



# The Importance of the Transdisciplinary Approach for Sustainable Tourism Development

Mariam Sharia<sup>1</sup>, Tatiana Sitchinava<sup>2\*</sup>

## Abstract

In light of pressing global challenges such as climate change, overtourism, and cultural homogenization, sustainable tourism development has emerged as a pivotal concept, reflecting the growing need to balance economic, environmental, and sociocultural considerations within the tourism industry. This paper explores the significance of employing a transdisciplinary approach to achieve sustainable tourism development, considering its multifaceted and interconnected nature. Traditional disciplinary boundaries often constrain comprehensive understanding and holistic problem solving in the realm of tourism development. The transdisciplinary approach transcends these limitations by fostering collaboration between various disciplines, stakeholders, and local communities. One of the primary benefits of the transdisciplinary approach is its capacity to uncover complex interactions and interdependencies among different facets of sustainable tourism. By integrating insights from multiple disciplines, a more nuanced understanding of the environmental impacts, sociocultural implications, and economic dimensions of tourism activities can be attained. This, in turn, empowers decision-makers and stakeholders to make informed choices that prioritize long-term sustainability over short-term gains. Furthermore, the transdisciplinary approach contributes to the empowerment of local communities by involving them in the decision-making process. Their indigenous knowledge, cultural insights, and historical perspectives become invaluable assets in crafting sustainable tourism strategies that respect and enhance the sociocultural fabric of the destination. The main research question of this article is "why the transdisciplinary approach is important for sustainable tourism development." A systematic review was used as a research methodology that involved several research results that were already conducted by the authors and other scientists. It aims to provide a comprehensive and unbiased synthesis of all relevant studies on a particular research question, including both quantitative and qualitative research. Transdisciplinary approaches are critical to developing sustainable tourism, as demonstrated in this study. By breaking down disciplinary silos, fostering collaboration, and integrating diverse perspectives, this approach enables a comprehensive understanding of the complex interactions within the tourism ecosystem. As the tourism industry seeks to navigate the delicate balance between economic growth and environmental preservation, the transdisciplinary approach stands as an essential means to achieve a more sustainable and harmonious future.

**Keywords** sustainable tourism, transdisciplinary approach, development, systematic review

## Introduction

In recent years, sustainable tourism development has taken centre stage, becoming an essential and transformative concept that not only safeguards the long-term viability of the tourism industry but also upholds the well-being of the destinations it touches. This paradigm shift is rooted in a global recognition of the profound impact that tourism exerts on economic, social, and environmental dimensions, thus necessitating a holistic approach to its planning and execution. The United Nations World Tourism Organization (UNWTO) and the United Nations Environment Program (UNEP) jointly define sustainable tourism as tourism that considers immediate and long-term consequences on economic, social, and environmental aspects, addressing the requirements of visitors, the industry, the natural environment, and local communities [19].

Traditional disciplinary boundaries have long served as confining barriers that hinder a comprehensive grasp and integrated resolution of the multifaceted challenges within the domain of sustainable tourism development. To surmount this limitation, the transdisciplinary approach emerges as a transformative paradigm. The transdisciplinary approach is a relatively new approach, but it has been gaining popularity in recent years as researchers have recognized the need to address complex problems that cannot be solved by any single discipline. It breaks down the walls separating distinct fields of study, promoting a dynamic synergy that encourages collaboration among diverse disciplines,

---

<sup>1</sup> Tourism and Hospitality Management/Faculty of Economics and Business, Ivane Javakishvili Tbilisi State University, Tbilisi, Georgia, mariamshariag@gmail.com

<sup>2</sup> Human Geography/Social and Political Science, Ivane Javakishvili Tbilisi State University, Tbilisi, Georgia,

\* Corresponding author: tatkasichinava21@gmail.com

stakeholders, and local communities. This approach not only transcends the limitations imposed by disciplinary boundaries but also offers a promising avenue for harnessing the collective wisdom and expertise of a wide spectrum of voices, thereby enriching the sustainable tourism development discourse.

