A New Model of Sustainable Supply Chain in Sport Tourism

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Abstract

Growth in the sport industry and accessibility to information lead to interests in sport and tourism. In response to the increasing needs and market demands, sport tourism supply chain management ("STSM") has gained recognition steadily for its contribution to revenue, especially to the area of sport venue. By organizing activities, either tourism or competitions, the area gains economic benefits from the incomers. Therefore, sport tourism and related factors for supply chain management should be investigated in detail. This study proposes a new model of STSM by combining the concept of sustainability balanced scorecard with supply chain management from five perspectives: the Internal process perspective; customer perspective; financial perspective; sustainability perspective and learning and growth perspective. To comprehend factors in sport tourism development, the researchers conducted a systematic literature review and identified the factors as well as the indicators of the STSM. The result, concluded from opinions of experts in tourism, sports and supply chain under the Delphi method, shows that 18 elements and 52 indicators are relevant to the development. By categorizing the elements into 5 perspectives, the model presents key aspects of the development of the STSM to apply in strategy development in industry and reduce the impacts on environment as well as increase efficiency in organizing activities.

Keywords: 1) Sport Tourism 2) Sustainability Balanced Scorecard 3) Supply Chain 4) Delphi Method

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Introduction

The concept of sport tourism has drawn attention in these recent years due to the needs from cities and tourist attractions responding to increasing demands. Numbers of research have been conducted to identify influences and draft a strategy to promote the concept. For example, the study on Mashhad metropolis in Iran, a city with unique attraction on characteristics of resident, nature and religion, has revealed that the roadmap of sport tourism, urban green space, favorable climate and factors on environment, society and health impact attract sport tourism (Darabi, et al., 2020, pp. 1–32). In addition to the existing capacity of a tourist attraction, sport tourism raises awareness and generates new value as tourists receive new experiences from cultural inheritance. For instance, the Polish Tourism Organization has initiated a new tourist attraction plan on sport by utilizing its long sport history and the fact that most of the Poles are fans of certain sports. It leverages a museum exhibition as one of the programs for sport tourists and include sports int a curriculum for the coming generations to understand and sustainably transfer the wisdom. The activities lead to the development in standard of living, economy, ecosystem, society and culture (Malchrowicz-Mosko and Munsters, 2018, pp. 25–38). Another example is from South Africa, where the country positions itself as a sport destination for foreign athletes thanks to its destination brand image, namely, favorable climate, attractive exchange rate and fascinating natural landscapes. Nevertheless, the country is in the process of development to improve safety condition, requiring investments from public entities and private organizations (Hemmonsbey and Tichaawa, 2020, pp. 177–194).

To examine correlations within a supply chain and identify means to reduce and manage complexities in tourism industry, service sector is a target of the study. While service is intangible, it demands extensive commitments from stakeholders, involving the whole process of supply chain management including forecasting, planning, implementation and control. It involves external and internal integration of information and finance along product flow to comprehensively respond to the needs of customers (Zhao and Abili, 2019, pp. 789–810). Existing studies mention four main pillars of sport tourism: the athletes, venue, fans & spectators and logistics management of sports equipment while using the supply chain operations reference model or SCOR as a tool for its wide coverage on all activities in sport logistics (Herold, et al., 2019, pp. 357–359).

In contrast to profitdriven development, sustainable development in sport tourism considers maximization of positive impacts from the activities to the environment. While tourism brings significant economic impacts, utilization on natural resources should be attentively monitored. For example, certain development plans should be implemented for riverside tours as the river is the resource for water activities, with a potential to develop into tourist attractions when supported by well functioned infrastructure and facilities (Ferreira and Carneiro, 2021, pp. 146–166). A prominent development can be found in

Japan where sustainable sport tourism consists of socialpsychological dimension, economic dimension, social and cultural dimension and, lastly, environmental dimension. These four dimensions enable sustainability in organizing activities related to sport tourism (Hinch and Ito, 2018, pp. 96–101). In recent years, sustainability has increased its role in sport tourism. As a tool for an organization to measure its performance on sustainability, the sustainability balanced scorecard ("SBSC") is widely implemented because it enables businesses, including corporates in sport tourism, to address challenges more efficiently. The SBSC monitors performance from five perspectives, namely, the internal process perspective, customer perspective, financial perspective, sustainability perspective and learning and growth perspective (Heebkhoksung, Rattanawong and Vongmanee, 2023, pp. 1–19).

