Enhancing Sustainability in UAE Aviation Ground Maintenance through Supply Chain Management Practices and Capabilities

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ABSTRACT

This study investigates the mediating role of Supply Chain Management Capabilities (SCMCs) in the association between Supply Chain Management Practices (SCMPs) and the sustainability of Aviation Ground Maintenance Operations (AGMOs) within the UAE aviation sector. Owing to the accelerated expansion of aviation activities across the region, airports, Maintenance, Repair and Overhaul (MRO) organisations, and airline operators are increasingly recognising sustainable ground maintenance systems as a strategic organisational imperative. The research adopts an analytical cross-sectional design and gathers data through a structured survey administered to professionals and managerial personnel engaged in aviation maintenance, procurement, and supply chain functions across UAE aviation organisations. The investigation focuses on three principal SCMPs, namely Supplier Management (SM), Customer Relationship Management (CRM), and Procurement Management (PM), to evaluate both their direct and indirect influence on sustainable AGMO outcomes. Partial Least Squares Structural Equation Modelling (PLS-SEM) is employed to assess the measurement model, structural relationships, and the proposed hypotheses. The empirical findings demonstrate that all three SCMP dimensions exert statistically significant positive effects on both SCMCs and AGMO sustainability. In addition, SCMCs significantly mediate the linkage between managerial supply chain practices and sustainable operational performance. The results further indicate that sustainability within aviation ground maintenance services is shaped not solely by operational-level practices, but also by the organisation's capability to integrate supply chain activities, facilitate inter-organisational coordination, promote information exchange, and strengthen stakeholder collaboration. The study enriches the existing body of knowledge concerning sustainable aviation supply chains while also providing practical insights for policy-makers, aviation executives, and aircraft maintenance organisations seeking to balance operational efficiency with environmental and sustainability-related responsibilities.

Keywords: Aviation Ground Maintenance; Supply Chain Management Practices; Supply Chain Management Capabilities; Sustainability; UAE Aviation Industry

INTRODUCTION

The aviation sector is increasingly confronted with the challenge of attaining financial efficiency while simultaneously mitigating its environmental, economic, and social impacts, particularly within globally interconnected aviation centres such as the United Arab Emirates (UAE). The continuous expansion of international air transportation, the enlargement of major airport infrastructures, and the UAE's strategic positioning as a global logistics and aviation gateway have collectively intensified the requirement for environmentally sustainable ground operational systems and management approaches (Barman & Sipos, 2025).

Within the broader aviation ecosystem, AGMOs represent a highly critical operational domain because of their substantial consumption of resources and energy, together with their direct influence on aircraft safety, operational dependability, and uninterrupted service continuity (Abdu et al., 2024). Consequently, ensuring the sustainability of AGMOs has become a strategic necessity for airlines, MRO organisations, and airport authorities seeking alignment with both domestic and international sustainability commitments (El Zein et al., 2025). AGMOS is commonly evaluated through three interrelated sustainability dimensions, namely environmental, economic, and social performance, in accordance with the widely adopted triple bottom line perspective. From an environmental standpoint, ground maintenance activities significantly contribute to carbon emissions, intensive energy utilisation, chemical waste generation, and pollution associated with fuel-powered operational equipment (Akande, 2025).

Economically, sustainability is reflected through operational cost optimisation, efficient resource allocation, and the long-term resilience of aviation operations against supply chain disruptions and market volatility (Patidar et al., 2025). In social terms, sustainable ground maintenance practices are associated with employee welfare, occupational health and safety standards, stakeholder engagement, and responsible supplier participation throughout the aviation value chain (Swastanto & Johnson, 2024). The interconnected nature of these sustainability dimensions highlights the necessity for integrated managerial approaches that extend beyond isolated technological interventions toward broader system-oriented sustainability management frameworks.

Within this context, SCM has emerged as a fundamental mechanism for advancing sustainability objectives in AGMOs. Aviation SCs are inherently sophisticated and depend upon extensive coordination among multiple stakeholders, including airlines, MRO providers, component suppliers, logistics operators, and airport management authorities, to ensure operational continuity while simultaneously satisfying sustainability expectations (Jash et al., 2025). Consequently, SCMPs such as SM, CRM, and PM are increasingly viewed as decisive organisational mechanisms capable of improving both operational performance and sustainable aviation maintenance practices (Raza et al., 2021).

SM is particularly significant because aviation maintenance organisations rely heavily upon external vendors for spare components, technical systems, and specialised maintenance services, all of which substantially influence operational reliability, environmental performance, and cost efficiency (Wafa & Sunitiyoso, 2025). Likewise, effective CRM within airline–MRO partnerships enhances demand predictability, facilitates collaborative SC planning, and strengthens service quality, thereby contributing positively to sustainability-related objectives (Shamoradifar et al., 2025). PM also plays an essential role in sustainability advancement through environmentally responsible sourcing policies, adoption of energy-efficient technologies, and the procurement of eco-friendly operational materials by maintenance organisations (Modarress Fathi et al., 2023).

Despite the recognised importance of these SCMPs, their effectiveness in delivering sustainable outcomes largely depends upon the presence of strong SCMCs. Such capabilities include information integration, inter-organisational coordination, responsiveness, and collaborative decision-making throughout aviation maintenance networks, enabling organisations to align operational resources, processes, and stakeholder activities with sustainability-oriented objectives (Valmohammadi & Amouei, 2025). In dynamic operational environments such as the UAE aviation industry, characterised by technological transformation, fluctuating market demand, and continuously evolving regulatory frameworks, SCMCs function as critical enabling mechanisms that convert strategic sustainability intentions into measurable operational performance outcomes (Latan et al., 2024). In the absence of robust SC integration and digital coordination capabilities, even highly developed SCMPs may fail to generate substantial sustainability improvements within AGMOs (Alharasees et al., 2023).

Although recent scholarly investigations have examined sustainability issues within aviation SCs and airport operations, limited empirical attention has been directed toward understanding the interrelationship between SCMPs, SCMCs, and AGMOS. Existing literature has predominantly concentrated either on broad green aviation SC initiatives or on technical efficiency within MRO systems, while largely overlooking the mediating function of managerial capabilities in translating operational practices into sustainability outcomes (Modarress Fathi et al., 2023). Furthermore, a considerable proportion of previous empirical studies has focused on European or global contexts, with insufficient evidence originating from the UAE despite its prominent strategic role within international aviation networks (Barman & Sipos, 2025). This research gap becomes increasingly significant considering the UAE's ambitious sustainability and green development agenda (El Zein et al., 2025), together with the considerable contribution of aviation maintenance, logistics, and airport operations to the aviation sector's overall carbon footprint.

To address this gap, the present study investigates the mediating influence of SCMCs on the relationship between SCMPs and AGMOS within the UAE aviation industry. More specifically, the research evaluates whether SM, CRM, and PM contribute to the development of SCMCs and subsequently examines the extent to which these capabilities enhance sustainability performance in ground maintenance operations. By integrating sustainability perspectives with SCM theory in the aviation context, the study aims to provide both theoretical enrichment and practical guidance for aviation executives, MRO organisations, and policy-makers seeking to strengthen sustainable operational performance within the rapidly expanding UAE aviation sector (Asante-Darko & Osei, 2024).

LITERATURE REVIEW

Theoretical Discussion

The present study is theoretically grounded in the Resource-Based View (RBV), which provides an organising framework explaining that sustainable organisational performance and long-term competitive superiority are primarily determined by a firm's ability to acquire, develop, and deploy valuable, rare, inimitable, and non-substitutable resources and capabilities.

RBV proposes that organisations possessing strategically superior resources are capable of implementing distinctive operational strategies that competitors cannot easily replicate (Fareed et al., 2016).

