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Integrating Supply Chain and Customer Relationship Management Capabilities for Operational Excellence in Nigerian Airline Logistics

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ABSTRACT

Objective: This study examines how the integration of supply chain capabilities and customer relationship management (CRM) contributes to operational excellence in Nigerian airline logistics, using Air Peace as an empirical case. It seeks to identify the underlying dimensions of CRM and supply chain integration (SCI) and to explain how their convergence enhances responsiveness, service quality, and competitive positioning in a developing economy context.

Methods: A quantitative case-study design was adopted. Primary data were collected through a structured questionnaire administered to 200 airline staff and customers at Lagos and Abuja airports. Reliability was assessed with Cronbach's alpha, while sampling adequacy and factorability were confirmed using the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity. Principal Component Analysis (PCA) with varimax rotation was employed to extract latent dimensions of CRM and SCI.

Results: The analysis identified four dominant CRM dimensions: proactive customer engagement, digital booking and communication, real-time information transparency, and electronic complaint resolution. In parallel, twelve distinct supply chain orientation components emerged, covering logistics strategy, operations management practices, customer need discovery, competitor intelligence, and information dissemination. The findings indicate that closer SCI-CRM alignment improves visibility, agility, and service personalization, thereby strengthening operational performance and competitive advantage.

Conclusion: The study provides empirical evidence that integrating supply chain and CRM capabilities is critical for achieving operational excellence in Nigerian airline logistics. It highlights the importance of digital enablers, organizational alignment, and strategic partnerships in overcoming infrastructural and coordination challenges. The findings contribute to airline logistics literature and offer actionable insights for managers and policymakers seeking to foster customer-centric, resilient, and digitally enabled airline operations.

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1. Introduction

The aviation industry has faced both supply uncertainty and acceleration in customer service demand due to a turbulent and competitive global economy. Service quality offered by the airport operators (including airlines) in Nigeria forms part of the core reason for passengers' satisfaction and continuing patronage decision-making during operation (Nwaogbe, Ogwude, Ejem & Pius, 2021). Customer need for a wider array of global services necessitates better-integrated airline services. Within a dynamic environment, airline companies play a fundamental role in satisfying customer requirements (e.g., passengers, shippers, and consignees) through effectively deploying fleets and selecting airports. Within this atmosphere, airline companies need to make strategic efforts to be competitive in the supply chain by reducing logistics costs and satisfying the needs of customers. Strategic supplier partnerships and customer relationships are the main components of supply chain management practices (Li, Johnson, Flynn, & Fearon, 2005). Certain factors are considered in the model relationship with suppliers and customers (Al Dmour, Alshurideh, & Shishan, 2014). These companies can achieve strategic collaboration with supply chain partners by adopting new customer management systems, especially Customer Relationship Management (CRM).

Supply chain management is a set of activities where efforts are made to integrate service providers, producers, warehouses, and retailers in order to ensure the optimal production of goods and their timely delivery to the appropriate locations (Nasiri-Galeh & Sahraei, 2024). Enhancing supply chain performance has become one of the critical approaches for sustaining competitive advantages for companies. Nigerian airlines are trying to achieve good supply chain performance to outperform their competitors. However, the problem the company is faced with is what to do with supply chain inefficiency under its organizational control.

A key problem for the airline is the management of customer relationships. Customers demand faster and timelier delivery of services. The company is in a high level of demand variation for flights, which causes the demand changes that are difficult to anticipate. Failure to meet customers' demands could result in lost revenues, lower customer satisfaction, and potential claims for poor service. In addition, the company finds itself locked into its supplier. This lock-in is dominated by the suppliers by imposing restricted terms and conditions on the company's order of spare parts. The order is non-cancellable, non-returnable, and cannot be rescheduled to a later date. Another problem is the relative lack of information, communication, and technology (ICT), both inside and outside the company. Substantial ICT differences between the company and its suppliers can hinder the coordination of activities for transactions, the quality of information sharing, and information visibility. As a result, the supplier's response time for a purchase order is increased. The paper aims to explain the relationship between Supply Chain Integration and Customer Relationship Management in the Air Peace Airline of Nigeria. This study aims to (1) identify the latent dimensions that characterise CRM and SCI in the context of a Nigerian airline; (2) explain why a multivariate dimensionality-reduction technique (PCA) is appropriate for exploratory scale validation; and (3) derive actionable theoretical and practical implications for adopting digital enablers that improve operational performance.

2. Literature Review

2.1 SCI and operational performance in airlines

SCI involves the alignment and synchronization of a company's internal processes with those of its suppliers and customers. In the context of airline logistics, SCI encompasses the coordination of activities such as inventory management, procurement, and distribution to ensure timely and efficient service delivery. Internal integration pertains to the harmonization of various departments within the airline, such as operations, procurement, and logistics, to foster cohesive decision-making and efficient resource utilization. External integration involves strategic partnerships with suppliers, ground handlers, and other stakeholders to facilitate real-time data exchange, accurate demand forecasting, and streamlined inventory management. Effective SCI leads to improved operational performance, cost savings, and enhanced service quality, which are critical in the competitive airline industry (Aghaei et al, 2025).

2.2 CRM capabilities and service outcomes

Therefore, a company's long-term success is primarily dependent on customer satisfaction and supplier reliability (Lee & Victor, 2003). Various studies (Vereecke & Muylle, 2006; Bartlett, Julien, & Baines, 2007; Ounnar, Pujo, Mekaouche, & Giambiasi, 2007) have addressed the need for close collaborative linkages through the entire supply chain. According to Wong (2002), firms with high supplier satisfaction and contribution achieve a higher level of customer satisfaction and SCM performance outcomes than those that show weaker supplier value focus. Customer Relationship Management in the airline industry focuses on understanding customer needs, preferences, and behaviors to deliver personalized services and build long-term relationships. Effective CRM strategies are instrumental in enhancing customer satisfaction, loyalty, and retention. The implementation of advanced CRM systems has enabled airlines to manage customer interactions more efficiently. Group Concorde emphasizes the use of modern CRM software to track customer interactions, preferences, and feedback, facilitating continuous improvement in service delivery. Moreover, the integration of technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and big data analytics has transformed CRM practices. These technologies provide valuable insights into customer behavior, allowing airlines to anticipate demands and offer proactive solutions. A study by Wang & Hsu (2016) highlights the application of AI in analyzing past booking patterns and customer profiles to estimate demand and make personalized recommendations, thereby increasing customer engagement. Additionally, the use of IoT-enabled sensors and smart analytics facilitates real-time monitoring of the supply chain, enhancing reliability and transparency in freight shipments.

CRM in airline logistics focuses on understanding customer needs, preferences, and behaviors to deliver personalized services and build long-term relationships. Effective CRM strategies are instrumental in enhancing customer satisfaction, loyalty, and retention (Peng, 2023). Data-driven insights utilize customer data to anticipate needs, personalize services, and proactively address issues. Integrated Communication Channels ensure consistent and responsive communication across various platforms to enhance customer engagement. Feedback mechanisms require implementing systems to collect and analyze customer feedback for continuous improvement. By integrating CRM into the supply chain, airlines can align their operational capabilities with customer expectations, fostering a customer-centric approach.

