

ASPECTS OF SPATIAL AND TEMPORAL DIMENSIONS OF SPORTS TOURISM AS KEY INDICATORS OF ITS SYNERGISM

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Abstract

The objective of the present study is to identify spatial and temporal aspects that enable the synergistic potential inherent in sports tourism. It relies on a theoretical framework based on the principles of open systems theory, synergetics, and systems thinking. This framework implies a flexible and multivalent interaction of various factors, including spatial layout, seasonality, infrastructure, and social context. The research builds the foundation for a deeper understanding of the scope, diversity, and structure of the sports tourism phenomenon. Facilitated by the proposed theoretical models, the research then relies on a qualitative analysis of secondary sources from scientific journals in the field of sports, tourism, and management in sports and tourism, with the application of a set of keywords. The findings indicate that the spatial dimension, encompassing aspects such as location, accessibility, landscape, and regional distribution, and the temporal dimension, including seasonality, duration, and development patterns of activities, serve as fundamental indicators in the conceptualization and theoretical underpinnings of sports tourism. These indicators facilitate the harmonization of intricate relationships within the sports tourism system. The discussion underscores the necessity for the establishment of flexible and adaptable models that facilitate synergy through the proposed sets of spatio-temporal aspects. These models are intended to promote sustainability, competitiveness, and resilience. Conclusions indicate the significance of incorporating elements of spatial and

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temporal dimensions into the planning process, thereby establishing the foundation for the formulation and advancement of sports tourism strategies that are oriented towards responsibility.

Keywords: sports tourism, spatial and temporal dimension, synergism, sustainable development

ASPEKTI PROSTORNE I VREMENSKE DIMENZIJE SPORTSKOG TURIZMA KAO KLJUČNI INDIKATORI NJEGOVOG SINERGIZMA

Apstrakt

Cilj istraživanja jeste identifikacija prostornih i vremenskih aspekata koji omogućavaju sagledavanje sinergetskog potencijala sportskog turizma. Teorijskim okvirom otvorenih sistema, sinergetike i sistemskog mišljenja, istraživanje analizira međusobno delovanje ključnih faktora kako bi se bolje razumela složenost sportskog turizma. Kroz predložene teorijske modele, istraživanje se oslanja na kvalitativnu analizu sadržaja relevantnih sekundarnih izvora iz naučnih časopisa u oblasti sporta, turizma i menadžmenta u sportu i turizmu, a uz primenu seta ključnih reči. Rezultati pokazuju da su prostorna dimenzija (lokacija, pristupačnost, pejzaž, regionalna distribucija) i vremenska dimenzija (sezonalnost, trajanje, razvojni obrasci) ključni indikatori u definisanju i teorijskom utemeljenju sportskog turizma, jer omogućavaju harmonizaciju složenih odnosa unutar njegovog sistema. Diskusija ističe potrebu za formiranjem fleksibilnih i adaptabilnih modela upravljanja koji obezbeđuju sinergiju kroz predložene setove prostorno-vremenskih aspekata čime se podstiče održivost, kompetitivnost i otpornost sistema. Zaključci ukazuju na značaj integracije aspekata prostorne i vremenske dimenzije u procesu planiranja, te postavljaju temelj za kreiranje i razvoj odgovorno orijentisanih strategija sportskog turizma.

Ključne reči: sportski turizam, prostorna i vremenska dimenzija, sinergija, održivi razvoj

Introduction

Sports tourism is a social, economic, and cultural phenomenon that promotes community belonging and healthy lifestyles through the interaction of activities, people, and places. The impact of sports on a nation's economy is multifaceted. It influences the country's income and Gross Domestic Product (GDP) opening multiple investment opportunities and through the development of sports and tourism infrastructure. This synergy between people and place through activities of sports and tourism engenders a multitude of effects that impact the entire society, economy, and culture, thereby rendering sports tourism a significant phenomenon in contemporary society. The sports tourism industry has undergone rapid development in recent decades, generating app. 600 billion dollars, constituting app. 14% of the total turnover achieved in tourism (Jovanović, 2013). This growth is accompanied by numerous challenges, among which the need for spatio-temporal coordination of activities, capacities, and resources stands out. Sustainability of this sector is contingent upon meticulous monitoring and interpretation of spatial and temporal dimensions. Such an approach facilitates strategic planning and responsible management of their development. Following open systems theory and synergetic approaches (Capra, 1996; Haken, 2021), this implies observing sports tourism as a dynamic system in which all elements act interdependently, and changes in one segment produce effects in the entire network of relationships (Zarotis, 2019).

