Journal of Tourism Management Research
2025 Vol. 12, No. 2, pp. 231-244
ISSN(e): 2313-4178
ISSN(p): 2408-9117
DOI: 10.18488/31.v12i2.4592

Mapping the literature on thermal tourism: A bibliometric and content analysis

Faten AlQaifi[1+]
Dilaver Tengilimoglu[2]
Ilknur Arslan Aras[3]

[1,2]*Faculty of Business, Atilim University, Ankara, Turkey.*
[1]*Email: fatenm2021@gmail.com*
[2]*Email: dilaver.tengilimoglu@gmail.com*
[3]*Faculty of Health sciences, Yuksek Ihtisas University, Ankara, Turkey.*
[3]*Email: ilknurarslan@yiu.edu.tr*

(+ Corresponding author)

Article History
Received: 23 June 2025
Revised: 13 October 2025
Accepted: 15 November 2025
Published: 19 December 2025

Keywords
Bibliometric analysis
Bibliometrix
Content analysis
Post-COVID-19
Sustainable tourism
Thermal tourism.

ABSTRACT

This study explores and maps the existing literature on thermal tourism to provide comprehensive insights and inform future research directions. The research design is based on a bibliometric analysis of 48 documents published between 2013 and 2023 and indexed in the Web of Science database. Data were processed and visualized using Microsoft Excel and Bibliometrix, followed by a content analysis of 42 English-language articles to capture thematic developments in the field. The findings indicate that, despite a temporary decline during the COVID-19 pandemic, publications on thermal tourism have shown strong growth and recovery, with an annual growth rate of 46.65%. The most significant contributions originated from Portugal, China, Spain, Taiwan, Turkey, and Japan, with research disseminated across 37 journals. Four central themes were identified: (1) tourist behaviors and satisfaction, (2) demand and motivations, (3) quality and resource management, and (4) strategic and sustainable development. Among these, tourist behaviors and satisfaction emerged as the most prominent research area, representing 38.10% of the analyzed literature. This paper addresses a gap in the literature by mapping the knowledge landscape in the relatively underexplored field of thermal tourism, highlighting its growth potential and proposing a future research agenda. The practical implications suggest that recognizing these trends and themes can help policymakers, industry stakeholders, and academics develop strategies to enhance sustainable practices and expand opportunities in thermal tourism.

Contribution/Originality: This study contributes to the existing literature by systematically mapping global thermal tourism research. It is among the few studies to combine bibliometric and content analyses, identify key research themes, and propose a future research agenda, offering both quantitative and qualitative insights for academics and industry stakeholders.

1. INTRODUCTION

Health tourism encompasses travel for medical treatments and includes subcategories such as medical, rehabilitation, spa, wellness, geriatric, and thermal tourism (Global Wellness Institute, 2023). Thermal tourism, or thermalism, leverages the therapeutic properties of thermal waters, such as hot springs and thermal baths with unique chemical compositions and elevated temperatures, to promote healing, preventive care, and relaxation in natural settings (Brandão, Liberato, Teixeira, & Liberato, 2021; Global Wellness Institute, 2023). It integrates healing, prevention, and the enhancement of physical, psychological, and social well-being through natural resources like mineral water, air quality, and climate, offering comprehensive benefits for the body, mind, and spirit (Brandão et al., 2021).

Combining elements of medical and wellness tourism, thermal tourism provides treatments for diseases while promoting relaxation and improved physical and psychological health (Antunes, Gonçalves, & Estevão, 2023). Its benefits include stress reduction, obesity management (Dutheil et al., 2019), as well as relaxation, stress relief, improved sleep, enhanced mental health, and the alleviation of medical conditions such as back pain, arthritis, and musculoskeletal issues (Clark-Kennedy & Cohen, 2017). Thermal tourism offers opportunities for indulgence, connection with nature, and escape from daily routines, providing a wide range of physical, mental, and social benefits (Clark-Kennedy & Cohen, 2017). It aligns with the $181 billion mental wellness market, underscoring its growing role in supporting mental health and overall well-being (Brandão et al., 2021; Global Wellness Institute, 2023).

