

# PANARCHIAL INTERACTIONS OF SOCIO-ECOLOGICAL SYSTEMS THROUGHOUT TOURISM SUPPLY CHAINS

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## INTRODUCTION

**Introduction.** Socio-ecological systems reflect a highly interconnected relationship between destination communities and influential organizations, such as tourism supply chains. Resilience of such systems depend on a wide range of factors stemming from the linkages between ‘human agencies’ and ecosystems. If human agency is included into formulation notions of resilience, especially when the focus shifts from resilience of a destination to an organization, then this suggests a shift towards more deterministic understanding of change in which destination communities, organizations and tourists supposedly possess the attributes with which to adapt to an external change. The expansion of resilience concepts to include human elements (TSCs) and encompass a much wider social-ecological systems perspective therefore represents not only a shift in focus from interdisciplinary analysis, it also integrates a new set of ideas around adaptation and adaptive capacity of a destination, also learning and innovation. Such perspective of resilience ‘acknowledges’ that people themselves are able to shape the trajectory of change and play a central role in the degree and type of impact caused by change.

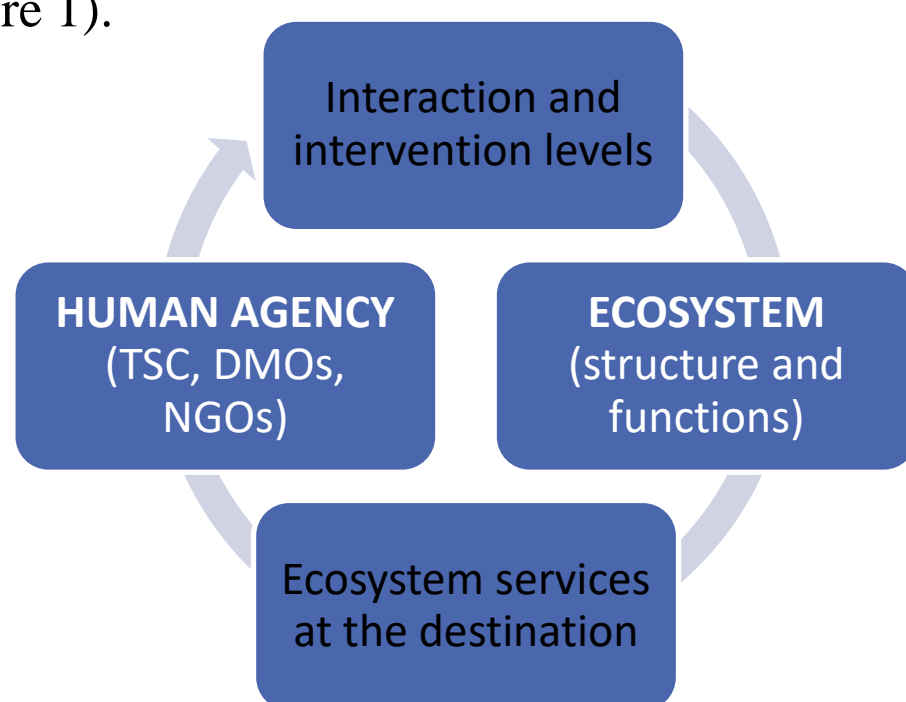
**The main problem question** is, how panarchical interactions change directions of socio-ecological systems towards Tourism supply chain resilience?

**The aim of research.** To determine linkages of socio-ecological systems towards TSC resilience.

**The methods of the research.** Conceptual research method applied, wherein research is conducted by observing and analyzing already present information on a given topic in a scientific literature on resilient TSC within 2012-2023. Conceptual research doesn't involve conducting any practical experiments. It is related to abstract concepts or ideas. The study was conducted in April, 2023.

## Theoretical background.

Socio-ecological systems present great organizational complexity both spatially and temporally (Figure 1).