In the context of contemporary unpredictable environmental conditions, open systems and synergetic approach are imperative to facilitate the perception and understanding of the intricacies inherent in the relationship between sports and tourism (Capra, 1996; Meadows, 2008). In such circumstances, it is possible to assume that theories dealing with spatio-temporal aspects of sports tourism require flexible, open models of systems thinking (Bertalanffy, 1968; Haken, 2021). This understanding of adaptability of sports tourism system can only be achieved in the context of a concrete environment, but also, at the same time, in maintaining internal coherence through self-regulation of processes (Haken, 2021; Meadows, 2008). As a founding principle of system thinking, the principle of multidimensionality posits that opposing tendencies exist and interact with each other. It further

asserts that these tendencies form a complementary relationship of multiple variables. From a synergetic perspective, compatibility between parts and their mutual interactions enhances mutual resonance and generates a force that will be greater than the sum of individual parts (Capra, 1996; Haken, 1983). Since laws of complexity apply universally and hierarchically and are not conditioned by the individual behavior of constituent parts, it is more likely that the behavior of parts can be explained by studying the behavior of the whole, enabling a deeper understanding of sports tourism as a dynamic system (Bertalanffy 1968; Haken, 2021; Meadows, 2008).

The present paper examines the etymology of the phenomenon of sports tourism through a synergetic perspective, understood through spatial and temporal dimensions in the light of experience economy. The objective of the present study is to establish a set of key aspects pertaining to the spatial and temporal dimensions of sports tourism, based on the examination of its framework, content and structural components. The analysis is conducted with the overarching aim of proposing effective management strategies that are instrumental in fostering sustainable development of sports tourism. This approach has the potential to establish a competitive yet sustainable system, thereby mitigating the adverse effects of unregulated development, emphasizing conservation of local natural resources and enhancement of ecosystem services. This approach aims to optimize sports tourism as a specific, albeit growing, and significant area at the intersection of sports and tourism. The fundamental idea is to establish a conceptual framework for delineating value criteria and formulating recommendations for activities encompassing the phenomenon of tourism-induced sports, as well as sports-stimulated tourism.

The research recognizes that it is impossible to establish a single clear classification, nor is it possible to accurately determine the extent or scope of the phenomenon of sports tourism due to its constant transformation of forms and conditions. Rapid evolution of these two sectors further exacerbates the establishment of a relationship between them. The prevailing common denominator, establishing a shared framework between these two phenomena, is spatio-temporal aspect shaped by the circumstances of leisure time, well-being culture, nurturing adventurous and meditative state of body and spirit, and

satisfying individual and social aspirations of the contemporary lifestyle.

Methodology

This paper utilizes qualitative content analysis as a research method, with the objective of identifying key theoretical approaches relevant to the understanding of sports tourism as a complex system. The initial step in this study is the analysis of the phenomenon of sports tourism. This analysis is conducted through a theoretical framework based on the principles of open systems theory (Bertalanffy, 1968), synergetics (Haken, 2021), and systems thinking (Capra, 1996; Meadows, 2008). This framework implies a flexible and multivalent interaction of various factors (spatial layout, seasonality, infrastructure, and social context) for a deeper understanding of the scope, diversity, and structure of the sports tourism phenomenon. Subsequently, informed by conclusions that emphasize spatial and temporal dimensions as pivotal in the integration of the sports tourism system, a content analysis is conducted on the basis of secondary sources, i.e., scientific and professional works published in relevant national and international magazines in the fields of sports, tourism, and sports and tourism management.

