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A Sustainable Supply Chain Model for Active Sports Tourism

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Abstract

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This study develops a sustainable supply chain model for active sports tourism using a mixed-method approach. The qualitative phase employed Glaser's grounded theory, analyzing in-depth interviews with 12 experts in sport management, tourism, and sport tourism, including university professors and senior managers. Trustworthiness was ensured through expert review, and coding reliability was confirmed using a test-retest approach, yielding a Kappa coefficient of 0.79. The quantitative phase involved 380 participants, including students of physical education and tourism, domain experts, managers, and practitioners in the sports and tourism sectors. Data were analyzed using confirmatory factor analysis (CFA) and PLS-SEM, while reliability was assessed through Cronbach's alpha calculated in SPSS, resulting in an overall coefficient of 0.82, indicating satisfactory internal consistency.

The findings revealed that key components include equitable distribution of services, effective communication and awareness among stakeholders, creativity and innovation in performance, and sustainability and agility in operations. Moreover, the positive impact of these components on the social, economic, and environmental performance of sports tourism was confirmed. A sustainable sports tourism supply chain can serve as an effective instrument for promoting the sustainable development of this industry in Iran. Considering the country's existing potential, attention to the identified components can enhance sports tourism performance and increase foreign exchange revenues. It is recommended that managers and policymakers strengthen this supply chain by developing appropriate infrastructure and fostering a culture of social participation.

Keywords:

Iran, Sports Tourism, Sustainable Supply Chain

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Introduction

Today, the tourism industry is recognized as one of the major sources of income worldwide and holds a prominent position as the most extensive service industry in the world (Beames et al., 2022). Consequently, many countries are engaged in intense competition to maximize the benefits and returns derived from this international activity (Lotfi Niya & Amar, 2018).

Global tourism stands as a paramount economic force and the world's largest service-based industry. Evidence from the World Tourism Organization (UNWTO) highlights its robust post-pandemic recovery, with 2023 international arrivals climbing to nearly 90% of pre-pandemic figures. This resurgence, coupled with projections that revenues will surpass pre-COVID-19 levels, cements the sector's status as a top global revenue generator. Beyond its economic impact, tourism fulfills an essential human desire for leisure, engaging 10% of the global population in what constitutes the most significant peaceful migration in history (Baharan et al., 2021).

The tourism industry is generally divided into six categories: cultural, business, religious, nature-based, health, and sports tourism. Among these, sports tourism is defined as the temporary movement of an individual from their place of residence to another region for the purpose of participating in or watching a sporting event (Preuss et al., 2007). In fact, sports tourism has emerged from the combination of the tourism industry—considered the largest and most diverse global industry—and the sports industry, one of the most entertaining and profitable sectors (Jaberi et al., 2025; Rezasoltani et al., 2024; Sami & Labbaf, 2023). Over the past two decades, sport-oriented travel has grown remarkably, and in recent years, it has become a focal point of academic research.

This previously noted growth trajectory is reflected in current global statistics, showing an annual growth rate of nearly 10% (Tasci et al., 2016) and is now regarded as a leading industry in most countries (Salimi & Labbaf, 2025b). With an annual growth rate of approximately 10%, it continues to expand rapidly. Currently, sports tourism accounts for more than 10% of global tourism revenue, and in certain destinations—such as Australia and parts of New Zealand—this share reaches 25% to even 55% (World Tourism Organization, 2019).

Furthermore, it is estimated that approximately 15 million people travel annually for sports tourism purposes. The global sports tourism market is expected to experience a compound annual growth rate (CAGR) of nearly 36% between 2019 and 2023 (Technavio, 2019). Many scholars regard international sports tourism as one of the main drivers of global tourism growth (Salimi & Labbaf, 2025b). Today, sports tourism has evolved from a marginal or secondary activity within the tourism sector into an omnipresent economic giant (Pouder et al., 2018).

To harness this potential and navigate post-pandemic volatility, the application of sustainable supply chain management (SSCM) principles becomes paramount. The concept of supply chain resilience—defined as a system's ability to return to its original state or transition to a new, desirable state following a disruption (Christopher & Peck, 2004)—is particularly critical. A resilient and sustainable supply chain must be adaptive, agile, and flexible to cope with dynamic changes and uncertainties (Beames et al., 2022; Christopher & Rutherford, 2004). These characteristics—flexibility, rapid responsiveness, visibility, and collaboration (Barzegar Vajhi Abadi et al., 2020)—are not merely operational advantages but foundational prerequisites for building a competitive and sustainable sports tourism industry, especially in developing economies with high vulnerability to global shocks.

