# Factors Influencing Sports Tourism Development in the Andaman Tourism Cluster

Parichat Pragobmas[1*]

**Abstract**

This research aimed to conduct a confirmatory factor analysis of factors influencing sports tourism development in the Andaman Tourism Cluster and to examine the causal relationships among selected factors—namely sports tourism purpose, participants, settings, and impacts—and their effects on the supportive factors for sports tourism development in the Andaman Tourism Cluster. The sample comprised 540 Thai residents of the Andaman Tourism Cluster, Thailand, including Phuket, Krabi, Trang, Phang Nga, Ranong, and Satun provinces. These respondents were obtained through proportional stratified random sampling. The research instrument was a questionnaire investigating factors influencing sports tourism development in the Andaman Tourism Cluster. Data were analyzed using confirmatory factor analysis and structural equation modeling. The findings revealed that the structural equation model of factors influencing sports tourism development in the Andaman Tourism Cluster demonstrated a good fit with the empirical data. Sports tourism purpose had a direct influence on sports tourism participants. Sports tourism participants directly influenced sports tourism settings. Sports tourism settings had a direct effect on sports tourism impacts, and sports tourism impacts directly influenced supportive factors for sports tourism development in the Andaman Tourism Cluster. The model fit indices were as follows: $\chi^2$ = 252.46, df = 85, p-value = 0.000, RMSEA = 0.072. Accordingly, destination management and policy formulation for sports tourism development should proceed in line with these causal relationships, beginning with clearly defining sports tourism purposes and promoting stakeholder participation, in order to enhance sports tourism settings, manage impacts, and strengthen the supportive factors necessary for sustainable sports tourism development in the Andaman Tourism Cluster.

**Keywords:** Andaman Tourism Cluster, Confirmatory Factor Analysis, Equation Modeling, Sports Tourism Development, Structural

[1*] Assistant Professor Dr., Faculty of Education, Phuket Rajabhat University
Corresponding Author, email: parichart.g@pkru.ac.th

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**บทคัดย่อ**

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาองค์ประกอบเชิงยืนยันของปัจจัยที่ส่งผลต่อการพัฒนาการท่องเที่ยวเชิงกีฬาในกลุ่มจังหวัดภาคใต้ฝั่งอันดามัน และศึกษาความสัมพันธ์เชิงเหตุผลระหว่างปัจจัย ได้แก่ วัตถุประสงค์ของการท่องเที่ยวเชิงกีฬา ผู้มีส่วนร่วมที่เกี่ยวข้องกับกีฬา สถานที่เพื่อการท่องเที่ยวเชิงกีฬา และผลกระทบของการท่องเที่ยวเชิงกีฬา ที่มีผลต่อส่วนสนับสนุนให้เกิดการพัฒนาการท่องเที่ยวเชิงกีฬาในกลุ่มจังหวัดภาคใต้ฝั่งอันดามัน กลุ่มตัวอย่างคือประชาชนชาวไทยที่เป็นผู้อยู่อาศัยในกลุ่มจังหวัดภาคใต้ฝั่งอันดามัน ได้แก่ จังหวัดภูเก็ต กระบี่ ตรัง พังงา ระนอง และสตูล จำนวน 540 คน ได้จากการสุ่มแบบแบ่งชั้นตามสัดส่วน โดยใช้แบบสอบถามเป็นเครื่องมือวิจัย วิเคราะห์ข้อมูลด้วยการวิเคราะห์องค์ประกอบเชิงยืนยัน และวิเคราะห์โมเดลสมการโครงสร้าง ผลการวิจัยพบว่า แบบจำลองสมการเชิงโครงสร้างของปัจจัยที่ส่งผลต่อการพัฒนาการท่องเที่ยวเชิงกีฬาในกลุ่มจังหวัดภาคใต้ฝั่งอันดามันที่พัฒนาขึ้นมีความสอดคล้องกลมกลืนกับข้อมูลเชิงประจักษ์ โดยปัจจัยวัตถุประสงค์ของการท่องเที่ยวเชิงกีฬา มีอิทธิพลทางตรงต่อผู้มีส่วนร่วมที่เกี่ยวข้องกับกีฬา ปัจจัยผู้มีส่วนร่วมที่เกี่ยวข้องกับกีฬา มีอิทธิพลทางตรงต่อปัจจัยสถานที่เพื่อการท่องเที่ยวเชิงกีฬา ปัจจัยสถานที่เพื่อการท่องเที่ยวเชิงกีฬา มีอิทธิพลทางตรงต่อปัจจัยผลกระทบของการท่องเที่ยวเชิงกีฬา และปัจจัยผลกระทบของการท่องเที่ยวเชิงกีฬา มีอิทธิพลทางตรงต่อปัจจัยส่วนสนับสนุนให้เกิดการพัฒนาการท่องเที่ยวเชิงกีฬาในกลุ่มจังหวัดภาคใต้ฝั่งอันดามัน โดยมีค่าดัชนีความสอดคล้องกลมกลืน ได้แก่ $\chi^2$ = 252.46, df = 85, p-value = 0.000 และ RMSEA = 0.072 ทั้งนี้ การบริหารจัดการแหล่งท่องเที่ยวและการกำหนดนโยบายในการพัฒนาการท่องเที่ยวเชิงกีฬา ควรพัฒนาตามความสัมพันธ์เชิงเหตุผล จากการกำหนดวัตถุประสงค์ของการท่องเที่ยวเชิงกีฬาให้ชัดเจนและการส่งเสริมการมีส่วนร่วมของผู้เกี่ยวข้อง เพื่อยกระดับสถานที่เพื่อการท่องเที่ยวเชิงกีฬา บริหารจัดการผลกระทบ และเสริมสร้างปัจจัยสนับสนุนที่จำเป็นต่อการพัฒนาการท่องเที่ยวเชิงกีฬาอย่างยั่งยืนในกลุ่มจังหวัดภาคใต้ฝั่งอันดามัน