The challenges associated with sustainable development often exhibit complexity and a multifaceted nature. Consequently, comprehending these challenges necessitates the integration of diverse forms of knowledge and academic disciplines. Transdisciplinary research empowers us to recognize and tackle pertinent issues with active involvement from experts across various fields, thereby generating recommendations for sustainable development. Within the academic sphere, scholars are actively working on pioneering approaches to address this concern. As a result, interdisciplinary and transdisciplinary methods have gained prominence, allowing us to delve into a broad spectrum of sustainability-related issues [7].

The transdisciplinary approach is not just a theoretical concept but a practical avenue for enhancing the resilience of tourism destinations, mitigating the environmental impact, and promoting the well-being of local communities. As researchers and practitioners increasingly adopt this approach, it opens up new vistas for innovative strategies and approaches that transcend traditional boundaries. By fostering a sense of shared responsibility and collaboration, the transdisciplinary approach paves the way for more effective, sustainable, and inclusive tourism development, aligning the industry with the principles of responsible tourism for the betterment of present and future generations.

The transdisciplinary approach is a versatile approach that can be applied to any field of study. In the context of sustainable tourism development, it offers several key benefits:

- It enables a more comprehensive understanding of the complex interactions and interdependencies among different facets of sustainable tourism.
- By integrating insights from multiple disciplines, a more nuanced understanding of the environmental impacts, sociocultural implications, and economic dimensions of tourism activities can be attained.
- This, in turn, empowers decision makers and stakeholders to make informed choices that prioritize long-term sustainability over short-term gains.
- Furthermore, the transdisciplinary approach contributes to the empowerment of local communities by involving them in the decision-making process. Their indigenous knowledge, cultural insights, and historical perspectives become invaluable assets in crafting sustainable tourism strategies that respect and enhance the sociocultural fabric of the destination.

The purpose of this paper is to explore the perspectives of employing a transdisciplinary approach in sustainable tourism development, considering its multifaceted and interconnected nature, based on a systematic review and transdisciplinary field case studies conducted in Georgia in 2018, 2019 and 2020. The introduction provides a concise overview of the topic and highlights the benefits of the transdisciplinary approach to sustainable tourism development. It also outlines the key points that will be discussed in the main body of the paper. "Why is the transdisciplinary approach important for sustainable tourism development?" This question will be addressed through a systematic review of relevant research studies.

## **Methods and Materials**

The scientific research methodology that involves several research results that are already conducted is commonly referred to as "systematic review." This methodology synthesizes and analyses existing research findings to draw more robust conclusions, identify trends, clarify inconsistencies, and provide a comprehensive overview of a particular research topic.

This approach, known as a "systematic review," seeks to offer a comprehensive, impartial synthesis of numerous pertinent studies within a single document. Although it shares similarities with a conventional literature review in terms of summarizing insights from a body of literature, a systematic review diverges by aiming to encompass the entirety of evidence related to a specific question and concentrating on research that presents empirical data.

To illustrate, the systematic review process comprises multiple stages, such as study selection, critical assessment, and data extraction, all performed in duplicate by independent reviewers. This approach diminishes the likelihood of subjective interpretations and minimizes the impact of random

errors on the review's findings. These stringent methodologies set systematic reviews apart from conventional literature reviews [3].

An effective systematic review should have the following steps:

1. Formulate Research Question: Clearly, define the research question or objective of the review.
2. Search Strategy: Develop a systematic and comprehensive search strategy to identify all relevant studies.
3. Study Selection: Apply predefined inclusion and exclusion criteria to select studies for inclusion in the review.
4. Data Extraction: Collect and summarize relevant information from each included study.
5. Quality Assessment: Assess the quality and risk of bias in each study.
6. Data Synthesis: Summarize the findings of the included studies, which may involve narrative synthesis, meta-analysis, or both depending on the nature of the studies.
7. Interpretation: Provide an overall interpretation of the evidence, discuss the implications for practice or policy, and highlight research gaps.
8. Advantages: Provides a comprehensive overview of existing research, includes both quantitative and qualitative data, and can inform decision-making in various fields.

