEM, this study evaluates the reliability and validity of the measurement model, including indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. It also assesses the structural model by examining collinearity, explanatory power, effect size, direct path relationships, indirect effects, and mediation. This modelling approach enables the study to determine whether AI Capabilities significantly influence Organisational Performance directly and whether Organisational Excellence serves as a mediating mechanism through which AI Capabilities are converted into performance outcomes.

By formulating and modelling this framework within the UAE aviation sector, the study contributes to the literature in several ways. First, it extends the application of the Resource-Based View by conceptualising AI Capabilities as strategic organisational resources whose performance value depends on complementary excellence practices. Second, it contributes to organisational excellence literature by positioning Organisational Excellence as a dynamic mediating mechanism rather than merely a certification, compliance, or evaluation framework. Third, it contributes methodologically by developing and testing an integrated PLS-SEM framework that links AI Capabilities, Organisational Excellence, and Organisational Performance. Finally, it contributes practically by offering UAE aviation leaders a structured model for aligning AI-driven transformation with excellence-oriented management practices and sustainable organisational performance.

2. Formulation of the Research Framework

The research framework is developed from the theoretical and empirical literature on Artificial Intelligence Capabilities, Organisational Excellence, and Organisational Performance. In the proposed model, AI Capabilities serve as the independent variable, Organisational Excellence serves as the mediating variable, and Organisational Performance serves as the dependent variable. The framework proposes that AI Capabilities influence Organisational Performance both directly and indirectly through Organisational Excellence.

AI Capabilities are increasingly recognised as multidimensional organisational capabilities that enable firms to acquire, process, interpret, and apply data-driven intelligence for strategic and operational value creation. These capabilities are not limited to technological infrastructure; rather, they combine technological resources, data resources, human expertise, managerial skills, and organisational routines that allow firms to generate value from AI-enabled systems (Mikalef & Gupta, 2021; Sjödin et al., 2021; Wamba, 2022). In this study, AI Capabilities are conceptualised as strategic organisational resources that may enhance decision-making, innovation, process efficiency, operational responsiveness, safety analytics, and customer value creation in the UAE aviation sector.

The theoretical foundation of the framework is supported by the Resource-Based View, which explains that organisations achieve superior performance when they possess and effectively deploy valuable, rare, difficult-to-imitate, and organisationally embedded resources (Barney, 1991, 2000, 2007). From this perspective, AI Capabilities may represent strategic resources because they support prediction, automation, resource optimisation, customer service, and operational efficiency. However, the Resource-Based View also suggests that resources do not create performance automatically. Their value depends on how they are configured, governed, integrated, and applied within organisational systems.

This argument is particularly relevant to AI implementation in aviation. Although AI technologies can support automation, prediction, optimisation, and real-time decision-making, their value depends on complementary organisational mechanisms such as leadership support, data governance, process integration, employee readiness, innovation culture, and continuous improvement practices (Davenport & Ronanki, 2018; Enholm et al., 2022; Mikalef & Gupta, 2021; Wamba-Taguimdje et al., 2020). In safety-critical and service-driven aviation organisations, AI may support predictive maintenance, passenger analytics, intelligent scheduling, safety monitoring, baggage handling, customer service automation, and decision-support systems. However, these capabilities must be embedded within disciplined organisational systems to produce sustainable performance outcomes.

For this reason, Organisational Excellence is positioned as the mediating construct in the framework. Organisational Excellence refers to structured organisational practices through which firms align leadership, strategy, people, processes, innovation, customer focus, stakeholder value, and continuous improvement to achieve superior results. Excellence frameworks such as the EFQM model and the UAE Government Excellence Model emphasise the alignment of organisational enablers with performance outcomes, thereby providing a structured mechanism for transforming resources and capabilities into sustainable value (Abu Laban, 2022; Kanji, 1998, 2012; Oakland & Tanner, 2008). Empirical studies have also shown that Organisational Excellence contributes to Organisational Performance by strengthening quality management, service delivery, operational effectiveness, innovation, and strategic execution (Akanmu et al., 2023; Al-Dhaafri et al., 2016; Al-Dhaafri & Alosani, 2021, 2023).

Accordingly, this study argues that AI Capabilities may influence Organisational Performance not only through direct technological and operational effects, but also through excellence-oriented organisational practices. AI Capabilities are expected to enhance Organisational Excellence by strengthening data-driven decision-making, process visibility, operational agility, predictive control, innovation capability, and continuous improvement. Organisational Excellence, in turn, is expected to improve Organisational Performance by enhancing efficiency, safety, service quality, customer satisfaction, regulatory compliance, strategic alignment, and long-term competitiveness.

As illustrated in Figure 1, the proposed framework consists of three direct structural paths and one mediating relationship. The first path examines the effect of AI Capabilities on Organisational Excellence. The second path examines the direct effect of AI Capabilities on Organisational Performance. The third path examines the effect of Organisational Excellence on Organisational Performance. The mediating path examines whether Organisational Excellence explains how AI Capabilities are translated into Organisational Performance.

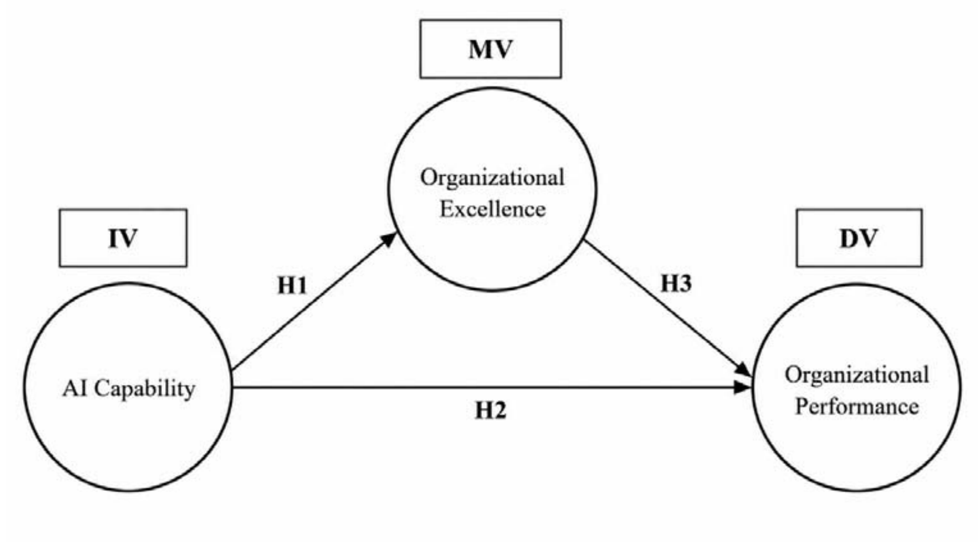

Figure 1. Proposed research framework

The framework is therefore designed as a partial mediation model. It allows the study to determine whether AI Capabilities directly improve Organisational Performance and whether part of this effect is transmitted through Organisational Excellence. This is theoretically important because prior research suggests that AI can influence performance through automation, prediction, innovation, knowledge processing, and resource optimisation (Babina et al., 2024; Chen et al., 2022; Mikalef & Gupta, 2021; Olan et al., 2022; Wamba, 2022). At the same time, studies indicate that the performance value of digital and AI capabilities often depends on organisational mechanisms such as agility, knowledge management, decision-making capability, dynamic capabilities, and process-oriented transformation (Neiroukh et al., 2024; Papagiannidis et al., 2022; Wamba, 2022; Wamba-Taguimdje et al., 2020). Thus, the inclusion of Organisational Excellence as a mediator provides a meaningful explanation of how AI Capabilities may be converted into performance outcomes.