Within the context of AGMOs, tangible organisational assets such as aircraft support equipment, transportation systems, operational fleets, and workforce capacity alone are insufficient to ensure enduring sustainable performance unless they are supported by advanced managerial and SC-related capabilities that facilitate coordinated and complex decision-making across interconnected logistics networks (Valmohammadi & Amouei, 2025). From the RBV perspective, SCMCs are regarded as strategic dynamic capabilities that enable organisations to integrate internal operational practices with the external strategies of SC partners, adapt effectively to environmental and market changes, and improve both operational efficiency and sustainability-related performance outcomes (Latan et al., 2024). These capabilities are particularly critical in highly regulated and operationally sophisticated industries such as aviation, where operational continuity, regulatory compliance, environmental stewardship, and safety assurance are deeply interconnected (Abdu et al., 2024).

SCMPs, particularly SM, CRM, and PM, may therefore be interpreted as foundational organisational routines that contribute directly to the development of SCMCs. SM represents a highly important managerial activity because aviation maintenance organisations depend extensively upon external suppliers for spare parts, specialised services, and technical components that significantly affect operational reliability, cost management, and environmental performance (Sajilan et al., 2019; Wafa & Sunitiyoso, 2025). Effective SM practices allow organisations not only to assess suppliers based on cost and quality considerations, but also to evaluate sustainability-related criteria such as waste minimisation, carbon footprint reduction, and energy efficiency (Modarress Fathi et al., 2023). From an RBV standpoint, strong supplier relationships constitute valuable relational resources capable of strengthening trust, collaborative problem-solving, and knowledge exchange throughout aviation maintenance networks (Maheshwari & Jaggi, 2024).

Similarly, CRM contributes significantly to the strengthening of SCMCs within aviation maintenance systems. Within the MRO environment, CRM refers to the establishment of structured communication and collaborative interaction between airlines and maintenance providers to improve service quality and align operational expectations through long-term strategic partnerships rather than isolated transactional engagements (Shamoradifar et al., 2025). These relational arrangements facilitate the development of information-sharing and coordination capabilities that are essential for efficient maintenance scheduling, resource deployment, and operational risk mitigation (Rajaratnam, 2023). RBV further argues that such relational capabilities are difficult for competitors to imitate, thereby representing an enduring source of competitive advantage while simultaneously supporting operational and environmental performance enhancement (Valmohammadi & Amouei, 2025).

PM also strengthens the theoretical association between SCMPs and sustainability performance through its influence on resource acquisition and technological integration. Sustainable procurement policies encourage the adoption of energy-efficient equipment, environmentally responsible maintenance materials, and low-emission ground support technologies, thereby reducing the environmental impact associated with aviation-related landside operations (Akande, 2025). Strategic procurement additionally contributes to SC resilience by ensuring diversified sourcing arrangements and reducing dependence upon limited suppliers, which assists organisations in managing supply disruptions and maintaining access to essential maintenance resources during unstable market conditions (Payne, 2025). From the RBV perspective, procurement routines centred on sustainability may evolve into organisation-specific capabilities that generate long-term value by improving operational procedures while simultaneously supporting environmental preservation objectives (Patidar et al., 2025).

Beyond the direct implementation of SCMPs, SCMCs operate as a mediating mechanism linking managerial initiatives with sustainable organisational outcomes. These capabilities, which include responsiveness, information integration, coordination, and collaborative communication, enable aviation MRO organisations to align internal operational processes with external stakeholders such as airlines, original equipment manufacturers (OEMs), suppliers, and airport authorities (Valmohammadi & Amouei, 2025). The integration of digital technologies and data-driven coordination systems further enhances these capabilities by facilitating predictive maintenance scheduling, real-time communication, and performance monitoring across aviation SC networks (Alharasees et al., 2023). Moreover, advanced digital systems such as blockchain technologies improve transparency, traceability, and trust among SC participants, thereby reinforcing the relationship between SCMCs and sustainability performance (Zhang, 2024).

From a sustainability perspective, SCMCs are central to achieving triple bottom line objectives within AGMOS. Environmentally, enhanced integration and coordination capabilities support the implementation of cleaner energy systems, improved equipment utilisation, and reductions in operational waste and emissions generated during ground maintenance activities (El Zein et al., 2025). Economically, these capabilities improve cost efficiency, reduce operational interruptions, and strengthen organisational resilience against market instability and SC disruptions (Patidar et al., 2025). Socially, improved coordination and transparency throughout the SC contribute to safer working environments, stronger stakeholder relationships, and more responsible governance practices within airport and maintenance ecosystems (Swastanto & Johnson, 2024).

The relevance of RBV becomes particularly evident within the UAE aviation industry due to its strategic geographical significance, advanced infrastructure, and highly interconnected operational environment. The rapid expansion of airports, aviation logistics systems, and MRO facilities across the UAE requires not only substantial physical investments but also sophisticated SC expertise and coordination capabilities to ensure sustainable growth and uninterrupted operational performance (Barman & Sipos, 2025). Furthermore, national sustainability agendas and evolving environmental regulations have intensified the importance of integrated SC strategies capable of balancing financial performance objectives with environmental responsibilities (El Zein et al., 2025). Consequently, examining the relationship between SCMPs, SCMCs, and AGMOS offers both theoretical contributions and practical implications for strengthening sustainability-oriented operational management within the rapidly evolving UAE aviation sector (Asante-Darko & Osei, 2024).

Hypotheses Development

Drawing upon the theoretical discussion presented in Subsection 2.1 and its integration into the proposed conceptual framework, this section formulates the empirical hypotheses concerning the influence of SCMPs on AGMOS, both directly and indirectly through the mediating role of SCMCs. Prior studies within aviation and industrial SC contexts suggest that managerial practices alone are insufficient to generate sustainable operational outcomes unless they are reinforced by organisation-specific and inter-organisational capabilities. Within highly regulated and operationally complex sectors such as aviation maintenance, sustainability is determined not merely by the implementation of organisational practices, but also by the effectiveness with which operational coordination, resource integration, and collaborative relationships are managed throughout the SC network. Dai et al. (2021) further emphasise that SCMCs function as a critical enabling mechanism through which managerial strategies are transformed into measurable sustainability performance outcomes within aviation ground operations.

Supply Chain Management Practices and SCM Capabilities

SM represents a fundamental component within aviation MRO SC networks because maintenance organisations rely extensively on external SC partners for the provision of essential spare parts, consumable materials, specialised technical expertise, and operational support services. (Wafa & Sunitiyoso, 2025) argue that maintaining strong collaborative relationships with strategic suppliers facilitates knowledge exchange, trust development, and joint problem-solving activities, all of which contribute positively to improved coordination and integration across the SC. When suppliers are managed as long-term strategic partners rather than purely transactional entities, organisations become more capable of responding to disruptions, sharing technical competencies, and implementing continuous operational improvement initiatives. Such relational mechanisms strengthen SCMCs, particularly in relation to responsiveness, information-sharing efficiency, and collaborative decision-making processes.

H1: Supplier Management has a positive and significant effect on Supply Chain Management Capabilities.

CRM plays a crucial role in strengthening SCMCs within aviation maintenance systems. Shamoradifar et al. (2025) highlight that effective CRM mechanisms enable structured communication channels, collaborative planning processes, and joint decision-making between airlines/operators and maintenance organisations. Continuous engagement with customers allows MRO entities to develop a more refined understanding of operational requirements, maintenance scheduling needs, and performance expectations, thereby enhancing their coordination and responsiveness capabilities. Over time, sustained relational engagement fosters organisational learning and supports capability development across the SC, reinforcing long-term integration and efficiency within aviation maintenance networks.

H2: Customer Relationship Management has a positive and significant effect on Supply Chain Management Capabilities.

PM influences SCMCs by shaping how resources, technologies, and suppliers are selected and integrated into maintenance operations. Strategic and sustainable PM requires close coordination between internal organisational functions and external SC partners, including suppliers, in order to strengthen activities such as SC integration and information exchange. In addition, proactive procurement risk management enhances organisational preparedness against disruptions by enabling supplier diversification and maintaining operational continuity during periods of uncertainty and change. Through these mechanisms, PM contributes to the strengthening of dynamic SC capabilities.