The integration of the SBSC into supply chain management is an important tool to manage sustainability in economy, society and environment in sport tourism industry. The combination is efficient to promote sustainability and high standard management to support public authorities in formulating a plan that includes businesses and sustainability for long-term development. Moreover, it promotes tourism while creating positive impacts on locality and environment, with planning and selection of appropriate resources to support sport tourism. By gathering data and analyzing the needs of stakeholders, analysts are able to propose qualified and sustainable development guidance for resource allocation. The results enable related organizations to develop and improve suitable location for sport activities such as competing ground, sport venues, facilities for participants and management of location to maximize its capacity. In addition to management, public and private sectors are beneficial from sport tourism as it creates a space for both sectors to collaborate such as the alliance between sport association and tourism agency to promote activities. By doing so, both parties mutually achieve financial performances, use natural resource, mange environment and establish social stability. Therefore, inclusive sustainable planning and supply chain operation with the SBSC as a monitoring tool will enable stakeholders, ranging from local entrepreneurs, participants, promotion agencies to sport associations, to achieve the desired performances in sustainable management in sport tourism.

To investigate characteristics of sustainable development in sport tourism, this research is structured into five sections as follows. Section 1 presents introduction. Next, Section 2 describes research methodology. Section 3 explains the results of the study with highlights on characteristics of sport tourism supply chain management. Then, Section4 discusses and interprets the results of STSM. Lastly, Section 5 concludes the study with summary, limitations and future work.

Research Methodology

This research aims to reduce the impacts from supply chain management in sport tourism and improve sustainable sport tourism industry by implementing the sustainability balanced scorecard. To obtain an indicator,

the researchers conduct systematic literature reviews, then obtain a consensus on the characteristics of STSM with the Delphi method.

Literature Review

To explore a topic of the study, the researchers conducted a systematic literature review to research other studies, including experimental research, descriptive research and qualitative research (Briner and Denyer, 2012, pp. 112–129), as a reference and foundation to improve the research related to supply chain management in sport tourism. The systematic literature review consists of the three following stages.

1. Identification stage: to search for the data related to sustainability management in sport tourism, the researchers explored related literatures with keywords on "sport logistics", "sport supply chain", "tourism logistics", "tourism supply chain", "travel logistics", "travel supply chain", "sport tourism supply chain", "sport tourism logistics", "sport tourism", "tourism sport" and "sport tourist". The researchers relied on Scopus and Web of Science (SSCI), then selected only the studies published during 2017 and 2021. To reduce a bias, the researchers limited the keywords into only English, therefore, all non-English literatures were removed at this stage.

2. Screening stage: the remaining literatures were screened by the preliminary review. Irrelevant papers were removed at this stage.

3. Included stage: the papers were examined thoroughly to review the characteristics of the STSM. During this stage, criteria and indicators of the STSM model were derived.

4. In summary: literature review is a process to analyze the characteristics of supply chain management in sport tourism before obtaining a consensus from the experts in tourism, sports, logistics and supply chain management.

Selection of Experts

The researchers used the Delphi method to compile a consensus from the experts for the dataset, consisting of elements and indicators. As the appropriate number of experts are varied from 5 to 20 persons (Rowe and Wright, 2001, pp. 125–144), the researchers invited 18 experts with the criteria of selection as follows: (1) the expert must have expertise in tourism, sport, logistics or supply chain; (2) the expert must have a master's degree or doctoral degree; and (3) the expert must have experiences in tourism, sport, logistics or supply chain. All criteria were set to ensure qualification on capabilities and understandings in the supply chain management in sport tourism to develop the sport tourism industry sustainably.

Delphi Method

Generally, the Delphi method is used to obtain insights and exchange information for group decisions or opinions. The study implements the Delphi method to examine characteristics of sport tourism sustainability management as below.

Step 1: the researchers gathered opinions from the experts by distributing a questionnaire to all qualified eighteen experts as described in Selection of experts. The questionnaire was developed from three sections: demographic questions; evaluation on the level of significance of each factor toward

the STSM; and free space for suggestions. In section two, the experts were required to rate their answers into "1" to "5" where "1" refers to the least important and "5" refers to most important. The scores were then ranked from the highest to the lowest to show the level of significance (Yoopetch, Kongarchapatara and Nimsai, 2023, pp. 1–14).