The data collection was conducted between December 1, 2024, and April 1, 2025. Relevant literature was collected through a search by keywords. A comprehensive search strategy was employed, encompassing the terms “sports tourism,” “management in sports and tourism,” and “principles of sports tourism”. This approach involved a meticulous examination of numerous databases, including Google Scholar, SCOPUS, DOAJ, and a plethora of other available academic databases. A comprehensive review of the existing literature revealed that more than 50 scientific publications met the inclusion criteria. Works published prior to the year 2000 were excluded from the corpus, with the exception of cases in which the authors were cited multiple times and were also present in contemporary literature, in which cases their earlier works, as well as monographic studies, were included in the analysis. Articles focusing on case studies were also omitted. A particular emphasis was placed on publications that address the theoretical framework, conceptualization, and operationalization of sports tourism.

Then, a content analysis was conducted, focusing on the notion of geography, destination, attraction, seasonality and mobility, as those words were repeating numerous times. This led to a final sample of 30 papers that were subjected to rigorous analysis. This analysis enabled the identification of key aspects pertaining to spatial and temporal dimensions inherent in the theoretical understanding of sports tourism, mostly manifested in works that approach sports tourism from a systemic, interdisciplinary, or managerial perspective, representing major categories for further research and modeling in this field.

Theoretical background

Sports tourism, as a contemporary social structure, is marked by heterogeneity, which is characterized by its multivalence, evading clear classification and typology (Vrondou & Ourania, 2017). The composition of its components represents an essential, content-based aspect of the complete system and forms the basis of its multidimensional structure. The modification of a single component of the system invariably entails alterations in other components, and, on occasion, the entire system (Gammon & Robinson, 2003). Therefore, the sports tourism system is characterized, above all, by its specific dynamics. In his study entitled *The Web of Life* (1996), Capra presents the concept of systems thinking, underscoring the interdependence of components within complex systems and the necessity of viewing parts in relation to the whole. This approach fosters a holistic understanding of reality, emphasizing that fundamental elements of the system are relationships and the methodologies employed to establish a specific network of interactions. Conversely, Bertalanffy (1968) in the book *General System Theory* establishes fundamental laws and principles that apply to all systems and enable the identification of common characteristics based on universal principles in different contexts. His theory offers a framework for examining and understanding complex phenomena such as sports tourism, which encompasses several interconnected domains such as sports, tourism, economics, ecology and culture. Consequently, the system's increased complexity leads to greater differentiation, thereby enhancing the complexity of the underlying structure. Systems thinking should strive to understand sports tourism as a unique phenomenon and a key set of indicators that

point to a more than a simple combination of sports and tourism systems in the way of their interpolation, at the end of interpretation.

In her study *Thinking in Systems: A Primer* (2008) Donella Meadows offers more insight into managing these complex interrelationships by introducing the idea of feedback loops. They serve to regulate the elastic stability and adaptability of a system, offering a nuanced perspective on the management of such intricate phenomena. Within the paradigm of sports tourism, negative feedback helps to stabilize (e.g., limiting access to preserve natural resources). In contrast, positive feedback can promote the faster development of a destination (e.g., more visitors bring more investment, making it more attractive). Furthermore, Meadows emphasizes the necessity of anticipating delays in system responses, a crucial consideration in the planning stage. The repercussions of inadequate management, such as overloading capacity or infrastructure networks, may only become evident after considerable delay.

The phenomenon of sports tourism must be understood synergetically, as more than a simple combination of sports and tourism (Weed, 2005). This necessitates an understanding and consideration of the unique characteristics of sport and tourism in an integrated manner, thereby facilitating an exploration of the heterogeneity inherent in the sport tourism phenomenon (Higham & Hinch, 2009). Despite the evident advantages of an explicit focus on sports tourism, it is imperative to acknowledge the permeable and dynamic nature of conceptual boundaries. This assertion is further substantiated by the theory of synergetics, as posited by Hermann Haken, elaborated upon in his seminal work *Synergetics: Introduction and Advanced Topics* (2021b). This theory examines how patterns of some new and specific order emerge spontaneously through the non-linear interaction between system components. Haken introduces the key concept of order parameters, which govern the behavior of the entire system, and the slaving principle, which describes how the behavior of smaller subsystems is coordinated according to the dominant patterns of the system as a whole. From this standpoint, sports tourism can be regarded as a multifaceted phenomenon, characterized by the interplay among users, market dynamics, and spatial resources. This intricate relationship gives rise to specific behaviors and the development of destinations.