According to UNESCO criteria, Iran ranks among the world's top ten countries in terms of tourism attractions and holds the fifth position globally in natural attractions (Tajer & Demir, 2022). Findings by Matin (2021) indicate that Iran's global and regional competitiveness in tourism has been on an upward trajectory since 2015, albeit with slow progress. In 2019, among 14 evaluated indicators, Iran's ranking declined in business environment, international openness, and land and port transport infrastructure, while other indicators showed relative improvement. Abedi et al. (2021) assessed Iran as having strong potential for attracting tourists interested in coastal and aquatic sports. González-García et al. (2022) emphasized that the development of tourism—particularly sports tourism—depends on analyzing citizens' social perceptions and evaluating their support for its advancement. Chang et al. (2022) further found that destination image and residents' perceived impacts of sports tourism are aligned with their support for its development.

Nevertheless, sports tourism stakeholders cannot overlook the importance of supply chain management if they wish to remain competitive and sustainable. Building upon the earlier discussion of supply chain resilience, sustainable supply chain management in sports tourism similarly requires flexibility, visibility, rapid responsiveness, and collaboration to support competitiveness and continuity after disruptions (Christopher & Peck, 2004). Beames et al. (2022) and Christopher and Rutherford (2004) highlight that sustainable processes are resilient, flexible, and agile—capable of rapid adaptation to change. This dynamic adaptability enables a supply chain to either recover its original function or achieve a more desirable

operational state following disruption. Barzegar Vajhi Abadi et al. (2020) identified four key elements of sustainability frequently cited in the literature: (a) flexibility, (b) rapid responsiveness, (c) visibility, and (d) productivity and collaboration. However, in Iran, fragmented governance, limited inter-organizational coordination, and inadequate planning frameworks have hindered the effective implementation of such principles, making the need for a structured and sustainable model even more critical.

Research confirms that Iran has not yet fully capitalized on its substantial tourism potential. The development and prosperity of this industry in Iran can lead to the integration and simultaneous utilization of both domestic and foreign resources. This strategic opportunity can diversify the local economy, create employment, generate income, and enhance the value of incoming resources within local communities.

The tourism industry holds even greater significance for developing countries that face challenges such as high unemployment, limited energy resources, and dependence on a single-product economy (Fazaeil et al., 2020). Iran, whose oil reserves constitute its primary source of national income, also possesses globally significant historical and natural attractions. This substantial tourism potential could be leveraged to promote economic sustainability. However, it is estimated that Iran earns only a small fraction of global tourism revenue, highlighting the urgent need for comprehensive planning and policy development (Baharan et al., 2021).

Tourism currently contributes approximately 0.1% to Iran's gross domestic product (GDP), with the share of sports tourism estimated to be less than 0.001%. This is despite the World Tourism Organization's (WTO) estimation that Iran's potential foreign exchange earnings from tourism could far exceed its oil revenues (Salimi et al., 2014, cited in WTO). In the realm of sports tourism, Iranian policymakers have begun to recognize the substantial benefits of developing this sector. For example, a memorandum of cooperation has been signed between the National Olympic Committee of Iran and the Cultural Heritage, Handicrafts, and Tourism Organization to promote sustainable sports tourism. Additionally, a specialized commission has been established within the National Olympic Committee to address this issue. Nevertheless, there remains a lack of comprehensive commitment and coordinated effort toward its large-scale development (Mortezaee & Kalate Seifari, 2020).

Among the various branches of tourism in Iran, sports tourism stands out as one of the most promising sectors with significant potential to generate substantial revenue under diverse conditions (Moharramzadeh & Imanzadeh, 2019). The importance of sports tourism has become so pronounced in some countries that, through effective management, planning, and the implementation of structured strategies, they have succeeded in turning it into a major contributor to their national economies. Global initiatives in this regard include the establishment of specialized degree programs in sports tourism at universities in the United States, the United Kingdom, and Australia at the undergraduate, master's, and doctoral levels; the publication of academic journals and the organization of international conferences; and the creation of online platforms dedicated to promoting sports tourism attractions and destinations (Sudarmanto et al., 2025).

In contrast, Iran still suffers from a lack of sufficient understanding, inadequate management, and the absence of well-defined strategies, which have collectively led to the neglect of this promising sector and the loss of unique opportunities. Considering the extensive economic, social, political, cultural, and environmental benefits of sports tourism—alongside the growing public desire for active and dynamic leisure activities—there is an urgent need for policymakers, planners, and administrators to focus on the development of this sector to build a healthier and more vibrant society.