The research questions for systematic review were as follows: what is and how to conduct transdisciplinary research? Is the transdisciplinary approach helpful for sustainable tourism development?

For the research strategy, the following keywords were selected: “transdisciplinary”, “transdisciplinary research”, “transdisciplinary approach”, “transdisciplinary paradigm”, “transdisciplinary approach for sustainable development”, and “transdisciplinary approach in tourism studies”. Articles, guidelines and books were collected from the Google Scholar database. There were some limitations for the searching phase – we were looking for results written in English with free access.

After reading all the selected papers, relevant information was extracted for each of them and classified into subtopics.

Together with the literature obtained online, transdisciplinary field case studies conducted in Georgia in 2018, 2019 and 2020 were also analysed.

## **Results**

As a result of the systematic review, the following major issues were identified: the essence and importance of the transdisciplinary approach; some innovative methods close to and related to the transdisciplinary approach; the transdisciplinary approach in sustainability studies; steps and challenges for TDR; TDR in tourism and TDR in sustainable tourism development.

First, let us consider what TDR is and how important it is. The transdisciplinary approach is a dynamic and innovative paradigm within academic research and problem solving that has gained increasing recognition in different academic fields. Unlike traditional disciplinary boundaries that often confine knowledge within specific fields, transdisciplinarity encourages the integration of diverse perspectives, methodologies, and expertise from multiple disciplines to address complex, real-world challenges.

There are several research papers and books on the transdisciplinary approach explaining its advantages and step-by-step guidelines. According to them, the emergence of a transdisciplinary paradigm holds promise in boosting innovation and advancing transformative knowledge, particularly amid the diminishing disruptive nature of academic research. It stands as a potential catalyst for rejuvenating academia and tackling intricate, real-world issues that demand a multifaceted approach, transcending the constraints of conventional disciplines and incorporating a diverse array of viewpoints. Through experimentation and transformative research designs, the transdisciplinary approach promotes a "new production of knowledge". A vast array of knowledge resources, including professional, every day, and implicit knowledge from various sectors, including politics, civil society, business, and culture, are actively integrated. They emphasize the innovation characteristics of this paradigm; in a free setting, researchers are encouraged to explore solutions unrestricted by conventional wisdom [2, 16].

Transdisciplinary approaches are recognized as effective methods of studying complex issues in modern scientific and educational fields. A specific research design can be selected based on the specifics of a particular research issue in different disciplines. This approach is close to the following

concepts: case study, citizen science, cooperative education, critical thinking, design thinking, sustainable development, indigenous knowledge, knowledge transfer, learning in transformation, participatory action research, performative knowledge, real-world lab, research integrity, research-based education, science communication and so on.

A case study involves the examination of a particular occurrence, whether it pertains to a product, individuals, an organization, or processes such as policymaking, decision-making, and transformation. It serves as a means to paint a detailed and intricate portrayal of the chosen phenomenon and its surrounding environment, which is frequently marked by intricate conditions. The primary objective of a case study is twofold: initially, to attain a better understanding of the phenomenon by exploring and uncovering its inner workings and origins within its unique context, and subsequently, to distil valuable insights that can be applied to other instances, both present and future.

Transdisciplinary case study research delves into pertinent societal issues through cooperation between scholars hailing from diverse disciplines and practitioners representing various sectors. To facilitate this collaborative research approach, a transdisciplinary case study typically encompasses three core stages: 1. collaborative problem definition, 2. collective knowledge generation, and 3. the amalgamation and practical application of insights.

Within the realm of sustainability studies, transdisciplinary case studies have transitioned from merely examining sustainability challenges, which entailed in-depth problem analysis and description, to encompassing research endeavours that also explore viable solutions to these sustainability issues. This shift towards solution-oriented research may encompass activities such as solution development, the study of their real-world implementation, or the assessment of the impacts resulting from these implemented solutions [14].

Another innovative concept and approach that should be incorporated into TDR is “citizen science”. The term "citizen science" has its roots in Anglo-American contexts and typically characterizes the practice of engaging individuals who lack institutional ties to academia as active contributors to the scientific research process.