Thermal tourism has surged in popularity since the COVID-19 pandemic as people increasingly prioritize their health (Pereira, Costa, & Gomes, 2023). For instance, Thermal/Mineral Springs Spas experienced a significant revenue decline during the pandemic, dropping from $3.66 billion in 2019 to $2.43 billion in 2020. However, the sector demonstrated strong post-pandemic recovery, reaching $6.21 billion in 2023. This growth was accompanied by a slight rebound in establishments, with numbers shifting from 9,349 in 2019 to 9,276 in 2023, reflecting renewed demand and expansion (Global Wellness Institute, 2023, 2024).

Despite this field's growth and potential, systematic research examining the literature remains scarce. For example, Pereira et al. (2023) provided an overview focused exclusively on Portuguese thermal tourism, while Del Río-Rama, Maldonado-Erazo, and Álvarez-García (2018) conducted a bibliometric and thematic analysis of thermalism, thalassotherapy, and spas, comparing publication trends between Scopus and Web of Science. However, these studies did not map the literature on thermal tourism. To address this gap, the goal of our research was to analyze the literature on thermal tourism systematically in order to provide both quantitative and qualitative insights (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). The findings include identifying key current research areas, proposing a future research agenda, and offering practical guidance. This was done using mixed methods (bibliometric and content analysis) to offer valuable insights to various stakeholders such as academics, researchers, and industry professionals.

2. METHODOLOGY

The objective of this research is to provide a combination of quantitative insights through bibliometric analysis and qualitative findings from literature content analysis. While bibliometric analysis reveals the growth of the literature and key contributors using metrics such as publication counts, content analysis identifies key research areas and themes within the literature (Donthu et al., 2021; Kyngäs, 2020).

This review utilized the Web of Science as the sole database to collect the relevant data. This was based on: (1) it is a comprehensive hub for scholarly information since 1900; (2) it is renowned for its vast collection of over 159 million publications across various scientific disciplines (Pranckutė, 2021). The selection process was carried out through the following combination of keywords: ("Thermalism" OR "Thermal" OR "Hot springs" OR "Hydrothermal" OR "Thermal baths" OR "Thermal spa" OR "Geothermal") AND ("Tourism" OR "Travel").

Since this niche field is closely connected to health, wellness, and spa tourism, researchers independently reviewed the articles to determine whether their focus or results were primarily related to thermal tourism. Only articles with a primary focus on thermal tourism were selected for analysis. The inclusion criteria excluded book reviews, editorial materials, and irrelevant articles, and included those published between January 2013 and December 2023, without language restrictions. In June 2024, the initial search yielded 1,759 articles, which were narrowed down to 48 after removing duplicates and irrelevant publications (Figure 1).