Although previous studies have examined AI and organisational outcomes, many have focused either on AI adoption as a technological issue or on organisational excellence as an independent management framework. Limited research has integrated AI Capabilities, Organisational Excellence, and Organisational Performance within a single empirically testable model, particularly in the UAE aviation sector. This gap justifies the formulation of the present framework. By integrating these constructs, the study offers a more comprehensive explanation of how AI-driven capabilities can support excellence-oriented practices and, ultimately, organisational performance.

To empirically validate the proposed framework, this study employs Partial Least Squares Structural Equation Modelling. PLS-SEM is appropriate because it enables the analysis of complex relationships among latent constructs, including direct and indirect effects. It also supports the assessment of the measurement model and structural model, including indicator reliability, internal consistency reliability, convergent validity, discriminant validity, collinearity, explanatory power, effect size, path coefficients, and mediation effects (Chin, 1998; Hair et al., 2017; Ringle et al., 2015; Urbach & Ahlemann, 2010). Therefore, the proposed framework provides a theoretical and methodological basis for examining how AI Capabilities influence Organisational Performance through Organisational Excellence in the UAE aviation sector.

3. Hypothesis Development

Building upon the proposed framework, the Resource-Based View, and the existing literature, this section develops the research hypotheses. The hypotheses examine the relationships among AI Capabilities, Organisational Excellence, and Organisational Performance in the UAE aviation sector.

3.1 AI Capabilities and Organisational Excellence

AI Capabilities are increasingly recognised as strategic organisational capabilities that can transform processes, decision-making, innovation, and operational responsiveness. Prior studies suggest that AI capability consists of technological resources, data resources, human skills, and organisational routines that enable organisations to generate value from AI-enabled systems (Mikalef & Gupta, 2021; Sjödin et al., 2021; Wamba, 2022). These capabilities allow organisations to automate repetitive processes, analyse large datasets, predict operational risks, support evidence-based decision-making, and improve resource allocation.

Organisational Excellence depends on the organisation’s ability to align strategy, leadership, people, processes, technology, and continuous improvement practices. AI can strengthen these dimensions by improving process visibility, supporting data-driven decision-making, enhancing service responsiveness, and enabling predictive and preventive management practices. For example, AI-enabled analytics can support continuous improvement by identifying inefficiencies, predicting operational disruptions, and enabling more accurate performance monitoring. Similarly, AI can strengthen innovation by allowing organisations to experiment with new service models, automate complex tasks, and improve customer experience.

Previous studies have suggested that digital and AI-enabled capabilities can support organisational transformation, excellence, and operational improvement (Davenport & Ronanki, 2018; El Sayed et al., 2023; Fountaine et al., 2019; Khatib & Ahmed, 2024; Tariq et al., 2021). In the UAE context, where excellence models are closely linked to government transformation, service quality, innovation, and institutional performance, AI capabilities may provide an important foundation for achieving higher levels of Organisational Excellence (Abu Laban, 2022; Al-Dhaafri et al., 2016; Halaweh, 2018). Therefore, the following hypothesis is proposed:

H1: AI Capabilities have a significant positive impact on Organisational Excellence in the UAE aviation sector.

3.2 AI Capabilities and Organisational Performance

The Resource-Based View suggests that strategic resources and capabilities can enhance organisational performance when they are valuable, difficult to imitate, and effectively deployed (Barney, 1991, 2000, 2007). AI Capabilities can be considered strategic resources because they enable organisations to improve prediction, automation, operational efficiency, decision-making speed, innovation, and customer value creation. In aviation, these capabilities are particularly relevant because airlines and airports must manage complex operational systems, large volumes of passenger data, aircraft maintenance requirements, safety obligations, and real-time service demands.

Empirical studies have shown that AI capabilities can positively influence firm performance by improving innovation, productivity, market responsiveness, customer service, operational efficiency, and competitive advantage (Babina et al., 2024; Chen et al., 2022; Mikalef & Gupta, 2021; Olan et al., 2022; Wamba-Taguimdje et al., 2020). AI can also improve organisational performance by enabling large-scale data analysis, dynamic resource allocation, demand forecasting, predictive maintenance, intelligent customer engagement, and improved managerial decision-making.

In the aviation sector, AI applications can support performance by improving safety analytics, maintenance planning, passenger processing, baggage handling, route optimisation, and service personalisation (Abduljabbar et al., 2019; Degas et al., 2022; Doğru et al., 2020; Shmelova et al., 2020). These applications can reduce operational delays, improve service quality, enhance safety outcomes, and support cost efficiency. Therefore, organisations with stronger AI capabilities are expected to achieve higher levels of Organisational Performance. Based on this reasoning, the following hypothesis is proposed:

H2: AI Capabilities have a significant positive impact on Organisational Performance in the UAE aviation sector.

3.3 Organisational Excellence and Organisational Performance

Organisational Excellence is widely recognised as a holistic management approach that supports sustainable organisational success. It involves the integration of leadership, strategy, people management, process improvement, innovation, customer focus, and performance measurement. Excellence frameworks such as EFQM and the UAE Government Excellence Model emphasise that superior performance is achieved through the systematic alignment of organisational enablers and results (Abu Laban, 2022; Kanji, 1998, 2012; Oakland & Tanner, 2008).

The relationship between Organisational Excellence and Organisational Performance is well established in management literature. Organisations that adopt excellence practices are more likely to improve process efficiency, service quality, customer satisfaction, employee engagement, innovation capability, and strategic execution. Empirical studies in the UAE and other contexts have demonstrated that Organisational Excellence contributes significantly to organisational performance outcomes (Al-Dhaafri et al., 2016; Al-Dhaafri & Alosani, 2021; Al-Dhaafri & Alosani, 2023; Akanmu et al., 2023; Pinar & Girard, 2008).

In the aviation sector, Organisational Excellence is particularly important because performance depends on safety, reliability, efficiency, customer experience, regulatory compliance, and continuous service improvement. Excellence-oriented practices help aviation organisations maintain operational discipline, reduce errors, improve service delivery, and strengthen long-term competitiveness. Therefore, higher levels of Organisational Excellence are expected to result in improved Organisational Performance. Accordingly, the following hypothesis is proposed:

H3: Organisational Excellence has a significant positive impact on Organisational Performance in the UAE aviation sector.

3.4 The Mediating Role of Organisational Excellence

Although AI Capabilities can directly influence Organisational Performance, the literature suggests that technology alone is insufficient to generate sustainable value. The AI productivity paradox indicates that investments in advanced technologies may fail to deliver expected outcomes if they are not supported by appropriate organisational structures, governance systems, managerial capabilities, and process integration (Brynjolfsson et al., 2019; Davenport & Ronanki, 2018). Therefore, the performance effect of AI may depend on the presence of organisational mechanisms that convert AI potential into practical and measurable outcomes.

The Dynamic Capabilities View further supports this argument by suggesting that organisations must sense opportunities, seize them, and reconfigure resources in response to environmental change (Teece, 2018). From this perspective, AI Capabilities represent important technological and informational resources, but Organisational Excellence provides the managerial and operational system through which these resources are organised and deployed. Excellence practices such as strategic alignment, leadership commitment, process maturity, innovation management, performance measurement, and continuous improvement may help translate AI-enabled insights into improved organisational outcomes.