Comparable methodologies are prevalent in various regions globally but under distinct designations such as community science and community-based research. Citizen science encompasses a spectrum of practices, spanning from large-scale data collection initiatives for the general public to instances of autonomous or self-guided research conducted by nonacademic collectives or communities, thereby prompting a reevaluation of the term "citizen science" itself.

For instance, Haklay (2013) distinguishes between several categories, including crowdsourcing (primarily involving virtual participation and data collection), distributed intelligence (involving collaboration at various stages of the research process), participatory science (collaboration across all phases of research), and extreme citizen science (research primarily spearheaded by nonacademic individuals or citizens) [10].

Another interesting approach is “design thinking”. Although the design thinking method is actively used in business, in the process of product creation and development, scientists believe that design thinking effectively fosters transdisciplinarity by immersing students or researchers in real-world experiences and connecting them to practical applications. Transdisciplinarity, defined as the extensive knowledge generation process involving diverse stakeholders and a receptivity to various forms of knowledge from both scientific and nonacademic communities, finds support in design thinking. This methodology adopts an interdisciplinary perspective, assembling researchers into diverse teams, thus exposing them to a multitude of knowledge sources and viewpoints. This setting promotes a transdisciplinary approach by facilitating the development of a shared understanding of the subject matter while considering multiple perspectives. As a problem-solving approach, design thinking is geared toward addressing complex, multifaceted challenges, making it a valuable didactic tool for real-world, practice-oriented learning experiences in education. Consequently, it can be regarded as a transdisciplinary pedagogical instrument for equipping learners to confront intricate problems effectively [18].

Participatory action research, as a research approach, places a central emphasis on the collaborative creation of knowledge and the implementation of action by integrating multiple perspectives to drive social change and rectify unjust systems. This method can be delineated by three core principles: 1. its primary goal is the amelioration of injustices, 2. researchers, directly engaged in sociopolitical processes, take on activist roles, engendering a perpetual interplay of reflection and action, and 3.

individuals within the social sphere become coresearchers, participating in the identification of study requirements and potential issues, information gathering, analysis, and decision-making. The participatory action research methodology is characterized by its cyclical, iterative, transdisciplinary, and transformative nature. It is grounded in the idea that critical reflection and dialogue in practice form the foundation for both research and action. This approach acknowledges people as subjects, coparticipants, and coauthors of knowledge and action, stemming from their diverse viewpoints. This includes the collaborative construction of various elements of the process (problem analysis, objective setting, agenda, planning, organization, etc.), creating opportunities for collective analysis and interpretation as research unfolds. Participatory action research offers potent techniques for collaborative research that place a focal point on power dynamics and the rectification of unjust and unsustainable circumstances [8].

Transdisciplinary research (TDR) manifests in various guises, encompassing approaches such as participatory action research, methodologies that facilitate the amalgamation of indigenous/local wisdom with Western scientific methods, collaborative adaptive management, and contemporary variants of citizen science. Distinctions emerge between the traditions of TDR in Europe and the United States: European practices involve both cross-disciplinary collaboration and the active engagement of stakeholders, whereas their American counterparts primarily concentrate on interdisciplinary research predominantly involving academic experts.

TDR projects commonly share three key characteristics: 1. Addressing the research question necessitates the integration of knowledge from various disciplines. 2. The methodology fosters the collaborative generation of knowledge. 3. The resultant solution is geared towards addressing practical, real-world issues.

In a similar vein, Lang et al. (2012) outlined a set of principles to steer an "ideal-typical" TDR process, which is structured into three phases: 1. Collaborative problem definition and the formation of a research team. 2. The cooperative generation of solution-focused and transferable knowledge through participatory research. 3. The reintegration and practical application of the jointly created knowledge [4].