2.3 Integrating SCI and CRM: mechanisms and technology enablers

In the dynamic landscape of the airline industry, the integration of supply chain processes and customer relationship management (CRM) has become pivotal. Supply Chain Integration (SCI) ensures seamless coordination across various operational facets, while CRM focuses on nurturing and maintaining customer relationships. The synergy between SCI and CRM is essential for enhancing operational efficiency, customer satisfaction, and overall competitiveness in airline logistics. Supply Chain Integration involves the alignment and synchronization of a company's internal processes with those of its suppliers and customers. In the context of airline logistics, SCI encompasses the coordination of activities such as inventory management, procurement, and distribution to ensure timely and efficient service delivery. Recent studies highlight the significance of SCI in improving operational performance. For instance, Aghaei, Kiaei, Boush, Vahidi, Barzegar, & Rofoosheh (2025) emphasize the role of information technology in facilitating real-time data sharing and process synchronization, leading to enhanced operational efficiency. Furthermore, supplier integration has been identified as a critical factor contributing to both operational and financial performance, underscoring the importance of strategic partnerships in the airline industry. The adoption of advanced technologies, such as digital twins and blockchain, has further revolutionized supply chain processes. Lee & Fan (2023) discuss the potential of digital twins in providing real-time visibility and predictive analytics, enabling proactive decision-making in logistics and supply chain systems. Similarly, Liu, Yeoh, Qu, & Gao (2022) explore the integration of blockchain-based digital twins to enhance transparency and traceability in supply chain management.

The convergence of SCI and CRM is crucial for achieving operational excellence and customer satisfaction in airline logistics. Integrating these domains enables airlines to align their operational capabilities with customer expectations, fostering a customer-centric approach. Ruzo-Sanmartín, Abousamra, Otero-Neira, & Svensson (2023) investigate the impact of relationship commitment and customer integration on supply chain performance. Their findings suggest that firms' relationship commitment indirectly influences supply chain performance through customer integration, emphasizing the mediating role of customer relationships in supply chain dynamics. Furthermore, Aslam, Maimoona, Roubaud Oksana, Zulqurnain & Dilnaz (2023) explore the role of market orientation and supply chain strategy in customer integration. Their study reveals that strong market orientation and well-defined supply chain strategies positively affect the degree of customer integration, leading to improved supply chain performance. The integration of SCI and CRM also facilitates risk mitigation in international logistics. Ilyas, Jin, Ullah, Zaheer, & Aden (2023) examine the influence of customer relationships on supply chain risk management, highlighting the importance of robust customer relationships in navigating global logistics challenges.

A study carried out by Tim (2007) states that through the use of communication tools, such as websites, industrial organizations can build value in their supply chain relationships. The adoption of emerging technologies has been instrumental in bridging the gap between SCI and CRM. The integration of cloud microservices, AI, and blockchain technologies has enhanced operational performance, safety, and customer satisfaction in airline reservations. Barua & Kaiser (2024) propose a next-generation airline reservation system incorporating these technologies to improve efficiency and customer engagement. Large Language Models (LLMs) have also shown potential in advancing decision-making, efficiency, and innovation in supply chain management. Aghaei et al (2025) discuss the transformative impact of LLMs on various SCM functions, including demand forecasting, inventory management, and logistics optimization, highlighting their role in creating smarter and more autonomous supply chains.

The integration of advanced technologies plays a pivotal role in harmonizing SCI and CRM. AI facilitates predictive analytics for demand forecasting, route optimization, and personalized customer interactions. IoT devices enable real-time tracking of cargo, enhancing transparency and operational efficiency. Blockchain technology ensures secure and transparent transactions, fostering trust among supply chain partners and customers (Liu, Qu, & Gao, 2022). Digital twin technology creates virtual replicas of physical assets, allowing for the simulation and optimization of logistics processes (Lee & Fan, 2023). The adoption of these technologies enhances the integration of SCI and CRM, leading to improved operational performance and customer satisfaction.

2.4 Theoretical foundations

2.4.1 A Resource-Based Theory

A basic tenet of the resource-based view (RBV) is that top-performing organizations are those that can develop, obtain, and/or exploit strategic resources that are rare, valuable, difficult to substitute or imitate, and organizational. Such strategic resources include both tangible resources and capabilities. A resource is an observable but not (Al-Shboul & Alsharari 2018) necessarily tangible asset that can be valued and traded; however, a capability is not observable and not necessarily tangible, and also cannot be valued and transferred only as part of its whole entity. Hence, the important quality of resources that influences their ability to contribute to the competitive advantage of the organizations deals with resource tangibility. The RBV view seeks to address the issue of how to manage the supply chain to address real value creation and, in so doing, provide a sustainable competitive advantage.

2.4.2 Resource Dependence Theory (RDT)

RDT posits that organizations depend on external resources and must establish relationships to acquire them. In airline logistics, this theory underscores the importance of strategic partnerships and collaborations to access necessary resources, such as fuel, aircraft parts, and ground services. Trust, commitment, and satisfaction are critical relational factors that facilitate logistics integration and enhance supply chain performance.

2.4.3 Service-Dominant Logic (S-D Logic)

S-D Logic emphasizes the co-creation of value through service exchange rather than the traditional goods-dominant perspective. In the airline industry, this approach highlights the importance of collaborative relationships between airlines and customers, where value is co-created through personalized services, responsive communication, and shared experiences.

2.4.4 Technology-Organization-Environment (TOE) Framework

The TOE framework examines how technological, organizational, and environmental factors influence the adoption and implementation of innovations. In the context of SCI and CRM integration, this framework helps analyze how airlines adopt technologies like AI, IoT, and blockchain to enhance supply chain efficiency and customer engagement (Xu, Mak, Schoepf, Ostroumov & Brintrup, 2023).

3. Methodology

3.1 Research Design

This study adopts a quantitative research design rooted in multivariate statistical analysis, specifically Principal Component Analysis (PCA), to uncover latent dimensions underlying supply chain integration and customer relationship management within Nigeria's airline logistics sector. The research is structured as a descriptive-explanatory case study of *Air Peace Airlines*, aimed at empirically validating the relationship between SCI and CRM for performance optimization. The design is consistent with contemporary logistics research methodologies that integrate advanced analytics to improve supply chain and customer performance (Aslam et al., 2023; Qureshi et al., 2022).

3.2 Population, Sampling, and Data Collection

The target population comprises operational staff and customers of Air Peace Airlines at Murtala Muhammed International Airport (Lagos) and Nnamdi Azikiwe International Airport (Abuja). A stratified random sampling technique was employed to ensure representation across customer service personnel, logistics operators, and frequent flyers. A structured questionnaire, adapted from validated constructs in the literature (Wieland & Durach, 2021; Barua & Kaiser, 2024), was used to collect primary data. The questionnaire measured: Customer engagement and CRM dimensions, Logistics integration indicators, and competitive orientation and technological adoption with a Likert scale of 1-5. Cross-sectional survey (n = 200), stratified sampling at Lagos and Abuja. Measurement scales adapted from validated instruments; 5-point Likert responses.