**คำสำคัญ:** การพัฒนาการท่องเที่ยวเชิงกีฬา, การวิเคราะห์องค์ประกอบเชิงยืนยัน, โมเดลสมการโครงสร้าง, กลุ่มจังหวัดภาคใต้ฝั่งอันดามัน

## Introduction

Sports tourism has emerged as one of the fastest-growing segments within the global tourism industry. The remarkable success of recent mega sporting events, exemplified by the Paris 2024 Olympic Games, demonstrates the transformative power of sports-related travel in stimulating consumer spending and regional development. According to the World Travel & Tourism Council (WTTC), the global tourism industry contributed USD 10.9 trillion to global GDP in 2024, representing 10% of the global economy (World Travel & Tourism Council, 2025). The global sports tourism market was valued at USD 564.7 billion in 2023 and is projected to reach USD 2,327 billion by 2032, representing a compound annual growth rate (CAGR) of 16.8% (Grand View Research, 2022; Global Market Insights, 2024).

Sports tourism encompasses three distinct categories: active sports tourism involving direct participation in sporting activities; passive sports tourism characterized by spectating at sporting events; and nostalgia sports tourism including visits to sports heritage sites (Gibson et

al., 1998). Current market data reveals that passive sports tourism dominates the sector, accounting for approximately 55% of all activities (Global Market Insights, 2024).

Building on this global momentum, Thailand has strategically positioned itself as a leading sports tourism destination through comprehensive policy initiatives. The Thai government's announcement of 2025 as the "Amazing Thailand Grand Tourism and Sports Year" represents a coordinated national effort to capitalize on sports tourism opportunities (Tourism Authority of Thailand, 2024). This campaign targets 40 million foreign visitors and aims to generate 2.8 trillion baht in tourism revenue, with sports tourism serving as a key economic driver (Tourism Authority of Thailand, 2025). The initiative encompasses major sporting events including MotoGP races, the 33rd SEA Games in December 2025, and various international competitions.

The Andaman Tourism Cluster (ATC), comprising six provinces—Krabi, Trang, Phang Nga, Phuket, Ranong, and Satun—represents Thailand's largest and most economically significant tourism region. In 2022, the ATC welcomed 29 million visitors and generated 600 billion baht in tourism revenue, with average daily spending of 4,800 baht per person, the highest among Thailand's five coastal tourism clusters (Program Management Unit for Competitiveness, 2024). The region's unique combination of pristine marine environments, diverse cultural heritage, and world-class infrastructure creates optimal conditions for sports tourism development, particularly in water-based activities.

The academic literature on sports tourism has evolved significantly since Gibson's (1998) seminal work. Subsequent studies have developed comprehensive frameworks examining the complex relationships between sports tourism motivations, participant characteristics, destination attributes, and socio-economic impacts (Higham, 2005; Pongsakornrungsilp et al., 2021). However, significant theoretical and methodological gaps persist. Limited research examines the causal relationships between sports tourism development factors within specific regional contexts, particularly in developing countries with complex cultural dynamics. While studies have individually explored sports tourism purposes, participant typologies, destination settings, and impact dimensions, few investigations have systematically analyzed their interdependencies using robust structural equation modeling approaches. Three specific gaps are evident. First, at the contextual level, no study has empirically modeled the causal structure of sports tourism development factors within the Andaman Tourism Cluster, despite its position as Thailand's most economically significant tourism region. Second, at the methodological level, prior studies have relied on descriptive or single-factor analyses rather than integrated structural equation modeling capable of testing multiple interdependent relationships simultaneously. Third, at the theoretical level, the interdependence among purpose, participant, setting, impact, and support factors remains untested as a unified causal system. Addressing these gaps is essential for evidence-based destination management and policy formulation in regional tourism cluster contexts.

In the Andaman Tourism Cluster context, existing research has primarily focused on general tourism development, marine conservation impacts, and cultural heritage preservation (Pongsakornrungsilp et al., 2021; Cheablam & Shrestha, 2015; Thongsakul & Hussin, 2025). These studies lack specific examination of sports tourism development factors and their systematic relationships.

Despite the growing importance of sports tourism globally and Thailand's strategic emphasis on sports tourism development, several critical knowledge gaps limit effective policy formulation and destination management in the ATC. No comprehensive framework exists for understanding the causal relationships between sports tourism purposes, participant characteristics, destination settings, impact dimensions, and community support factors within regional tourism cluster contexts. Previous studies have primarily employed single-method approaches or focused on individual factor analysis, lacking the systematic, multi-dimensional investigation required for complex destination management decisions.

This research addresses these gaps through a comprehensive investigation of sports tourism development dynamics in the Andaman Tourism Cluster. The primary research objective is to examine and model the causal relationships among five factors—sports tourism purpose, participants, settings, impacts, and supportive factors—within the ATC context. The study develops an integrated conceptual model grounded in three theoretical foundations: 1) Sports tourism framework (Gibson et al., 1998; Neirotti, 2003; Higham, 2005; Orams, 2005), which conceptualizes sports tourism through the interrelated dimensions of purpose, participants, and settings; 2) Social Exchange Theory (Yoon et al., 2001; Gursoy et al., 2002; Gursoy & Rutherford, 2004), which explains how residents' perceptions of sports tourism impacts shape their support for tourism development; and 3) the sustainable tourism development framework aligned with the United Nations Sustainable Development Goals (World Tourism Organization, 2019). These theoretical perspectives collectively inform the five primary factor categories—purpose, participants, settings, impacts, and supportive factors—that interact to influence sports tourism development outcomes.