Step 2: the researchers used descriptive statistics to define criteria of consensus. The criteria consist of three conditions. Firstly, the median equals to or larger than 3. Secondly, the interquartile range ("IQR") equals to or less than 1 for the five scale measurement (Brouwer, et al., 2019, pp. 1–7). Thirdly, the Kendall's coefficient of concordance or W is mandatorily below 0.5 to be appropriate under the Delphi method (Kendall and Smith, 1939, pp. 275–287). Before finding the IQR, the pth quartile or qn(p) was calculated from the data set x1, x2, ... , xn., where xn was the minimum score; xn was the maximum score; and p ranges between 0 and 1 (Kraaikamp and Meester, 2005, pp. 234–236). Given k = p(n+1) and α = p(n+1) – k, qn(p) was calculated by Equation (1).

$$q_n(p) = x_{(k)} + \alpha\,(x_{(k+1)} - x_{(k)}) \qquad (1)$$

Next, IQR or a difference between the upper quartile or q_n (0.75) and the lower quartile or q_n (0.25) was calculated as shown in Equation (2).

$$IQR = q_n\,(0.75) - q_n\,(0.25) \qquad (2)$$

When a result met all three criterions, it was considered as a consensus and accepted as an indicator. On the other hand, the result that did not meet the three criterions was rejected. The questionnaire was thereafter modified and redistributed to the experts for reconsideration.

Results

Literature Review

The analysis from 57 literatures classified the main composites of supply chain management in sport tourism into 4 pillars: tourism logistics management; venue logistics management; participants logistics management; and equipment logistics management. Among the four pillars, the venue logistics management aligns with the proposal of Herold, et al. that all operations related to venue, including information management, planning and coordination, contribute the most to the success of events (Herold, et al., 2019, pp. 357–359). Each pillar consists of indicators regarding supply chain management in sport tourism with the details can be summarized as follows.

Pillar 1: Tourism Logistics Management

Tourist service infrastructure: among the improvements in infrastructure and facilities related to global extreme sport tourism in Malaysia (Ahmad, et al., 2019, pp. 449–453), major improvements were found in accommodation, sites, entertainment spots, shopping centers, and food and beverage (Aicher, Buning and Newland, 2020, pp. 542–553; Hritz and Cecil, 2019, pp. 224–240; Malchrowicz-Mośko and Poczta, 2018, pp. 1–19; Mirehie, et al., 2021, pp. 1–9; Priporas, et al., 2018, pp. 745–765; Yang, et al., 2020, pp. 1–16). Therefore, there is still a room of improvement to increase customer satisfaction, in particular, (Markus, et al., 2019, pp. 141–150) public transportation

(Dickson, Darcy and Walker, 2021, pp. 1–21; Lyu and Han, 2017, pp. 740–758). As it is a supporting mechanism for tourists to reach the destination, all land, water and air transportation (Spector, 2017, pp. 159–177), together with the investment should be considered (Joksimović, et al., 2021, pp. 1170–1187).

Tourism destination and sustainability: favorable climates and safety are important factors for tourists to select a destination (Hemmonsbey and Tichaawa, 2020, pp. 177–194). In addition to the attraction, its nearby activities such as recreation, arts, exhibitions and cultural engagement (Pedauga, et al., 2020, pp. 1–22) also play parts in consideration. Regarding accommodation, good quality of food, reasonable stay with activities, location (Perić, Vitezić and Badurina, 2019, pp. 1–13), scenery and cost are also factors in decision making (Mirehie and Gibson, 2020, pp. 536–538; Rejón-Guardia, Alemany-Hormaeche and García-Sastre, 2020, pp. 1–14). Hence, policies and guidance in relation to sustainable development for tourist attractions should be developed from economic, sociocultural, and environmental aspects (Achu, 2019, pp. 1307–1320; Malchrowicz-Moško and Chlebosz, 2019, pp. 1–18; Yang, et al., 2020, pp. 1–20). In view of residents, an improvement in quality of services and products leads to financial return as it attracts repeated customers and engages the recipients of souvenirs (Pookaiyaudom, 2019, pp. 1–14). To stimulate the flow of tourists, promotional activities are necessary to attract more attention from the potential groups. The activities should be organized by collaboration of stakeholders to develop more sustainable tourism (Chang, Choong and Ng, 2020, pp. 215–234; Yeh, Lin and Huang, 2018, pp. 1–14). Lastly, the preparation of exercising facilities is one of the factors that a tourist selects a destination (Cho, Khoo and Lee 2019, pp. 912–923; Heuwinkel and Venter, 2018, pp. 247–263). Therefore, promotion of outdoor activities (Malchrowicz-Mośko, et al., 2019, pp. 1–13) should be considered to attract the target group (Ferreira and Carneiro, 2021, pp. 146–166).

Sport travel agency and sport tour operator: as tourists make a decision on trips and accommodations on the available data such as quality of services (Priporas, et al., 2018, pp. 745–765, there should be clear details on travel programs with choices of selection, customized for individual preferences (Kendall and Smith, 1939, pp. 275–287; Uesugi and Kudo, 2020, pp. 162–179). In addition, the tourism industry and residents should strongly collaborate to plan and offer a package for tourists with the contribution of local wisdom from residents and strategic plans from the industry to attract tourists to stay for longer period (Lesjak, Axelsson and Mekinc 2017, pp. 74–79). Moreover, there should be training on package sale and other related activities to accelerate the decision-making process of the customers (Agha and Dixon, 2021, pp. 7–29).