By integrating the methodologies of Capra, Bertalanffy, Meadows, and Haken, sports tourism can be conceptualized as a complex, adaptive system whose behavior is contingent on the interaction of numerous actors, feedback loops, i.e., interaction within the system, as well as on the capacity of the system to adapt to the dynamics of external influences. Observing the resulting system through a synergetic perspective, the phenomenon of sports tourism aims to understand general trends, encourage positive feedback loops and intervene strategically at key points of the system, while respecting its internal dynamics and limitations.

The relationship between the sports system and the tourism system

Starting from the basic assumption that sports not only affect tourism, but that tourism affects sports, it seems justified to highlight the high degree of interdependence between sport and tourism. At this initial stage, a classification matrix was constructed, predicated on key tourist and sports characteristics. (Higham & Hinch, 2003b). The primary contribution of this classification system is the conceptualization of sports tourism as a “two-dimensional (spatio-temporal) experience of physical activity related to a specific environment” (Standeven & DeKnop, 1999). Furthermore, each of these dimensions is articulated in terms of its key components, which facilitates a more profound examination of the concept of sports tourism.

The increase in individual mobility and diversification of sporting activities has led to the idea that the intersection of these two became a significant field of research (Glyptis, 1982; Standeven & DeKnop, 1999; Weed & Bull, 2004). The intersection of sports and tourism has undergone remarkable expansion, characterized by compatibility, manifesting notable mutual benefits for both domains, with a corresponding clarification of their respective roles (Higham & Hinch, 2002).

The term “sports tourism” was coined to better understand the use of sports as a tourism endeavor. Sport and tourism are major global phenomena that show a significant and increasing degree of integration (Gibson, 1998; Standeven & DeKnop, 1999). A substantial proportion of

sporting activities is marked by travel (Hinch & Higham, 2001), while a considerable aspect of tourism is intricately intertwined with sports (World Tourism Organization & IOC, 2001). On the one hand, the topic exhibits a programmatic and temporal character, and on the other, a spatial character. Sports tourism is defined as “leisure-based travel that takes individuals temporarily outside of their home communities to participate in physical activities, to watch physical activities, or to venerate attractions associated with physical activities.” (Gibson, 1998: 49). A similar explanation can be found in the work of Standeven and DeKnop (1999), who describe sports tourism as all forms of active and passive involvement in sports activities, casual or organized, for a wide variety of reasons, requiring travel away from home and workplace (Standeven & DeKnop, 1999). These two observations underscore the role of sport as a tourist activity, while simultaneously alluding to their spatial and temporal dimensions.

Spatial and Temporal dimension of sports tourism

The experience economy, in contrast to the conventional economic framework, facilitates an emotional and spiritual interaction with consumers (Li et al., 2021)). This term is employed to delineate an economic model in which products and services that provide unique and memorable experiences are prioritized over traditional products and services that satisfy needs and are predominantly material in nature. The transition in consumption patterns from the realm of tangible products to the domain of experiential activities has emerged as a pivotal paradigm shift. This transformation in consumer behavior cannot be comprehended without an understanding of the spatio-temporal continuum that underpins experiential engagement and the utilization of leisure time. In the domain of sports tourism, the focus is on orchestrating the participation of tourists in activities designed to foster interpersonal connections, thereby addressing their emotional needs and contributing to the enhancement of their self-esteem (Pine & Gilmore, 2011). As a new wave of economic development, it is embedded in place and time. The specific location and time become the primary economic indicators. Tourism is predicated on the concept of picturesque places, while sport is predicated on personal participation and excitement. When sports are integrated into tourist activities and presented as tourist attractions, the quality of available tourist products and psychological satisfaction are significantly enhanced. This, in turn,

leads to an overall sense of well-being for the individual.

Discussions concerning contemporary sport and tourism necessitate an initial understanding of various forms of mobility, particularly personal mobility (Burns & Novelli, 2008), along with the growing interest in both passive and active physical pursuits (Gliptis, 1991b). Despite the apparent generalizations in such claims, it is acknowledged that, in numerous societies, heightened degrees of personal mobility are predominantly confined to the domain of the privileged (Hall, 2004a). Moreover, engagement in a wide array of sports and recreational activities is delineated by social class, race, and gender (Gibson, 2005b). Furthermore, the observation that analogous status groups tend to exhibit similar lifestyles and consumption patterns lends support to the notion that sports, and consumption are indeed equivalent phenomena (Booth & Loy, 1999).