**Research Objectives**

1. To conduct a confirmatory factor analysis of factors influencing sports tourism development in the Andaman Tourism Cluster.

2. To examine the causal relationships among sports tourism purpose, participants, settings, and impacts on supportive factors for sports tourism development in the Andaman Tourism Cluster.

The study framework comprises the following factors, components, and variables:

1. Sports tourism purpose factors in the Andaman Tourism Cluster comprise five observed variables or components (Gibson et al., 1998; Neirotti, 2003; Higham, 2005; Orams,

2005), including sports competition, sports training or competition preparation, recreational activities participation, visiting renowned sports venues, and sports-related business activities.

2. Sports tourism participants factors consist of eight observed variables or components (Gibson et al., 1998; Neirotti, 2003; Higham, 2005; Orams, 2005), encompassing athletes participating in sports competitions; sports spectators or sports fans; recreational activity participants; athletes' family members or friends; sports activity administrators; sports sponsors and sports business personnel; sports experts, including coaches, physicians, physiotherapists, sports psychologists, and sports technical staff; and sports media personnel.

3. Sports tourism settings factors consist of three observed variables or components (Gibson et al., 1998; Neirotti, 2003; Higham, 2005; Orams, 2005), which include natural sports venues; built sports facilities; and sports heritage sites referring to historical sports locations such as sports museums, halls of fame, and sports stadiums.

4. Sports tourism impacts factors consist of 23 observed variables or components (Chen, 2001; Yoon et al., 2001; Gursoy et al., 2002; Gursoy & Rutherford, 2004; Kitnuntaviwat & Tang, 2008; Hritz & Ross, 2010; Prayag et al., 2013; Pongprasert, 2015). These factors encompass economic, social, cultural, and environmental dimensions.

5. Support for sports tourism development factors consist of 15 observed variables or components (World Tourism Organization, 2019; Centre for SDG Research and Support, 2021), comprising partnerships and community involvement (SDG1, SDG8), support of the locals (SDG1, SDG8), sport events (SDG1, SDG8), sport events for a cause (SDG1, SDG8), new sport (SDG1, SDG8), technology (SDG1, SDG8), combining sport tourism with other tourism resources (SDG1, SDG8), safety (SDG1, SDG8), participation of residents (SDG3), consideration of women (SDG5), enhancement of accessibility (SDG11), sustainable use of natural resources (SDG12, SDG13, SDG14, SDG15), environmental measures (SDG12, SDG13, SDG14, SDG15), educating tourists and the locals (SDG12, SDG13, SDG14, SDG15), and encouraging interactions (SDG16, SDG17).

## Research Methodology

This quantitative research examines causal relationships and has received approval from the Human Research Ethics Committee of Phuket Rajabhat University (COA No. PKRU2568/23). The research methodology follows a systematic approach as described below.

### Population and Sample

The study population comprises 2,302,351 Thai residents in the Andaman Tourism Cluster, Thailand. This population consists of 419,675 residents in Phuket Province, 481,687 residents in Krabi Province, 633,649 residents in Trang Province, 262,855 residents in Phang Nga Province, 180,095 residents in Ranong Province, and 324,390 residents in Satun Province (Department of Provincial Administration, 2024).

The research sample consisted of Thai citizens, both male and female, aged 18 years and above, residing in the Andaman Tourism Cluster, namely Phuket, Krabi, Trang, Phang Nga, Ranong, and Satun Provinces. In this stage, the factor analysis model contained 54 free parameters to be estimated; therefore, the minimum sample size was determined using the criterion of 10 times the number of free parameters in the model (Kline, 2005), yielding a required minimum of 540 respondents. The sample was then obtained through Proportional Stratified Random Sampling, using the number of Thai residents as the stratification framework and allocating the sample size in each stratum in proportion to the population of each province relative to the total population (Proportional Allocation); consequently, the sample size varied across provinces. The sample distribution included 98 residents from Phuket Province (18.23%), 113 residents from Krabi Province (20.92%), 149 residents from Trang Province (27.52%), 62 residents from Phang Nga Province (11.42%), 42 residents from Ranong Province (7.82%), and 76 residents from Satun Province (14.09%).

**Research Instrument**

A questionnaire was developed to examine factors influencing sports tourism development in the Andaman Tourism Cluster. The instrument utilizes a 5-point Likert scale to measure perception and need levels. The questionnaire comprises six parts: Part 1 covers respondent demographics; Part 2 examines sports tourism purpose; Part 3 analyzes sports tourism participants; Part 4 investigates sports tourism settings; Part 5 assesses sports tourism impacts; and Part 6 evaluates support needs for sports tourism development in the Andaman Tourism Cluster. Parts 2-5 measure perception levels, while Part 6 measures need levels. The scale points are defined as follows: 5 = highest perception or need, 4 = high perception or need, 3 = moderate perception or need, 2 = low perception or need, and 1 = lowest perception or need.

The instrument's content validity was assessed by five qualified experts specializing in physical education, sports tourism, tourism, or related fields, all holding at least a master's degree. The Index of Item-Objective Congruence (IOC) yielded values ranging from 0.67 to 1.00, indicating acceptable content validity. The revised questionnaire was pilot-tested with 30 residents from the Andaman Tourism Cluster who were not included in the main sample. Reliability was assessed using Cronbach's Alpha Coefficient, which yielded a reliability value of 0.80, indicating good internal consistency.