H3: Procurement Management has a positive and significant effect on Supply Chain Management Capabilities.

Supply Chain Practices and Aviation Ground Maintenance Sustainability

Beyond their influence on capability development, SCMPs are also expected to exert a direct effect on AGMOS. SM contributes to sustainability outcomes by enabling organisations to select environmentally responsible suppliers that prioritise energy efficiency, waste reduction, and regulatory compliance. Modarress Fathi et al. (2023) emphasise that long-term, sustainability-oriented supplier relationships facilitate the adoption of cleaner technologies, recyclable inputs, and environmentally responsible maintenance practices, thereby supporting greener ground operations. In parallel, collaborative supplier networks enhance operational reliability and improve cost efficiency, thereby reinforcing both environmental and economic dimensions of sustainability in aviation ground maintenance activities.

H4: Supplier Management has a positive and significant effect on Aviation Ground Maintenance Operations Sustainability.

CRM is also expected to contribute positively to sustainability outcomes by enabling better alignment between operational requirements and environmental performance planning. Shamoradifar et al. (2025) show that effective CRM practices improve maintenance scheduling efficiency, optimise equipment utilisation, and reduce unnecessary ground movements, which in turn lowers fuel consumption and associated emissions across airline and MRO operations. Strong customer relationships further encourage joint investment in sustainable solutions, including the adoption of electric ground support equipment and the implementation of predictive maintenance systems, thereby strengthening both operational efficiency and environmental performance in aviation ground operations.

H5: Customer Relationship Management has a positive and significant effect on Aviation Ground Maintenance Operations Sustainability.

PM has significant sustainability implications because it directly shapes the environmental characteristics of materials, equipment, and energy sources used in maintenance activities. Akande (2025) demonstrates that sustainable procurement practices facilitate the transition from diesel-powered systems to biodiesel alternatives and electric ground support equipment, resulting in substantial reductions in carbon emissions within airport landside operations. In addition, strategically oriented PM enhances economic sustainability by improving long-term cost competitiveness and strengthening SC resilience through more effective risk mitigation and supplier diversification.

H6: Procurement Management has a positive and significant effect on Aviation Ground Maintenance Operations Sustainability.

Role of SCM Capabilities in Sustainability

Although SCMPs provide the foundational mechanisms for achieving sustainability, their effectiveness is contingent upon the presence of robust SCMCs. Valmohammadi and Amouei (2025) emphasise that coordination, integration, information sharing, and responsiveness constitute core capabilities that enable organisations to translate strategic sustainability intentions into measurable performance outcomes within aviation ground maintenance contexts. The adoption of digitalisation, real-time data exchange systems, and integrated maintenance planning platforms further strengthens these capabilities by improving transparency, operational efficiency, and decision-making across the SC. Consequently, organisations with well-developed SCMCs are better positioned to reduce waste, optimise resource utilisation, and enhance overall environmental and economic performance in aviation maintenance operations.

H7: Supply Chain Management Capabilities have a positive and significant effect on Aviation Ground Maintenance Operations Sustainability.

Mediating Role of SCM Capabilities

Although SM influences AGMOS, its full effect is realised only when organisations possess sufficient SCMCs to coordinate, integrate, and manage information flows across SC actors. Asante-Darko and Osei (2024) argue that in the absence of strong SCMCs, even well-designed supplier strategies may fail to generate meaningful sustainability improvements, largely due to fragmented supplier structures that limit effective collaboration and integration. Conversely, when SCMCs are well developed, supplier relationships can produce stronger direct contributions to both environmental and social sustainability in ground maintenance operations, with SCMCs further reinforcing and amplifying this relationship.

H8: Supply Chain Management Capabilities mediate the relationship between Supplier Management and Aviation Ground Maintenance Operations Sustainability.

Similarly, the sustainability benefits associated with CRM are expected to be partially dependent on SCMCs. Although CRM can directly enhance coordination and service quality, its direct contribution to sustainability is relatively limited unless it is supported by strong capabilities to access and analyse customer data, synchronise maintenance activities, and dynamically adjust operational processes. Shamoradifar et al. (2025) argue that SCMCs act as a critical mechanism through which CRM practices are converted into improved sustainability performance within aviation ground operations.

H9: Supply Chain Management Capabilities mediate the relationship between Customer Relationship Management and Aviation Ground Maintenance Operations Sustainability.

Finally, although PM directly contributes to sustainability performance through the adoption of greener sourcing practices and specification of energy-efficient equipment, its effectiveness is contingent upon the organisation's ability to coordinate suppliers, manage information flows, and align procurement decisions with operational planning requirements. Strong SCMCs are therefore essential for ensuring the successful implementation of procurement strategies across the maintenance SC, thereby strengthening their overall sustainability impact (Payne, 2025).

H10: Supply Chain Management Capabilities mediate the relationship between Procurement Management and Aviation Ground Maintenance Operations Sustainability.

METHODOLOGY

This study adopts a quantitative, cross-sectional research design to examine the effects of SCMPs and SCMCs on AGMOS within the UAE aviation sector. A survey-based approach was selected because it enables systematic collection of standardised data from respondents and facilitates robust statistical testing of complex relationships among latent constructs. This design is particularly appropriate for analysing managerial perceptions and organisational practices in technologically advanced and highly regulated industries such as aviation maintenance and MRO operations (Swastanto & Johnson, 2024). The target population comprised middle-level managers and professionals working in airlines, MRO organisations, ground handling firms, and aviation service providers. These respondents were selected due to their direct involvement in SC decision-making, procurement activities, supplier coordination, and maintenance operations planning. A purposive sampling technique was employed to ensure that participants possessed relevant knowledge and practical experience in SC management and ground maintenance operations.

A total of 224 valid responses were included in the final dataset, satisfying the minimum sample size requirements for PLS-SEM and ensuring sufficient statistical power for hypothesis testing (Sarstedt et al., 2021). Data were collected using a structured questionnaire distributed through online platforms and professional networks within the UAE aviation industry. The instrument was developed based on established constructs from prior studies and adapted to the specific context of aviation ground maintenance. It measured five key constructs: SM, CRM, PM, SCMCs, and AGMOS. All items were assessed using a five-point Likert scale ranging from “strongly disagree” to “strongly agree,” capturing respondents’ levels of agreement with each statement. This measurement approach is consistent with established practices in aviation SC and sustainability research (Valmohammadi & Amouei, 2025).

SM was operationalised through indicators such as supplier selection criteria, long-term collaboration, quality monitoring, and environmental responsibility in supplier relationships. CRM was measured using items related to communication quality, joint planning, service coordination, and strategic collaboration between airlines and MRO providers. PM was assessed through sustainable sourcing practices, technology adoption, cost efficiency considerations, and risk management in purchasing decisions. SCMCs were operationalised through dimensions of coordination, integration, information sharing, and responsiveness within the maintenance SC. AGMOS was measured across environmental, economic, and social dimensions, including energy efficiency, waste reduction, cost efficiency, operational continuity, and stakeholder engagement. These measurement dimensions are consistent with prior empirical and conceptual research on sustainability in aviation SCs and MRO contexts (Modarress Fathi et al., 2023).

Prior to data collection, the questionnaire underwent expert review by aviation maintenance and SC professionals to ensure content validity, clarity, and contextual relevance. Minor modifications were made based on expert feedback to improve wording and alignment with industry terminology. A pilot study was subsequently conducted with a small group of aviation professionals to further refine item clarity and enhance instrument reliability and validity within the UAE aviation context (Wafa & Sunitiyoso, 2025). Data analysis was conducted using SmartPLS software, applying Partial Least Squares Structural Equation Modelling (PLS-SEM). This technique was selected due to its suitability for predictive research models involving multiple latent variables and relatively small to medium sample sizes. The analysis followed a two-stage procedure involving evaluation of both the measurement model and the structural model.