The appearance of things in time means that they partially appear in a certain order, and the location of things in space implies their specific position with each other, imply both temporal and spatial relations (Van Fraassen, 2013). Following the assumption that relations create order, that is, a close connection between relations and order, indicates the existence often significantly more complex due to the multidimensionality of space and time. While space is three-dimensional, time is one-dimensional. It represents a temporal sequence that is linear and irreversible and can be interpreted as a fourth spatial dimension and one that marks its movement through historical and social time (Hawking, 1988). The way in which dimensions are related to the complexity of order and the relationship between both concepts represents a key indicator of the interpretive potential of sports tourism. When sport tourism is viewed as a dynamic, time-sensitive system with a tangible spatial basis, it becomes an important interpretive tool in interdisciplinary approaches such as systems thinking and synergetics (Capra, 1996; Haken, 2021; Meadows, 2008). Understanding space-time relations in this domain enables more precise planning, sustainable management of resources, and the introduction of strategic order in the complex network of tourist-sport interactions.

Spatial dimension of sports tourism

The spatial dimension constitutes the fundamental determinant in the study of sports tourism, as resources primarily comprise the territory itself and its facilities, chiefly physical and cultural-geographical features (Hall & Page, 2006; Higham & Hinch, 2009c). These facilities fulfill a dual function in the realm of sports tourism. Firstly, from the perspective of sports, they provide conditions for the development of a particular type of sport. Secondly, from the perspective of tourism, they provide destination services that users wish to experience, among others, beautiful peaks, glaciers, icefalls, lakes, and waterfalls. They possess iconic value and serve to represent identity within sports tourism (Weed & Bull, 2004).

The development of sports tourism facilities is often geographically specific, with the infrastructure corresponding to a particular location. The location, as the inaugural thematic unit of the spatial dimension in a more extensive spatio-temporal network, establishes a sports-tourist destination, that is, a region as a secondary thematic domain of a particular higher or lower degree of specialization and intensity of use (Getz, 2008; Müller, 2007; Gutić et al., 2023) marked with a distinctive image (Gibson et al., 2012; Kaplanidou & Vogt, 2007). The unique character of the destination, in conjunction with its capacity to integrate sports and tourist activities, gives rise to the concept of the sports-tourism landscape (Gibson, 2005b). This landscape constitutes a spatial zone that is distinguished by its unique qualities and a high degree of ambient and functional connectivity. Consequently, it is well-suited for the development of sustainable and thematically specific forms of tourism (Perić, Vitezić, & Đurkin, 2016). The landscape establishes a connection between individual sports and specific spatial resources, thereby demonstrating the influence of sports on tourist spatial units through the motif of the landscape (Müller, 2007; Perić et al., 2016). With respect to the concept of resource dependence, a fundamental distinction emerges between sports that are contingent on the presence of particular characteristics inherent to natural resources (e.g., skiing, sailing, and rafting) and those that function independently of such resources (e.g., indoor team sports). Concurrently, the influence of sports on the tourism landscape, particularly concerning its cultural characteristics, has gained significant attention from scholars (see Higham, 2005; Hall, 2011c; Gutić et al., 2023).

The spatial dimension of sports tourism, therefore, encompasses the concepts of location-attraction, region-destination, and zone—that is, landscape regarded as an ecological system. A thorough examination of the extant framework of the spatial dimension of sports tourism reveals the presence of two distinct categories of indicators. The first category comprises internal indicators of the attractiveness of the location and the accessibility of the destination, that is, the region. The second category consists of external indicators of the networking of the zones, that is, the landscape into a continuous ecosystem (Hall & Page, 2006; Müller, 2007). The synergistic effect of these factors fosters the resilience of the spatial dimension, not only with changes in climatic and ecological potential, but also with social and cultural transformations of space. The spatial dimension encompasses not only the physical realm but also the social space shaped by the meaning, practices, and perception of the locality (Soja, 1996; Weed & Bull, 2004). This concept is predicated on the increasing societal interest in and respect for nature, as well as the notion of sustainable, balanced tourism development (Sharpley, 2009). This phenomenon is intricately linked to the processes of globalization and ecologization (Gössling & Hall, 2006; Zbiljić, 2023). The global proliferation of high-tech tourism services has led to a diversification of demand, as evidenced by the increasing pursuit of alternative tourism forms, such as ecological, natural, active, and athletic tourism (Higham & Hinch, 2009).