**Data Analysis**

Confirmatory Factor Analysis (CFA) was conducted to examine factors affecting sports tourism development in the Andaman Tourism Cluster. This analysis includes measurement models of latent variables using standardized regression weights and model fit statistics. The model fit statistics comprise Chi-square ($\chi^2$), Relative Chi-square ($\chi^2$/df), Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI), and Root Mean Square Error of Approximation (RMSEA). Structural Equation Modeling (SEM) was employed to analyze causal

relationships between selected factors. This analysis examined standardized regression weights, Square Multiple Correlation ($R^2$), Direct Effects (DE), Indirect Effects (IE), and Total Effects (TE). Model fit assessment utilized the same statistical indices as confirmatory factor analysis, including $\chi^2$, $\chi^2$/df, AGFI, GFI, and RMSEA.

## Results

### Part 1: Confirmatory Factors Influencing Sports Tourism Development in the Andaman Tourism Cluster

#### Sports tourism purpose factors

Confirmatory factor analysis (CFA) of the initial hypothetical model showed inadequate fit indices ($\chi^2$ = 19.92, df = 5, $\chi^2$/df = 3.98, CFI = 0.88, GFI = 0.98, TLI = 0.75, RMSEA = 0.088). Model modification was performed based on modification indices, removing items with non-significant factor loadings. The revised model demonstrated excellent construct validity and fit indices ($\chi^2$ = 0.00, df = 0, CFI = 1.00, GFI = 1.00, TLI = 1.00, RMSEA = 0.000). The final model comprised three components with statistically significant factor loadings ($p < 0.05$): recreational activities participation (PUR3) demonstrated the highest standardized factor loading at 0.41, followed by sports-related business activities (PUR5) at 0.30, and visiting renowned sports venues (PUR4) at 0.28, as shown in Figure 1.

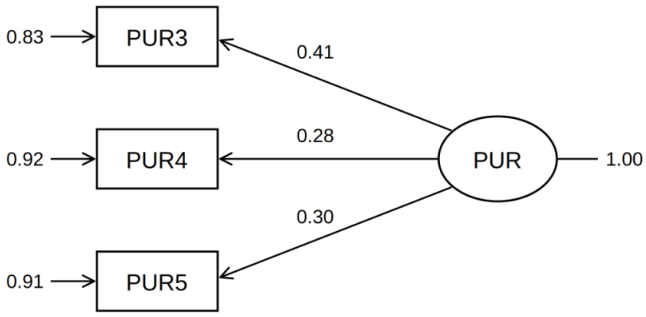



**Figure 1** Measurement Model of Sports Tourism Purpose Factors
**Note.** Author

#### Sports tourism participants factors

Confirmatory factor analysis (CFA) of the initial hypothetical model showed inadequate fit indices ($\chi^2$ = 219.44, df = 20, $\chi^2$/df = 10.97, CFI = 0.67, GFI = 0.87, TLI = 0.54, RMSEA = 0.161). Model modification was performed based on modification indices, removing items with non-significant factor loadings. The revised model demonstrated excellent construct validity and fit indices ($\chi^2$ = 0.00, df = 0, CFI = 1.00, GFI = 1.00, TLI = 1.00, RMSEA = 0.000). The final model comprised three components with statistically significant factor loadings ($p < 0.05$): athletes (PAR1) demonstrated the highest standardized factor loading at 0.71, followed by

recreational activity participants (PAR3) at 0.64, and sports spectators or sports fans (PAR2) at 0.52, as shown in Figure 2.

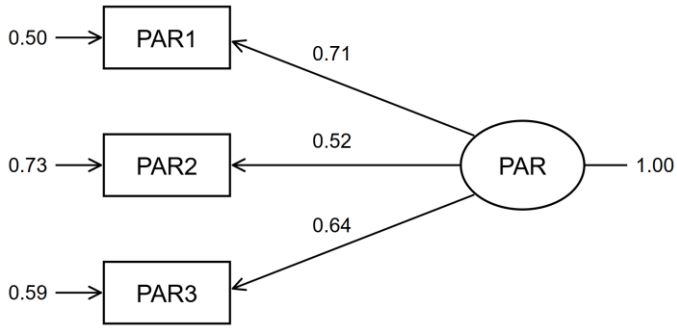



**Figure 2** Measurement Model of Sports Tourism Participants Factors
**Note.** Author

**Sports tourism settings factors**

Confirmatory factor analysis (CFA) of the initial hypothetical model demonstrated excellent fit indices ($\chi^2$ = 0.00, df = 0, CFI = 1.00, GFI = 1.00, TLI = 1.00, RMSEA = 0.000), requiring no model modification. The final model comprised three components with statistically significant factor loadings ($p < 0.05$): built sports facilities (SET2) demonstrated the highest standardized factor loading at 0.70, followed by natural sports venues (SET1) at 0.64, and sports heritage sites (SET3) at 0.33, as shown in Figure 3.