ICT readiness: as information today flows across internet and social networks (Myburgh, Kruger and Saayman, 2018, pp. 275–301) with increasing access to customers (Edensor, et al., 2021, pp. 217–235), utilization of TV and social medias to gain more attention from prospected customers is one of the key

methods that event organizers currently implement (Swart, et al., 2021, pp. 34–38). As a result, an organizer should develop an online platform, for example, advanced purchase tickets with automatic responses (Zarei, Holmes and Yusof, 2018, pp. 675–691) as well as promotional activities by using chatbots and other online media such as videos, sounds, photos to increase the transaction. Furthermore, by utilizing advanced technology such as virtual reality and augmented reality (Prokopenko, et al., 2020, pp. 84–96), customers can experience their destination virtually, leading to increasing data availability. However, the technology should be efficiently implemented by focusing on the target groups and provide information through specific channels, customized upon the persona (Han and Ni, 2020, pp. 11652–11659; Pookaiyaudom, 2019, pp. 1-14).

Pillar 2: Venue Logistics Management

Venue operation: as customers decide destinations from activities, facilities are crucial in decision making. The facilities include all parts of user experiences such as seating arrangement, crowd and traffic management and duration of the event (Lyu, 2021, pp. 482–499; Zarei, Holmes and Yusof, 2018, pp. 675–691; Zuo, et al., 2021, pp. 1–21). To respond to customer demands, collaboration among stakeholders, either public or private sectors are necessary (Chaigasem and Leruksa, 2020, pp. 1–8; Darabi, et al., 2020, pp. 1–13; Stoll, et al., 2020, pp. 195–213). Therefore, to address the needs of customers, standardized services should be added upon facility management. To ensure the quality, a certification system should be introduced for those who comply with ecological and social practices (Hodeck, et al., 2021, pp. 1–13).

Venue sustainability: organizations related to sport tourism should collaborate to raise awareness on environmental preservation and resource exploitation. Moreover, as tourism involves residents in the area, training programs on capacity development should be conducted to supply well trained manpower into the industry. The program should be developed with an objective to reduce environmental and social impacts from sport tourism to the area (Mascarenhas, et al., 2021, pp. 42–65; Nyikana and Tichaawa, 2020, pp. 756–771; Stoll, et al., 2020, pp. 195–213; Zuo, et al., 2021, pp. 1–21). For example, there is collaboration between stakeholders, regardless of their relevance as tourist attractions, to increase choices of travel and activities in Japan (Ito and Higham, 2020, pp. 269–284). To facilitate the activities, policies for sustainable development, including promotion of environment and sustainable transportation should be implemented. In details, the policies should include air pollution monitoring, climate changes and waste management (Malchrowicz-Mośko, Botiková and Poczta, 2019, pp. 1–20; Weed, 2020, pp. 79–92).

Safety and health: COVID-19 has introduced an effective tracking and assessing mechanism to prevent the spread of disease (Hemmonsbey, Tichaawa and Knott, 2021, pp. 54–68). As the venue should be hygiene for participants, preventive measures and preparation for emergencies should be implemented (Jeong, Yu and Kim., 2020, pp. 1–16; Silva, et al., 2021, pp. 1–16; Yang, et al., 2021, pp. 1–21).

In addition to the hygiene aspect, physical safety should be considered and arranged in advanced. For example, a plan on managing resources such as polices, fire fighters, and healthcare personnels in emergency should be operated and constantly practiced (Myburgh, Kruger and Saayman, 2018, pp. 275–301) as well as the practices on crisis and crime management (Tajalli and Peña, 2017, pp. 15–32; Zhao and Abili, 2019, pp. 789–810). Logistics and crowd movement is also another plan needed consideration when organizing an event. (Stoll, et al., 2020, pp. 195–213).

Pillar 3: Participants Logistics Management

Infrastructure: existing infrastructures, including routes, parking spaces, and attractions, should be periodically examined and evaluated for their suitability to accommodate travelers (Edensor, et al., 2021, pp. 217–235; Zarei, Holmes and Yusof, 2018, pp. 675–691).

Planning: planning is crucial in resource management and efficient operation. By implementing a plan with comprehensive understandings on operation, operators are able respond to customer needs instantly, increasing satisfaction for the destination (Kimmm, 2020, pp. 1–15).