Naturally, the structure of the supply chain in a service-based context such as tourism differs fundamentally from that of a traditional business environment and includes its own unique components. Furthermore, a review of the existing literature reveals a clear research gap in this area. A review of the literature identified two key studies in related domains: Asadi et al. (2020), who explored factors associated with the health tourism supply chain, and Yektayar (2019), who proposed indicators for service supply chain management in sports.

While countries like Australia have successfully integrated these principles, turning sports tourism into a major economic contributor, the academic literature lacks comprehensive models that translate these macro-level successes into a structured, operational supply chain framework applicable to developing nations like Iran. This study seeks to fill this gap by not only identifying the components but also delineating their hierarchical relationships and interactions within a sustainable supply chain model, thereby providing an actionable roadmap for policymakers and managers.

Research Methods

This study employed a mixed-methods approach, combining qualitative and quantitative methods within an exploratory and expert-oriented framework. Using a descriptive-analytical approach, the research sought not

only to understand the current situation but also to elaborate on the underlying dimensions of the issue. The study did not begin with predefined hypotheses; instead, it aimed to develop hypotheses through empirical exploration.

The participants for this study were selected from a statistical population comprising university professors specializing in physical education and tourism, domain experts, managers, and active practitioners in the sports and tourism sectors. To ensure the selection of knowledgeable and experienced participants, specific inclusion criteria were applied across all phases: (1) a minimum of 5 years of professional or academic experience in sports tourism, physical education, or tourism management; (2) direct involvement in sports tourism planning, management, or operations; and (3) willingness to participate in the study and share their expertise.

In the qualitative phase, participants for the in-depth interviews were selected through purposive and snowball sampling methods. The initial participants were chosen based on their recognized expertise and publications in the field, and they were then asked to recommend other qualified experts (snowball sampling). This process continued until theoretical saturation was achieved, meaning that new interviews no longer yielded new concepts or categories. Theoretical saturation was reached after conducting 12 interviews. The final qualitative sample consisted of 5 professors of sport management, 2 professors of tourism, 2 general directors from the Department of Sports and Youth, and 3 sport tourism experts.

In the quantitative (survey) phase, based on the model dimensions, a total of 380 participants were selected using Cochran's simple random sampling formula from among professors, Ph.D. Data for the quantitative phase were collected using a structured questionnaire. The questionnaire was developed based on the components and indicators extracted from the qualitative phase. It employed a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to measure participants' agreement with the statements reflecting the sustainable supply chain model components. The collected quantitative data were analyzed using IBM SPSS Statistics (Version 24) and SmartPLS software (Version 4). It is noteworthy that an Exploratory Factor Analysis (EFA) was not conducted in SPSS. This methodological choice was deliberate; since the measurement model's structure was developed a priori and grounded in the in-depth qualitative findings, the quantitative phase was dedicated to confirming this theoretically established structure using Confirmatory Factor Analysis (CFA) within the SEM framework, rather than exploring it anew. The quantitative sample consisted of students in physical education and tourism, domain experts, managers, and practitioners in sports and tourism. Following the extraction and final confirmation of the model components, expert panels consisting of 8 to 12 scholars and specialists were convened to refine and validate the final model. The panel members were purposively selected from the initial pool of qualitative and quantitative phase participants based on their extensive experience (over 15 years) and expertise in both sports management and tourism sectors, ensuring a deep and diverse understanding of the subject matter. Data analysis was conducted according to the process illustrated in Figure 1.

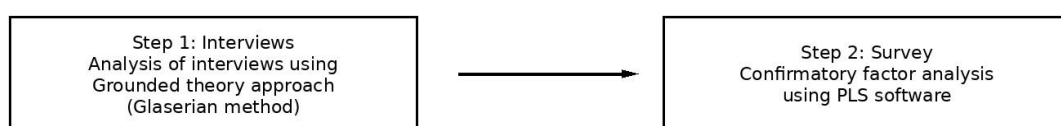


Figure 1. Research Process

In the first phase, after each interview, the participants' responses were transcribed and analyzed using thematic analysis based on Glaser's grounded theory approach. Coding was performed after each interview, and this process continued iteratively until theoretical saturation was achieved.

The second phase involved quantitative data collection and confirmatory factor analysis (CFA) to validate the proposed model.