According to Standeven and DeKnop (1999), the experience of a place constitutes a pivotal component of sports tourism. They assert that individuals are drawn to a place's characteristics and qualities. Conversely, sports necessitate specific spatial resources. As indicated by the previous author, the prevalence of certain phenomena varies considerably. Climate change, characterized by its unpredictable weather patterns and substantial daily shifts in microclimates, introduces a critical temporal dimension to this intricate issue, as emphasized by Scott, Hall, & Gössling (2012). This dimension necessitates meticulous consideration in all facets of sports tourism planning and management, as it exerts a substantial influence on the seasonality and sustainability of destination.

Temporal dimension of sports tourism

The temporal dimension of sports tourism manifests through three topics: the duration of travel, i.e., sports activities; seasonality; and evolution, which summarizes the transformations and adaptability of the sports tourism program. The initial salient topic pertains to the duration of visits, which is measured in terms of the number of visitors per day as well as the number of visitors who stay for one or more nights. This characteristic of travel is a fundamental component in most definitions of tourism (Mathieson & Wall, 1982). It also has implications for a variety of issues, including the extent of economic impact associated with a visit and the nature of host-guest relationships (Cohen, 1984). The duration of the sports activity (i.e., day-night duration, game duration) also significantly defines the range of sports activities, as well as their frequency, rhythm, and density of events. Another important issue is the seasonality of tourism, a topic that merits further examination. Most tourist destinations are characterized by significant seasonal fluctuations in tourist activity, attributed to various natural and institutional factors (Allcock, 1989; Butler, 1994; Snepenger, Houser, & Snepenger, 1990). Tour operators often perceive this fluctuation as a challenge that necessitates the management of variable revenue streams while covering operational expenses. The third topic concerns the pattern of development or evolution of tourism products and destinations over time. This process is of particular significance in the context of contemporary research trends in sustainable tourism and the necessity to consider processes and forms in tourism studies, as it demonstrates how destinations and sports tourism undergo distinct stages in their life cycle (Butler, 1980; Zbiljić, 2023). Considering global trends, including the professionalization and globalization of sports events, this aspect assumes paramount importance in the analysis of the long-term sustainable development of sports tourism and the potential impacts that may arise through changes in the social, ecological, and economic spheres (Bale, 1989). Comprehension of the potential changes in one domain enables stakeholders to enhance their understanding and management of the anticipated impacts in another domain. The duration of the trip is indicative of the time dimension, which, through the aspect of seasonality, is directly reflected in the development of tourism resources (Butler, 1994; Allcock, 1989). This encompasses the so-called “flow dimension,” which is defined as the frequency and temporal

distribution of a destination's tourist attractions. Additionally, it encompasses the sequentiality, rhythm, and frequency of sporting events and activities (Getz, 2008).

These elements are intricately linked and comprise three distinct yet interconnected levels. The first level encompasses the trajectory of movement between locations within the broader region. The second level focuses on the networking of attractions within the destination. The third level addresses the internal and external evolvability of the destination. The concept of internal evolvability pertains to the adaptability of the sports offer and its diversity. In contrast, external evolvability is reflected in the flexibility of using spatial and resource capacities in the network of connected locations (Cooper et al., 2008; Hall, 2005). This phenomenon directly reflects the inclination and preference of sports tourism actors towards a specific destination, thereby confirming that time is not only a physical, but also a psychological and social category (Leiper, 1990). Consequently, the temporal dimension, in conjunction with spatial determinants, emerges as a pivotal factor in comprehending the intricate dynamics of sports tourism.