Pillar 4: Participants Logistics Management

Transportation: logistics of equipment and merchandises in sport tourism, staring from routes planning, custom clearance to product delivery, have been limitedly researched (Herold, et al., 2019, pp. 357–359), in contrast to their valuable contribution to a business (Myburgh, Kruger and Saayman, 2018, pp. 275–301). Transportation to a specific event may involve multimodal transportations either by cars, planes, or rails to reach the destination (Lyu, 2021, pp. 482–499).

When integrating the issue on supply chain management in sport tourism with the sustainability balanced scorecard, there are five perspectives to consider as follows:

Internal process perspective: the internal process in both public and private organizations plays a significant role in enabling an organization to achieve its goal and sustainability. The perspective focuses on development and improvement of the internal process to increase efficiency and reduce losses to modify an operation in alignment with strategies (Kaplan and Norton, 1996, pp. 143–147)

Customer perspective: the customer perspective focuses on attraction and impression on services to increase satisfaction and happiness to a customer. This perspective relates to product or service improvement to respond to customer needs and create long-term contentment. (Maiga and Jacobs, 2023, pp. 283–281)

Financial perspective: all organizations in public and private sectors implement strategies and action plans to achieve its goals. Well-developed strategies lead to favorable performances, resulting in financial impacts and generating return subsequently. This perspective aims to create financial stability, increase revenue, control cost and generate value to an organization (Kaplan and Norton, 2001, pp. 87–104).

Learning and growth perspective: the capacity to learn and develop of an individual,

an organization and a public entity lead to flexibility and innovation. This perspective highlights organizational adaptability and incubation of innovators to lead an organization (Epstein and Wisner, 2001, pp. 1–10).

Sustainability perspective: the perspective supplements the balanced scorecard by combining social, environmental and economic dimensions of sustainability to measure performances with the goals and objectives in sustainability. The concept includes indicators such as environmental impact, social responsibility, resource efficiency and participation of stakeholders (Figge, et al., 2002, pp. 269–284).

By grouping the four main pillars of supply chain management in sport tourism with the integration of the sustainability balanced scorecard, the new concept of supply chain management is classified in 5 perspectives, consisting of 18 elements and 54 Indicators, as shown in Table 1.

Table 1 Possible characteristics of sustainable supply chain management in sport tourism, classified from related perspectives.

Perspective	Element		Indicators
Internal process perspective (IP)	City development plan and operational monitor	IP1	Establishing roadmaps and action plans that align with city development plan and its strategy
		IP2	Conducting SWOT analysis, monitoring progresses and evaluating KPIs
		IP3	Setting standards for operation and service
	Commitment of management team	IP4	Setting organizational visions, commitments, values and cultures to be a sport city of excellence
		IP5	Implementing clear supply chain management policies
		IP6	Operating with transparency, governances and responsibilities on society and environment
	Infrastructure on venue and transportation	IP7	Providing sufficient facilities for travelers, such as clean restrooms, easy access information centers, and supports for specific groups, namely impaired people and the seniors, to reach a destination
		IP8	Supporting investments in clean energy
		IP9	Having choices of transportation to support the journey such as cars, cruises, airplanes, trains, trams and other qualified public transportation
		IP10	Organizing activities or festivals and night activities as well as selling spots for souvenirs and merchandises

Perspective	Element		Indicators
Internal process perspective (IP)	IT system management	IP11	Exchanging information within an organization
		IP12	Having a network for monitoring and information exchange within a supply chain
		IP13	Providing a tool with augmented reality and virtual reality in social networks such as Facebook, twitter or Line and implementing a plan on system improvement
Customer perspective (CP)	Quality management of accommodation	CP1	Showing clear and accurate details such as price, methods and duration in a travel program
		CP2	Operating a system for advanced appointment, cancellation and payment
		CP3	Providing advices and service information to tourists as well as maintaining equipment, materials and places to be in service
	Interaction with travelers and customer relationship management	CP4	Conducting satisfactory surveys on travelers
		CP5	Gaining repeaters and new travelers
		CP6	Acquiring organic new travelers from recommendation
	Traveler data management	CP7	Having customer database including their personal information, suggestions and complaints
		CP8	Analyzing and segmenting travelers upon their data
		CP9	Analyzing customer data for the development of tourist attractions
	Collaboration and alliance among stakeholders	CP10	Collaborating within an alliance formed by public authorities, private entities and residents
		CP11	Multilaterally collaborating with alliances to promote tourism in the area
		CP12	Having clear responsibilities among stakeholders to understand roles as a host of an event
Financial perspective (FP)	Cost and quality management of products	FP1	Reducing and controlling internal cost to attract and motivate consumers with prizing strategy
		FP2	Organizing activities to deliver product with quality at reasonable price
		FP3	Maintaining customer royalty by organizing activities
		FP4	Exercising a mechanism and guidance for stakeholders in the supply chain to participate in an operation