For the qualitative data analysis, the interviews were transcribed and then managed and coded using MAXQDA software (version 2022). This software facilitated the systematic organization of the data, the application of open, axial, and selective coding as per Glaser's grounded theory, and the visual exploration of emerging categories and their relationships. In the qualitative phase, the Lincoln and Guba (1985) criteria were used to ensure trustworthiness, encompassing four elements: credibility, transferability, dependability, and confirmability. Additionally, the test-retest reliability index was calculated for the researcher's coding consistency over time. To this end, the researcher re-coded three interviews after a 10-day interval, yielding a reliability coefficient of 79%. This coefficient, while in the acceptable range for exploratory qualitative research (Vanbelle et al., 2024; Landis & Koch, 1997), primarily indicates a high level of consistency in the

researcher's coding interpretation over time. It is acknowledged that in grounded theory, the focus is on the theoretical development of categories rather than purely quantitative measures of intercoder agreement.

In the quantitative phase, construct and content validity were assessed through confirmatory factor analysis (CFA) using PLS software, while reliability was evaluated through Cronbach's alpha, which yielded an overall coefficient of 0.82, indicating satisfactory internal consistency. The CFA and structural equation modeling (SEM) were conducted using SmartPLS software. The selection of SmartPLS was justified by its primary function for prediction-oriented modeling and theory development, its robustness with non-normally distributed data, and its effectiveness in handling complex models—characteristics that align with the exploratory nature and objectives of this study. The analysis employed the partial least squares (PLS) algorithm with a path weighting scheme and a maximum of 300 iterations to estimate the model parameters. The bootstrapping procedure with 5000 subsamples was used to assess the significance of the path coefficients.

Findings

The demographic characteristics of the study sample are presented in Table 1.

Table 1- Demographic characteristics and frequency distribution of interviewees

Demographic Dimension	Subcategory	Frequency	Percentage
Position	Professor of Sport Management	5	41.67
	Professor of Tourism	2	16.67
	General Director of the Department of Sports and Youth	2	16.67
	Expert in Sport Tourism	3	25.00
Education	Ph.D.	10	83.00
	Master's Degree	2	17.00
Work Experience	Less than 10 years	3	25.00
	11–20 years	5	41.67
	20 years and above	4	33.33

Through thematic analysis of interviews conducted with 12 experts and professionals in the field—whose characteristics were presented in Table 1—the main components of the sustainable supply chain model for active sport tourism were identified. Using Glaser's grounded theory approach, each interview was coded systematically, leading to the extraction of theoretical categories as presented in Table 2.

Table 2- Theoretical coding derived from the integration of open and axial coding

Theoretical Coding	Core Category	Open Coding
Equitable Distribution of Services	Creating a Sense of Belonging	Reviving a sense of belonging among tourists; Ensuring equitable service delivery to all tourists; Establishing talent identification and support centers for sport tourists; Ensuring budget allocation to support athletic talents.
Strengthening the Social Dimension through Participation	Fostering Participatory Environment and Cultural Awareness (Social Dimension)	Ensuring sufficient supplier participation; Providing social support to industry actors; Promoting awareness and cultural education; Social accountability toward challenges and events; Securing stakeholder support; Encouraging private sector participation; Implementing broad advertising; Leveraging athlete and club brands while preserving intellectual property; Removing inefficient suppliers.
Awareness-Raising and Effective Stakeholder Communication	Education and Awareness Proper Communication Management	Developing educational programs; Ensuring continuous training on standards for staff, tourists, and stakeholders; Implementing empowerment programs; Establishing leadership in development and training. Effective communication with athletes, fans, media, and stakeholders; Promoting intra- and inter-organizational collaboration; Maintaining active public relations;