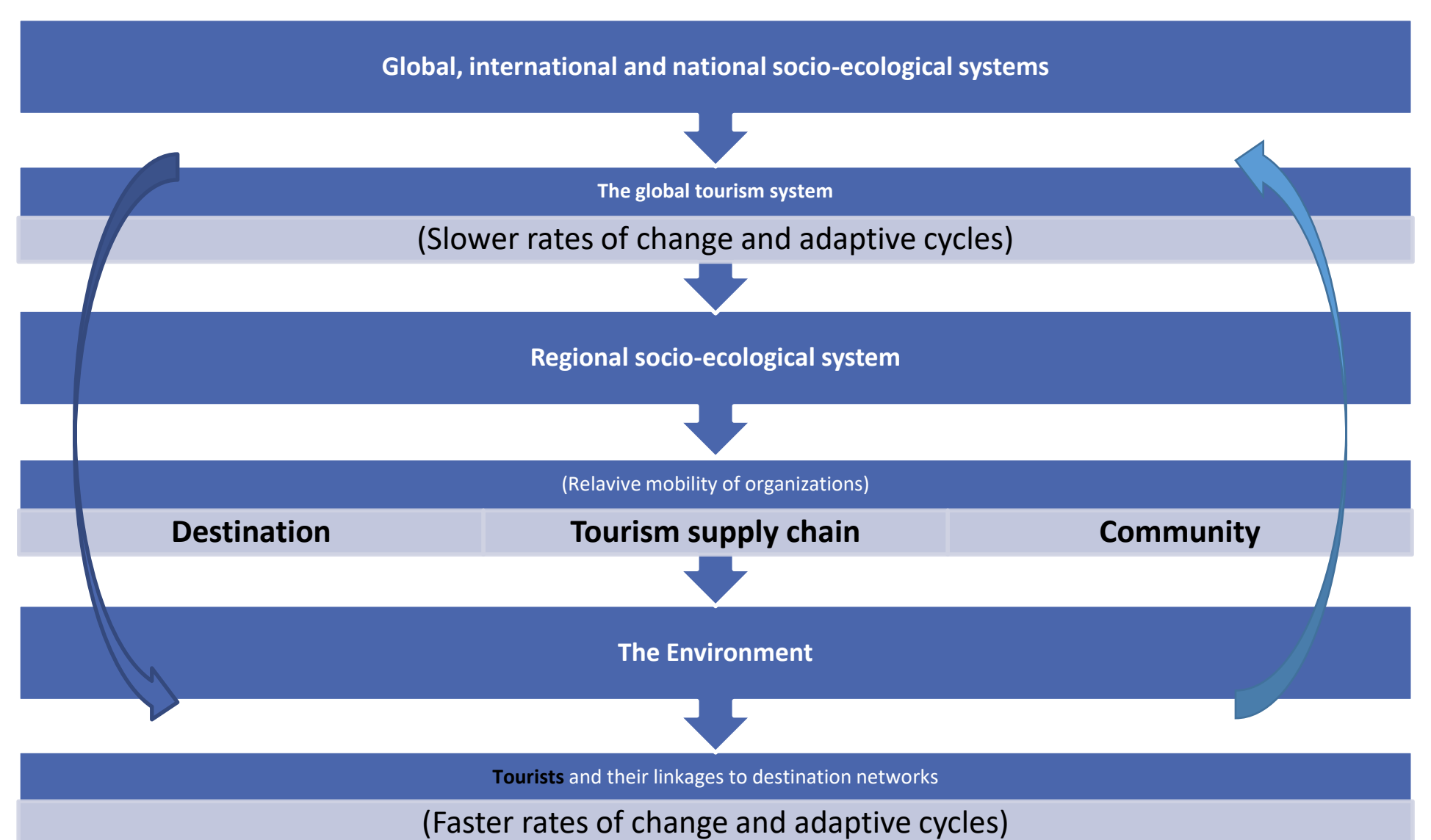
Its dynamics present non-linear changes and abrupt transitions, that is, changes in their structure and functioning. Such changes can occur unpredictably and may affect the provision of ecosystem services that are the basis of economic and productive activity. Systems management, therefore, presents with the unavoidable challenge of the sustainability and resilience of ecosystem services. From a socio-ecological resilience perspective, resilience practice is very much concerned with the thresholds at which one regime shifts to another. In such a shift the system behaves in a different way. From such an approach, management of socio-ecological systems should not be concerned about equilibrium of ‘balance of nature’, but should instead focus on the key mechanisms that allow a system to persist, and on the fact that these mechanisms have only a certain capacity, which can be reduced by environmental change and human impact. Critical to these are the notions of the adaptive cycle of socio-ecological systems and its panarchy. The adaptive and evolutionary nature of adaptive cycles that are nested one within the other across space and time scales is known in scientific literature as panarchy. Adaptive cycles are nested in the hierarchy across time and space. Larger and slower structures tend to set conditions in which faster ones function. However, the structures and the relationships between them are not static. For example, destinations with TSC structures are embedded within a wider tourism system which is subject to broader changes in the socio-economic system. Yet such cross-scale interactions do not just depend on destination and can also come from specific organizational and community systems, which are, in turn, potentially influenced by management modifications. In addition to that as well as the vertically nested relations, the TSC is also characterized by horizontal linkages and relations to other destinations and regions, including at the organizational and individual level, and the inherent mobility of tourists and the potential mobility of organizations and capital. Furthermore, change to a system does not just come from fast external shocks, such as disaster or crisis, but also may arise from gradual (impacts of new technological practices) or slow cumulative change as the result, for example, of evolutionary change or changes in socio-technical systems that give rise to habits and social and economic practices.