Perspective	Element		Indicators
Financial perspective (FP)	Investment budgeting	FP5	Conducting comprehensive budget and reviewing the annual budget as appropriated
		FP6	Controlling cost within the budget
		FP7	Providing criteria for appropriate budgeting
	Financial risk management	FP8	Having risk management plans with structural evaluation of risks and practices
		FP9	Complying with the plan and recording data constantly
		FP10	Collaborating with stakeholders to improve the practices in supply chain
Learning and growth perspective (LP)	Inclusiveness from institutes and organizations in knowledge development	LP1	Training residents on local knowledge
		LP2	Organizing cultural and environmental workshops
		LP3	Reminding tourists to respect local culture and environment
	Product development and service management	LP4	Setting a plan to improve and develop local products, sport merchandises and souvenirs
		LP5	Having product certification system from public authorities
		LP6	Providing details of products accurately and clearly
	Tourism management team from community	LP7	Promoting skill development for tourism management in a community
		LP8	Equipping a community with knowledges and skills necessary for sustainable development on tourism
		LP9	Providing opportunities for all stakeholders to access tourist information in the community
Sustainability perspective (SP)	Safety operation	SP1	Assessing risks and planning for risk management with communication about safety
		SP2	Having emergency management plan
		SP3	Having preventive and safety measures in the area as well as the first-aid system
	Hygienic and environmental operation	SP4	Having standard procedures on hygiene and environment as required by laws as well as the guidance on disease prevention
		SP5	Having standards on waste management and its treatment as well as the preventive, recovery and promotion plan of ecosystem

Perspective	Element	Indicators	
Sustainability perspective (SP)	Economic Operation	SP6	Creating jobs and reducing the unemployment rate. Promoting a development and growth of SMEs in the area
		SP7	Promoting job creating sustainable tourism, local culture and the products
		SP8	Increasing resource efficiency for consumption and manufacturing
		SP9	Planning on using renewable energy in the area
		SP10	Having an efficient energy management plan and reducing energy usage from grids

Selection of Experts

The summary of all 18 experts is shown in Table 2.

Table 2 Profiles of the experts

Expert No.	Title	Position	Expertise
1.	-	Director General for Department of Tourism	Tourism
2.	Dr.	Lecturer in Tourism	Tourism
3.	-	Director of Tourism Resource Development Division	Tourism
4.	Dr.	Lecturer in Tourism	Tourism
5.	Asst. Prof.	Lecturer is Hospitality	Tourism
6.	-	Director of Northern office, Sport Authority of Thailand	Sport
7.	-	Director of Northeastern office, Sport Authority of Thailand	Sport
8.	Assist.Prof.Dr.	Lecturer in physical education	Sport
9.	Dr.	Lecturer in sports science	Sport
10.	Dr.	Sports Development Officer, Practitioner Level, Ministry of Tourism and Sports	Tourism and Sport
11.	Dr.	Vice President, Division of Sport Engineering	Tourism and Sport
12.	-	Vice President of Eastern Branch, Thai Chamber of Commerce	Tourism and Sport
13.	-	Vice President of Central Branch, Thai Chamber of Commerce	Tourism and Sport
14.	Asst. Prof.	Lecturer in logistics and supply chain management	Logistics and supply chain
15.	-	Logistics and traffic planning engineer	Logistics and supply chain

Expert No.	Title	Position	Expertise
16.	-	Project planning and analysis engineer	Logistics and supply chain
17.	Dr.	Lecturer in logistics and supply chain management	Logistics and supply chain
18.	Dr.	Lecturer in logistics and supply chain management	Logistics and supply chain

Delphi Method

The results from the experts can be categorized into 5 perspectives, 18 elements and 54 indicators of the STSM model. The model is developed with an objective in the management of supply chain in tourism industry and sustainable development of sport tourism industry. By analyzing the Delphi method, the results are interpreted into descriptive statistics as presented in Table 3.

After examining the result in the first round, "CP6" and "SP2" were deemed as unqualified, therefore, reducing the number of indicators to 52. Since the first data set was not completely acceptable, the researchers needed to distribute the questionnaire to the experts for the second round with 5 perspectives, 18 elements and 52 Indicators. The result from the second round showed that the average score is in the range from 3.83 to 4.72, meaning the indicators are "Quite Important" to "Critically Important", meeting the criteria with the Kendall's coefficient of concordance or W of 0.488. Since W was less than 0.5 or the acceptance criteria, the response reached a consensus as shown in Table4.