Theoretical Coding	Core Category	Open Coding
Enhancing the Economic Dimension through Cash Flow	Transparency and Proper Information Dissemination	Ensuring staff awareness of operational policies; Ensuring stakeholder awareness of operational policies. Leaders' policies are transparent and properly communicated.
	Establishing Liquidity Flow and Financial Support (Economic Dimension)	Ensuring financial liquidity within the supply chain; Providing cost-effective services; Forecasting inbound sport tourists; Creating employment opportunities in sport tourism; Offering unique services; Achieving profitability; Establishing commercial centers for sports-related goods and services; Managing contracts effectively; Controlling costs and pricing; Ensuring leaders secure adequate funding; Identifying and managing target markets; Supporting professional and branded clubs.
Health and Environmental Considerations	Promoting Health and Hygiene (Environmental Dimension)	Providing comprehensive health and hygiene services; Leaders monitor vaccination and health conditions of tourists.
Implementing Integrated Performance Management Systems	Accountability and Feedback	Establishing key performance indicators across dimensions; Ensuring accountability to audiences; Enhancing audience satisfaction; Implementing performance-based reward systems; Developing feedback evaluation mechanisms; Maintaining process feedback systems; Ensuring performance management tools exist; Defining guiding performance policies; Leaders implement evaluation systems.
Sustainability and Agility in Operations	Integrated Performance Management System Risk Assessment and Management	Applying risk management in decision-making; Holding risk management sessions; Maintaining checklists and infrastructure for risk control.
	Sustainability Flexibility	Ensuring system stability and sustainability; Proper maintenance and preventive management of facilities and equipment. Providing flexible services to athletes; Responding flexibly to challenges and events; Promoting organizational dynamism, agility, and coordination.
Innovation and Creativity in Operations	Service Delivery Speed	Ensuring time management processes in tourism services; Ensuring accessible and standardized service delivery.
Establishing Proper Infrastructure	Employing Creativity and Innovation	Integrating creativity and innovation into operations.
Utilizing Core Competencies and Capabilities	Adequate Infrastructure Information Technology Infrastructure	Providing suitable infrastructures; Ensuring compliance with safety and resilience standards. Enabling online booking for athletes; Ensuring IT infrastructure availability; Maintaining an up-to-date supplier database; Utilizing modern technologies.
	User-Friendly Technologies	Employing apps and user-friendly digital tools.
	Structural Organizational Alignment	Aligning with cultural and political structures; Ensuring relevant legislation and regulations; Governmental supervision; Securing governmental support;
	Organizational Competence and Meritocracy	Employing competent human resources; Effective management of athletes; Proper management of sport services; Leadership that motivates and educates employees.

Theoretical Coding		Core Category	Open Coding
Total Quality Management (TQM)	Quality	Capacity and Resource Management	Providing a wide range of tourism services; Ensuring service capacity; Utilizing tourism potential; Organizing events and competitions; Leveraging international support; Engaging scientific institutions; Promoting recreation and enjoyment for tourists.
		Comprehensive Quality Management	Ensuring post-service processes; Establishing transparent service delivery pathways; Ensuring supplier selection quality; Ensuring process and product quality; Implementing review processes for efficiency improvement; Managing sport events effectively.
		Simplified and Integrated Processes	Ensuring defined processes are simple and comprehensive.
		Goal Orientation	Existence of strategic planning.
Visionary Competent Leadership	and	Knowledgeable and Capable Leadership	Ensuring leaders are aware of process execution and improvement; Ensuring leaders understand tourist priorities.
Governmental Support Governance Systems	and	Utilizing Governance Capacity	Aligning policies with national strategies in event execution; Ensuring proper governmental oversight to eliminate intermediaries; Establishing suitable governmental frameworks for policy implementation.

To identify the components and indicators of the sustainable supply chain model for active sport tourism, Structural Equation Modeling (SEM) was employed. Before presenting the SEM model, the demographic characteristics and main variables were analyzed using SPSS software. These characteristics are presented in Table 3.

Table 3- Demographic characteristics of the quantitative sample

Variable	Category	Frequency	Percentage
Gender	Male	131	34.5
	Female	249	65.5
Field of Study	Related to Tourism	116	30.5
	Related to Physical Education and Sport Sciences	264	69.5

Subsequently, the structural equation model was analyzed and is illustrated in Figure 2, representing the model structure based on factor loadings.