The measurement model assessed indicator loadings, internal consistency reliability (Cronbach's alpha and composite reliability), convergent validity (Average Variance Extracted), and discriminant validity using the Heterotrait–Monotrait ratio and Fornell–Larcker criterion, ensuring robust construct validity prior to hypothesis testing (Latan et al., 2024). The structural model was then evaluated using path coefficients, t-values, p-values, and R^2 values. Bootstrapping with 5,000 resamples was employed to test the statistical significance of direct and indirect relationships among constructs. Mediation analysis was conducted to examine the indirect effects of SCMCs in the relationships between SM, CRM, PM, and AGMOS. This approach provides rigorous empirical evidence for both direct and mediated pathways within the proposed conceptual framework (Sarstedt et al., 2021).

FINDINGS

This section presents and interprets the study results based on PLS-SEM analysis. The findings are organised into two main parts: the measurement model assessment (including reliability and validity) and the structural model evaluation (hypothesis testing). The analysis covers descriptive statistics, normality assessment, construct reliability and validity, discriminant validity, model fit considerations, as well as direct and indirect relationships among the study variables. Table 1 reports the descriptive statistics and normality assessment for all key constructs, namely SM, CRM, PM, SCMCs, and AGMOS. Normality was examined using skewness and kurtosis values based on a sample of 224 responses. The skewness values range from −1.165 to −0.621, while kurtosis values range from 0.450 to 2.054. These values fall within the acceptable thresholds of ±2 for skewness and ±3 for kurtosis, indicating that the dataset demonstrates an approximately normal distribution. Overall, the data do not exhibit extreme asymmetry or excessive peakedness. SCMCs show the highest level of negative skewness (−1.165) and kurtosis (2.054); however, both remain within acceptable limits for PLS-SEM analysis. Similarly, SM, CRM, PM, and AGMOS also demonstrate acceptable skewness and kurtosis values, confirming that the data are suitable for subsequent multivariate analysis and structural equation modelling.

Table 1: Normality Test

Variable	N	Skewness	Kurtosis
SC	224	-0.912	1.115
CRM	224	-0.823	1.476
PM	224	-0.669	0.450
SCMC	224	-1.165	2.054
AGMOS	224	-0.621	0.507

AGMOS: Aviation Ground Maintenance Operations Sustainability; CRM: Customer Relationship Management; PM: Procurement Management; SCMC: Supply Chain Management Capabilities; SM: Supplier Management

Table 2 presents the descriptive statistics for all study variables based on responses from 224 participants. Overall, the results indicate generally positive perceptions across the examined constructs, with mean values ranging from 3.578 to 3.955 on a five-point Likert scale. SCMCs recorded the highest mean score (M = 3.955, SD = 0.664), suggesting that respondents perceive relatively strong levels of coordination, integration, information sharing, and responsiveness within aviation maintenance SCs in the UAE. SM also demonstrated a high mean value (M = 3.749, SD = 0.786), reflecting favourable evaluations of supplier-related practices such as long-term collaboration, joint development initiatives, quality management, and strategic partnerships.

CRM achieved a mean score of (M = 3.721, SD = 0.762), indicating generally positive relational dynamics between airlines and maintenance organisations, particularly in terms of communication quality and service coordination. PM showed a comparatively lower but still positive mean value (M = 3.578, SD = 0.870), suggesting that while procurement practices are broadly effective, there remains potential for improvement, particularly in relation to sustainable and strategic sourcing approaches. Finally, AGMOS recorded a mean score of (M = 3.612, SD = 0.719), indicating that respondents perceive their organisations as achieving a moderately strong level of performance across environmental, economic, and social sustainability dimensions.

Table 2: Summary of Descriptive Analysis

Variable	N	Mean	Std. Deviation
SC	224	3.749	0.786
CRM	224	3.712	0.762
PM	224	3.578	0.870
SCMC	224	3.955	0.664
AGMOS	224	3.612	0.719

Figure 1 illustrates the initial measurement model used in this study to evaluate the relationships between latent constructs and their observed indicators prior to conducting structural model analysis. The diagram represents the conceptual framework within the PLS-SEM approach and includes five latent constructs: SM, CRM, PM, SCMCs, and AGMOS. Each construct is depicted as an oval, while its corresponding measurement items are shown as rectangular indicators. The directional arrows from each latent variable to its indicators indicate a reflective measurement specification, implying that the observed indicators are manifestations of their underlying constructs. In addition to the measurement relationships, the figure also presents the interconnections among the latent constructs in line with the proposed theoretical model. Overall, Figure 1 provides a visual representation of the initial measurement model used to assess construct reliability and validity before proceeding to model refinement and subsequent hypothesis testing in the structural analysis stage.

Table 3 presents the results of construct reliability and convergent validity for the initial measurement model, encompassing SM, CRM, PM, SCMCs, and AGMOS. The assessment of the measurement model was conducted using indicator loadings, Cronbach's alpha, composite reliability, and Average Variance Extracted (AVE) to ensure that all constructs demonstrate adequate reliability and validity prior to structural model estimation. The results indicate that most indicator loadings exceed the recommended threshold of 0.70, confirming strong reliability and satisfactory item representation of their respective latent constructs. However, a small number of items recorded loadings below 0.70, and three AGMOS indicators exhibited negative loadings. These problematic items were removed from the initial model to improve construct validity and enhance overall measurement quality. Following these adjustments, the remaining indicators demonstrated strong and meaningful associations with their respective constructs.