Discussion – integration of aspects defining spatial and temporal dimension

While examining the spatial and temporal dimensions is undoubtedly beneficial, their interdependence offers comprehensive and far-reaching advantages for understanding the complex, adaptive, and synergetic properties of sport tourism (Haken, 2021; Meadows, 2008). As indicated in the preceding analysis, the spatial dimension encompasses not only physical location and landscape, but also cultural, infrastructural, and ecological networks that serve as the foundation for the specialization of destinations (Hall, 2005b; Standeven & De Knop, 1999). The temporal dimension, characterized by the duration, seasonality, and development cycle of activities and destinations, exerts a direct influence on the dynamics of resource utilization, capacity planning, and the profiling of the tourist offer (Butler, 1980; Getz, 2008). The symbiotic relationship between sports and tourism stems from the congruence that arises when the spatial characteristics of a destination align with the temporal patterns of demand and user behavior.

Considering the intricacies and challenges associated with its univalent classification, a set of factors has been identified that exert a substantial influence on the nature of the synergy between sports and tourism. These factors include: (1) spatio-temporal accessibility, defined as the seasonal capacity of the location, and (2) seasonal flexibility, characterized by the capacity to distribute activities throughout the year. The bi-temporal quality of the attraction is characterized by the integration of local natural and cultural resources into a unique sports-tourism product. This product is based on the offer of experience, i.e., the ecological capacity of the location, as well as derived spatio-temporal aspects related to the destination's resistance to climatic and social changes.

1. Seasonal capacity of the destination (space-time accessibility)

The temporal dynamics of use are inextricably linked to the spatial infrastructure of the destination, and consideration of the seasonal capacity of the destination is imperative in assessing the synergy between these two factors. As destination is comprised of a variety of geographical, climatic, and ecological factors inherent to the location, it is closely connected to the seasonal tourist potential and the program character of the sport. In consideration of this aspect, a synergetic approach was employed to establish dynamic links between binary phenomena. This is achieved through the flexibility of the sports program and the adaptability of the spatial framework of the tourist attraction. Consequently, the multivalent use of the space-time capacities of the place was enabled. Management strategies that better regulate the relationship between the characteristics of the tourist destination and the seasonality of sports could determine the key values that should be nurtured in the process of environmental regeneration. These strategies would contribute to the preservation of the environment through the balance between the carrying capacity of space and the intensity of activities (Getz, 2008; Hall, 2005).

2. Temporal quality of attraction (seasonal flexibility and capacity of activity distribution)

The attractiveness of a location is contingent on the number and quality of sports-induced attractors, namely the specificity of natural resources, infrastructural equipment, and accessibility to resources, their

exceptionality and uniqueness, as well as the involvement of the local community in this process (Hall & Page, 2014; Relph, 1976; (Perović & Đukić, 2023). The activation of resources through time patterns of use is also a contributing factor. The duration of the trip is contingent upon the time and quality of the stay, which, in turn, is influenced by the generation of an emotionally and experientially rich stay (Getz, 2008; Pine & Gilmore, 1999). The destination dictates the characteristics of the spatial environment and its compatibility with the sports activity—that is, its program. The location, in turn, is influenced by the social, economic, and cultural framework of the locale in which the sports activity is conducted. Following synergetic logic, a location is not an isolated entity; rather, it is a component of a functional network that utilizes spatial and temporal flows to establish connections between multiple points within a destination. The length of stay and patterns within the wider system are directly influenced by the quality and diversity of sporting attractions, including local community cultural participation, infrastructure, and natural features. The role of the local community in this process is crucial, as it contributes to the sustainability and authenticity of the offer, and at the same time coordinates the rhythm of the destination with the needs of the market (Dredge & Jenkins, 2007).

3. Ecological capacity of the place and services (integrating local natural and cultural resources into a holistic experiential product)

Within the context of a synergetic perspective, the dimensions of space and time must be interpreted in relation to the natural resources and ecological services that determine the rhythm, duration, and quality of activities within a specific space-time context. The implementation of sports and tourist trips and stays is contingent upon the ecological treatment of the location and destination. The presence of fresh air, a favorable microclimate, and climatic conditions that ensure the smooth implementation of sports and tourist activities directly correlate with the degree of sustainability of the sports tourism system. This phenomenon represents a pivotal intersection between natural limitations and the functional needs of sports tourism users. From the perspective of synergetics, as developed by Haken (2021), the accessibility and openness of this system are of key importance. The provision of environmental services, like air quality, water and soil conservation, and microclimate stability, facilitates not only the

physical development of sports and tourism activities but also influences the perception of a destination and the dynamics of its use (Meadows, 2008).