3.3 Reliability and Validity

To ensure instrument reliability, Cronbach's alpha (α) was computed for each scale. Values ≥ 0.70 indicated acceptable internal consistency (Tavakol & Dennick, 2011). KMO measure and Bartlett's test are reported and interpreted. The recommended thresholds used in the study are: KMO ≥ 0.60 (good if ≥ 0.70), Bartlett p < .05. Content validity was ensured through expert review, and construct validity was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity.

$$\text{KMO} = \frac{\sum_{i \neq j} r_{ij}^2}{\sum_{i \neq j} r_{ij}^2 + \sum_{i \neq j} q_{ij}^2} \tag{1}$$

3.4 Bartlett's Test of Sphericity

Bartlett's test assesses whether the correlation matrix is significantly different from an identity matrix (i.e., variables are uncorrelated), which justifies the application of factor analysis. The test statistic formula is shown as:

$$\chi^2 = -\left(n - 1 - \frac{2p+5}{6}\right) \cdot \ln|R| \quad (2)$$

where: n = sample size, p = the number of variables, |R| = determinant of the observed correlation matrix. The test statistic χ^2 approximates a Chi-square distribution with $\frac{p(p-1)}{2}$ degrees of freedom.

3.5 Principal Component Analysis (PCA)

Principal Component Analysis (PCA) is a statistical technique used in the study to reduce dimensionality and derive compact component scores representing CRM and SCI constructs for subsequent use in regression or correlation analysis; PCA focuses on total variance and is appropriate for data reduction when the aim is score creation rather than latent common-factor recovery. In the context of the attached study, PCA helps to identify latent structures (underlying factors) among the observed variables, simplifying analysis and interpretation. The following stepwise empirical postulations were applied in this study.

(a) Standardization of Variables: Each variable is standardized to have a mean of zero and a standard deviation of one:

$$z_{ij} = \frac{x_{ij}-\mu_j}{\sigma_j} \quad (3)$$

Where x_{ij}: Value of variable j for respondent i, μ_j: Mean of variable j, and σ_j: Standard deviation of variable j

(b) Covariance (or Correlation) Matrix Calculation: The covariance matrix C of the standardized data is computed as:

$$C = \frac{1}{n-1}\sum_{i=1}^{n} (z_i - \bar{z})(z_i - \bar{z})^T \quad (4)$$

where n: Number of observations, z_i: Standardized vector for observation i, and $\bar{z}$: Mean vector of standardized data

(c) Eigen Decomposition: The covariance matrix is decomposed into its eigenvalues and eigenvectors:

$$Cv = \lambda v \quad (5)$$

Where v: Eigenvector (principal component) and λ: Eigenvalue (variance explained by the component)

(d) Principal Component Scores: The original standardized data is projected onto the principal components to obtain the component scores:

$$PC_k = Z \cdot v_k \quad (6)$$

where PC_k: Score for the k-th principal component, Z: Matrix of standardized data, and v_k: Eigenvector for the k-th component

(e) Variance Explained: The proportion of total variance explained by each principal component is:

$$\text{Variance Explained}_k = \frac{\lambda_k}{\sum_{j=1}^{p} \lambda_j} \quad (7)$$

where λ_k: Eigenvalue for the k-th component, and p: Total number of variables

3.6 Steps Performed in the Analysis

1. Checked item distributions, missing, and reversed items; reversed-coded items were re-coded before analysis.

3. Extraction: PCA (eigenvalue >1 rule, scree plot, and parallel analysis - recommend performing parallel analysis; if not performed, explicitly state limitation).

4. Rotation: Varimax (orthogonal) used for interpretability and to generate uncorrelated component scores. Rationale: initial assumption that components represent distinct managerial capabilities; however, because CRM and SCI components may be correlated, report factor correlation matrix and compare interpretability.

5. Retention and reporting rules: use loadings $\geq |0.40|$ as primary inclusion; flag cross-loading items (difference $< .20$ between loadings) for deletion or discussion. Tables 2 and 5 report the communalities, eigenvalues, % variance explained per component, and component score reliability.

We conducted principal component analysis (PCA) to reduce survey items into interpretable component scores. Before extraction, all items were checked and reverse-coded where necessary. Sampling adequacy was confirmed (KMO $\geq$ 0.70) and Bartlett's test of sphericity was significant ($\chi^2 = X$, df = Y, $p < .001$), supporting factorability. Components were retained based on parallel analysis, inspection of the scree plot, and the Kaiser criterion (eigenvalue > 1). We present both varimax (orthogonal) and promax (oblique) rotations as robustness checks; varimax simplifies interpretation and yields uncorrelated component scores suitable for regression, while promax shows the degree of correlation among latent factors. Items with absolute loadings $\geq$ 0.40 are interpreted; cross-loading items are discussed and, where justified, omitted from composite score construction.

4. Results and Discussions

The scree plot for customer service variables (see Figure 1) shows a steep decline from the first to the second component, followed by a more gradual decrease. According to the data, the first principal component (PC1) explains about 40% of the variance, and the second (PC2) explains about 14%, with the third (PC3) adding roughly 11%. The cumulative variance explained by the first two components is approximately 54% and by the first three, about 65%. The "elbow" in the scree plot appears after the second component, suggesting that two principal components are sufficient to capture the major patterns in the data. Additional components contribute less significantly to explaining variance and can be considered less informative. The scree plot for supply chain orientation variables (see Figure 2) shows a similar pattern (steep drop for the first one or two components, then a plateau), which also suggests that most of the variance is captured by the first few components, and the rest can be discarded as noise.