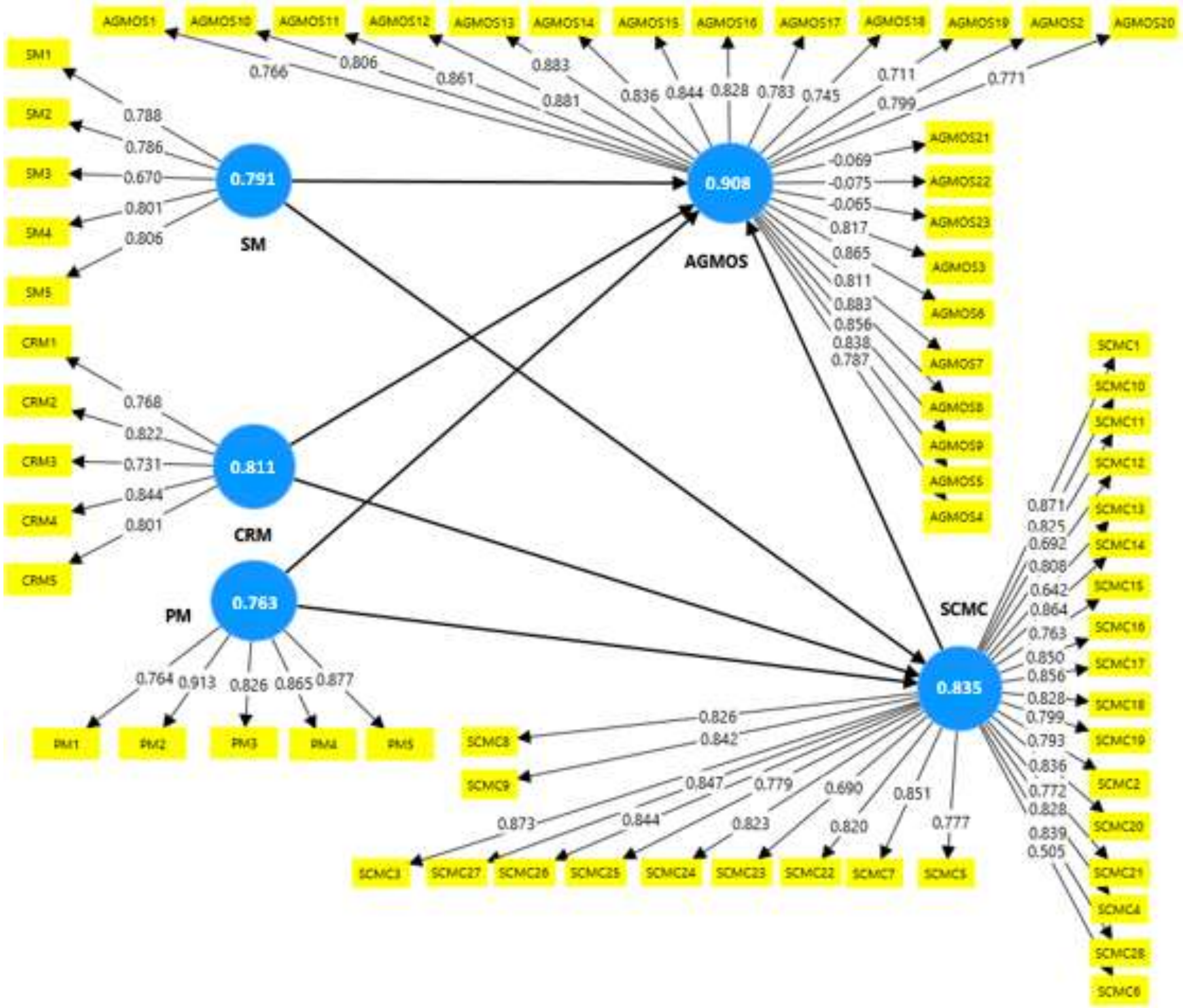

Figure 1: Initial Model Measurements

Regarding internal consistency, all Cronbach's alpha values exceeded the acceptable benchmark of 0.70, ranging from 0.763 to 0.908, indicating satisfactory reliability across all constructs. Similarly, composite reliability values ranged from 0.766 to 0.925, surpassing the recommended threshold of 0.70 (Nunnally, 1978), thereby confirming strong construct reliability and measurement stability. Convergent validity was assessed through AVE values, all of which exceeded the minimum acceptable value of 0.50. In particular, AVE values for AGMOS and PM ranged between 0.556 and 0.687, indicating that a substantial proportion of variance in the indicators is explained by their respective latent constructs. Overall, these results confirm that the constructs demonstrate adequate convergent validity and are theoretically and empirically well represented by their measurement items.

Table 3: Construct Reliability and Validity –Initial Model Measurements

	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
AGMOS1	0.765	0.908	0.925	0.556
AGMOS10	0.804			
AGMOS11	0.861			
AGMOS12	0.882			
AGMOS13	0.883			
AGMOS14	0.836			
AGMOS15	0.843			
AGMOS16	0.827			
AGMOS17	0.783			
AGMOS18	0.744			
AGMOS19	0.712			
AGMOS2	0.798			
AGMOS20	0.772			
AGMOS21	-0.089			
AGMOS22	-0.093			
AGMOS23	-0.085			
AGMOS3	0.816			
AGMOS4	0.785			
AGMOS5	0.838			
AGMOS6	0.864			
AGMOS7	0.810			
AGMOS8	0.881			
AGMOS9	0.856			
CRM1	0.768	0.811	0.822	0.599
CRM2	0.822			
CRM3	0.731			
CRM4	0.844			
CRM5	0.801			
PM1	0.764	0.763	0.766	0.687
PM2	0.913			
PM3	0.826			
PM4	0.865			
PM5	0.877			

Table 4(continued): Construct Reliability and Validity –Initial Model Measurements

	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
SCMC1	0.868	0.835	0.841	0.612
SCMC10	0.826			
SCMC11	0.697			
SCMC12	0.815			
SCMC13	0.647			
SCMC14	0.863			
SCMC15	0.765			
SCMC16	0.853			
SCMC17	0.856			
SCMC18	0.830			
SCMC19	0.800			
SCMC2	0.791			
SCMC20	0.838			
SCMC21	0.776			
SCMC22	0.815			
SCMC23	0.687			
SCMC24	0.819			
SCMC25	0.779			
SCMC26	0.844			
SCMC27	0.852			
SCMC28	0.842			
SCMC3	0.870			
SCMC4	0.827			
SCMC5	0.771			
SCMC6	0.501			
SCMC7	0.852			
SCMC8	0.829			
SCMC9	0.841			
SM1	0.788	0.791	0.805	0.566
SM2	0.786			
SM3	0.670			
SM4	0.800			
SM5	0.806			

Figure 2 presents the final measurement model following refinement of the initial model based on reliability and validity assessment. It illustrates the relationships between latent constructs and their retained observed indicators within the PLS-SEM framework. PLS-SEM was adopted due to its suitability for analysing complex models with multiple constructs and indicators, its capacity to estimate theoretically specified relationships, its robustness with relatively small sample sizes, and its ability to generate latent variable scores (Ahmad et al., 2022). The final model comprises five latent constructs: SM, CRM, PM, SCMCs, and AGMOS. Each construct is represented as a circular node, while the corresponding measurement items are shown as rectangular indicators. The directional arrows from indicators to their respective latent constructs reflect a reflective measurement specification, indicating that the observed items serve as manifestations of their underlying constructs. In addition to the measurement structure, the figure also depicts the directional relationships among the latent variables consistent with the study's conceptual framework, particularly the linkages between SCMPs, SCMCs, and AGMOS. Overall, Figure 2 provides a refined visual representation of the validated measurement model used for subsequent structural model analysis and hypothesis testing.