Destinations worldwide have suffered severe consequences due to organizational lack of adaptive capacity, resilience and preparedness for a crisis. Sustainability, therefore, is not enough. Before a destination can be sustainable, it must first be resilient. Only when they are both sufficiently robust to withstand shocks and flexible enough to adapt to changes can destinations consider themselves resilient and be able to maintain their sustainability efforts. In general, resilience refers to the capacity of a socio-ecological system, such as a local ecosystem and the destination, to absorb disturbance and reorganize its functionality while undergoing a change. Thus, in adapting to change, broadest approach is a socio-ecological resilience. It is based on the integration of ecological and social process, adaptive capacity and transformability via learning and innovation.

## Practical background.

Social and environmental systems have a symbiotic relationship with the resilience of the tourism supply chain system, as well as other socio economic systems, such as destinations, regions, communities and countries, which cannot be resilient if the environment system is vulnerable. The resilience of this tourism system is a product of the interconnections and linkages between the different parts of the system at different scales (Figure 2). Smaller scale elements, such as tourists, have much higher rates of change than larger scale elements such as destinations. Different adaptive capacities also exist at different scales. However, as noted above, changes at one scale do not necessarily lead to changes at another to which it is connected. From an ecological resilience perspective, the relationships between the elements of a system are not linear. Such a situation with respect to the holistic nature of systems clearly creates predictive issues with respect to TSC resilience as well as other elements of tourism system. Nevertheless, a number of significant observations can be reported that have implications for destinations of their resilience that lead to overall sustainability. Along the interactions of socio-ecological systems with the tourism supply chain, below is a tourism supply chain vulnerability–resilience framework, which systematically and comprehensively lists the linkages affecting the sustainable development of tourism destination.

Figure 2. Panarchical interactions of socio-ecological systems towards Tourism supply chain resilience.



The adaptive cycle model is a way of describing the progression of the socio ecological systems over time and its associated resilience. Socio-ecological systems reflect a highly interconnected relationships between management decisions and ecosystems. Resilience of such a system depends on a wide range of factors stemming from the linkages between structures, that make decisions and ecosystems in the destination. The four stages of the cycle are rapid growth, conservation, release, and reorganisation, followed again by rapid growth. Adaptive cycles tend to apply to smaller spatial units rather than to entire ecosystems, but this is also a function of the temporal unit used to measure change and potentially the nature of the disturbance at the destination. However, as well as their significance of the adaptive cycles within scales, it is also important to recognise that processes and structures are linked – what happens at one scale can influence or even drive what’s happening at other scales. For understandings of destination resilience this is potentially a crucial observation as it means that the resilience of the destination system, which is the only meaningful notion of destination resilience from a sustainability perspective, needs to be seen within the context of what is happening at other scales and in their interaction with the destination system.

## MAIN RESULTS AND CONCLUSIONS

- First, although connectedness is an important attribute of TSCs and the panarchical nature of socio-ecological systems in the global tourism network, there is a risk that TSC at destinations may actually become less resilient the more they interact and engage with larger regional, national and global systems - what can be described as vertical connectedness - as this leads to increased vulnerability to externally induced change.
- Second, TSC resilience and cohesion is an important component of destination resilience. Destinations with socio-ecological systems are not identical, but they do substantially overlap in the adaptive cycle model throughout with TSCs. Such horizontal connectedness allows the development of shared destination interest, including, most importantly, given some of the research undertaken on resilience in tourism, a shared place.
- Third, the adaptive cycle model of interactions of socio-ecological systems provides a representation of the panarchical nature of tourism related resilience. Even though they act differently, social and environmental systems have a symbiotic relationship and the resilience of the tourism supply chain system, as well as other socio economic systems, such as destinations, regions, communities and countries cannot be resilient if the environment system is vulnerable. The resilience of this tourism system is a product of the interconnections and linkages between the different parts of the system at different scales.