Previous studies have shown that digital resources and AI capabilities often influence performance through mediating mechanisms such as organisational agility, process-oriented dynamic capabilities, knowledge management, decision-making capability, and organisational innovation (Nwankpa & Roumani, 2016; Papagiannidis et al., 2022; Wamba, 2022; Wamba-Taguimdje et al., 2020). These findings support the argument that AI capabilities require organisational mechanisms to generate performance value. In this study, Organisational Excellence is proposed as such a mechanism because it provides the governance, process discipline, leadership alignment, quality orientation, and continuous improvement culture required to convert AI capabilities into sustainable performance outcomes.

In the UAE aviation sector, this mediating role is especially important because airlines and airports must balance technological innovation with safety, reliability, service quality, regulatory compliance, and operational continuity. AI may enhance prediction, automation, and decision-making, but Organisational Excellence ensures that these capabilities are embedded within disciplined processes and aligned with strategic objectives. Therefore, Organisational Excellence is expected to mediate the relationship between AI Capabilities and Organisational Performance. Based on this reasoning, the following hypothesis is proposed:

H4: Organisational Excellence mediates the relationship between AI Capabilities and Organisational Performance in the UAE aviation sector.

4. Methodology

This study adopted a quantitative research design to examine the relationships among Artificial Intelligence Capabilities, Organisational Excellence, and Organisational Performance in the UAE aviation sector. The quantitative approach was appropriate because the study aimed to test a proposed research framework and assess direct and mediating relationships among latent constructs using Structural Equation Modelling. Specifically, Partial Least Squares Structural Equation Modelling was employed because it is suitable for predictive models, complex relationships, and mediation analysis.

The target population comprised mid-to-senior level professionals working within the UAE aviation ecosystem. This population was selected because the study required respondents with sufficient organisational knowledge and professional exposure to evaluate AI deployment, excellence-oriented practices, and organisational performance outcomes. The target population covered three main categories of aviation organisations: regulatory bodies, airport operators, and airlines or aviation service providers. Regulatory bodies included organisations such as the General Civil Aviation Authority and the Dubai Civil Aviation Authority. Airport operators included organisations such as Dubai Airports and Abu Dhabi Airports. Airlines and aviation service providers included organisations such as Emirates, Etihad Airways, FlyDubai, and related aviation service organisations.

The unit of analysis was the individual professional working within the UAE aviation sector. Specifically, the study focused on professionals holding decision-making authority or relevant responsibility in areas related to Artificial Intelligence, strategy, information technology infrastructure, operations, or Organisational Excellence. These individuals were considered appropriate respondents because they possess the strategic and operational visibility required to assess both the technical deployment of AI and its perceived influence on Organisational Excellence and Organisational Performance.

Given the specialised nature of the population, a purposive non-probability sampling technique was employed. Purposive sampling is appropriate when respondents are selected because of their knowledge, expertise, position, or relevance to the research phenomenon (Etikan et al., 2016). In this study, a random sampling approach was less suitable because it could include employees with limited knowledge of AI, IT infrastructure, strategy, performance management, or organisational excellence practices. Therefore, purposive sampling ensured that respondents had sufficient familiarity with the constructs examined in the study.

To reduce the potential limitations associated with purposive sampling, a maximum variation strategy was applied. This involved seeking respondents from different types of aviation organisations, different emirates, and different organisational sizes. The purpose of this strategy was to improve the diversity of the sample and ensure that the data reflected the broader structure of the UAE aviation ecosystem rather than a single organisation, location, or professional group.

The sample size was determined based on the requirements of Structural Equation Modelling and the complexity of the proposed mediation framework. Two criteria were considered. First, the study considered the 10-times rule, which is commonly used in PLS-SEM to determine the minimum sample size. According to Hair et al. (2017), the minimum sample should be at least ten times the largest number of structural paths directed at any endogenous construct or the largest number of indicators measuring a construct. Given the mediation structure of the model, this criterion indicated that a minimum sample of approximately 120 respondents would be acceptable.

Second, the study considered statistical power using G*Power logic. To achieve a statistical power of 0.80 with a medium effect size of $f^2 = 0.15$ at a significance level of $\alpha = 0.05$, a priori power analysis generally suggests a minimum sample size of approximately 150 to 180 respondents for a model of this nature. Accordingly, this study initially targeted at least 250 respondents to account for incomplete or unusable responses and to ensure adequate statistical power for model estimation.

After data screening, 318 valid responses were retained for analysis. This final sample exceeded the minimum requirements suggested by both the 10-times rule and power analysis. Therefore, the sample was considered sufficient for assessing the measurement model, structural model, and mediating effect using PLS-SEM.

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Table 1. Demographic profile of respondents (N = 318)

Category	Sub-category	Frequency	Percentage (%)
Current Position	Manager / Executive	84	26.4
	Engineer	64	20.1
	Supervisor	56	17.6
	Analyst	50	15.7
	Officer / Technician	64	20.1
Experience	1–5 years	68	21.4
	6–10 years	91	28.6
	11–15 years	76	23.9
	More than 15 years	83	26.1
Organisation Type	Airline	150	47.2
	Airport	105	33.0
	Regulator	63	19.8
Emirate	Dubai	149	46.9
	Abu Dhabi	127	39.9
	Sharjah / Others	42	13.2
Organisation Size	Large, more than 250 employees	193	60.7
	Medium, 51–250 employees	103	32.4
	Small, fewer than 50 employees	22	6.9
AI Involvement	Directly involved	223	70.1
	Not directly involved	95	29.9

Table 1 presents the demographic profile of the 318 valid respondents. The sample included respondents from different professional positions, levels of experience, organisation types, emirates, organisation sizes, and degrees of AI involvement. This diversity strengthens the relevance of the sample for examining AI Capabilities, Organisational Excellence, and Organisational Performance across the UAE aviation sector.

In terms of current position, managers and executives represented the largest group, accounting for 26.4% of the sample. Engineers and officers or technicians each accounted for 20.1%, followed by supervisors at 17.6% and analysts at 15.7%. This distribution indicates that the study captured both managerial and technical perspectives, which is important because AI implementation in aviation involves strategic decision-making as well as operational and technological execution.

Regarding professional experience, 28.6% of the respondents had between 6 and 10 years of experience, while 26.1% had more than 15 years of experience. Respondents with 11 to 15 years of experience represented 23.9%, and those with 1 to 5 years represented 21.4%. This shows that most respondents had substantial industry exposure and were likely to possess sufficient knowledge to evaluate organisational practices and performance outcomes.

With respect to organisation type, 47.2% of respondents were from airlines, 33.0% were from airport operators, and 19.8% were from regulatory bodies. This distribution reflects the major components of the UAE aviation ecosystem and supports the relevance of the data to the study context. Geographically, 46.9% of the respondents were based in Dubai, 39.9% in Abu Dhabi, and 13.2% in Sharjah or other emirates. This distribution is consistent with the concentration of major aviation operations in Dubai and Abu Dhabi, while still including representation from other emirates.

In terms of organisation size, 60.7% of respondents were from large organisations with more than 250 employees, 32.4% were from medium-sized organisations with 51 to 250 employees, and 6.9% were from small organisations with fewer than 50 employees. The dominance of large organisations is appropriate for this study because larger aviation organisations are more likely to possess formal AI infrastructure, established excellence systems, and structured performance management processes.

Finally, 70.1% of respondents reported direct involvement in AI-related activities, while 29.9% were not directly involved. This indicates that the majority of respondents had direct exposure to AI initiatives. At the same time, the inclusion of respondents not directly involved in AI allowed the study to capture wider organisational perspectives from professionals involved in strategy, operations, IT infrastructure, organisational excellence, or performance management.