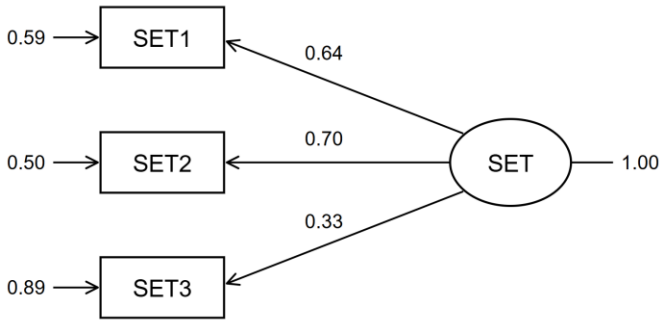



**Figure 3** Measurement Model of Sports Tourism Settings Factors
**Note.** Author

**Sports tourism impacts factors**

Confirmatory factor analysis (CFA) of the initial hypothetical model showed inadequate fit indices ($\chi^2$ = 5079.04, df = 230, $\chi^2$/df = 22.08, CFI = 0.22, GFI = 0.46, TLI = 0.15, RMSEA = 0.235). Model modification was performed based on modification indices, removing items with non-significant factor loadings. The revised model demonstrated excellent construct validity and fit indices ($\chi^2$ = 0.03, df = 1, $\chi^2$/df = 0.03, CFI = 1.00, GFI = 1.00, TLI = 1.00, RMSEA = 0.000). The final model comprised four components with statistically significant factor loadings

($p < 0.05$): environmental problems including traffic congestion, waste generation, and pollution (STI23) demonstrated the highest standardized factor loading at 0.98, followed by support for diverse cultural activities (STI12) and environmental conservation and destination image development (STI18) both at 0.93, and maintenance of sports heritage structures (STI20) at 0.74, as shown in Figure 4.

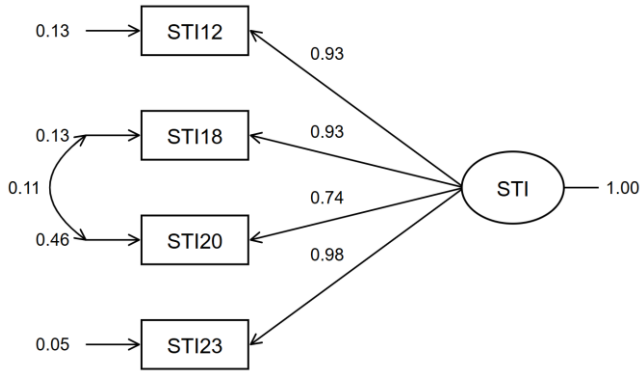



**Figure 4** Measurement Model of Sports Tourism Impacts Factors
**Note.** Author

**Support for sports tourism development factors**

Confirmatory factor analysis (CFA) of the initial hypothetical model showed inadequate fit indices ($\chi^2$ = 2424.85, df = 90, $\chi^2$/df = 26.94, CFI = 0.14, GFI = 0.54, TLI = -0.01, RMSEA = 0.260). Model modification was performed based on modification indices, removing items with non-significant factor loadings. The revised model demonstrated excellent construct validity and fit indices ($\chi^2$ = 0.00, df = 0, CFI = 1.00, GFI = 1.00, TLI = 1.00, RMSEA = 0.000). The final model comprised four components with statistically significant factor loadings ($p < 0.05$): participation of residents (SST9) demonstrated the highest standardized factor loading at 0.91, followed by safety (SST8) at 0.82, technology (SST6) at 0.62, and combining sports tourism with other tourism resources (SST7) at 0.42, as shown in Figure 5.

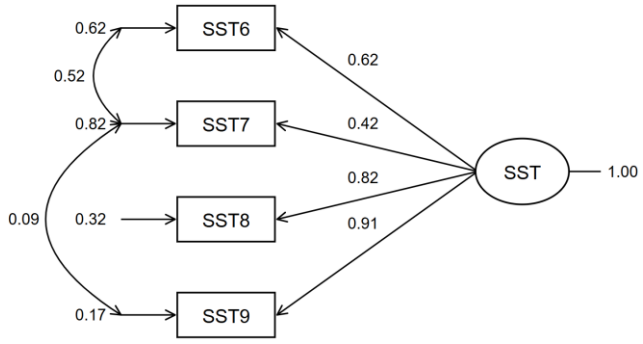



**Figure 5** Measurement Model of Support for Sports Tourism Development Factors
**Note.** Author

Confirmatory factor analysis (CFA) of the initial overall measurement model showed inadequate fit indices ($\chi^2$ = 664.06, df = 109, $\chi^2$/df = 6.09, CFI = 0.80, GFI = 0.83, TLI = 0.75, RMSEA = 0.115). Comprehensive model modification was performed based on modification indices, removing items with non-significant factor loadings.