Along with everything, we must mention the challenges of transdisciplinary research. Effective communication management among participants is deemed essential to establish mutual trust, especially in scenarios where scientists from diverse fields or nonacademic stakeholders are engaged. Effective conflict resolution, facilitated through proper means, is identified as a critical element in bolstering the transformative potential of transdisciplinary projects. The careful selection of representatives for stakeholders and the implementation of strategies to ensure their active engagement are also recognized as pivotal. Equally significant is the formulation of research questions that held value across all disciplines engaged in a project, alongside the collaborative delineation of problems with nonacademic stakeholders. A significant hurdle encountered at various levels arises from the amalgamation of diverse scientific traditions. In the researcher's assessment of a research initiative within the Australian Alps, Mitchell et al. (2017) noted the absence of a common conceptual framework and identified epistemological misunderstandings between disciplines, even though a facilitation team had been employed [15].

Despite the abovementioned challenges, it is interesting that the transdisciplinary approach is used not only to effectively solve problems in real life but also to create an appropriate theoretical-methodological basis in the academic field. In the paper "Emerging Transdisciplinary Theory on Tourism Research: A Case from Bali", a transdisciplinary paradigm has been applied in an effort to position tourism as a science. According to the authors, tourism can be studied from the perspectives of many different disciplines, and each discipline is interested in different issues that are interconnected in real life. Researchers wrote that tourism in Bali intricately intertwines with numerous facets of human existence, encompassing social and cultural dimensions. The academic exploration of tourism has traditionally leaned towards economic growth paradigms, with less scrutiny devoted to the ideological dimensions of tourism development. Consequently, the adoption of a transdisciplinary approach, referred to as "anthro-sociotourism," is anticipated to unveil the underlying ideology shaping tourism practices, a subject that holds significance within tourism epistemology [1].

In the context of tourism, the transdisciplinary approach involves the integration of stakeholders' empirical knowledge into the methodology of sustainable tourism development. Alongside practical knowledge, the incorporation of multidisciplinary theoretical insights is highly significant within this

domain. This significance arises from the inherent complexity of tourism, with its multifaceted components being individually explored across various scientific, social, and economic disciplines. Both approaches play a pivotal role in discerning practical solutions to issues and promoting the sustainable advancement of the field. The significance of adopting a transdisciplinary approach within the realm of tourism becomes even more pronounced when considering the environment's influence on this sector. Environmental changes can result from both the influence of tourism and external factors unrelated to it [11].

As in sustainable tourism, the needs of visitors, the industry, the environment, and local communities are taken into account on both an immediate and long-term basis, and TDR is very helpful for sustainable tourism development. This approach ensures that the perspectives of different stakeholders are represented and indigenous, practical and academic knowledge are combined, giving us the possibility of determining long-term problem-solving decisions that reflect the interests of each party.

## **Discussion**

The transdisciplinary approach presents numerous significant advantages, with its primary strength lying in its focus on socially relevant issues. Central to this approach is the emphasis on unifying knowledge from various disciplines, all oriented towards the resolution of societal problems and the design of transformative strategies for sustainable development [5, 6, 12, 13]. Transdisciplinary research (TDR), as an amalgamation of diverse knowledge forms and worldviews (Lang et al., 2012), serves to enhance sustainability transformations not only within the realm of science but also in policy and practical applications [9].

While the applicability of transdisciplinary research extends across disciplines, it is crucial to recognize the intricacies and organizational challenges involved in the TD research process. The main difficulties arise from the distinct research methods and approaches in various disciplines. Problem framing, integration, and effective implementation become significant issues in this context. Moreover, the scarcity of researchers who possess training and experience in multiple disciplines can be a limiting factor. Transdisciplinary research often demands substantial time and resources, as it necessitates interdisciplinary learning and collaboration. The communication and dissemination of transdisciplinary research can be challenging, as it requires audiences to possess a foundational understanding of multiple disciplines. It is imperative to consider and harmonize different perspectives and development scenarios involving both academic and nonacademic stakeholders.

Despite these limitations, transdisciplinary research remains a valuable tool for tackling complex issues. It has demonstrated its utility in various fields, including medicine, climate change, education, and sustainable development, facilitating significant advancements and a holistic understanding of multifaceted challenges.