The data were analysed using Partial Least Squares Structural Equation Modelling. PLS-SEM was selected because it is appropriate for assessing complex predictive models involving latent constructs, direct relationships, indirect relationships, and mediation effects. The analysis followed a two-stage approach. First, the measurement model was assessed to establish indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Second, the structural model was assessed to test collinearity, explanatory power, effect size, path coefficients, and the mediating role of Organisational Excellence. This approach enabled the study to determine whether AI Capabilities significantly influence Organisational Performance directly and whether Organisational Excellence mediates this relationship.

5. Modelling of the Framework

This section presents the assessment of the proposed research framework, which examines the influence of Artificial Intelligence Capabilities on Organisational Performance through the mediating role of Organisational Excellence in the UAE aviation sector. The use of partial least squares structural equation modelling is appropriate for examining complex predictive models involving multiple latent constructs and mediation relationships (Chin, 1998; Hair, Hult, Ringle, & Sarstedt, 2017; Ringle, Wende, & Becker, 2015; Urbach & Ahlemann, 2010).

The framework is theoretically grounded in the resource-based view, which suggests that valuable, rare, inimitable, and organisationally embedded resources can generate superior organisational outcomes (Barney, 1991, 2000, 2007). In this study, AI Capabilities are treated as strategic organisational capabilities that can enhance decision-making, operational efficiency, innovation, and performance (Mikalef & Gupta, 2021; Wamba-Taguimdje et al., 2020; Wamba, 2022). In the aviation sector, AI has become increasingly relevant in areas such as safety, maintenance, air traffic management, predictive analytics, automation, and intelligent operational systems (Abduljabbar et al., 2019; Degas et al., 2022; International Civil Aviation Organization, 2022; Shmelova, Sterenharz, & Dolgikh, 2020).

Organisational Excellence is positioned as a mediating construct because excellence-oriented systems, leadership, quality management, continuous improvement, and process discipline are widely recognised as mechanisms through which organisational resources are transformed into superior performance outcomes (Al-Dhaafri, Al-Swidi, & Al-Ansi, 2016; Al-Dhaafri & Alosani, 2021, 2023; Akanmu et al., 2023; Kanji, 1998, 2012; Oakland & Tanner, 2008). Therefore, this section evaluates both the measurement model and the structural model, including indicator reliability, internal consistency reliability, convergent validity, discriminant validity, collinearity, explanatory power, effect size, direct path relationships, and mediation analysis.

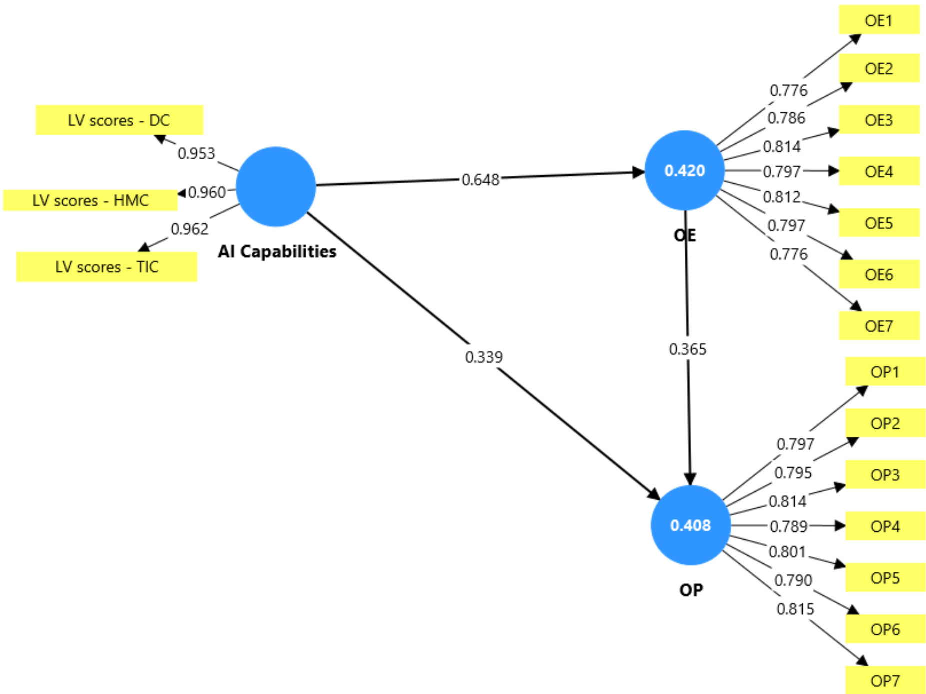

Figure 2. Layout of the framework PLS model

5.1 Indicator Reliability: Outer Loadings

Indicator reliability was assessed using the outer loadings of the reflective indicators. In PLS-SEM, outer loadings above 0.70 are generally considered acceptable because they indicate that the indicator explains a sufficient proportion of variance in its associated latent construct (Hair et al., 2017; Urbach & Ahlemann, 2010). Strong outer loadings therefore provide evidence that the observed indicators are reliable measures of their respective constructs.

Table 2. Outer loadings of reflective indicators

Indicator	AI Capabilities	OE	OP
LV Scores - DC	0.953		
LV Scores - HMC	0.960		
LV Scores - TIC	0.962		
OE1		0.776	
OE2		0.786	
OE3		0.814	
OE4		0.797	
OE5		0.812	
OE6		0.797	
OE7		0.776	
OP1			0.797
OP2			0.795
OP3			0.814
OP4			0.789
OP5			0.801
OP6			0.790
OP7			0.815

Table 2 shows that all indicator loadings exceed the recommended threshold of 0.70. The AI Capabilities dimensions recorded particularly high loadings, ranging from 0.953 to 0.962, indicating strong representation of the higher-order AI capability construct. This is consistent with previous studies that conceptualise AI capability as a multidimensional strategic capability involving technological, human, and organisational resources (Mikalef & Gupta, 2021; Mikalef et al., 2023; Sjödin, Parida, Palmié, & Wincent, 2021).

Similarly, the indicators for Organisational Excellence and Organisational Performance demonstrate adequate reliability, with loadings ranging from 0.776 to 0.815. These findings support the reliability of the measurement items and indicate that the indicators are suitable for further analysis. The results also align with prior organisational excellence and performance studies that emphasise the importance of reliable measurement systems in evaluating organisational effectiveness and performance outcomes (Antony & Bhattacharyya, 2010; Kanji & Moura E Sá, 2007; Richard, Devinney, Yip, & Johnson, 2009).

5.2 Internal Consistency Reliability and Convergent Validity

Internal consistency reliability was assessed using Cronbach’s alpha and composite reliability, while convergent validity was assessed using the average variance extracted. Cronbach’s alpha and composite reliability values above 0.70 indicate acceptable internal consistency, whereas AVE values above 0.50 confirm adequate convergent validity (Hair et al., 2017; DeVellis & Thorpe, 2021; George & Mallery, 2010).

Table 3. Reliability and convergent validity

Construct	Cronbach's Alpha	Composite Reliability	AVE	Decision
AI Capabilities	0.955	0.971	0.918	Acceptable
OE	0.902	0.923	0.631	Acceptable
OP	0.906	0.926	0.640	Acceptable

Table 3 demonstrates that all constructs have strong internal consistency reliability. Cronbach's alpha values range from 0.902 to 0.955, while composite reliability values range from 0.923 to 0.971. These values exceed the minimum recommended threshold of 0.70, confirming that the indicators consistently measure their respective constructs (Hair et al., 2017; DeVellis & Thorpe, 2021).