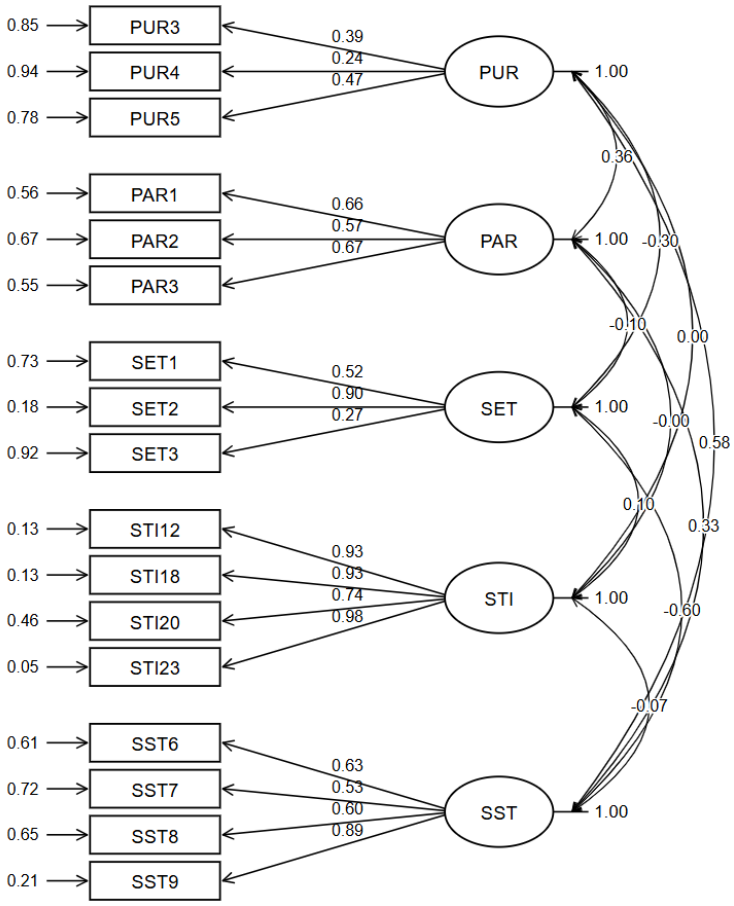



**Figure 6** Measurement Model of Factors Influencing Sports Tourism Development in The Andaman Tourism Cluster

**Note.** Author

The revised model demonstrated good construct validity and fit indices ($\chi^2$ = 283.69, df = 100, $\chi^2$/df = 2.83, CFI = 0.94, GFI = 0.92, TLI = 0.92, RMSEA = 0.069). The final model comprised 17 components with statistically significant factor loadings ranging from 0.24 to 0.98 ($p < 0.05$), as shown in Figure 6. This validated measurement model provides a robust foundation for subsequent structural equation modeling analysis.

Descriptive statistical analysis examined means (M), standard deviations (SD), skewness (Sk), and kurtosis (Ku) for all observed variables in the sports tourism development model.

Mean values ranged from 3.659 to 4.599, with SST9 showing the highest mean (M = 4.599), followed by SST6 and PUR3 (M = 4.547 each). Standard deviations ranged from 0.322 to 0.846, with STI20 demonstrating the highest variability (SD = 0.846). Skewness values ranged from -0.900 to 2.390, and kurtosis values from -1.764 to 3.730, with SET1 showing the highest values for both measures (Sk = 2.390, Ku = 3.730).

Data normality assessment followed established criteria of skewness between -2 and +2 and kurtosis between -7 and +7 (Byrne, 2010; Hair et al., 2010). Only one variable exceeded the skewness threshold, indicating that most variables approximated normal distribution suitable for structural equation modeling. Pearson correlation analysis confirmed all coefficients remained below 0.85 (Kline, 2005), verifying the absence of multicollinearity issues and validating the data's appropriateness for SEM analysis.

**Part 2: Causal Relationships Among Sports Tourism Purpose, Participants, Settings, and Impacts on Supportive Factors for Sports Tourism Development in the Andaman Tourism Cluster**

Structural equation modeling (SEM) using LISREL methodology examined the structural relationships among sports tourism purpose, participants, settings, and impacts on supportive factors for sports tourism development in the Andaman Tourism Cluster.

The hypothetical model demonstrated inadequate fit with empirical data ($\chi^2$ = 832.58, df = 115, $\chi^2$/df = 7.24, CFI = 0.76, GFI = 0.80, TLI = 0.72, RMSEA = 0.128). Model modification was performed based on modification indices, allowing correlations between measurement errors of specific observed variable pairs while maintaining theoretical appropriateness.

The modified model showed improved compatibility with empirical data ($\chi^2$ = 252.46, df = 85, $\chi^2$/df = 2.97, CFI = 0.95, GFI = 0.93, TLI = 0.91, RMSEA = 0.072), demonstrating acceptable fit indices for subsequent analysis of structural relationships.

**Table 1** Model Fit Indices Before and After Modification with Analysis Criteria and Assessment Results

| Index | Criteria | Index value before modification | Judgment | Index value after modification | Judgment |
|---|---|---|---|---|---|
| $\chi^2$/df | < 3.00 | 7.24 | Fail | 2.97 | Pass |
| RMSEA | < .08 | 0.128 | Fail | 0.072 | Pass |
| CFI | ≥ .90 | 0.76 | Fail | 0.95 | Pass |
| GFI | ≥ .90 | 0.80 | Fail | 0.93 | Pass |
| TLI | ≥ .90 | 0.72 | Fail | 0.91 | Pass |

As shown in Table 1, all five indices failed to meet their criteria before modification but satisfied the recommended thresholds after modification. The modified sports tourism development model demonstrated adequate fit with empirical data, with acceptable goodness-of-fit indices supporting reliable estimation of structural relationships. This validates the theoretical framework underlying the relationships among sports tourism purpose, participants, settings, impacts, and supportive factors in the Andaman Tourism Cluster. Table 2 reports the standardized direct, indirect, and total effects among the latent constructs, together with the coefficient of determination ($R^2$) for each dependent variable.