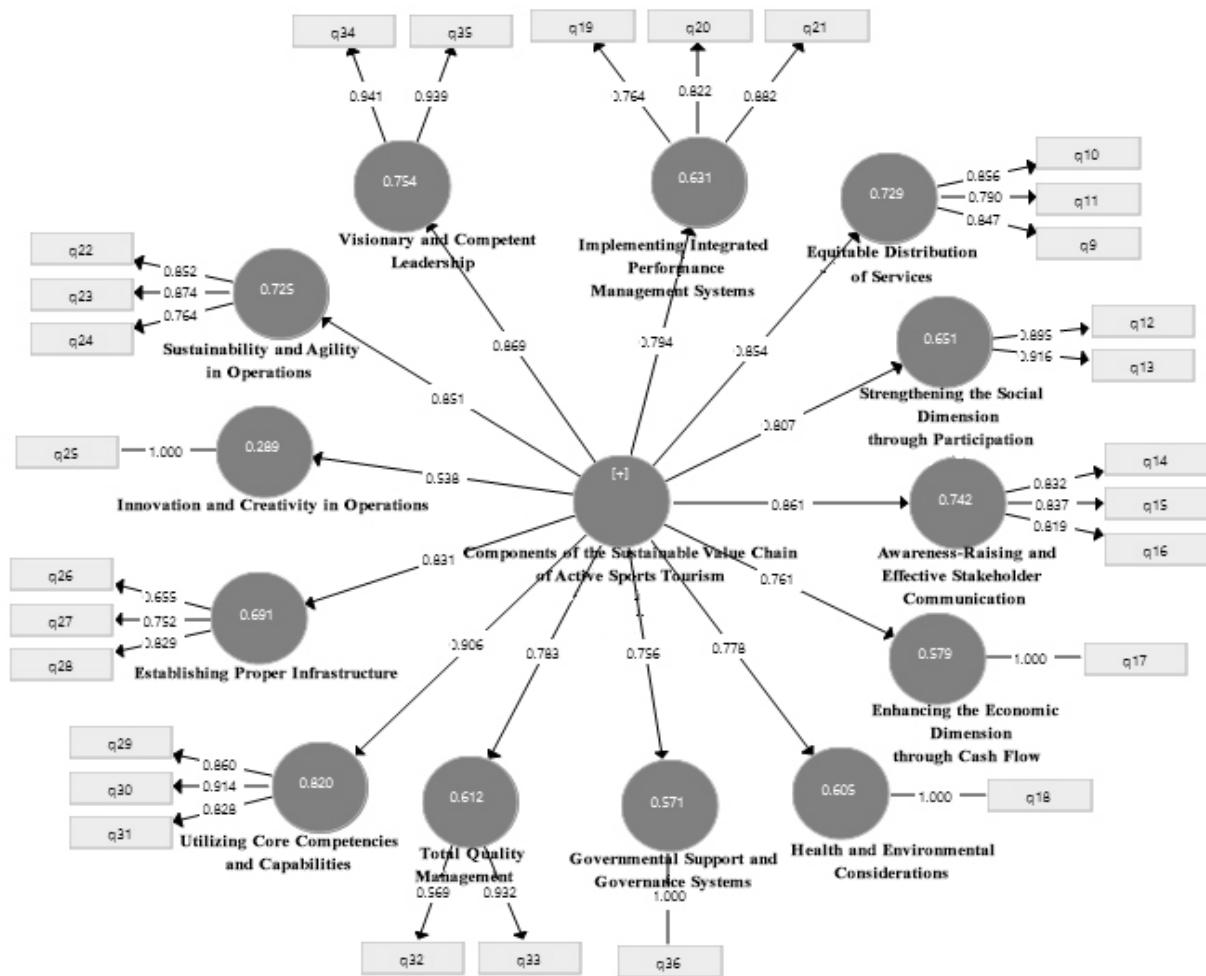


Figure 2. Structural Equation Model Based on Factor Loadings

The overall model fit indices for the structural equation model (SEM) are presented in Table 4.

Table 4- Overall fit indices for the SEM model

Index	Value	Acceptable Threshold
SRMR	0.101	< 0.08 (Acceptable)
Chi-Square	15.788	-
NFI	0.099	> 0.90 (Good)
RMSEA	0.06	< 0.08 (Good)
CFI	0.92	> 0.90 (Good)

The model fit indices present a mixed picture. The SRMR value of 0.101 is slightly above the ideal threshold of 0.08, and the NFI value of 0.099 is below the conventional cutoff. These indices, which are sensitive to model complexity and sample size, suggest room for improvement in the model's exact fit. However, the primary evaluation criteria in the PLS-SEM approach focus on predictive power and the significance of the structural paths. As presented in Table 5, all factor loadings are highly significant ($p < 0.001$) and substantial. Furthermore, the R-squared (R^2) values indicate that the model explains a substantial portion of the variance for most constructs. Most critically, the Stone-Geisser's Q^2 values for all constructs are above zero, providing clear evidence of the model's predictive relevance. The value of '1.000' on some paths in Figure 2 represents fixed loadings for reference indicators, which is a standard graphical convention in SEM. Therefore, based on the criteria of path significance and predictive relevance, the model is considered robust for the explanatory purposes of this study. The relatively lower R^2 for 'Creativity and Innovation in Operations' (0.292) suggests that while it is a significant component, its variance is also influenced by factors beyond this model, presenting an avenue for future research. The indices indicate that the proposed model is supported by the empirical data, meaning that the data fit the model adequately. Overall, the fit indices suggest the appropriateness and acceptability of the structural equation model.

The reliability and validity of the measurement model were assessed. As shown in Table 5, all constructs demonstrated satisfactory reliability, with Cronbach's alpha and composite reliability (CR) values exceeding the recommended threshold of 0.7. Convergent validity was established as the average variance extracted

(AVE) for each construct was above 0.5. Furthermore, all factor loadings were significant and greater than 0.7, confirming indicator reliability.