In addition, all AVE values are above 0.50, confirming that each construct explains more than half of the variance in its indicators. Therefore, the measurement model demonstrates satisfactory reliability and convergent validity. These findings are important because reliable and valid constructs strengthen the credibility of structural model results in PLS-SEM analysis (Chin, 1998; Hair et al., 2017; Urbach & Ahlemann, 2010).

5.3 Discriminant Validity

Discriminant validity was assessed using the Fornell–Larcker criterion. According to this criterion, the square root of the AVE for each construct should be greater than its correlations with other constructs. This indicates that each construct is empirically distinct from the other constructs in the model (Hair et al., 2017; Urbach & Ahlemann, 2010).

Table 4. Fornell–Larcker matrix

Construct	AI Capabilities	OE	OP
AI Capabilities	0.958		
OE	0.648	0.794	
OP	0.575	0.584	0.800

Table 4 shows that the diagonal values, representing the square root of AVE, are higher than the inter-construct correlations. The square root of AVE for AI Capabilities is 0.958, which is greater than its correlations with OE and OP. Similarly, the square root of AVE values for OE and OP are higher than their corresponding correlations with the other constructs.

These results confirm that discriminant validity has been established, indicating that AI Capabilities, Organisational Excellence, and Organisational Performance are empirically distinct constructs. This distinction is theoretically important because previous studies have treated AI capability, excellence practices, and organisational performance as related but separate constructs (Al-Dhaafri et al., 2016; Mikalef & Gupta, 2021; Richard et al., 2009;

Wamba-Taguimdje et al., 2020).

5.4 Collinearity Assessment: Variance Inflation Factor

Collinearity was assessed using the variance inflation factor. In PLS-SEM, VIF values below 5 are commonly considered acceptable, while values above 5 may indicate potential multicollinearity and should be interpreted with caution (Hair et al., 2017). Collinearity assessment is important because high collinearity among predictor constructs may distort the estimation of path coefficients and reduce the interpretability of the structural model.

Table 5. Variance Inflation

Construct	VIF
LV Scores - DC	4.99
LV Scores - HMC	4.87
LV Scores - TIC	4.04

Table 5 indicates that all VIF values are below the commonly recommended threshold of 5. The VIF values range from 4.04 to 4.99, with DC recording the highest value of 4.99, followed by HMC at 4.87 and TIC at 4.04. These results suggest that multicollinearity is not a serious concern among the AI capability dimensions. Therefore, the predictor indicators demonstrate acceptable collinearity levels and are suitable for inclusion in the structural model analysis. This supports the reliability of the subsequent path coefficient estimates, as the relationships among constructs are unlikely to be distorted by excessive collinearity.

5.5 Coefficient of Determination: R^2

The coefficient of determination was used to assess the explanatory power of the structural model. R^2 indicates the proportion of variance in an endogenous construct explained by its predictor variables. In behavioural and management research, R^2 values are often interpreted according to the complexity of the model and the research context (Chin, 1998; Cohen, 1988; Hair et al., 2017).

Table 6. Coefficient of Determination

Endogenous Construct	R^2	Predictive Accuracy
Organisational Excellence	0.420	Moderate
Organisational Performance	0.408	Moderate

Table 6 shows that AI Capabilities explain 42.0% of the variance in Organisational Excellence. This indicates that AI-related capabilities play an important role in explaining excellence-oriented organisational practices in the UAE aviation sector. This finding is consistent with studies suggesting that digital transformation, AI adoption, data-driven decision-making, and technological capabilities can strengthen organisational systems and managerial effectiveness (Alhashmi, Salloum, & Abdallah, 2019; Almarzooqi, 2019; Halaweh, 2018; Khatib & Ahmed, 2024).

The model also explains 40.8% of the variance in Organisational Performance, indicating moderate explanatory power. This supports previous research showing that AI capabilities can contribute to firm performance through improved decision-making, innovation, process efficiency, agility, and value creation (Chen, Esperança, & Wang, 2022; Mikalef & Gupta, 2021; Olan et al., 2022; Wamba-Taguimdje et al., 2020; Wamba, 2022). Therefore, the proposed framework demonstrates adequate explanatory power in explaining how AI Capabilities and Organisational Excellence contribute to organisational outcomes in the aviation sector.

5.6 Effect Size: f^2

Effect size was assessed using f^2 to determine the practical contribution of each exogenous construct to the endogenous constructs. While statistical significance indicates whether a relationship exists, f^2 provides insight into the magnitude of the relationship. According to Cohen's guidelines, f^2 values of 0.02, 0.15, and 0.35 may be interpreted as small, medium, and large effects, respectively (Cohen, 1988; Hair et al., 2017).

Table 7. Effect size effect

Relationship	**f^2**	**p-value**	**Statistical Magnitude**	**Practical Implication**
AI Capabilities → OE	0.723	< 0.001	Large	AI is a critical success factor for Organisational Excellence.
AI Capabilities → OP	0.112	0.005	Small, approaching medium	AI has a direct but comparatively limited effect on performance.
OE → OP	0.130	0.004	Small, approaching medium	Excellence practices contribute meaningfully to performance outcomes.

Table 7 shows that AI Capabilities have a large effect on Organisational Excellence, with an f^2 value of 0.723. This indicates that AI Capabilities are a major driver of excellence-related practices in the UAE aviation sector. This finding is consistent with prior studies suggesting that AI capabilities can support organisational transformation, innovation, and excellence by improving data-driven decision-making, operational responsiveness, and knowledge-based capabilities (Mikalef & Gupta, 2021; Mikalef et al., 2023; Tariq, Poulin, & Abonamah, 2021; Wamba, 2022).

The effect of AI Capabilities on Organisational Performance is smaller, with an f^2 value of

0.112. This suggests that AI contributes directly to performance, but its direct effect is more limited compared with its effect on Organisational Excellence. This supports the view that the business value of AI often depends on how effectively AI is embedded into organisational processes, managerial systems, and dynamic capabilities (Enholm, Papagiannidis, Mikalef, & Krogstie, 2022; Fountaine, McCarthy, & Saleh, 2019; Wamba-Taguimdje et al., 2020).

In addition, Organisational Excellence has a small but meaningful effect on Organisational Performance, with an f^2 value of 0.130. This indicates that excellence-oriented practices play an important role in translating organisational resources and capabilities into improved performance outcomes. This result aligns with previous research showing that organisational excellence can drive performance by strengthening leadership, strategic planning, quality management, process management, innovation, and continuous improvement (Al-Dhaafri et al., 2016; Al-Dhaafri & Alosani, 2023; Akanmu et al., 2023; Oakland & Tanner, 2008).

5.7 Direct Path Analysis

The direct path analysis was conducted to test the hypothesised relationships among AI Capabilities, Organisational Excellence, and Organisational Performance. The path coefficients, t-statistics, and p-values were used to determine whether the proposed hypotheses were statistically supported. In PLS-SEM, significant path coefficients indicate that the hypothesised relationships among latent constructs are empirically supported (Hair et al., 2017; Ringle et al., 2015).

Table 8. Hypothesis testing results

Hypothesis	**Path**	**β Coefficient**	**t-statistic**	**p-value**	**Decision**
H1	AI Capabilities → OE	0.648	20.272	< 0.001	Supported
H2	AI Capabilities → OP	0.339	6.214	< 0.001	Supported
H3	OE → OP	0.365	6.681	< 0.001	Supported

Table 8 indicates that all direct relationships are positive and statistically significant. The relationship between AI Capabilities and Organisational Excellence is strong and significant, supporting H1. This suggests that organisations with stronger AI capabilities are more likely to achieve higher levels of organisational excellence. The finding is consistent with studies arguing that AI capability enhances organisational intelligence, process improvement, innovation capacity, and operational responsiveness (Mikalef & Gupta, 2021; Mikalef et al., 2023; Tariq et al., 2021).