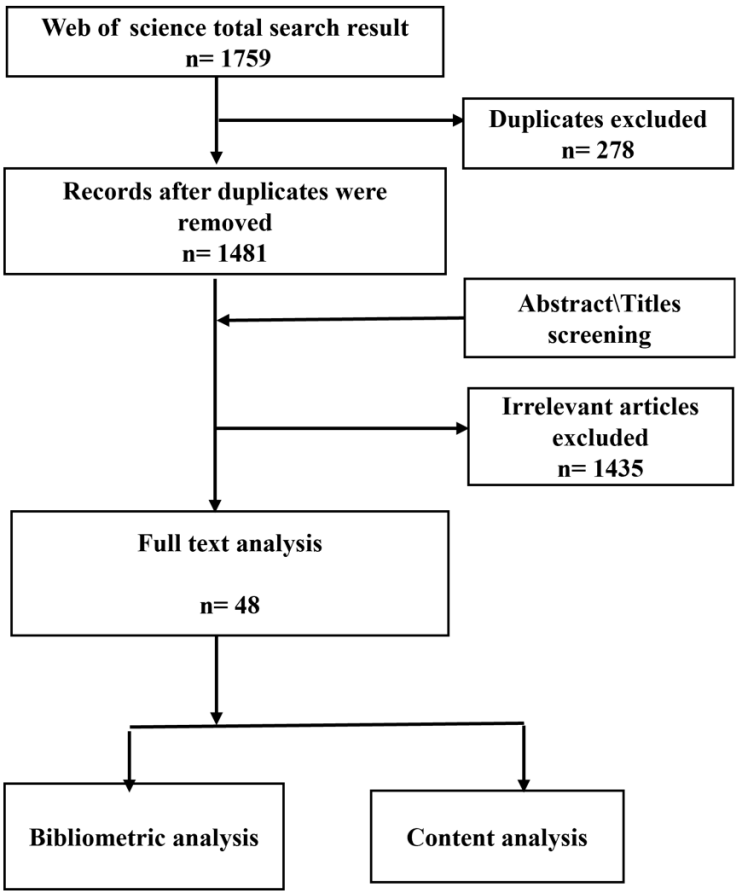

Figure 1. Methodology.

First, bibliometric analysis was conducted using the final dataset of 48 documents. Microsoft Excel was used to identify key contributors, while Bibliometrix R tools were employed to construct and visualize bibliometric networks (Aria & Cuccurullo, 2017). Following this, content analysis was performed on the 42 English-language articles, excluding four articles in Spanish and one each in Portuguese and Turkish (Figure 2).

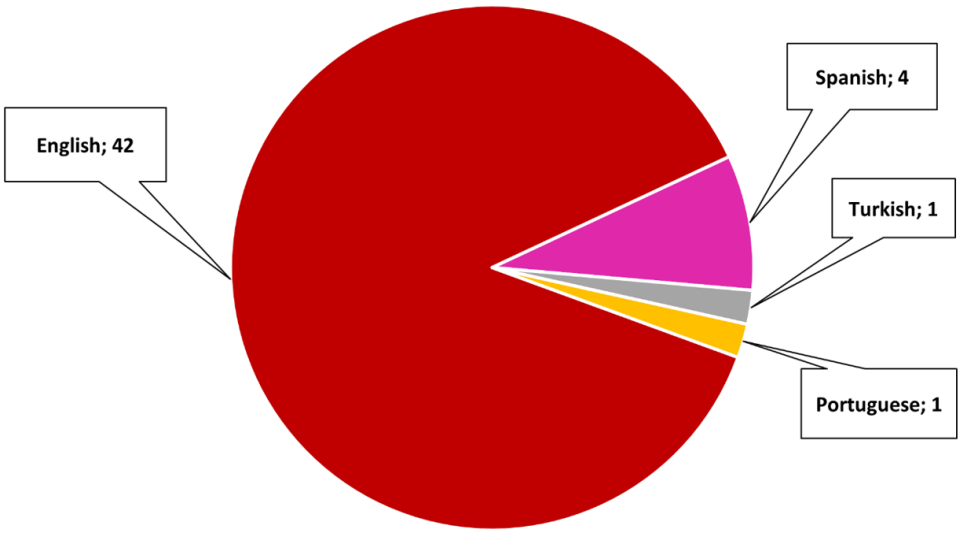

Figure 2. Publications language.

3. RESULTS

3.1. Bibliometric Analysis

Table 1 provides an overview of bibliometric data from 2013 to 2023, covering 48 documents published in 37 sources, with an annual growth rate of 46.65%. The dataset highlights significant collaboration among 185 authors, averaging 2.5 co-authors per document, with 15.79% of works involving international co-authorship.

Table 1. Main information.

Timespan	2013:2023
Sources (Journals, Books, etc.)	37
Documents	48
Annual Growth Rate %	46.65
Document Average Age	4.86
Average citations per document	9.683
References	3734
Document contents	
Keywords Plus (ID)	93
Author's Keywords (DE)	124
Authors	
Authors	185
Authors of single-authored docs	6
Authors collaboration	
Single-authored docs	6
Co-Authors per Doc	2.5
International co-authorships %	15.79

3.1.1. Publications Annual Growth and Documents' Type

Figure 3 illustrates the publication trend in thermal tourism research highlights a steady growth in publication output over the years. A notable increase is observed from 2018 onward, peaking at 12 publications in 2023. Although the COVID-19 pandemic led to a slight stagnation in publication numbers during 2020 and 2021, the upward trajectory resumed thereafter. Despite this trend, the overall number of publications remains relatively low, indicating a significant gap in the field and underscoring the need for further research, as previously emphasized by Del Río-Rama et al. (2018).