Table 5- Reliability and Convergent Validity of the Constructs

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Awareness-Raising and Effective Stakeholder Communication	0.85	0.89	0.62
Utilization of Core Competencies and Capabilities	0.90	0.93	0.77
Strengthening the Social Dimension through Participation	0.82	0.88	0.60
Strengthening the Economic Dimension via Cash Flow	0.81	0.87	0.58
Equitable Distribution of Services	0.84	0.89	0.67
Government Support and Governance Systems	0.83	0.88	0.65
Health and Environmental Considerations	0.80	0.87	0.69
Visionary and Competent Leadership	0.86	0.90	0.70
Total Quality Management	0.82	0.88	0.59
Creativity and Innovation in Operations	0.79	0.86	0.61
Adequate Infrastructure	0.83	0.89	0.73
Sustainability and Agility in Operations	0.85	0.90	0.75
Implementation of Integrated Performance Management Systems	0.81	0.87	0.63

The direct effects of the model components are summarized in Table 6.

Table 6- Direct effects of model components

Component	Factor Loading	Standard Error	t-value	Significance (p)	R ²	Q ²
Awareness-Raising and Effective Stakeholder Communication	0.857	0.037	23.551	0.001	0.734	0.41
Utilization of Core Competencies and Capabilities	0.904	0.018	50.799	0.001	0.817	0.55
Strengthening the Social Dimension through Participation	0.799	0.049	16.459	0.001	0.638	0.32
Strengthening the Economic Dimension via Cash Flow	0.753	0.056	13.696	0.001	0.567	0.28
Equitable Distribution of Services	0.848	0.040	21.206	0.001	0.719	0.38
Government Support and Governance Systems	0.753	0.039	19.583	0.001	0.567	0.25
Health and Environmental Considerations	0.770	0.060	12.993	0.001	0.593	0.22
Visionary and Competent Leadership	0.866	0.025	34.166	0.001	0.750	0.45
Total Quality Management	0.782	0.033	23.558	0.001	0.612	0.31
Creativity and Innovation in Operations	0.540	0.040	13.498	0.001	0.292	0.10
Adequate Infrastructure	0.830	0.025	32.959	0.001	0.689	0.35
Sustainability and Agility in Operations	0.851	0.026	32.341	0.001	0.724	0.42
Implementation of Integrated Performance Management Systems	0.795	0.027	28.987	0.001	0.632	0.29

As observed, the coefficient of determination (R²) values is generally satisfactory and exceed 0.5, except for the component "Creativity and Innovation in Operations". All defined relationships for independent variables are statistically significant. It should be noted that there are no indirect effects in this model.

Discussion

The present study was conducted to develop a sustainable supply chain model for active sport tourism.

The study identified several key components of the sustainable supply chain strategy, including: equitable distribution of services, awareness-raising and effective stakeholder communication, creativity and innovation in operations, sustainability and agility in performance, IT infrastructure, and organizational culture (comprising the utilization of core competencies and capable, visionary leadership). The role of IT infrastructure is particularly critical, as it enables the visibility, coordination, and real-time data exchange

necessary for achieving the agility and responsiveness highlighted in sustainable supply chain theory (Christopher & Peck, 2004). The social performance dimension includes strengthening the social dimension through participatory approaches; the economic performance dimension encompasses enhancing economic flows through proper cash management and government support; and the environmental performance dimension covers adherence to health and environmental standards. Furthermore, risk and compliance management are ensured via the implementation of integrated performance management systems, and policies, procedures, and standards are governed through total quality management (TQM).

The findings of this study both align with and extend the existing literature on sustainable supply chains and tourism development. The critical role of equitable distribution of services resonates with the emphasis on social sustainability and inclusive growth highlighted by González-García et al. (2022), who found that residents' support for tourism is tied to perceived fair benefits. Similarly, the centrality of effective stakeholder communication and awareness-raising directly supports the conclusions of Chang et al. (2022), which underscored the importance of destination image and stakeholder perceptions. Furthermore, the identification of agility, flexibility, and resilience as core components strongly aligns with the foundational principles of sustainable supply chain management put forth by Christopher & Rutherford (2004) and operationalized in a tourism context by Beames et al. (2022). However, this study moves beyond these individual concepts by integrating them into a cohesive model. A key divergence from the broader literature, such as that on Australia's success (World Tourism Organization, 2019), is the model's specific emphasis on government support and governance systems as a vital economic enabler. This highlights a critical contextual difference, suggesting that in developing economies like Iran, proactive governmental scaffolding is a prerequisite for activating other components of the sustainable chain, whereas in more mature markets, these may evolve through private sector leadership. However, the implementation in the Iranian context may face specific challenges, such as navigating international financial restrictions (economic limitation) and adapting participatory models to the local cultural norms (cultural consideration), which require tailored approaches.