The relationship between AI Capabilities and Organisational Performance is also positive and significant, supporting H2. This indicates that AI Capabilities directly contribute to improved organisational outcomes. This result aligns with previous studies showing that AI adoption and AI-enabled capabilities can improve firm performance, productivity, agility, innovation, and competitive advantage (Alekseeva, Gine, Samila, & Taska, 2020; Babina, Fedyk, He, & Hodson, 2024; Chen et al., 2022; Olan et al., 2022; Wamba-Taguimdje et al., 2020).

Furthermore, Organisational Excellence has a significant positive effect on Organisational Performance, supporting H3. This confirms that excellence-oriented practices are important drivers of performance in the aviation sector. The result is consistent with previous research that identifies organisational excellence as a mechanism for improving performance through leadership, strategic planning, process management, quality management, human resource practices, and continuous improvement (Al-Dhaafri et al., 2016; Al-Dhaafri & Alosani, 2021; Akanmu et al., 2023; Kanji, 2012; Oakland & Tanner, 2008).

5.8 Mediation Path Analysis

Mediation analysis was conducted to examine whether Organisational Excellence (OE) mediates the relationship between AI Capabilities and Organisational Performance (OP). Mediation analysis provides insight into the mechanism through which an independent variable influences a dependent variable by examining the role of an intervening variable (Baron & Kenny, 1986; Preacher & Hayes, 2004; Zhao, Lynch, & Chen, 2010). In the present study, Organisational Excellence is proposed as an explanatory mechanism through which AI Capabilities contribute to improved Organisational Performance.

The significance of the mediation effect was assessed using the bootstrapping procedure. The results are presented in Table 9.

Table 9. Mediation Effect of Organisational Excellence

Effect Type	Path	β Coefficient	t-statistic	p-value	Interpretation
Indirect	AI Capabilities → OE → OP	0.236	6.356	< 0.001	Significant indirect effect
Direct	AI Capabilities → OP	0.339	6.214	< 0.001	Significant direct effect
Total	AI Capabilities → OP	0.575	15.778	< 0.001	Significant total effect

As shown in Table 9, the indirect effect of AI Capabilities on Organisational Performance through Organisational Excellence is positive and statistically significant ($\beta = 0.236$, $t = 6.356$, $p < 0.001$). The significant indirect effect provides empirical support for the mediating role of Organisational Excellence in the relationship between AI Capabilities and Organisational Performance.

At the same time, the direct effect of AI Capabilities on Organisational Performance remains positive and statistically significant ($\beta = 0.339$, $t = 6.214$, $p < 0.001$). The total effect is also positive and significant ($\beta = 0.575$, $t = 15.778$, $p < 0.001$). The persistence of a significant direct effect alongside a significant indirect effect indicates that Organisational Excellence does not fully account for the relationship between AI Capabilities and Organisational Performance. Rather, AI Capabilities are associated with Organisational Performance through both direct and indirect pathways.

These findings indicate that Organisational Excellence represents an important mechanism through which AI Capabilities are associated with improved organisational outcomes. AI

Capabilities may create direct operational and technological benefits; however, part of their contribution to performance is also realised through organisational systems and practices associated with excellence. These may include continuous process improvement, service quality, innovation orientation, operational discipline, knowledge management, and managerial effectiveness.

This interpretation is consistent with previous research suggesting that the business value of AI and digital technologies depends not only on technological resources themselves, but also on the organisational capabilities, management practices, and dynamic capabilities through which those technologies are deployed and integrated into organisational processes (Al-Dhaafri et al., 2016; Akanmu et al., 2023; Enholm et al., 2022; Mikalef & Gupta, 2021; Wamba-Taguimdje et al., 2020).

Because both the direct and indirect effects are statistically significant and operate in the same positive direction, the mediation pattern may also be classified as complementary mediation following Zhao et al. (2010). In conventional terminology, this corresponds to a form of partial mediation, because the effect of AI Capabilities on Organisational Performance operates partly through Organisational Excellence while a significant direct relationship remains.

5.9 Determining the Extent of Mediation: VAF Analysis

Following confirmation of the significant indirect effect through bootstrapping, the Variance Accounted For (VAF) was calculated as a supplementary measure to assess the relative magnitude of the mediation effect. VAF represents the proportion of the estimated total effect that is attributable to the indirect pathway through the mediator. In PLS-SEM, VAF has traditionally been used as an additional indicator for describing the extent of mediation (Hair et al., 2017).

The VAF is calculated as follows:

- **VAF = Indirect Effect / Total Effect**

In this study:

- **Direct effect: β = 0.339**
- **Indirect effect:** β = 0.236
- **Total effect:** 0.339 + 0.236 = 0.575

Therefore:

- **VAF = 0.236 / 0.575 = 0.410, or 41.0%**

The VAF value of 41.0% indicates that approximately 41% of the estimated total relationship between AI Capabilities and Organisational Performance is associated with the indirect pathway through Organisational Excellence. The remaining approximately 59% is represented by the direct effect of AI Capabilities on Organisational Performance.

Using the conventional PLS-SEM guideline proposed by Hair et al. (2017), a VAF value between 20% and 80% is interpreted as evidence of partial mediation. Accordingly, the VAF value of 41.0% is consistent with the conclusion that Organisational Excellence partially mediates the relationship between AI Capabilities and Organisational Performance. This interpretation is also supported by the bootstrapping results reported in Section 5.8, which demonstrate that both the indirect effect ($\beta = 0.236$, $p < 0.001$) and the direct effect ($\beta = 0.339$, $p < 0.001$) are statistically significant.

Therefore, H4 is supported. The findings provide evidence that Organisational Excellence serves as a significant explanatory pathway linking AI Capabilities with Organisational Performance. However, because the direct relationship remains significant, Organisational Excellence represents only part of the mechanism through which AI Capabilities are associated with performance.

In the context of the UAE aviation sector, this finding is particularly relevant because aviation organisations operate in complex, safety-critical, service-intensive, and technology-driven environments. AI applications can contribute to aviation performance in areas such as predictive maintenance, safety analytics, operational planning, customer service, intelligent decision-making, and process automation (Abdelghany et al., 2023; Degas et al., 2022; Doğru, Bouarfa, Arizar, & Aydoğan, 2020; Gao & Mavris, 2022; Yang & Huang, 2023).

The mediation result suggests, however, that technological capability alone may not fully explain improvements in organisational performance. A meaningful proportion of the relationship operates through Organisational Excellence, indicating that the organisational context in which AI is implemented is also important. In practical terms, the performance benefits associated with AI Capabilities are more likely to be realised when AI initiatives are accompanied by strong leadership, effective process management, continuous improvement, knowledge integration, quality-oriented practices, and other organisational excellence mechanisms.

Overall, the findings suggest that AI Capabilities and Organisational Excellence function as complementary organisational resources. AI Capabilities provide technological and analytical potential, while Organisational Excellence provides organisational mechanisms through which part of that potential can be translated into improved performance. The significant remaining direct effect further indicates that AI Capabilities may also influence Organisational Performance through additional pathways beyond Organisational Excellence.

5.10 Summary of Model Assessment

Overall, the findings provide strong empirical support for the proposed research framework. The measurement model demonstrates satisfactory indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. These results confirm that the constructs used in the study are reliable and valid measures of AI Capabilities, Organisational Excellence, and Organisational Performance (Hair et al., 2017; Urbach & Ahlemann, 2010).