The consensus has found that there are 52 indicators suitable to the STSM model while the other two indicators are removed from the analysis. When categorizing the indicators by perspective, it is found that the internal process perspective contains 13 indicators. Regarding the customer perspective, there are 13 indicators, excluding 1 indicator being rejected. Next, the financial perspective contains 10 indicators. Then, the sustainability perspective contains 9 indicators, excluding 1 indicator being rejected. Lastly, the learning and growth perspective contains 9 indicators. The analysis from the Delphi method has reduced the prospected indicators from 54 indicators to 52 indicators.

Table 3 Verification of statistics to select indicators on the STSM model (first round)

Internal process perspective (IP)													
Indicators (IP)	IP1	IP2	IP3	IP4	IP5	IP6	IP7	IP8	IP9	IP10	IP11	IP12	IP13
First Round:													
(M.D.≥3)	5	4	5	5	4	5	5	4.50	5	4	4.50	5	5
(IQR ≤ 1)	1	0.25	1	1	1	1	1	1	1	0.50	1	0.25	1
Expert Consensus	√	√	√	√	√	√	√	√	√	√	√	√	√

Customer perspective (CP)												
Indicators (CP)	CP1	CP 2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	CP12
First Round:												
(M.D.≥3)	4	5	4.5	5	5	5	5	5	4.5	4	4	4
(IQR ≤ 1)	0.50	1	1	1	1	1.25	1	1	1	0	1	1
Expert Consensus	√	√	√	√	√	×	√	√	√	√	√	√

Financial perspective (FP)										
Indicators (FP)	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10
First Round:										
(M.D.≥3)	4	4	4	5	5	4.5	5	4	4	4.5
(IQR ≤ 1)	1	1	1	1	0.25	1	1	1	1	1
Expert Consensus	√	√	√	√	√	√	√	√	√	√

Sustainability perspective (SP)										
Indicators (SP)	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10
First Round:										
(M.D.≥3)	5	4	4.5	4	4	4.5	5	4	5	5
(IQR ≤ 1)	1	1.25	1	1	1	1	1	0.25	1	1
Expert Consensus	√	×	√	√	√	√	√	√	√	√

Learning and growth perspective (LP)									
Indicators (LP)	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9
First Round:									
(M.D.≥3)	5	5	4	5	5	5	5	4	4
(IQR ≤ 1)	1	1	1	0.25	1	1	1	1	0.50
Expert Consensus	√	√	√	√	√	√	√	√	√

Notes: median (M.D.); Interquartile Range (IQR); Accepted (√); Rejected (×).

Table 4 Verification of statistics in selecting indicators of the STSM model (second round)

Internal process perspective (IP)													
Indicators (IP)	IP1	IP2	IP3	IP4	IP5	IP6	IP7	IP8	IP9	IP10	IP11	IP12	IP13
Second Round:													
(M.D.≥3)	5	5	5	5	4	5	4	4	4	4	5	5	5
(IQR ≤ 1)	1	1	1	1	1	1	0.50	0.50	0.50	0.50	1	1	1
Expert Consensus	√	√	√	√	√	√	√	√	√	√	√	√	√

Customer perspective (CP)												
Indicators (CP)	CP1	CP 2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	CP12
Second Round:												
(M.D.≥3)	5	5	5	5	5	-	4.5	4.5	4.5	5	5	5
(IQR ≤ 1)	1	1	1	1	1	-	1	1	1	1	1	1
Expert Consensus	√	√	√	√	√	-	√	√	√	√	√	√

Financial perspective (FP)										
Indicators (FP)	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10
Second Round:										
(M.D.≥3)	5	4	4	5	4	4	4	4	5	4.5
(IQR ≤ 1)	1	1	1	1	1	1	1	1	1	1
Expert Consensus	√	√	√	√	√	√	√	√	√	√

Sustainability perspective (SP)										
Indicators (SP)	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10
Second Round:										
(M.D.≥3)	5	-	5	4	4	5	5	5	5	5
(IQR ≤ 1)	1	-	1	0.5	0.5	1	1	1	1	1
Expert Consensus	√	-	√	√	√	√	√	√	√	√

Learning and growth perspective (LP)									
Indicators (LP)	LP1	LP2	LP3	LP4	LP5	LP6	LP7	LP8	LP9
Second Round:									
(M.D.≥3)	4	5	4.5	5	5	5	4	4	4
(IQR ≤ 1)	1	1	1	1	1	1	1	1	1
Expert Consensus	√	√	√	√	√	√	√	√	√

Notes: median (M.D.); Interquartile Range (IQR); Accepted (√); Rejected (×).

Discussion

The researchers have proposed the concept of the STSM from 5 perspectives, 18 elements and 52 indicators that significantly impact supply chain management in sport tourism as described below.