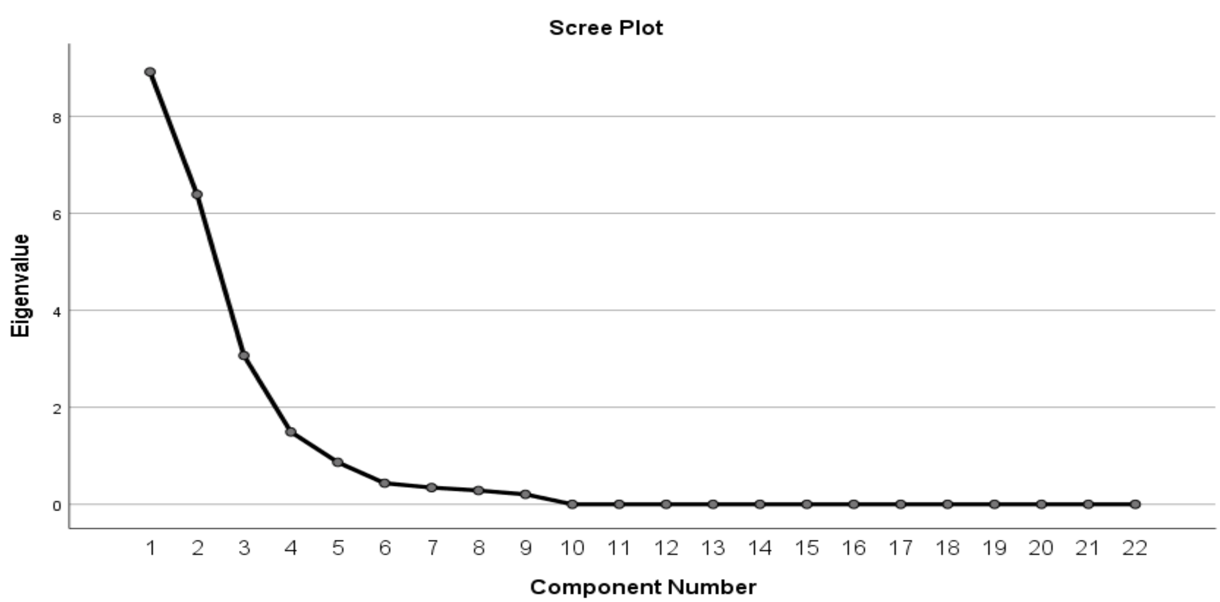

Figure 1. Scree Plot of the Air Peace Customer Service Variables

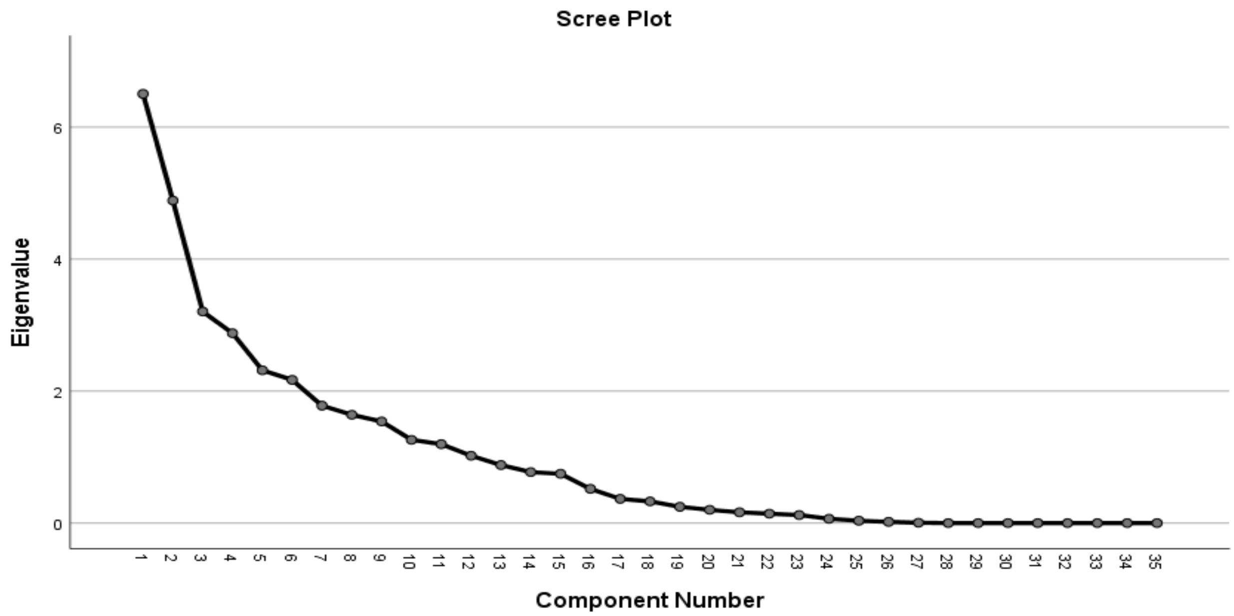

Figure 2. Scree Plot of the Air Peace Supply Chain Orientation Variables

4.1 Analysis of Air Peace Customer Service Variables

Cronbach's alpha was used to assess the reliability of each scale. From Table 1, Alpha values over 0.7 indicate that all scales can be considered reliable. For each of the item scales, factor analysis was used to reduce the total number of items to a manageable number of factors.

Table 1. Reliability Statistics for Airlines' Customer Variables

Cronbach's Alpha	Number of Items
.701	22

Principal components analysis is used to extract factors with an eigenvalue greater than 1. Varimax rotation is used to facilitate the interpretation of the factor matrix. The rotated component matrix in Table 3 is a result of principal component factor analysis, typically used to identify underlying constructs (components) from observed variables. The result culminated in the following distinct components: proactive customer interaction and forecasting, digital booking and communication, real-time updates and transparency, and electronic complaint resolution/ feedback.

Table 2. Communalities, eigenvalues, % variance explained per component, and component score reliability for airlines customers' variables

Communalities

	Initial	Extraction
Shares service information with customers electronically	1.000	.982
Accepts customer bookings electronically	1.000	.962
Interacts with customers to forecast demand	1.000	.889
booking placing system that is fast and easy to access	1.000	.948
Shares the booking status with customers during booking scheduling	1.000	.916
Shares booking status with customers during service delivery	1.000	.973
Shares booking status with customers during service delivery disruption	1.000	.995
Prestige and image of the company	1.000	.968
Provide regular information on the range of services	1.000	.871
Discounts and special offers	1.000	.732
Adaptation of service to changes in the market	1.000	.913
Good management and transparency of service	1.000	.934
Offer advantages through loyalty programmes	1.000	.912
Attractive and comfortable facilities	1.000	.926
Offer clear information about the conditions of service	1.000	.959
Solutions to involuntary faults/problems	1.000	.969
Adaptation of service to the specific needs of each customer	1.000	.962
Efficient management of claims or complaints	1.000	.937
Alliances with other airline companies	1.000	.990
Incorporate added travel benefits	1.000	.990
Completion of conditions of service	1.000	.930
Quality and price relationship of the service offered	1.000	.209

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.916	40.529	40.529	8.916	40.529	40.529	8.342	37.918	37.918
2	6.391	29.048	69.577	6.391	29.048	69.577	6.579	29.903	67.820
3	3.067	13.941	83.518	3.067	13.941	83.518	3.306	15.026	82.846
4	1.492	6.783	90.301	1.492	6.783	90.301	1.640	7.455	90.301
5	.866	3.936	94.237						
6	.434	1.974	96.211						
7	.345	1.566	97.777						
8	.284	1.290	99.067						
9	.205	.933	100.000						
10	4.594E-15	2.088E-14	100.000						
11	2.658E-15	1.208E-14	100.000						
12	2.306E-15	1.048E-14	100.000						
13	1.267E-15	5.759E-15	100.000						
14	1.017E-15	4.621E-15	100.000						
15	6.536E-16	2.971E-15	100.000						
16	3.686E-16	1.675E-15	100.000						
17	-2.849E-16	-1.295E-15	100.000						
18	-7.200E-16	-3.273E-15	100.000						
19	-1.180E-15	-5.362E-15	100.000						
20	-3.056E-15	-1.389E-14	100.000						
21	-3.244E-15	-1.474E-14	100.000						
22	-4.264E-15	-1.938E-14	100.000						

Extraction Method: Principal Component Analysis.

The principal component analysis (PCA) applied to 21 airline customer-related variables produced strong communalities, with most items above 0.90. This indicates that the extracted components effectively account for the majority of variance in the observed variables and that the measurement items were well-suited for factor analysis. Only the "quality–price relationship" item showed a lower extraction value, suggesting it may not align strongly with the main constructs. Four factors were retained based on eigenvalues greater than one and cumulative variance explained. Together, these components accounted for more than 90% of the variance, a level that signals strong explanatory power. The steep drop after the fourth factor in the eigenvalue distribution supports the decision to stop at this level. Such a high proportion of explained variance suggests that the structure of customer-oriented practices in airlines can be captured effectively through these four dimensions. The rotated solution clarified the distribution of variables across four interpretable factors:

1. **Customer Information and Service Adaptation**

Items such as forecasting demand, providing service information, and adapting services to market changes loaded strongly here. This factor represents an airline's ability to anticipate and respond to evolving customer needs through data-driven communication and flexible service adjustments.