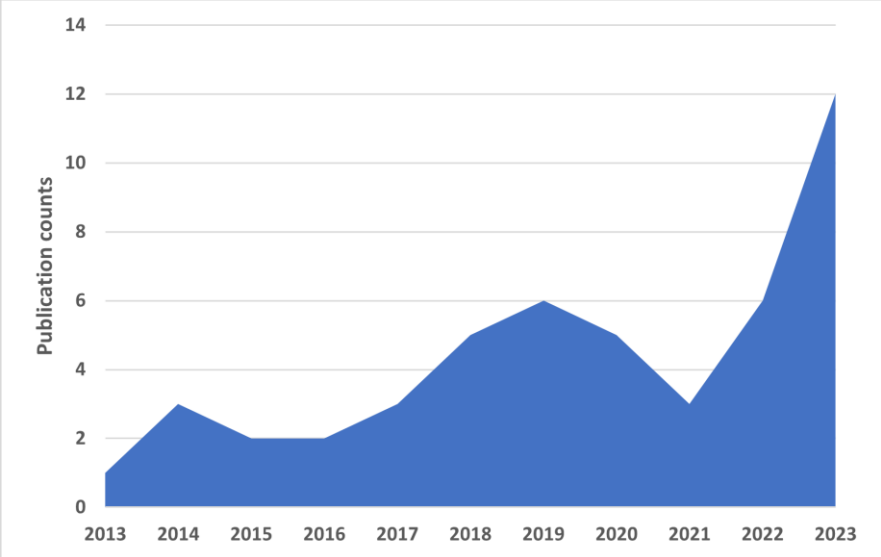

Figure 3. Publications growth.

The data includes 46 articles and only 2 reviews (4%), as shown in Figure 4.

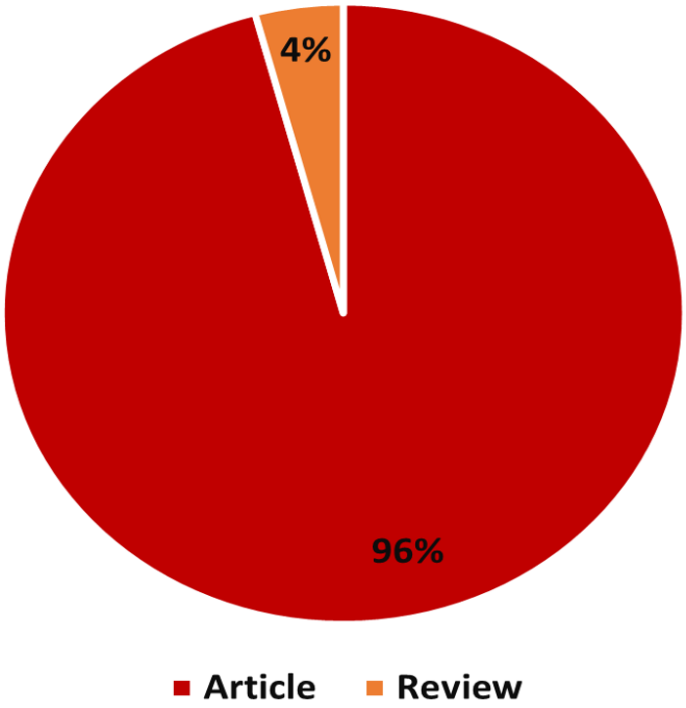

Figure 4. Publications type.

3.1.2. Key Countries

Figure 5 shows the distribution of publications by country, with Portugal leading at 9 publications, followed by China (7), Turkey (6), Taiwan (6), Spain (5), Japan (4), and several other countries contributing fewer publications.