Internal process perspective (IP): a clear policy to support construction and development of sport venue leads to supportive environment and strengthens supply chain management in sport tourism. The perspective contains 4 elements and 12 indicators. The first element or "city development plan and operational monitor" consists of the indicator "IP1", "IP2" and "IP3". The second element or "commitment of management team" consists of the indicator "IP4", "IP5" and "IP6". The third element or "infrastructure on venue and

transportation" consists of the indicator "IP7", "IP8", "IP9" and "IP10". Lastly, the fourth element or "IT system management" consists of the indicator "IP11", "IP12" and "IP13".

Customer perspective (CP): the customer perspective focuses on increasing satisfaction of participants and the quality of services in responding to customer expectation. Practically, the perspective focuses on improving experiences in each process of the supply chain in tourism. The result has found that there are 4 elements and 12 indicators in this perspective. The first element or "quality management of accommodation" consists of the indicator "CP1", "CP2" and "CP3". The second element or "interaction with travelers and customer relationship management" consists of the indicator "CP4" and "CP5". The third element or "traveler data management" consists of the indicator "CP7", "CP8" and "CP9". Lastly, the fourth element or "collaboration and alliance among stakeholders" consists of the indicator "CP10", "CP11" and "CP12".

Financial perspective (FP): the perspective focuses on creating profits and financial efficiency in tourism supply chain because financial management leads to efficient and sustainable management of the supply chain in tourism. The analysis has found that there are 3 elements and 10 indicators in this perspective. The first element or "cost and quality management of products" consists of the indicator "FP1", "FP2", "FP3" and "FP4". The second element or "investment budgeting" consists of the indicator "FP5", "FP6" and "FP7". Lastly, the third element or "financial risk management" consists of the indicator "FP8", "FP9" and "FP10".

Sustainability perspective (SP): the perspective focuses on sustainable supply chain management to support economic and social development without adverse effects through the limited utilization of natural resources, sustainable development of supply chain and emphasis on social responsibility. The analysis has found that there are 4 elements and 9 indicators in this perspective. The first element or "safety operation" consists of the indicator "SP1" and "SP3". The second element or "hygienic and environmental operation" consists of the indicator "SP4" and "SP5". The third element or "economic operation" consists of the indicator "SP6", "SP7" and "SP8". Lastly, the fourth element or "energy related operation" consists of the indicator "SP9" and "SP10".

Learning and growth perspective (LP): the perspective considers sustainable development and comprehensive learning in tourism supply chain to extend and develop capacity in human and organizational resources. Learning and growth can impact the supply chain in tourism as it enables an organization to be adaptable and increases its capacity in the disruption in industry. The study has found that there are 3 elements and 9 Indicators in this perspective. The first element or "inclusiveness from institutes and organizations in knowledge development" consists of the indicator "LP1", "LP2" and "LP3". The second element or "product development and service management" consists of the indicator "LP4", "LP5" and "LP6". Lastly, the third element or

"tourism management team from community" consists of the indicator "LP7", "LP8" and "LP9".

Conclusions

The increasing recognition on sport tourism nowadays is a result of the growth in sport industry. To raise efficiency in sport tourism, this study proposes the initiative on the STSM, developed from the integration of supply chain in sport tourism with the concept of the SBSC from five perspectives: the internal process perspective; the customer perspective; the financial perspective; the sustainability perspective; and the learning and growth perspective. The model aims to develop sustainability in sport tourism through the growth and development of each component in a supply chain such as an improvement in sport venues, an increasing quality of services and an advancement in operational processes of tourism that enable related activities to occur sustainably. Considering the participants, sport tourists also have opportunities to meet and build relationships with people from different backgrounds in sport, culture and society. The activities do not only contribute to personal satisfaction but the capacity building in individuals and organizations, generating revenue to local area and the country. In conclusion, the supply chain in sport tourism is beneficial to all levels regardless of the area of activities. It acts as an indicator for the management and development of sport tourism activities to be more efficient with progressive results.

Limitations and Future Research

While the findings from the research are beneficial to public sector in drafting a policy for the development of sport tourism, there are limitations described as below.

- The STSM proposed in the study was developed to reduce the impacts of supply chain management in sport tourism and develop the industry to be more sustainable. Nevertheless, the indicators were derived from the opinions of Thai experts in tourism, sport and supply chain. Therefore, the explanatory power of the study is limited to only the context of Thailand, with constraints on implementing in other locations. As a result, there is a room to develop and adjust for different contexts in the future.

- The analysis of characteristics from literature reviews may insufficiently attend the issues in relation to the STSM.

- This research only presents a development of supply chain in sport tourism without practical implementation. Therefore, future research may use a structural model to build a model with multicriteria decision making as a tool to assess sport tourism.

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