**Table 2** Standardized Direct Effects, Indirect Effects, and Total Effects of the Model of Factors Affecting Sports Tourism Development

| Dependent variable | $R^2$ | Relationship | Independent variable | | | |
|---|---|---|---|---|---|---|
| | | | PUR | PAR | SET | STI |
| PAR | .80 | DE | .90* | - | - | - |
| | | IE | - | - | - | - |
| | | TE | .90* | - | - | - |
| SET | .02 | DE | - | -.15* | - | - |
| | | IE | -.13 | - | - | - |
| | | TE | -.13 | -.15* | - | - |
| STI | .02 | DE | - | - | .14* | - |
| | | IE | -.02 | -.02 | - | - |
| | | TE | -.02 | -.02 | .14* | - |
| SST | .02 | DE | - | - | - | -.13* |
| | | IE | .00 | .00 | -.02 | - |
| | | TE | .00 | .00 | -.02 | -.13* |
| $\chi^2$ = 252.46, df = 85, p-value = 0.000, $\chi^2$/df = 2.97, CFI = 0.95, GFI = 0.93, TLI = 0.91, RMSEA = 0.072 | | | | | | |

* Statistically significant at the .05 level

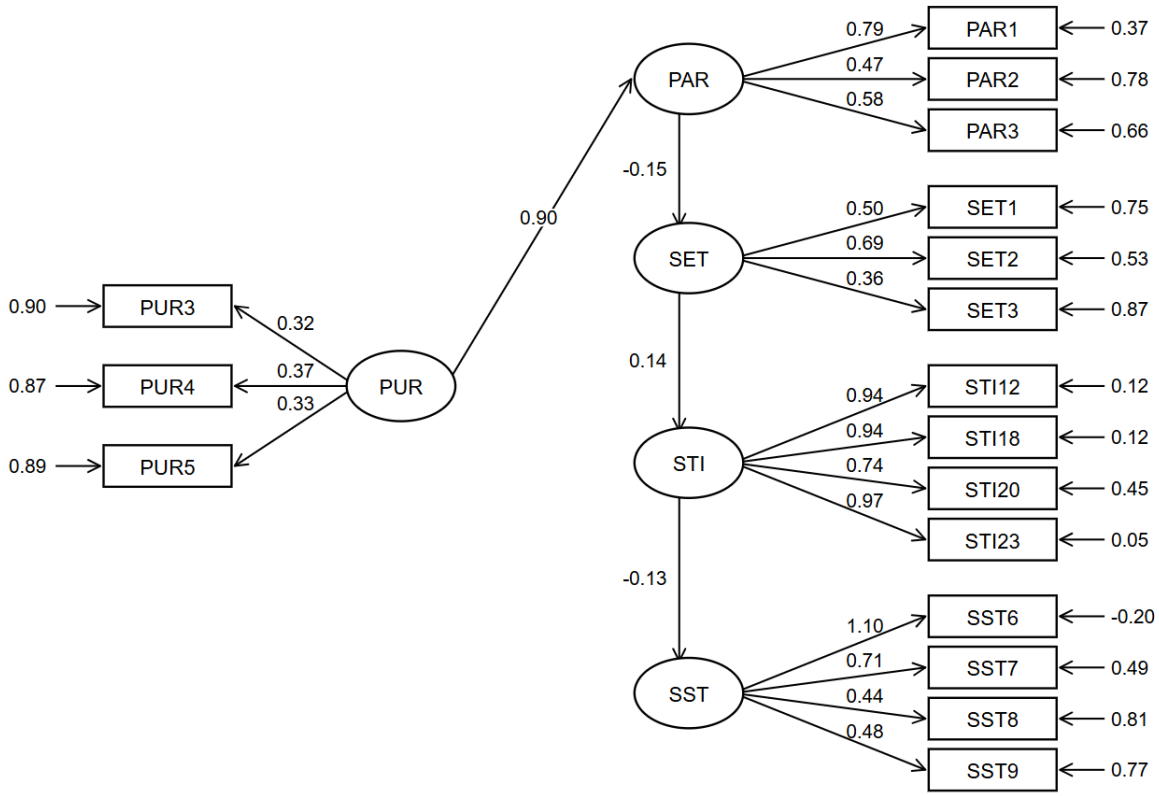



**Figure 7** Structural Equation Model of Factors Influencing Sports Tourism Development in the Andaman Tourism Cluster

**Note.** Author

The modified sports tourism development factors affecting the Andaman Tourism Cluster are detailed as follows, as presented in Table 2 and illustrated in Figure 7:

1. Sports tourism purpose factors in the Andaman Tourism Cluster have a significant direct effect on sports tourism participant factors in the Andaman Tourism Cluster at the 0.05 level of statistical significance (coefficient of influence = 0.90).

2. Sports tourism participant factors in the Andaman Tourism Cluster have a significant direct effect on sports tourism setting factors in the Andaman Tourism Cluster at the 0.05 level of statistical significance (coefficient of influence = -0.15).

3. Sports tourism setting factors in the Andaman Tourism Cluster have a significant direct effect on sports tourism impact factors in the Andaman Tourism Cluster at the 0.05 level of statistical significance (coefficient of influence = 0.14).

4. Sports tourism impact factors in the Andaman Tourism Cluster have a significant direct effect on support factors for sports tourism development in the Andaman Tourism Cluster at the 0.05 level of statistical significance (coefficient of influence = -0.13).

**Conclusion and Discussion**

The structural equation model developed in this study successfully demonstrates the interconnected relationships among factors influencing sports tourism development in the Andaman Tourism Cluster, showing excellent fit with empirical data. The model reveals a systematic progression where sports tourism purposes directly influence participant engagement, which subsequently affects destination settings, leading to measurable tourism impacts that ultimately determine the level of supportive factors for sustainable development.