The structural model also shows acceptable explanatory power. AI Capabilities explain a meaningful proportion of variance in Organisational Excellence and Organisational

Performance, confirming the strategic role of AI in organisational transformation and performance improvement. These findings are consistent with previous research showing that AI capabilities can enhance organisational performance by improving decision-making, innovation, agility, automation, knowledge sharing, and operational efficiency (Chen et al., 2022; Mikalef & Gupta, 2021; Olan et al., 2022; Wamba, 2022; Wamba-Taguimdje et al., 2020).

The direct path results confirm that AI Capabilities significantly enhance both Organisational Excellence and Organisational Performance. In addition, Organisational Excellence significantly improves Organisational Performance and partially mediates the relationship between AI Capabilities and Organisational Performance. This supports the view that organisational excellence acts as an important mechanism for converting strategic capabilities into superior organisational outcomes (Al-Dhaafri et al., 2016; Al-Dhaafri & Alosani, 2023; Akanmu et al., 2023; Kanji, 2012; Oakland & Tanner, 2008).

In the UAE aviation sector, the findings imply that AI should not be treated merely as a technological investment. Instead, AI should be viewed as a strategic organisational capability that must be embedded within excellence-driven leadership, process management, employee readiness, innovation systems, and continuous improvement practices. This is especially important in the UAE context, where government excellence, digital transformation, and AI-driven innovation have become central to public and private sector development (Abu Laban, 2022; Ahrens, 2014; Halaweh, 2018; Khatib & Ahmed, 2024; Almarzooqi, 2019).

Therefore, the study concludes that AI Capabilities have both a direct and indirect influence on Organisational Performance. The indirect influence through Organisational Excellence highlights the importance of aligning AI investments with organisational excellence frameworks to achieve sustainable performance improvement in the UAE aviation sector.

6. Conclusion

This study formulated and empirically modelled a research framework examining the impact of Artificial Intelligence Capabilities on Organisational Performance through the mediating role of Organisational Excellence in the UAE aviation sector. Drawing on the Resource-Based View, the study conceptualised AI Capabilities as strategic organisational resources comprising technological infrastructure, data assets, human expertise, and organisational routines. The study argued that although AI Capabilities can directly enhance organisational outcomes, their full performance value is more likely to be realised when they are embedded within excellence-oriented organisational systems.

Using data collected from 318 mid-to-senior level professionals across airlines, airport operators, regulatory bodies, and aviation service providers in the UAE, the study applied Partial Least Squares Structural Equation Modelling to assess the measurement and structural models. The measurement model demonstrated satisfactory indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, confirming the suitability of the constructs for structural analysis. The structural model provided empirical support for the proposed framework, showing that AI Capabilities significantly influence both Organisational Excellence and Organisational Performance. In addition, Organisational Excellence was found to have a significant positive effect on Organisational Performance.

The mediation analysis further confirmed that Organisational Excellence partially mediates the relationship between AI Capabilities and Organisational Performance. The variance accounted for analysis indicated that 41.0% of the total effect of AI Capabilities on Organisational Performance is transmitted through Organisational Excellence. This finding suggests that AI Capabilities generate performance outcomes through both direct technological effects and indirect organisational mechanisms. Therefore, AI should not be viewed merely as an operational technology, but as a strategic capability whose value depends on effective leadership, process discipline, governance, innovation, employee readiness, and continuous improvement practices.

The findings make several contributions. Theoretically, the study extends the Resource-Based View by demonstrating that AI Capabilities can function as strategic resources in the aviation sector, but that their performance impact is strengthened when mediated by Organisational Excellence. The study also contributes to organisational excellence literature by positioning Organisational Excellence as a dynamic mechanism for converting AI potential into measurable organisational outcomes, rather than treating it only as a compliance, assessment, or quality management framework. Methodologically, the study contributes by formulating and validating an integrated PLS-SEM framework linking AI Capabilities, Organisational Excellence, and Organisational Performance.

Practically, the study offers important implications for aviation leaders and policymakers in the UAE. Organisations seeking to benefit from AI should not focus only on acquiring advanced technologies or digital infrastructure. Instead, they should align AI initiatives with excellence frameworks, strategic objectives, data governance, process improvement, service quality, safety systems, and employee capability development. In the UAE aviation sector, where operational reliability, safety, customer experience, and global competitiveness are critical, AI investments are more likely to produce sustainable performance outcomes when supported by strong Organisational Excellence practices.

Overall, the study concludes that AI Capabilities have a significant and positive impact on Organisational Performance in the UAE aviation sector, both directly and indirectly through Organisational Excellence. The results confirm that Organisational Excellence serves as a critical governance and transformation mechanism that enables aviation organisations to convert AI-driven capabilities into sustainable performance improvement. Future research may extend this framework by examining additional mediators or moderators, such as organisational agility, digital leadership, innovation culture, or regulatory readiness, and by testing the model across other high-reliability sectors or comparative international aviation contexts.

References

Abdelghany, E. S., Farghaly, M. B., Almalki, M. M., Sarhan, H. H., & Essa, M. E. S. M.

(2023). Machine learning and IoT trends for intelligent prediction of aircraft wing anti-icing system temperature. *Aerospace*, *10*(8), 676. https://doi.org/10.3390/aerospace10080676

Abduljabbar, R., Dia, H., Liyanage, S., & Bagloee, S. A. (2019). Applications of artificial intelligence in transport: An overview. *Sustainability*, *11*(1), 189. https://doi.org/10.3390/su11010189

Abu Laban, R. A. (2022). *Excellence awards in the UAE government sector: An evaluative framework for the Government Excellence Model implementation*. Doctoral dissertation, University of Wollongong in Dubai.

Ahrens, T. (2014). Tracing the evolution of the Dubai Government Excellence Program. *Journal of Economic and Administrative Sciences*, *30*(1), 2–15. https://doi.org/10.1108/JEAS-06-2013-0018

Akanmu, M. D., Hassan, M. G., Ibrahim Alshuaibi, M. S., Ibrahim Alshuaibi, A. S., Mohamad, B., & Othman, A. (2023). The mediating role of organizational excellence between quality management practices and sustainable performance. *Total Quality Management & Business Excellence*, *34*(9–10), 1217–1242. https://doi.org/10.1080/14783363.2022.2158803

Al-Dhaafri, H. S., Al-Swidi, A. K., & Al-Ansi, A. A. (2016). Organizational excellence as the driver for organizational performance: A study on Dubai Police. *International Journal of Business and Management*, *11*(2). https://doi.org/10.5539/ijbm.v11n2p47

Al-Dhaafri, H. S., & Alosani, M. S. (2021a). Role of leadership, strategic planning and entrepreneurial organizational culture towards achieving organizational excellence: Evidence from public sector using SEM. *Measuring Business Excellence*, *26*(3), 378–396. https://doi.org/10.1108/MBE-02-2021-0021

Al-Dhaafri, H. S., & Alosani, M. S. (2021b). Integration of TQM and ERP to enhance organizational performance and excellence: Empirical evidence from public sector using SEM. *World Journal of Entrepreneurship, Management and Sustainable Development*, *17*(4), 822–845. https://doi.org/10.1108/WJEMSD-12-2020-0170

Al-Dhaafri, H. S., & Alosani, M. S. (2023). The importance of service design and information and analysis in enhancing organizational performance through a mechanism of organizational excellence in public sector organizations. *International Journal of Quality & Reliability Management*, *40*(9), 2166–2183. https://doi.org/10.1108/IJQRM-02-2021-0035

Alekseeva, L., Gine, M., Samila, S., & Taska, B. (2020). *AI adoption and firm performance: Management versus IT*. SSRN. https://doi.org/10.2139/ssrn.3677237

Alhashmi, S. F., Salloum, S. A., & Abdallah, S. (2019). Critical success factors for implementing artificial intelligence projects in Dubai Government United Arab Emirates health sector: Applying the extended technology acceptance model. In *International Conference on Advanced Intelligent Systems and Informatics* (pp. 393–405). Springer. https://doi.org/10.1007/978-3-030-31129-2_36

Almarzooqi, A. (2019). *Towards an artificial intelligence-driven government in the United Arab Emirates: A framework for transforming and augmenting leadership capabilities*. Doctoral dissertation, Pepperdine University.