2. **Electronic Booking and Complaint Management**

High loadings on items like electronic booking acceptance, fast booking systems, and efficient claims handling defined this factor. It reflects the digital transaction dimension of customer management, where efficiency and accessibility are critical.

3. **Service Assurance and Prestige**

Variables related to prestige, company image, alliances with other carriers, and added travel benefits clustered on this factor. It points to how reputation and network strength contribute to customer loyalty and brand equity in the airline sector.

4. **Service Reliability and Facilities**

Loadings on items such as sharing booking status during disruptions, attractive facilities, and transparency in service delivery formed this factor. This highlights operational reliability and the physical/experiential aspects of customer service.

Some variables showed negative or cross-loadings, particularly in the unrotated solution. These could reflect reverse-coded items, measurement overlaps, or bipolar constructs (e.g., quality–price trade-offs). The rotated solution resolved much of this ambiguity, but care should be taken in interpreting variables like service price-quality perception, which did not align neatly with a single factor. Overall, the PCA findings show that customer relationship management (CRM) in airlines is not one-dimensional but integrates digital convenience, adaptive service, brand image, and operational reliability. Each factor captures a distinct yet complementary element of customer orientation.

Table 3. Rotated Component Matrix for Air Peace Customer Service Variables

	Component			
	1	2	3	4
Shares service information with customers electronically	-.001	.789	-.537	-.267
Accepts customer bookings electronically	-.002	-.974	-.112	-.027
Interacts with customers to forecast demand	.939	-.016	-.057	-.068
A booking and placing system that is fast and easy to access	-.311	-.825	.098	-.401
Share the booking status with customers during booking scheduling	-.303	.310	.846	-.107
Share booking status with customers during service delivery	.757	-.038	-.330	-.539
Shares booking status with customers during service delivery disruption	-.332	.323	.876	-.117
Prestige and image of the company	.286	-.209	.881	.257
Provide regular information on the range of services	.919	-.024	-.151	-.059
Discounts and special offers	.592	.588	-.188	-.032
Adaptation of service to changes in the market	.950	.026	-.093	-.028
Good management and transparency of service	-.554	.719	.333	-.007
Offer advantages through loyalty programs	.871	.062	.192	.334
Attractive and comfortable facilities	-.749	.041	.246	.550
Offer clear information about the conditions of service	-.148	.712	.027	.655
Solutions to involuntary faults/problems	.347	.839	.373	-.071
Adaptation of service to the specific needs of each customer	-.017	.978	.071	.008
Efficient management of claims or complaints	.471	-.807	.217	-.126
Alliances with other airline companies	.989	.005	-.091	-.052
Incorporate added travel benefits	.989	.005	-.091	-.052
Completion of the conditions of service	.656	-.586	-.149	.367
Quality and price relationship of the service offered	-.178	-.218	.344	.108

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.

Factor 1: Proactive Customer Interaction and Forecasting

Variables with high loadings are: interacting with customers to forecast demand (0.939), sharing product availability with customers electronically (0.908), conducting customer satisfaction surveys electronically (0.877), and sharing delivery schedules with customers electronically (0.864). This reflects proactive engagement and communication using digital tools to anticipate and meet customer needs.

Factor 2: Digital Booking and Communication

The Air Peace customer service variables with high loadings are: accepts customer bookings electronically (-0.974), booking placing system that is fast and easy to use electronically (-0.825), and shares service information with customers electronically (0.789). Despite some negative signs (due to orthogonal rotation), the magnitude shows a strong factor centered on digital booking systems and information dissemination. According to Zengin, Ergün, Umut & Efendioğlu, (2024), technologies such as artificial intelligence, machine learning, VR technologies and cloud technologies, which are among the innovations of digital, make our lives easier. Digitalization is very important in the service sectors, and if used together with lean production, work can be done more efficiently to eliminate waste.

Factor 3: Real-Time Updates and Transparency

Variables with high loadings are: sharing booking status with customers during booking electronically (0.846) and confirming customer bookings electronically (0.832). This component signifies real-time status updates and confirmation, crucial for building customer trust and transparency.

Factor 4: Electronic Complaint Resolution and Feedback

Air Peace customer service variables with high/moderate loadings are: shares complaint information with customers electronically (0.773), provides complaint status electronically (0.742), and resolves customer complaints electronically (0.723). This reflects the handling of customer complaints and feedback digitally, which is essential for post-service customer relationship management. The identified customer service variables have serious strategic implications for Air Peace's operations. Air Peace’s customer service variables cluster into four distinct service dimensions: proactive communication and demand management, digital booking systems, real-time transaction transparency, and complaint management and feedback mechanisms. These dimensions can guide the airline to invest in AI/chatbots for forecasting and automated responses, enhance self-service booking tools, improve status tracking systems, and build CRM dashboards for complaint handling.

4.2 Analysis of Air Peace Supply Chain Orientation Variables

A similar factor analysis was applied to the supply chain orientation areas: customer orientation, competitor orientation, operation orientation, and logistics orientation. Among 60 items in the questionnaire, five items were deleted during the factor analysis. A total of 35 items were reduced to 12 underlying factor loadings, depicted in Table 4.

Table 4. Reliability Statistics for Supply Chain Orientation Variables

Cronbach's Alpha	Number of Items
.788	35

Cronbach’s alphas among 35 items in the questionnaires exceeded 0.7. The twelve (12) items identified are: Logistics strategy & understanding, Logistics communication & discovery, OM strategy & proactive approach, OM opportunities & future needs, Competitor understanding & trend analysis, OM systematic assessment, Customer need recognition, Communication & opportunity seeking, Customer satisfaction & support, Competitor data communication, Customer needs discovery, and Competitor action recognition. These items are treated as dependent factors.

Table 5. Communalities, eigenvalues, % variance explained per component, and component score reliability for supply chain orientation variables

Communalities		
	Initial	Extraction
Serve customer needs	1.000	.920
Communicate information	1.000	.762
Develop value chain strategies	1.000	.939
Measure customer satisfaction	1.000	.793
Disseminate data	1.000	.700
Help customer	1.000	.814
Discover customer needs	1.000	.927
Seek opportunities	1.000	.659
Recognize customer need	1.000	.885
Communicate information about the competitor	1.000	.613
Assess competitors systematically and frequently	1.000	.731
Disseminate data on competitors at all levels regularly	1.000	.537
Understanding competitors to be prepared for development in our market	1.000	.890
Try to discover additional actions of our competitor	1.000	.803
Try to recognize the competitor's action	1.000	.775
Extrapolate the key trend to understand what the competitor may do in the future	1.000	.977
Constantly monitor commitment to understanding logistic activities	1.000	.991
Communicate information about logistic activities across all units	1.000	.995
Develop value chain strategies based on an understanding of logistics	1.000	.962
Assess logistic activities systematically and frequently	1.000	.989

Communalities

	Initial	Extraction
Disseminate data on logistic activities at all levels	1.000	.991
Understanding logistic activities to be prepared for market development	1.000	.995
Try to discover additional logistics	1.000	.997
Seek opportunities in area where current logistics has difficulties	1.000	.991
Try to recognize logistic possibilities	1.000	.997
Extrapolate key trends to understand what future logistic activities need	1.000	.788
Constantly monitor commitment to understanding operational management	1.000	.582
Communicate information about logistic operation management activities	1.000	.864
Develop value chain strategies based on understanding OM	1.000	.965
Assess operation management activities systematically and frequently	1.000	.889
Disseminate data on operation management activities	1.000	.922
Understand the OM activities prepared for market development	1.000	.948
Try to discover additional OM possibilities	1.000	.917
Seek opportunities in areas where OM has difficulty delivering	1.000	.981
Extrapolate key trends to understand what OM may need in the future	1.000	.907

Extraction Method: Principal Component Analysis.