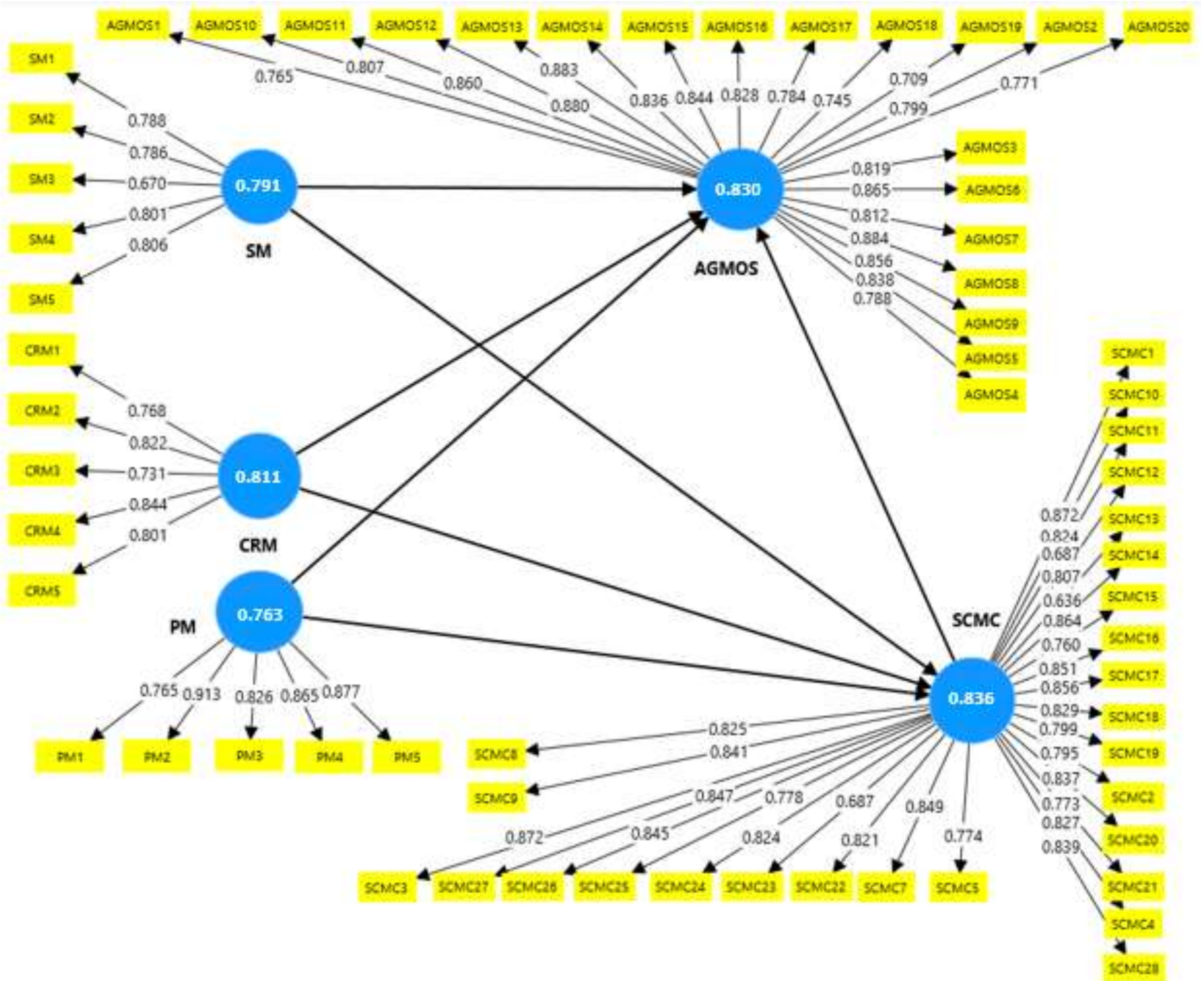

Figure 2: Final Model Measurement

Table 4 presents the results of construct reliability and convergent validity for the final measurement model, encompassing AGMOS, CRM, PM, SCMCs, and SM. The assessment was conducted using indicator loadings, Cronbach's alpha, composite reliability, and AVE in line with established PLS-SEM criteria. All retained indicators demonstrate satisfactory reliability, with loadings exceeding the minimum threshold of 0.60 and most values above 0.70. For AGMOS, loadings ranged from 0.710 to 0.884, indicating consistent measurement of environmental, economic, and social sustainability dimensions in aviation ground maintenance operations. CRM indicators showed loadings between 0.731 and 0.844, reflecting reliable measurement of customer relationship practices within the aviation maintenance context. PM items demonstrated strong loadings ranging from 0.765 to 0.913, confirming robust representation of procurement-related activities. SCMCs exhibited loadings between 0.627 and 0.872, supporting their validity in capturing coordination, integration, information sharing, and responsiveness capabilities across the SC. SM indicators ranged from 0.670 to 0.806, indicating acceptable measurement quality for supplier-related practices.

Table 5: Construct Reliability and Validity –Final Model Measurements

	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
AGMOS1	0.765	0.830	0.831	0.638
AGMOS10	0.807			
AGMOS11	0.860			
AGMOS12	0.880			
AGMOS13	0.883			
AGMOS14	0.836			
AGMOS15	0.844			
AGMOS16	0.828			
AGMOS17	0.784			
AGMOS18	0.745			
AGMOS19	0.710			
AGMOS2	0.799			
AGMOS20	0.771			
AGMOS3	0.819			
AGMOS4	0.787			
AGMOS5	0.838			
AGMOS6	0.864			
AGMOS7	0.812			
AGMOS8	0.884			
AGMOS9	0.856			
CRM1	0.768	0.811	0.822	0.599
CRM2	0.822			
CRM3	0.731			
CRM4	0.844			
CRM5	0.801			
PM1	0.765	0.763	0.766	0.687
PM2	0.913			
PM3	0.826			
PM4	0.865			
PM5	0.876			

Table 6(continued): Construct Reliability and Validity –Final Model Measurements

	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
SCMC1	0.872	0.836	0.842	0.622
SCMC10	0.820			
SCMC11	0.682			
SCMC12	0.807			
SCMC13	0.627			
SCMC14	0.862			
SCMC15	0.756			
SCMC16	0.854			
SCMC17	0.854			
SCMC18	0.831			
SCMC19	0.804			
SCMC2	0.797			
SCMC20	0.838			
SCMC21	0.776			
SCMC22	0.823			
SCMC23	0.684			
SCMC24	0.827			
SCMC25	0.777			
SCMC26	0.845			
SCMC27	0.846			
SCMC28	0.839			
SCMC3	0.867			
SCMC4	0.827			
SCMC5	0.765			
SCMC7	0.848			
SCMC8	0.825			
SCMC9	0.836			
SM1	0.788	0.791	0.805	0.566
SM2	0.786			
SM3	0.670			
SM4	0.801			
SM5	0.806			

In terms of internal consistency, Cronbach's alpha values for all constructs ranged from 0.763 to 0.836, exceeding the recommended threshold of 0.70 and confirming satisfactory reliability. Similarly, composite reliability values ranged from 0.766 to 0.842, further demonstrating strong internal consistency and measurement stability across all constructs. Convergent validity was assessed using AVE, with all constructs surpassing the recommended minimum value of 0.50. Specifically, AVE values were 0.638 for AGMOS, 0.599 for CRM, 0.687 for PM, 0.622 for SCMCs, and 0.566 for SM. These results confirm that each construct explains more than half of the variance in its indicators, thereby providing strong evidence of convergent validity and conceptual adequacy.

Table 5 presents the Heterotrait–Monotrait (HTMT) ratio used to assess discriminant validity among the study constructs, namely AGMOS, CRM, PM, SCMCs, and SM. All HTMT values between construct pairs are below the recommended threshold of 0.85, indicating adequate discriminant validity across the measurement model. The highest HTMT value is observed between AGMOS and SM (0.849), which remains within the acceptable limit and therefore does not indicate any discriminant validity issue. Other relationships also show satisfactory separation, including AGMOS–CRM (0.770), AGMOS–PM (0.711), and AGMOS–SCMC (-0.097), confirming that sustainability performance is empirically distinct from SC-related constructs. In addition, the relatively low HTMT values involving SCMCs, such as CRM–SCMC (0.135) and PM–SCMC (0.080), further support the conceptual distinctiveness of SCMCs as a mediating construct. These results indicate that SCMCs are not confounded with the independent SCMP variables and are empirically distinguishable within the proposed model. Overall, the findings confirm strong discriminant validity among all constructs in the study.

Table 5: The Heterotrait–Monotrait Ratio of Correlations (HTMT)

	AGMOS	CRM	PM	SCMC	SM
AGMOS					
CRM	0.770				
PM	0.711	0.758			
SCMC	0.097	0.135	0.080		
SM	0.849	0.735	0.728	0.128	

Table 6 presents the discriminant validity results based on the Fornell–Larcker criterion for all constructs, namely AGMOS, CRM, PM, SCMCs, and SM. In this approach, the diagonal (bolded) values represent the square root of AVE for each construct, while the off-diagonal values indicate inter-construct correlations. The results confirm that, for all constructs, the square root of AVE is higher than the corresponding inter-construct correlations, thereby satisfying the Fornell–Larcker criterion and establishing discriminant validity. AGMOS records a diagonal value of 0.820, which exceeds its correlations with CRM (0.702), PM (0.756), SCMCs (−0.105), and SM (0.788).

Table 6: Latent Variable Correlations (Fornell–Larcker Criterion)

	AGMOS	CRM	PM	SCMC	SM
AGMOS	0.820				
CRM	0.702	0.894			
PM	0.756	0.746	0.850		
SCMC	-0.105	-0.140	-0.078	0.809	
SM	0.788	0.774	0.719	-0.136	0.872

Similarly, CRM shows a diagonal value higher than its correlations with AGMOS (0.702), PM (0.746), SCMCs (−0.140), and SM (0.774), confirming its distinctiveness. PM also demonstrates strong discriminant validity, with a diagonal value of 0.850 exceeding its correlations with AGMOS (0.756), CRM (0.746), SCMCs (−0.078), and SM (0.719). SCMCs exhibit a diagonal value of 0.809, which is higher than its correlations with AGMOS (−0.105), CRM (−0.140), PM (−0.078), and SM (−0.136), confirming that SCMCs are empirically distinct from both SCMPs and sustainability outcomes. Finally, SM shows the highest diagonal value of 0.872, exceeding its correlations with AGMOS (0.788), CRM (0.774), PM (0.719), and SCMCs (−0.136). Overall, these results confirm strong discriminant validity among all constructs in the model, indicating that each construct measures a distinct theoretical concept.