Antony, J. P., & Bhattacharyya, S. (2010). Measuring organizational performance and organizational excellence of SMEs—Part 2: An empirical study on SMEs in India. *Measuring Business Excellence*, *14*(3), 42–52. https://doi.org/10.1108/13683041011074209

Babina, T., Fedyk, A., He, A., & Hodson, J. (2024). Artificial intelligence, firm growth, and product innovation. *Journal of Financial Economics*, *151*, 103745. https://doi.org/10.1016/j.jfineco.2023.103745

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Barney, J. B. (2000). Firm resources and sustained competitive advantage. In *Economics meets sociology in strategic management* (pp. 203–227). Emerald Group Publishing Limited. https://doi.org/10.1016/S0742-3322(00)17018-4

Barney, J. B. (2007). *Gaining and sustaining competitive advantage*. Prentice Hall.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Chen, D., Esperança, J. P., & Wang, S. (2022). The impact of artificial intelligence on firm performance: An application of the resource-based view to e-commerce firms. *Frontiers in Psychology*, *13*, 884830. https://doi.org/10.3389/fpsyg.2022.884830

Chin, W. W. (1998). Issues and opinion on structural equation modeling. *MIS Quarterly*, *22*(1), 7–16. https://doi.org/10.2307/249674

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge.

Degas, A., Islam, M. R., Hurter, C., Barua, S., Rahman, H., Poudel, M., … Aricò, P. (2022). A survey on artificial intelligence and explainable AI in air traffic management: Current trends and development with future research trajectory. *Applied Sciences*, *12*(3), 1295. https://doi.org/10.3390/app12031295

DeVellis, R. F., & Thorpe, C. T. (2021). *Scale development: Theory and applications*. Sage.

Doğru, A., Bouarfa, S., Arizar, R., & Aydoğan, R. (2020). Using convolutional neural networks to automate aircraft maintenance visual inspection. *Aerospace*, *7*(12), 171. https://doi.org/10.3390/aerospace7120171

Enholm, I. M., Papagiannidis, E., Mikalef, P., & Krogstie, J. (2022). Artificial intelligence and business value: A literature review. *Information Systems Frontiers*, *24*(5), 1709–1734. https://doi.org/10.1007/s10796-021-10186-w

Fountaine, T., McCarthy, B., & Saleh, T. (2019). Building the AI-powered organization. *Harvard Business Review*, *97*(4), 62–73.

Gao, Z., & Mavris, D. N. (2022). Statistics and machine learning in aviation environmental impact analysis: A survey of recent progress. *Aerospace*, *9*(12), 750. https://doi.org/10.3390/aerospace9120750

George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference, 17.0 update*. Allyn & Bacon.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage.

Halaweh, M. (2018). Artificial intelligence government: The UAE leading model. *Journal of Artificial Intelligence Research*, *62*, 269–272. https://doi.org/10.1613/jair.1.11210

International Civil Aviation Organization. (2022). *Using artificial intelligence to improve global aviation safety*.

Kanji, G. K. (1998). Measurement of business excellence. *Total Quality Management*, *9*(7), 633–643. https://doi.org/10.1080/0954412988325

Kanji, G. K. (2012). *Measuring business excellence*. Routledge. https://doi.org/10.4324/9780203996737

Kanji, G., & Moura E Sá, P. (2007). Performance measurement and business excellence: The reinforcing link for the public sector. *Total Quality Management & Business Excellence*, *18*(1–2), 49–56. https://doi.org/10.1080/14783360601043096

Khatib, M. M. E., & Ahmed, G. (2024). Achieving excellence in business practices through artificial intelligence: A case study of the Dubai public sector. *International Journal of Public Sector Performance Management*, *14*(2), 262–277. https://doi.org/10.1504/IJPSPM.2024.140550

Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management*, *58*(3), 103434. https://doi.org/10.1016/j.im.2021.103434

Mikalef, P., Lemmer, K., Schaefer, C., Ylinen, M., Fjørtoft, S. O., Torvatn, H. Y., … Niehaves, B. (2023). Examining how AI capabilities can foster organizational performance in public organizations. *Government Information Quarterly*, *40*(2), 101797. https://doi.org/10.1016/j.giq.2022.101797

Oakland, J. S., & Tanner, S. J. (2008). The relationship between business excellence and performance: An empirical study using Kanji's leadership excellence model. *Total Quality Management*, *19*(7–8), 733–749. https://doi.org/10.1080/14783360802159402

Olan, F., Arakpogun, E. O., Suklan, J., Nakpodia, F., Damij, N., & Jayawickrama, U. (2022). Artificial intelligence and knowledge sharing: Contributing factors to organizational performance. *Journal of Business Research*, *145*, 605–615. https://doi.org/10.1016/j.jbusres.2022.03.008

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731. https://doi.org/10.3758/BF03206553

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of Management*, *35*(3), 718–804. https://doi.org/10.1177/0149206308330560

Ringle, C. M., Wende, S., & Becker, J. M. (2015). *SmartPLS 3*. SmartPLS GmbH.

Shmelova, T., Sterenharz, A., & Dolgikh, S. (2020). Artificial intelligence in aviation industries: Methodologies, education, applications, and opportunities. In *Handbook of research on artificial intelligence applications in the aviation and aerospace industries* (pp. 1–35). IGI Global. https://doi.org/10.4018/978-1-7998-1415-3.ch001

Sjödin, D., Parida, V., Palmié, M., & Wincent, J. (2021). How AI capabilities enable business model innovation: Scaling AI through co-evolutionary processes and feedback loops. *Journal of Business Research*, *134*, 574–587. https://doi.org/10.1016/j.jbusres.2021.05.009

Tariq, M. U., Poulin, M., & Abonamah, A. A. (2021). Achieving operational excellence through artificial intelligence: Driving forces and barriers. *Frontiers in Psychology*, *12*, 686624. https://doi.org/10.3389/fpsyg.2021.686624

Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information Technology Theory and Application*, *11*(2).

Wamba, S. F. (2022). Impact of artificial intelligence assimilation on firm performance: The mediating effects of organizational agility and customer agility. *International Journal of Information Management*, *67*, 102544. https://doi.org/10.1016/j.ijinfomgt.2022.102544

Wamba-Taguimdje, S. L., Fosso Wamba, S., Kala Kamdjoug, J. R., & Tchatchouang Wanko, C. E. (2020). Influence of artificial intelligence on firm performance: The business value of AI-based transformation projects. *Business Process Management Journal*, *26*(7), 1893–1924. https://doi.org/10.1108/BPMJ-10-2019-0411

Yang, C., & Huang, C. (2023). Natural language processing in aviation safety: Systematic review of research and outlook into the future. *Aerospace*, *10*(7), 600. https://doi.org/10.3390/aerospace10070600

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). *Reconsidering Baron*.

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