An illustrative example of transdisciplinary research in practice is the project titled "Transdisciplinarity for sustainable development of tourism in the Caucasus region." This collaborative initiative involved the Armenian State Pedagogical University (ASPU, Yerevan, Armenia), Ivane Javakhsishvili Tbilisi State University (TSU, Tbilisi, Georgia), University of Natural Resources and Life Sciences (BOKU, Vienna, Austria), and Krems University of Applied Sciences (Krems, Austria). Notably, this project marked the first instance of employing a transdisciplinary approach to tourism research in the Caucasus region. The participating educational institutions embarked on a journey to explore how universities could contribute to solving the challenges surrounding the sustainable development of tourism in the Caucasus countries by fostering collaboration with local populations and other stakeholders.

A pivotal moment in this endeavor was the first transdisciplinary field research undertaken by Tbilisi State University in 2018, located in the Samtskhe-Javakheti region in the town of Tsaghveri. This study engaged students and professors from various faculties, including the Faculty of Economics and Business, the Faculty of Social and Political Sciences, and the Faculty of Exact and Natural Sciences, alongside local residents and stakeholders. Subsequently, a second transdisciplinary study occurred in 2019 in Stepantsminda, located in the Mtskheta-Mtianeti region. Here, students and professors from the same faculties of Tbilisi State University actively participated. In 2020, the third transdisciplinary field study took place in Ambrolauri, a municipality in the Racha-Lechkhumi and Kvemo Svaneti region. This time, it involved students from Ilia State University in addition to those from Tbilisi State University. Each of these locations was strategically chosen due to their rich tourism potential and the

array of challenges hindering tourism development. The transdisciplinary research process successfully integrated diverse perspectives, enabling a comprehensive understanding of the intricate interactions within the tourism ecosystem. This project serves as a tangible testament to the effectiveness and applicability of transdisciplinary research in addressing complex issues, offering a valuable blueprint for future endeavours in diverse domains.

## **Conclusion**

This article underscores the vital role played by transdisciplinarity in addressing the complexities of sustainable tourism. Through a comprehensive exploration of the theoretical frameworks, practical applications, and case studies, we have uncovered the capacity of this approach to foster holistic solutions, bridge gaps across various domains, and facilitate the engagement of diverse stakeholders.

Sustainable tourism is intrinsically linked to the well-being of our planet, and as the challenges continue to evolve, transdisciplinarity has proven itself as a powerful ally in our pursuit of harmony between tourism and the environment. By transcending traditional disciplinary boundaries and fostering collaboration among experts from various fields, researchers can better comprehend the multifaceted nature of sustainable tourism development.

The systematic and structured transdisciplinary approach, as showcased in the article, illuminates the need for a new way of thinking and working together. It enables the integration of indigenous knowledge, scientific expertise, and community involvement, fostering the creation of sustainable tourism models that respect the environment, empower local communities, and provide enriching experiences for tourists.

As we conclude, it is evident that the transdisciplinary approach is not merely a conceptual framework but a practical and transformative methodology that holds the promise of steering the tourism industry towards a more sustainable and responsible future. By embracing this approach, we can unlock the true potential of tourism as a force for positive change, both in the destinations it touches and in the global pursuit of a sustainable future.

## **Competing interests**

The authors declare that they have no competing interests.

## **Authors' contribution**

The authors of the article jointly agreed on the topic and methodology of the article. As the systematic review methodology requires, both authors were actively involved in the research process. Abstract, introduction and discussion are provided by Tatiana Sitchinava, and results and conclusion are written by Mariam Sharia