Table 7 reports the coefficient of determination (R^2) values for the endogenous constructs in the structural model, namely AGMOS and SCMCs. R^2 represents the proportion of variance explained in each dependent variable by its respective predictors. The results show that AGMOS has an R^2 value of 0.722, with an adjusted R^2 of 0.718. This indicates that approximately 72.2% of the variance in AGMOS is jointly explained by SM, CRM, PM, and SCMCs. In the context of PLS-SEM, this represents a substantial level of explanatory power, suggesting that the proposed model provides a strong explanation of sustainability outcomes in aviation ground maintenance operations within the UAE.

Table 7: Coefficient of Determination (R^2)

	R-Square	R-Square Adjusted
AGMOS	0.722	0.718
SCMC	0.028	0.012

AGMOS: Aviation Ground Maintenance Operations Sustainability; SCMC: Supply Chain Management Capabilities

In contrast, SCMCs exhibit an R^2 value of 0.028 and an adjusted R^2 of 0.012, indicating that only 2.8% of the variance in SCMCs is explained by SM, CRM, and PM. This relatively low explanatory power suggests that SCMCs are likely influenced by additional factors beyond the three SCMPs included in the model. Such factors may include digital transformation, organisational culture, leadership practices, and technological infrastructure, which are not captured within the current framework but may play a significant role in shaping SCMCs in aviation maintenance environments.

Figure 3 illustrates the structural path model estimated using Partial Least Squares Structural Equation Modelling (PLS-SEM), which tests the hypothesised relationships among the study constructs. The model visually represents the directional linkages between the independent variables, the mediating construct, and the dependent variable in accordance with the proposed conceptual framework. The structural model comprises five latent constructs: SM, CRM, PM, SCMCs, and AGMOS. Each construct is depicted as a circular node, while the corresponding observed indicators are represented as rectangular boxes. The directional arrows connecting the constructs indicate the hypothesised causal relationships, including the direct effects of SCMPs (SM, CRM, and PM) on both SCMCs and AGMOS, as well as the mediating pathway from SCMCs to AGMOS. In addition, the figure presents standardised path coefficients alongside their statistical significance levels derived from bootstrapping procedures, thereby indicating the strength and reliability of the estimated relationships. Overall, Figure 3 provides a concise graphical representation of the estimated structural model, illustrating how the study hypotheses are operationalised and forming the basis for the subsequent interpretation of direct and indirect effects.

Table 8 presents the results of the direct effects tested through bootstrapping in the PLS-SEM structural model. The table reports standardised beta coefficients, means, standard deviations, t-values, and p-values for all hypothesised relationships, allowing assessment of the strength and significance of each path. Overall, the findings indicate that all hypotheses (H1–H7) are supported at the 0.05 significance level. CRM shows a positive and significant effect on AGMOS (β = 0.279, t = 2.711, p = 0.001), supporting H1. CRM also has a significant positive impact on SCMCs (β = 0.511, t = 2.458, p < 0.01), confirming H2. PM demonstrates a strong and highly significant effect on AGMOS (β = 0.603, t = 6.802, p < 0.001), indicating its central role in enhancing aviation ground maintenance sustainability and supporting H3. PM also positively influences SCMCs (β = 0.309, t = 2.393, p < 0.01), supporting H4.

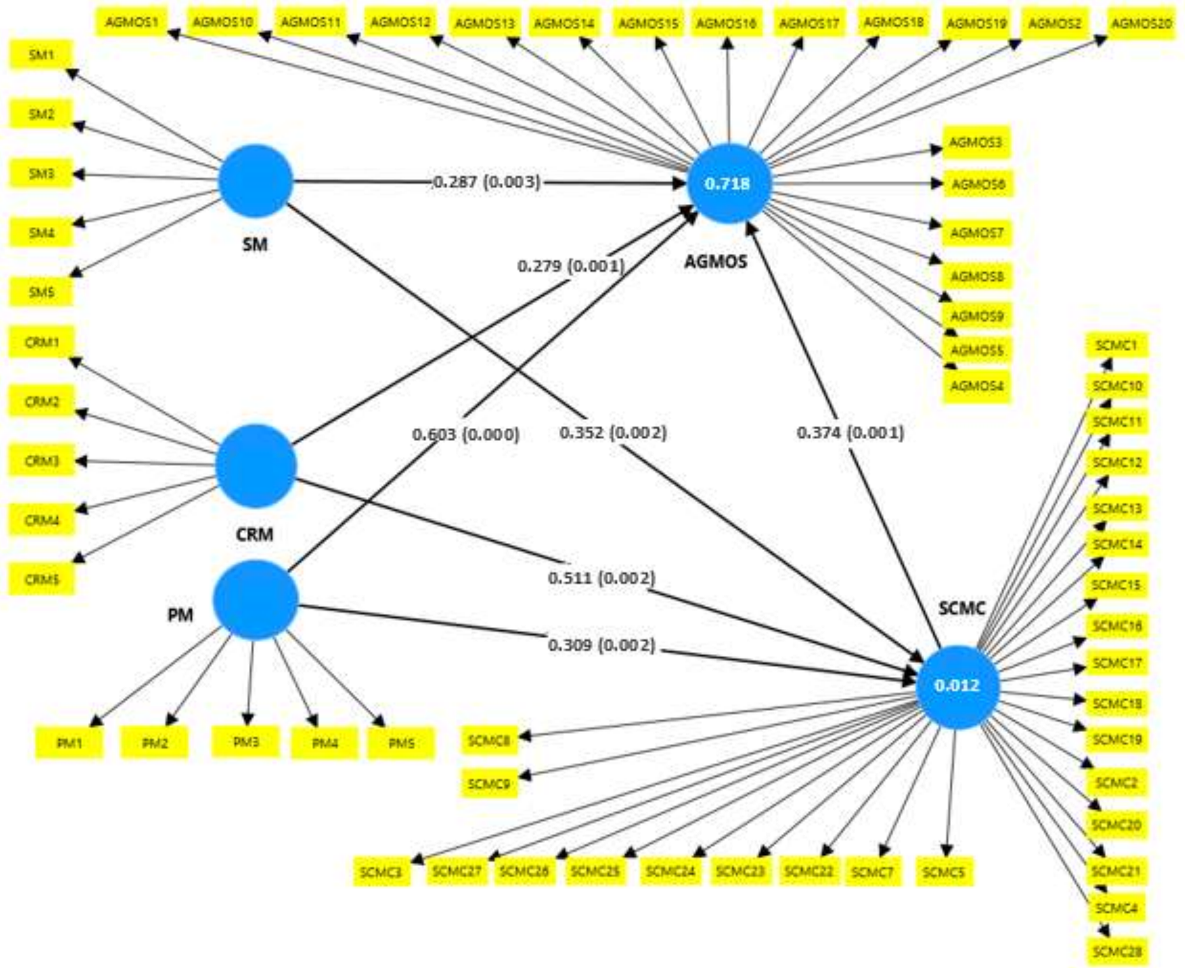

Figure 3: Path Model Significance Results

Table 8: Direct Hypotheses

Hypotheses	Beta	Sample Mean (M)	SD	T Statistics	P Values	Decision
CRM -> AGMOS	0.279	0.173	0.108	2.711	0.001	Accepted
CRM -> SCMC	0.511	0.180	0.218	2.458	0.002	Accepted
PM -> AGMOS	0.603	0.595	0.093	6.802	0.000	Accepted
PM -> SCMC	0.309	0.182	0.135	2.393	0.002	Accepted
SCMC -> AGMOS	0.374	0.064	0.148	2.651	0.001	Accepted
SM -> AGMOS	0.287	0.192	0.111	2.704	0.003	Accepted
SM -> SCMC	0.352	0.134	0.169	2.184	0.002	Accepted

SCMCs exhibit a significant positive effect on AGMOS (β = 0.374, t = 2.651, p = 0.001), supporting H5 and highlighting the importance of capabilities in translating SCMPs into sustainability outcomes. SM is also positively related to AGMOS (β = 0.287, t = 2.704, $p < 0.01$), supporting H6. Finally, SM significantly affects SCMCs (β = 0.352, t = 2.184, p = 0.002), confirming H7. Overall, the results confirm that SCMPs (SM, CRM, and PM) significantly influence both SCMCs and AGMOS, while SCMCs themselves play a key role in enhancing sustainability performance in aviation ground maintenance operations.