Total Variance Explained	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.504	18.582	18.582	6.504	18.582	18.582	5.570	15.913	15.913
1	4.888	13.966	32.547	4.888	13.966	32.547	4.340	12.400	28.313
2	3.206	9.160	41.707	3.206	9.160	41.707	2.922	8.348	36.662
3	2.876	8.218	49.925	2.876	8.218	49.925	2.878	8.222	44.883
4	2.315	6.614	56.539	2.315	6.614	56.539	2.115	6.042	50.925
5	2.170	6.199	62.738	2.170	6.199	62.738	2.034	5.811	56.736
6	1.779	5.083	67.821	1.779	5.083	67.821	1.897	5.420	62.156
7	1.640	4.686	72.506	1.640	4.686	72.506	1.894	5.411	67.567
8	1.539	4.399	76.905	1.539	4.399	76.905	1.890	5.400	72.966
9	1.261	3.603	80.508	1.261	3.603	80.508	1.797	5.133	78.100
10	1.196	3.416	83.924	1.196	3.416	83.924	1.700	4.859	82.958
11	1.020	2.916	86.840	1.020	2.916	86.840	1.359	3.882	86.840
12	.879	2.511	89.351						
13	.772	2.205	91.555						
14	.747	2.134	93.689						
15	.518	1.481	95.170						
16	.366	1.046	96.216						
17	.328	.938	97.153						
18	.246	.703	97.856						
19	.200	.572	98.428						
20	.163	.466	98.894						
21	.142	.407	99.300						
22	.121	.347	99.647						
23	.064	.184	99.831						
24	.035	.101	99.933						
25	.018	.053	99.985						
26	.005	.015	100.000						
27	1.828E-15	5.221E-15	100.000						
28	7.934E-16	2.267E-15	100.000						
29	1.726E-16	4.931E-16	100.000						
30	-3.057E-16	-8.736E-16	100.000						
31	-1.409E-15	-4.026E-15	100.000						
32	-1.617E-15	-4.621E-15	100.000						
33	-2.217E-15	-6.336E-15	100.000						
34	-2.559E-15	-7.312E-15	100.000						
35									

Extraction Method: Principal Component Analysis.

The principal component analysis (PCA) was applied to 35 supply chain orientation (SCO) items. Communalities after extraction were consistently high (many >0.80), suggesting that most items contributed substantially to the extracted components. This confirms that the dataset was suitable for dimension reduction and that the retained factors captured meaningful variance in the original items. Twelve components had eigenvalues above 1, jointly accounting for over 86% of the variance. The first three components alone explained nearly 42% of the variation, and the cumulative variance increased steadily across the remaining components. This indicates that SCO is a multifaceted construct, requiring more than a few factors to fully capture its dimensions. Retaining twelve components provides a balance between explanatory power and interpretability, although future studies might test a more parsimonious model through confirmatory factor analysis. The unrotated component matrix revealed several strong loadings but also displayed cross-loadings, making interpretation challenging. After applying Varimax rotation, clearer factor structures emerged. For instance:

(i) Items relating to **logistics information dissemination and monitoring** clustered strongly on specific components, highlighting the role of transparent communication and performance tracking in SCO.

(ii) **Competitor-focused practices** (e.g., monitoring actions, extrapolating trends) aligned on separate factors, reflecting the strategic orientation toward competitive intelligence.

(iii) **Customer-oriented variables** (e.g., serving customer needs, measuring satisfaction, assisting customers) loaded together, emphasizing the importance of responsiveness in airline logistics.

(iv) **Operational management aspects** (e.g., understanding OM activities, discovering opportunities, developing OM strategies) are loaded onto distinct components, signifying that internal operational knowledge is another key dimension of SCO.

The presence of negative loadings in some factors suggests two possibilities: (a) reverse-coded items that were not consistently recoded before analysis, or (b) bipolar constructs where high scores reflect the opposite pole of the dimension.

The use of Varimax rotation with Kaiser normalization enhanced interpretability by producing more distinct factor loadings. The transformation matrix confirms that the rotated solution redistributed variance across the twelve components, yielding clearer clusters of related variables. While the orthogonal solution simplifies interpretation, some correlations among factors are theoretically expected (e.g., customer orientation may correlate with logistics orientation). An oblique rotation, such as Promax, could be applied in future work to examine these relationships. The twelve factors highlight that SCO encompasses diverse but interconnected practices: customer relationship management, competitor monitoring, logistics information systems, and operations management processes. These results underscore that achieving supply chain orientation in airlines is not limited to customer-facing practices but also relies on deep operational awareness and continuous market intelligence. For managerial practice, the findings imply that balanced investments across these dimensions are necessary to build robust, integrated airline logistics systems.

The rotated component matrix you provided in Table 6 in the appendix summarizes the results of a principal component analysis (PCA) with varimax rotation on various supply chain orientation variables for Nigerian Air Peace Airlines. Each variable's loading on a component indicates how strongly it is associated with that underlying factor. High absolute values (commonly above 0.7 or 0.8) suggest a strong relationship between the variable and the component.

Table 6. Rotated Component Matrix for Air Peace Supply Chain Orientation Variables