## **References**

- [1] Anom, I. P., Mahagangga, I. G., Suryawan, I. B., Kristianto, Y., & Nuruddin, D. (2020). Emerging Transdisciplinary Theory on Tourism Research: A Case from Bali. *International Journal of Innovation, Creativity and Change*, 11(1).
- [2] Arevalo, V. J., Haan, R. J., Berends, K., Baart, F., Voort, M. v., & Hulscher, S. J. (2023). Drivers and Barriers to Knowledge Exchange Through an Envisioned Online Platform for Transdisciplinary Research Projects. *ELSEVIER, Environmental Science and Policy*, 201-214.
- [3] Aromataris, E., & Pearson, A. (2014, March). *The Systematic Review: An Overview*. The Joanna Briggs Institute, 114(3).
- [4] Bennich, T., Maneas, G., Maniatakou, S., Piemontese, L., Schaffer, C., Schellens, M., & Österlin, C. (2020). Transdisciplinary Research for Sustainability: Scoping for Project Potential. *International Social Science Journal*.
- [5] Bergmann, M., Jahn, T., Knobloch, T., Krohn, W., & Pohl, C. (2012). *Methods for Transdisciplinary Research: A Primer for Practice*.
- [6] Coggan, A., Carwardine, J., Fielke, S., & Whitten, S. (2021). Cocreating Knowledge in Environmental Policy Development. An Analysis of Knowledge Cocreation in the Review of the Significant Residual Impact Guidelines for Environmental Offsets in Queensland, Australia. *Environmental Challenges*, 4(100138).

- [7] Editorial. (2015). Sustainable Tourism, Progress, Challenges and Opportunities: an Introduction. *Journal of Cleaner Production*, 285-294.
- [8] Hensler, L., Frenk, G. A., & Merçon, J. (2023). Participatory Action Research. In *Handbook Transdisciplinary Learning (Vol. 6)*. Higher Education: University Teaching & Research.
- [9] Jacobi, J., Llanque, A., Mukhovi, S., Birachi, E., Groote, P., Eschen, R., . . . Robledo-Abad, C. (2022). Transdisciplinary Co-creation Increases the Utilization of Knowledge from Sustainable Development Research. *Environmental Science & Policy*, 129, 107-115. doi: <https://doi.org/10.1016/j.envsci.2021.12.017>
- [10] Jaeger-Erben, M., Becker, F., Prüse, B., Mendoza, J. N., Gutberlet, J., & Rodrigues, E. (2023). Citizen Science. In *Handbook Transdisciplinary Learning (Vol. 6)*. Higher Education: University Teaching & Research.
- [11] Khelashvili, I. (2020). Transdisciplinary Concept. *Sustainable Development of Tourism*.
- [12] Lang, D., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., . . . Thomas, C. (n.d.). Transdisciplinary Research in Sustainability Science: Practice, Principles, and Challenges. *Sustainability Science*, 7(1), 25-43.
- [13] Liu, J., Mooney, H., Hull, V., Davis, S., Gaskell, J., Hertel, T., . . . Li, S. (2015). Systems Integration for Global Sustainability. *Science*, 347(6225). doi: <https://doi.org/10.1126/science.1258832>
- [14] Meyer, S., Brundiars, K., Mader, M., & Weiser, A. (n.d.). Case Study. In *Handbook Transdisciplinary Learning (Vol. 6)*. Higher Education: University Teaching & Research.
- [15] Otero, I., Darbellay, F., Reynard, E., Hetenyi, G., Perga, M. E., Ruegg, J., . . . (n.d.). Designing Inter- and Transdisciplinary Research on Mountains: What Place for the Unexpected? doi: <https://doi.org/10.1659/MRD-JOURNAL-D-20-00036.1>
- [16] Philipp, T., & Schmohl, T. (2023). *Handbook Transdisciplinary Learning*. In *Handbook Transdisciplinary Learning (Vol. 6)*. Higher Education: University Teaching & Research.
- [17] Philipp, T., & Schmohl, T. (2023). Transdisciplinary Learning for Innovative Problem Solving. In *Handbook Transdisciplinary Learning (Vol. 6)*. Higher Education: University Teaching & Research.
- [18] Taimur, S., Peukert, D., & Pearce, B. (2023). Design Thinking. In *Handbook Transdisciplinary Learning (Vol. 6)*. Higher Education: University Teaching & Research.
- [19] UNWTO. (2005). *Making Tourism More Sustainable - A Guide for Policy Makers*. UNEP & .