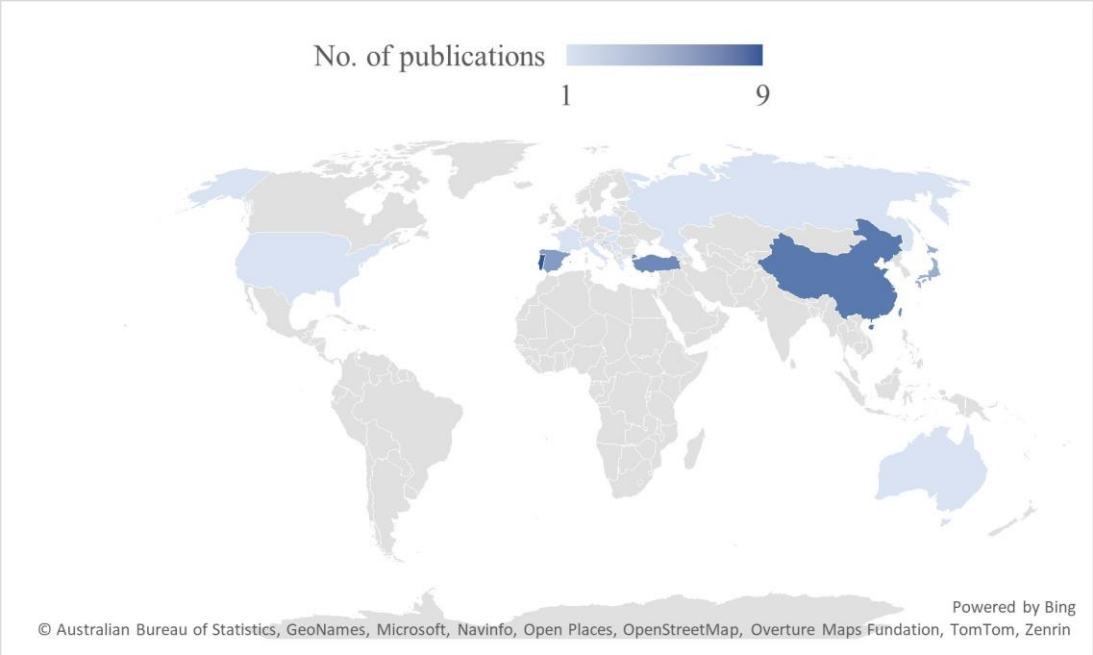

Figure 5. Global scientific production.

The high publication counts in these countries reflect their significant investment in thermal tourism, driven by factors such as rich cultural heritage, government support, and the growing demand for health and wellness services. The ongoing challenges faced by the thermal tourism sector require further research to better understand the economic, cultural, and environmental factors that will shape its future. For example, with over 3,000 hot springs,

China attracts millions of visitors annually, and the government has expanded these establishments to meet rising demand from an aging population and sedentary lifestyles (Zhou et al., 2023). However, post-pandemic, China's thermal springs revenues continued to decline through 2022 due to extended lockdowns and economic conditions (Global Wellness Institute, 2023).

Many European countries, including Portugal, Spain, and France, have a long-standing tradition of utilizing thermal and mineral waters, with Portugal alone featuring 40 thermal spas and over 400 springs that significantly contribute to its thermal tourism industry (Pereira et al., 2023). Germany and Hungary each attract approximately 10 million foreign thermal tourists annually, while France's renowned spa towns host about 1 million visitors, and Switzerland welcomes around 800,000 tourists (Global Wellness Institute, 2021). Europe's thermal and mineral springs sector, valued at $22.55 billion in 2020, encompasses 6,492 establishments, thriving on a combination of diverse offerings, state-of-the-art facilities, and sustainable practices (Global Wellness Institute, 2023; Pereira et al., 2023).

Spain's thermal spas prioritize preventive care, traditional treatments, relaxation, and beauty, with continuous efforts aimed at modernizing facilities to appeal to a broader audience (Pinos-Navarrete, Shaw, & Maroto-Martos, 2020). Turkey, ranked first in Europe and seventh globally in thermal resources, witnessed a decline in tourism revenue from $1 billion in 2019 to $500 million in 2020 due to the pandemic, yet experienced a remarkable 48.2% annual growth in thermal establishments between 2021 and 2022, positioning it as the tenth-largest global market (Global Wellness Institute, 2023; Kalyoncuoğlu, 2021). Despite the economic significance of thermal tourism for these countries, further research is necessary to evaluate the long-term effects of disruptions and evolving patterns in the post-COVID era (Global Wellness Institute, 2023).