Table 9 presents the results of the indirect effects used to examine the mediating role of SCMCs in the relationships between SCMPs and AGMOS. The mediation analysis was conducted using bootstrapping with 5,000 resamples, with significance assessed through t-values and p-values. Overall, the results confirm that all mediation hypotheses (H8–H10) are statistically significant at the 0.05 level. H8 is supported, as SM shows a significant positive indirect effect on AGMOS through SCMCs (β = 0.114, t = 3.815, p = 0.001). This indicates that SM enhances sustainability performance indirectly by strengthening SCMCs, particularly in terms of coordination, integration, and information sharing. Similarly, H9 is supported, as CRM exhibits a significant positive indirect effect on AGMOS via SCMCs (β = 0.181, t = 2.176, $p < 0.001$). This suggests that CRM not only contributes directly to sustainability but also indirectly improves AGMOS by enhancing SCMCs, which facilitate better collaboration, planning, and operational alignment within aviation maintenance systems. In addition, H10 is supported, as PM demonstrates a significant positive indirect effect on AGMOS through SCMCs (β = 0.106, t = 3.928, p = 0.002). This finding indicates that sustainable procurement practices contribute to improved sustainability performance by strengthening SCMCs, particularly through enhanced responsiveness, risk mitigation, and cross-functional coordination.

Table 9: Indirect Hypothesis

Hypotheses	Beta	Sample Mean (M)	SD	T Statistics	P Values	Decision
SM -> SCMC -> AGMOS	0.114	0.012	0.032	3.815	0.001	Accepted
CRM -> SCMC -> AGMOS	0.181	0.037	0.087	2.176	0.000	Accepted
PM -> SCMC -> AGMOS	0.106	0.011	0.028	3.928	0.002	Accepted

DISCUSSION

This study examined both the direct effects and the indirect (mediated) effects of SCMPs—SM, CRM, and PM—on AGMOS through SCMCs. The findings provide clear empirical evidence that sustainable aviation ground maintenance is not driven solely by operational or functional initiatives, but also depends on integrated SC capabilities that align multiple stakeholders within the maintenance ecosystem. Overall, the results reinforce the view that SCMCs act as a critical mechanism through which managerial practices are translated into tangible sustainability outcomes in aviation contexts (Raza et al., 2021).

The results highlight the strategic importance of SM in shaping both SCMCs and AGMOS. Strong supplier relationships promote knowledge sharing, joint problem-solving, and long-term collaboration, which collectively enhance coordination and resilience within aviation maintenance SCs. Effective supplier selection and partnership management improve operational reliability while reducing sustainability-related risks in MRO environments (Wafa & Sunitiyoso, 2025). Moreover, engaging suppliers in environmentally responsible practices—such as adopting cleaner technologies, recyclable materials, and energy-efficient maintenance processes—reduces the environmental footprint of ground operations. These supplier-driven sustainability initiatives contribute significantly to both environmental performance and operational efficiency in aviation SCs (Modarress Fathi et al., 2023).

CRM also emerged as a significant determinant of both SCMCs and AGMOS. Effective CRM strengthens alignment in scheduling, resource allocation, and service expectations between airlines and maintenance providers. It also promotes closer customer involvement in maintenance processes through collaborative monitoring and operational coordination (Shamoradifar et al., 2025). Such relational structures contribute to environmental sustainability by reducing unnecessary ground equipment movements, lowering fuel consumption, and minimising idle time. Consequently, strong stakeholder relationships play a vital role in advancing sustainability within the global MRO sector (Swastanto & Johnson, 2024).

PM was found to be highly relevant to sustainability in aviation ground maintenance operations. Green procurement policies directly influence the environmental profile of purchased equipment, materials, and energy inputs used in ground operations. The adoption of electric and biodiesel-based ground support equipment in place of diesel alternatives can significantly reduce carbon emissions across airport operations (Akande, 2025). In addition, strategic procurement enhances economic sustainability by reducing long-term operational costs and strengthening SC resilience. Procurement-related risk management further ensures operational continuity during market instability and SC disruptions (Payne, 2025). A key contribution of this study is the empirical confirmation of SCMCs as a mediating mechanism between SCMPs and AGMOS. Although SM, CRM, and PM directly influence sustainability outcomes, their full impact is realised only when supported by strong SCMCs, including coordination, integration, information sharing, and responsiveness. SCMCs can therefore be understood as dynamic capabilities that enable organisations to align internal processes with external SC partners in highly dynamic aviation environments (Valmohammadi & Amouei, 2025).

In aviation maintenance operations, these capabilities support real-time communication, predictive planning, and inter-organisational problem-solving, all of which are essential for achieving sustainable performance outcomes (Latan et al., 2024). Digital transformation further strengthens the SCMC–sustainability relationship. Advanced digital platforms enhance real-time data exchange across the SC, improving transparency and reducing information asymmetry among stakeholders. Blockchain-enabled systems improve traceability, accountability, and trust within aviation SC networks (Zhang, 2024). Similarly, digital MRO systems and knowledge-sharing platforms enhance collaboration, learning, and operational efficiency, thereby indirectly supporting sustainability objectives (Alharasees et al., 2023; Zaini et al., 2019). Within the UAE aviation sector, these findings are particularly relevant due to the country's position as a global aviation hub with advanced infrastructure and highly interconnected organisational networks. The continued expansion of airports and MRO facilities requires not only physical development but also mature SC capabilities to ensure sustainable and resilient operations (Barman & Sipos, 2025). Moreover, increasing regulatory pressure and growing environmental expectations further reinforce the need for integrated SC strategies that align economic performance with environmental responsibility (El Zein et al., 2025).

CONCLUSION

This study examined the relationships among SCMPs, SCMCs, and AGMOS within the UAE aviation industry. The findings highlight that sustainability in aviation ground maintenance is not determined solely by individual managerial capabilities but is primarily shaped by an organisation's ability to develop and deploy effective SC capabilities within its operational systems. The results indicate that SM, CRM, and PM each play a significant role in enhancing SCMCs and overall sustainability performance. These practices improve coordination, information exchange, resource allocation, and stakeholder engagement, all of which are essential for achieving economically viable and environmentally sustainable aviation maintenance operations. A key contribution of this study is the identification of SCMCs as a central mediating mechanism linking SCMPs to sustainability outcomes. The findings suggest that SCMPs do not automatically translate into improved sustainability performance unless they are supported by strong capabilities related to integration, responsiveness, and inter-organisational collaboration. Overall, the study underscores the strategic importance of aligning SC management and sustainability objectives within the rapidly expanding UAE aviation sector, particularly in the context of ground maintenance operations. The results provide practical guidance for aviation organisations seeking to enhance operational sustainability while maintaining efficiency, performance, and responsiveness across their maintenance SCs.

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