The research findings substantiate the multidimensional nature of sports tourism as conceptualized by Gibson et al. (1998), who identified sports tourism as encompassing both competitive and recreational activities. The direct relationship between sports tourism purposes and participant engagement observed in the Andaman Tourism Cluster reflects the diverse motivational factors driving sports tourism participation. This finding extends beyond traditional athlete-spectator dichotomies to include essential support personnel such as coaches, trainers, physiotherapists, and accompanying groups including family members, administrators, and business representatives, creating a complex tourism ecosystem that reflects the broadened participant typologies recognized in the sports tourism literature (Weed & Bull, 2009). The emergence of heritage-based sports tourism, as noted by Neirotti (2003), represents a significant evolution in the sector. The Andaman Tourism Cluster's integration of natural environments with constructed facilities exemplifies contemporary developments in purpose-built sporting venues that replicate natural environments while maintaining accessibility and safety standards. This hybrid approach addresses the operational diversity requirements identified by Higham (2005) and Orams (2005), who emphasized the necessity for varied settings in sports tourism development.

The direct influence of participant characteristics on tourism settings within the Andaman cluster aligns with findings from comparable studies in the Thai context. Pongprasert's (2015) structural equation model revealed similar patterns where sports tourism objectives encompassing competitions, recreational activities, and training camps influenced both participant demographics and destination characteristics. The aesthetic appeal factor identified by Inpongpan (2019) particularly resonates with the Andaman cluster's natural beauty, suggesting that destination attractiveness serves as both a draw for participants and a catalyst for facility development.

The research confirms that sports tourism settings in the Andaman Tourism Cluster generate measurable impacts that directly influence community support for continued development. The assessment of these economic, social, cultural, and environmental impacts is consistent with established tourism-impact frameworks (Chen, 2001). This relationship validates the World Tourism Organization's (2019) assertion that appropriately managed sports tourism contributes significantly to achieving the 17 Sustainable Development Goals. The

unique characteristics of sports tourism, including enhanced physical activity engagement, facilitation of social interactions, and scalability from small-scale events to major competitions, position it as an effective vehicle for sustainable development. The study's findings regarding community support mechanisms corroborate established research by Gursoy and Kendall (2006) and Hritz and Ross (2010), who demonstrated that resident support for tourism development increases when communities perceive tangible benefits. This pattern is further supported by resident-attitude studies showing that perceived economic, social, and environmental benefits enhance community support for tourism development (Kitnuntaviwat & Tang, 2008; Prayag et al., 2013). This benefit-based reasoning is grounded in social exchange theory (Ap, 1992) and aligns with community support models in which residents weigh the perceived costs and benefits of tourism before endorsing its development (Nunkoo & Ramkissoon, 2011). In the Andaman context, this relationship appears particularly strong, suggesting that sports tourism development has successfully generated social, economic, and environmental benefits that resonate with local communities. Environmental conservation awareness emerges as a critical factor in the Andaman Tourism Cluster's sports tourism development, supporting Hinch and Higham's (2011) emphasis on environmental stewardship in natural tourism destinations. This finding is particularly relevant given the cluster's marine and terrestrial biodiversity, requiring careful balance between tourism development and ecological preservation.

The research provides actionable insights for sports tourism development in similar coastal and island destinations. The systematic relationship identified in the model suggests that effective sports tourism development requires coordinated attention to purpose definition, participant engagement strategies, setting optimization, and impact management. Yuvanont's (2018) identification of economic impacts through tourist revenue, urban renewal, and cultural activity diversification provides a framework for measuring and maximizing sports tourism benefits in the Andaman context. The study's emphasis on infrastructure development, including improvements in public utilities, communications, and community spaces, indicates that sports tourism serves as a catalyst for broader regional development. This multiplier effect extends the value proposition beyond immediate tourism revenues to encompass long-term community enhancement. While this research provides valuable insights into sports tourism development in the Andaman Tourism Cluster, several limitations warrant consideration. The study's focus on a specific geographic region may limit generalizability to other tourism contexts with different natural, cultural, or economic characteristics. Future research should examine the model's applicability across diverse sports tourism destinations to validate its universal relevance.

The structural equation model successfully demonstrates that sports tourism development in the Andaman Tourism Cluster follows a systematic progression from purpose through participants and settings to impacts and supportive factors. This research contributes

to both theoretical understanding and practical application of sports tourism development principles, particularly in natural environment contexts where sustainability considerations are paramount. The findings provide an evidence-based framework for destination managers, policymakers, and industry stakeholders seeking to develop sports tourism in a manner that generates economic benefits while preserving environmental and cultural assets for future generations.

## Suggestions

### Suggestions for Research Implementation

1. Integrated Sports Tourism Development Strategy: Given the positive relationship between sports tourism purposes and participant engagement, destination managers should develop comprehensive marketing strategies emphasizing diverse sports tourism objectives including recreational activities, competitive events, and heritage tourism. Implementation should include targeted communication campaigns highlighting the region's natural venues, built facilities, and cultural heritage sites while establishing clear value propositions for different participant categories.

2. Sustainable Impact Management Framework: The negative relationships between participants-settings and impacts-support factors indicate the need for proactive capacity and environmental management. Policymakers should establish carrying capacity limits for natural venues, implement environmental monitoring systems, and develop community benefit-sharing mechanisms. This framework should include infrastructure planning, environmental protection protocols, and stakeholder engagement processes to maintain long-term community support.

### Suggestions for Future Research

Longitudinal and Comparative Analysis: Future research should examine how relationships among sports tourism factors evolve over time across different contexts. Comprehensive studies spanning multiple years and diverse geographical settings would reveal temporal patterns, identify critical development stages, and assess sustainability impacts. Research should incorporate seasonal variations, economic cycles, and changing preferences while validating model applicability across mountain, urban, and desert environments. Cross-cultural studies examining different national contexts would enhance understanding of cultural, economic, and institutional influences on model components, improving generalizability and supporting evidence-based policy development.

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