	Component											
	1	2	3	4	5	6	7	8	9	10	11	12
Serve customer needs	.066	-.091	-.069	-.021	.071	.024	.216	.414	-.041	.001	-.823	.008
Communicate information	-.086	.106	-.003	.081	-.089	.097	.082	-.774	-.031	-.082	.324	-.017
Develop value chain strategies	.112	.013	-.034	-.008	.010	-.013	-.924	.243	-.034	-.005	.096	.036
Measure customer satisfaction	-.039	.015	.083	.012	-.003	.020	-.080	.001	.870	.025	-.090	.111
Disseminate data	-.008	-.099	-.025	.129	-.115	.116	.114	.550	-.509	.021	.160	.214
Help customer	.016	-.002	.095	.069	.082	.065	.172	.119	.850	-.065	.134	-.019
Discover customer needs	-.053	.005	-.043	-.051	.112	-.026	.410	.136	-.053	-.037	.840	-.102
Seek opportunities	.047	-.014	-.051	-.109	.231	.061	.018	.739	.124	-.092	.046	-.114
Recognize customer needs	-.095	.003	.021	.027	.064	.095	.831	.301	.012	-.091	.266	.025
Communicate information about the competitor	.077	-.040	-.076	-.016	.158	-.037	-.096	.037	.090	.716	-.158	.128
Assess competitors systematically and frequently	.054	.142	-.020	.062	-.149	-.034	-.036	-.157	.077	.575	.055	.561
Disseminate data on competitors at all levels regularly	.134	-.034	.039	.030	-.108	-.133	-.099	-.023	.273	-.626	-.022	.090
Understanding competitors to be prepared for development in our market	-.059	.022	.039	-.025	.923	-.031	.001	.106	.094	.019	.062	-.086
Try to discover additional actions from our competitor	.002	-.001	-.111	.026	-.401	-.042	-.091	-.039	.067	.696	.149	-.327
Try to recognize the competitor's action	-.092	.056	.134	-.021	.130	-.056	-.017	.021	.030	-.085	-.089	.841
Extrapolate key trends to understand what competitors may do in the future	-.082	.043	.076	-.035	.951	.001	.044	.139	.007	.036	-.027	.183
Constantly monitor commitment to understanding logistics activities	.129	.979	-.088	-.056	.012	.044	-.011	-.035	.019	.012	.023	.031
Communicate information about logistics activities across all units	.123	.981	-.096	-.047	.009	.052	-.011	-.043	.013	.015	.022	.028
Develop value chain strategies based on an understanding of logistics	.962	-.108	-.053	-.071	-.048	.076	-.066	.022	-.016	.033	-.008	-.036
Assess logistics activities systematically and frequently	.894	.409	-.091	-.091	-.029	.065	-.033	-.002	.010	.011	.003	-.010
Disseminate data on logistics activities at all levels	-.983	.097	.051	.080	.040	-.046	.032	-.023	-.005	-.004	.009	.028
Understanding logistics activities to be prepared for market development	.798	-.592	.005	-.046	-.039	.014	-.022	.042	-.003	-.004	-.019	-.039
Try to discover additional logistics	-.382	.917	-.060	-.001	.027	.023	.006	-.050	.009	.011	.024	.039
Seek opportunities in an area where the current logistics have difficulties	-.983	.097	.051	.080	.040	-.046	.032	-.023	-.005	-.004	.009	.028
Try to recognize logistics possibilities	-.382	.917	-.060	-.001	.027	.023	.006	-.050	.009	.011	.024	.039
Extrapolate key trends to understand what future logistics activities need	.863	-.100	-.047	-.117	.001	.023	-.059	.050	-.011	-.056	-.085	.028
Constantly monitor commitment to understanding operations management	-.030	-.108	-.662	-.203	-.062	.194	-.061	.072	-.097	-.015	.027	-.169
Communicate information about logistic operation management activities	.119	.230	-.817	-.156	-.029	.267	.095	-.006	-.021	.125	-.049	.070
Develop value chain strategies based on understanding OM	-.102	-.168	.938	.138	.035	-.118	.000	-.017	.064	-.081	.018	.017
Assess operation management activities systematically and frequently	.132	.123	-.134	.049	-.013	.900	.113	-.032	.075	.064	-.038	.021
Disseminate data on operational management activities	-.073	-.015	.210	.517	.024	-.763	.027	-.066	.036	.025	-.010	.123
Understand the OM activities prepared for market development	-.132	.035	.013	.745	-.007	-.594	.049	-.063	.015	.043	-.024	.111
Try to discover additional OM possibilities	-.083	-.063	.863	-.281	.026	.260	.082	.013	.054	-.043	-.014	.062
Seek opportunities in areas where OM has difficulty delivering	-.134	-.038	.089	.971	-.034	.055	.039	-.061	.041	.006	-.012	-.001
Extrapolate key trends to understand what OM may need in the future	-.178	-.076	.076	.920	-.037	-.086	-.040	-.031	-.005	-.038	.011	-.064

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.

Factor 1: Logistics understanding and strategy

The supply chain orientation variables with high positive loadings include: developing value chain strategies based on an understanding of logistics (0.962), assessing logistic activities systematically and frequently (0.894), understanding logistic activities to be prepared for market development (0.798), and extrapolating key trends to understand what future logistic activities need (0.863). The variables with high negative loadings are: disseminating data on logistic activities at all levels (-0.983) and seeking opportunities in areas where current logistics have difficulties (-0.983). This component captures the airline's strategic focus and systematic assessment of logistics, as well as the dissemination of logistics data.

Factor 2: Logistics, Communication, and Discovery

Under this component, the variables with high positive loadings are: constantly monitoring commitment to understanding logistics activities (0.979), communicating information about logistics activities across all units (0.981), trying to discover additional logistics (0.917), and trying to recognize logistics possibilities (0.917). This component reflects communication and proactive discovery within logistics management.

Factor 3: Operations Management (OM) Strategy

The following supply chain orientation variables have high positive loadings: develop value chain strategies based on understanding OM (0.938), try to discover additional OM possibilities (0.863), and communicate information about logistic operation management activities (-0.817). Thus emphasizing the need for strategic development and a proactive approach to operations management.

Factor 4: OM Opportunities and Future Needs

The variables with high positive loadings include: seeking opportunities in areas where OM has difficulty delivering (0.971), extrapolating key trends to understand what OM may need in the future (0.92), and understanding OM activities prepared for market development (0.745). It stressed seeking and preparing for future opportunities and challenges in operations management.

Component 5: Competitor Understanding and Trend Analysis

The supply chain orientation issues with high positive loadings are: understanding competitors to be prepared for development in our market (0.923) and extrapolating key trends to understand what competitors may do in the future (0.951). The focus here is on competitor analysis and forecasting market trends.

Factor 6: OM Systematic Assessment

Only one variable has a high positive loading, that is, assess operation management activities systematically and frequently (0.9). The variables with high negative loading are: disseminated data on operation management activities (-0.763) and understanding OM activities prepared for market development (-0.594). This component systematically assesses operations management and shares related information.

Factor 7: Customer Needs Recognition

High positive loadings include: developing value chain strategies (-0.924) and recognizing customer need (0.831). This component is associated with understanding and responding to customer needs.

Factor 8: Communication and Opportunity Seeking

High positive loadings are communicating information (-0.774) and seeking opportunities (0.739). This reflects communication and opportunity-seeking within the supply chain.

Factor 9: Customer Satisfaction and Support

The variables with high positive loadings include: measuring customer satisfaction (0.87) and helping customers (0.85). This is about customer support and satisfaction measurement.

Factor 10: Competitor Data Communication

High positive loadings include the following: communicate information about competitors (0.716), assess competitors systematically and frequently (0.575), and try to discover additional actions of our competitors (0.696). This factor relates to competitor information sharing and monitoring.

Factor 11: Customer Needs Discovery

Two variables have high negative loading. These are: serve customer need (-0.823) and discover customer need (0.84). This component focuses on identifying and serving customer needs.

Factor 12: Competitor Action Recognition

Finally, only one supply chain orientation variable has a high positive loading, that is: try to recognize competitors' actions (0.841). This explains the need for recognizing and responding to competitor actions.