According to the synergetic framework, the ecological capacity of a place is a measure of the adaptive capacity of the system. It is the system's capacity to receive sports, and tourism demands without disturbing the natural processes of the ecosystem. It also determines how much local communities, management structures, and users contribute to the conservation and valuation of ecological services (Müller, 2007). This comprehensive examination is essential for elucidating interdependence among various factors, thereby illuminating the potential for resonant development in the realm of sports tourism.

A comprehensive understanding of the dynamic relationships between spatial infrastructure, mobility, seasonality, and ecological sustainability in the context of a synergetic approach to sports tourism necessitates the integration of spatio-temporal dimensions. This approach enables a comprehensive understanding of sports tourism as a multifaceted system, wherein the interplay of components such as resilience, accessibility, and attractiveness can generate positive synergetic outcomes that enhance the sustainability and efficiency of destinations. Even distribution of tourist traffic throughout the year and reduction of burden during the peak season are made possible by the network of attractions and the accessibility of destinations, which promote mobility in relation to the duration of activities, participation in visits, and seasonal characteristics.

The coordination and infrastructure of sports and tourism activities, as well as their capacity to adapt to changing seasons and development over time, all demonstrate the importance of the spatio-temporal component. Furthermore, landscape resilience guarantees spatial flexibility and adaptability over time, facilitating sustainable management of ecological services. For sports tourism to remain sustainable in the long term, development strategies that incorporate all the above-mentioned factors must be implemented to enhance the system's capacity to adapt to changes and uncertainties.

Conclusion

In a broader theoretical and empirical framework, spatial and temporal dimensions of sports tourism are viewed through the prism of an open system and synergetic approach, where elements of geography, ecology, and social sciences are interconnected. Theoretical models of spatial interaction are complemented by contemporary concepts of spatial resilience, economy of experience, as well as the growing dependence of sports and tourism activities on natural resources. This multifaceted analysis facilitated a more precise understanding of how local landscapes and global flows shape the sports tourism offer, as well as how spatio-temporal aspects can serve as a foundation for sustainable destination management. The significance of a holistic approach is further substantiated by the identification of pivotal spatio-temporal indicators that collectively influence the sustainability and competitiveness of sports tourism. This comprehensive framework serves as a discussion of sports-induced tourism and sports-supported tourism.

A multitude of directions for future research are suggested by these findings. The value of researching the specific relationships found in each component is not equal. The quality and utility of these relationships will vary significantly. One potential avenue for research might involve the examination of the impact of space-time considerations on the propensity of sports tourists to engage in travel. It is imperative to identify specific measures of these variables and to test hypotheses regarding their probable impact on length of stay and distance travel. Alternatively, the effects of different types of recreational and elite competition can be studied. This type of information would be useful in developing sport and tourism management strategies. After the selection of these variables, the framework proposes key relationships for exploration. The interchange of subjects gives rise to novel avenues for research in the domain of sports tourism. Rather than posing inquiries within a single research dimension, this framework enables researchers to methodically examine the interrelationships among subjects across two fundamental dimensions. Despite the valuable holistic insight into the dynamic nature of sports tourism, there remains room to consider the extent to which the potential synergies of this area have been comprehensively exploited. Consequently, the guidelines for future research call for a more systematic and integrative approach, primarily through research

based on the specific spatial problems of destinations or specific branches of sports.

It can be concluded that achieving equilibrium between the spatial and temporal dimensions is imperative to comprehending the sustainable framework of sports tourism. The proposed framework, which integrates these various aspects, has the potential to facilitate the development of strategies that support local communities, promote ecological and socially responsible planning, attract investments, and address the needs of contemporary society. This approach creates an opportunity for the implementation of innovative management practices that balance economic interests with the principles of environmental and social responsibility.

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