The model's three main pillars—social, economic, and environmental performance—maintain a stable and sustainable balance between risks and objectives. Specifically, enhancing the social dimension through participation, strengthening the economic dimension via proper cash flows and government support, and adhering to health and environmental standards act as control mechanisms between risks and objectives. Risk and compliance management in this model is achieved through the implementation of an integrated performance management system, which continuously and holistically evaluates market and environmental risks—the former affecting infrastructure and the latter influencing strategy. This cyclical process is only feasible through comprehensive quality management (TQM) of processes, procedures, and regulations, thereby completing the sustainable value supply chain cycle for active sport tourism.

Based on the study findings, several practical recommendations are proposed:

Short-Term Priorities (0-2 years):

1. Develop Integrated Media Campaigns: Systematically promote Iran's unique sports tourism offerings (e.g., mountain climbing, desert sports) to target markets.
2. Establish Basic Health Protocols: Monitor and standardize health, hygiene, and vaccination protocols for tourists, building on post-COVID-19 traveler expectations.
3. Form Public-Private Task Forces: Draft targeted legislation and initiate pilot projects for talent identification centers and stakeholder collaboration.

Medium to Long-Term Strategic Goals (2-5+ years):

4. Invest in Digital and Physical Infrastructure: Prioritize the development of user-friendly online booking platforms (IT Infrastructure) and upgrade related service facilities to increase delivery speed and agility.
5. Foster an Adaptive Organizational Culture: Develop training programs to enhance organizational competence and establish a flexible, performance-based structure capable of responding to market changes.
6. Secure Alternative Financing: Leverage external resources and international partnerships to ensure liquidity and de-risk high-potential investments in sports tourism.

Conclusion

The findings highlight that sustainability in sport tourism supply chains is not a unidimensional construct but an interconnected system shaped by social, economic, and environmental considerations. Consistent with the broader literature on sustainable supply chain management, the results underscore that resilience, flexibility, and stakeholder collaboration are foundational capabilities that enable destinations to withstand disruptions and adapt to uncertainty.

Qualitative insights further revealed that sustainable development in active sport tourism depends heavily on equitable service distribution, stakeholder engagement, transparent communication, and the establishment of a participatory culture among tourism and sport organizations. Experts emphasized that weaknesses in governance structures, limited inter-organizational coordination, and insufficient strategic planning remain major barriers to achieving sustainability—an observation that aligns with prior studies on tourism development challenges in emerging economies.

The model developed in this study contributes to the literature by illustrating the hierarchical interactions among critical components such as visionary leadership, agility, IT infrastructure, innovation, operational sustainability, and integrated performance management. The interplay between these elements demonstrates that sustainability emerges when strategic and operational layers are aligned, enabling continuous improvement and long-term competitiveness.

From a practical perspective, the findings provide policymakers and managers with a structured roadmap for designing and implementing sustainable sport tourism supply chains. Strengthening leadership capacity, investing in digital infrastructure, improving stakeholder communication, and institutionalizing quality management systems are essential steps toward enhancing resilience and sustainability. Ultimately, adopting a holistic and system-driven approach can enable active sport tourism destinations to achieve stable growth, improve service quality, and maximize their economic, social, and environmental outcomes.

Research Limitations and Suggestions for Future Research

Although this study provides a comprehensive framework for sustainable supply chains in active sport tourism, it has certain limitations. First, the research relied on expert interviews and survey data from a specific set of stakeholders in Iran, which may limit the generalizability of the findings to other countries or cultural contexts. Second, the study focused primarily on strategic and operational components of the supply chain and did not extensively explore the technological or policy implementation challenges in different regions.

Future research could expand the model by incorporating cross-country comparisons and investigating the impact of digital transformation and emerging technologies on the sustainability of sport tourism supply chains. Additionally, longitudinal studies could track the evolution of these supply chains over time, evaluating the effectiveness of interventions and governance strategies. Finally, researchers may explore the financial and behavioral outcomes of sustainable sport tourism practices to provide a more detailed understanding of stakeholder engagement and economic impact.

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Conflicts of Interest

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ChatGPT AI was used solely for grammatical improvement and language refinement of this article. The content, interpretation of data, and intellectual contributions are entirely the work of the authors.

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