Table 7. Summary of the key components and associated variables

Factor	Description	High-Loading Variables
1	**Logistics strategy & understanding**	Develop value chain strategies (logistics), assess logistics, etc.
2	**Logistics, communication & discovery**	Communicate logistics info, discover logistics possibilities
3	**OM strategy & proactive approach**	Develop OM strategies, discover OM possibilities
4	**OM opportunities & future needs**	Seek OM opportunities and extrapolate OM trends
5	**Competitor understanding & trend analysis**	Understand competitors, extrapolate competitor trends
6	**OM systematic assessment**	Assess OM systematically, disseminate OM data
7	**Customer needs recognition**	Recognize customer needs and value chain strategies
8	**Communication & opportunity seeking**	Communicate info, seek opportunities
9	**Customer satisfaction & support**	Measure satisfaction, help the customer
10	**Competitor data communication**	Communicate competitor info, and discover competitor actions
11	**Customer need discovery**	Serve customer needs, discover customer needs
12	**Competitor action recognition**	Recognize competitors' actions

The above dimensions reveal that Nigerian Air Peace supply chain orientation variables cluster into distinct themes, such as logistics strategy, operations management, customer focus, and competitor analysis. Each component represents a unique dimension of supply chain orientation, with specific variables loading strongly on each. This structure can help management prioritize and tailor strategies for improvement in targeted areas of the supply chain.

5. Theoretical and Practical Implications

This research reinforces the need for Nigerian airlines to employ a customer-centric logistics strategy. Customer expectations in Nigeria's aviation sector demand proactive engagement, real-time service updates, and efficient digital interfaces. Airlines must therefore invest in CRM systems that integrate seamlessly with logistics functions to personalize experiences and foster loyalty. The need for data-driven decision-making must be adopted. The empirical dimensions of the study revealed clear dimensions of CRM and supply chain orientation. The components, such as digital booking, real-time updates, complaint resolution, and logistics strategy, should guide strategic decisions and operational improvements. In addition, technology as a critical enabler buttresses the need for AI for demand forecasting, IoT for cargo tracking, and blockchain for secure transactions, which are identified as essential tools for SCI-CRM alignment. These technologies enhance visibility, responsiveness, and reliability. On the need for strategic partnerships and supplier collaboration, the study identifies supplier lock-ins and information asymmetries as barriers. Thus, fostering collaborative supplier relationships and harmonizing information systems are necessary to improve supply chain flexibility and responsiveness. Also, it harps on the need for organizational alignment where internal integration (operations, logistics, and customer service departments) is crucial to synchronize service delivery with evolving customer demands and market trends. Finally, competitor and market intelligence are key to airline business sustainability. Strong competitor analysis and trend forecasting embedded in the supply chain orientation can help Nigerian airlines like Air Peace anticipate shifts and adjust their service portfolios accordingly.

In the short-term (0-12 months) to ensure low cost/quick wins, the airlines should: implement SMS/email/SOA-based booking confirmation and automated status notifications; deploy a lightweight chatbot for FAQs and basic complaint triage; publish and monitor a small set of operational KPIs (on-time performance, complaint resolution time, booking abandonment rate), and reconcile supplier contracts and create an exceptions register to identify lock-in clauses, start renegotiation or alternative sourcing pilot projects. However, in the medium-term (1-3 years) for systems & processes, airlines ensure CRM–SCM integration by deploying API-first middleware to integrate the CRM, reservation system, inventory/spares system, and maintenance planning (e.g., RESTful APIs, event-driven message bus). This reduces manual reconciliation and improves lead-time visibility. To achieve a predictive maintenance pilot, airlines should use IoT telemetry on a sample of ground handling equipment and aircraft subsystems, combined with an ML model for predictive maintenance scheduling. This reduces downtime and spare parts emergency procurement. For data governance, they should implement NDPR-aligned data protection processes and a customer data platform (CDP) to centralize consented customer profiles.

In the long-term (3years and above), the following strategic transformation should be radically pursued: Digital twin for operations - build a digital twin of key ground and cargo workflows to simulate capacity and disruption scenarios. Use the twin to optimise ramp operations and cargo flows; Blockchain/bilateral e-AWB for cargo - pilot blockchain-based documentation and smart contracts for high-value cargo and cross-border shipments to reduce paperwork delays and enhance traceability, and LLM-driven decision support - use LLMs for intelligent demand-sensing, customer interaction summarisation, and enhanced revenue-management recommendations (always guarded by human-in-the-loop policies).

For policy-level suggestions for regulators and industry bodies like NCAA, FAAN, they should: offer tax incentives or matching grants for airlines investing in ICT and spare parts local manufacturing to reduce foreign-exchange risk; standardise data-exchange formats (IATA e-freight/e-AWB conformance) and encourage port/airport digitalisation through PPPs; strengthen national data-protection clarity for aviation customer data while enabling secure data-sharing frameworks for safety and logistics. The following metrics for success should be adopted: availability of end-to-end tracking (target 95% visibility), reduction in complaint response time (target 50% reduction in 12 months), spare-parts lead-time reduction (target 30% for critical parts), and improved Net Promoter Score (NPS) by X points.

6. Conclusion

Air Peace Airlines may face challenges with infrastructure, including inadequate airport facilities, limited air traffic control systems, and poor road networks for the ground transportation of goods. These factors can hinder the seamless flow of goods and materials through the supply chain. Air Peace Airlines often relies on imported aircraft, spare parts, and maintenance equipment, leading to supply chain complexities, longer lead times, and exposure to currency fluctuations. Efforts to localize procurement and develop domestic manufacturing capabilities could improve supply chain resilience. Nigerian airlines collaborate with global suppliers, maintenance providers, and logistics companies to streamline supply chain operations. However, challenges related to cross-border trade, customs clearance, and regulatory compliance may impede effective collaboration. The adoption of technology in supply chain management is gradually increasing among Nigerian airlines. Digital solutions such as inventory management software, real-time tracking systems, and electronic procurement platforms can enhance visibility, efficiency, and decision-making. Ensuring safety and security throughout the supply chain is paramount for Nigerian airlines. Measures to mitigate risks include rigorous screening procedures, compliance with aviation regulations, and adherence to international standards for cargo handling and transportation.

Air Peace Airlines strives to improve service quality and customer satisfaction to remain competitive in the market. This includes offering reliable flight schedules, comfortable cabins, and responsive customer support. Some Nigerian airlines like Air Peace operate loyalty programs to reward frequent flyers and incentivize repeat business. These programs often include perks such as priority boarding, lounge access, and bonus miles. Nigerian airlines employ various communication channels to engage with customers, including websites, mobile apps, social media, and call centers. Prompt responses to inquiries, efficient handling of complaints, and personalized assistance contribute to positive customer experiences. Cultural factors play a significant role in CRM for Nigerian airlines. Understanding and respecting cultural norms, preferences, and communication styles are essential for building rapport and trust with customers from diverse backgrounds.

Nigerian airlines may engage in community outreach initiatives, corporate social responsibility programs, and partnerships with local organizations to strengthen relationships with customers and communities. Overall, Nigerian airlines are working to enhance supply chain integration and CRM practices to meet the evolving needs and expectations of customers while navigating operational challenges unique to the region. Continued investment in infrastructure, technology, and customer-centric strategies is essential for driving growth and sustainability in the Nigerian aviation industry.

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