Taiwan, a prominent player in global thermal tourism, features over 100 resorts and spas that attract millions of visitors annually while recently emphasizing sustainability through private, health-focused experiences, aiming to maintain resilience in the face of current challenges (Global Wellness Institute, 2021, 2023). Similarly, Japan, which is home to 55% of the world's thermal and mineral springs, has faced the closure of approximately 3,500 onsen facilities despite increasing revenues in the sector (Global Wellness Institute, 2023). Beppu, one of Japan's most popular thermal destinations, typically attracts 13 million tourists annually. However, it experienced a significant decline of 38.5% in domestic visitors and an 86.6% drop in international visitors due to the pandemic. In response, recovery efforts have been implemented, including the introduction of travel packages (Handler & Kawaminami, 2023). Nevertheless, further studies are essential to assess the efficacy of these strategies in sustaining competitiveness and ensuring recovery in the post-pandemic period.

3.1.3. Keywords Analysis

The word map (Figure 6) illustrates key themes within thermal tourism using authors' keywords. Central and most prominent terms like "thermal tourism" and "health tourism" are surrounded by related but less prominent keywords such as "hot springs," "wellness tourism," "sustainable development," "balneotherapy," as well as terms related to consumer behavior, such as "satisfaction" and "segmentation." This keyword analysis reflects the industry's increasing focus on health and well-being, environmental sustainability, and marketing strategies, as evidenced by many studies in this field (e.g., (Fu & Tzeng, 2016; Kurata & Ohe, 2020; Rocha & Brandao, 2014)).

Figure 6. Word map.

3.2. Content Analysis

An extensive literature review identified 4 key themes (Table 2). The most researched theme is tourists' behaviors and satisfaction (38.10%), followed by strategic and sustainable development (26.19%), focusing on promoting growth and sustainability. The remaining themes, demand and motivations (19.05%) and quality and resource management (16.67%), receive less attention and address the drivers of thermal tourism and the need for efficient resource use and regulatory compliance.

Table 2. Distribution of studies by theme.

Theme	Total studies	Percent	Studies
Demand and motivations	8	19.05%	Brandão et al. (2021); Chrobak, Ugolini, Pearlmutter, and Raschi (2020); Chen, Liu, and Chang (2013); Clark-Kennedy and Cohen (2017); Kervankıran (2016); Loureiro et al. (2023); Medai, Okamoto, Ogasawara, and Hihara (2022) and Pereira et al. (2023)
Tourists' Behaviors and Satisfaction	16	38.10%	Alén (2018); Anaya-Aguilar, Gemar, and Anaya-Aguilar (2021); Chen, Li, Weng, and Wang (2023); Esiyok, Kurtulmuşoğlu, and Özdemir (2018); Handler (2022); Handler and Kawaminami (2023); Huang, Zhang, and Li (2022); Japutra, Loureiro, Molinillo, and Primanti (2023); Kaya (2018); Lin (2012); Liu, Fu, and Li (2019); Mi, Chen, Cheng, Uwanyirigira, and Lin (2019); Montargot, Férérol, and Kallmuenzer (2023); Moreno-González, León, and Fernández-Hernández (2025); Rodrigues, Brochado, and Troilo (2020) and Chang, Lin, and Wu (2022)
Quality and resource management	7	16.67%	Fu and Tzeng (2016); Liao, Hsu, and Chang (2019); Pavić et al. (2023); Tretiakova, Shmeleva, and Brankov (2018); Vaz et al. (2023); Vuković, Čavlin, and Čavlin (2015) and Wang, Xin, Zhu, Fang, and Zhu (2023)
Strategic and sustainable development	11	26.19%	Antunes et al. (2023); Bertan (2019); Bozóti (2015); Del Río-Rama et al. (2018); Emir and Saraçli (2014); Kurata and Ohe (2020); Liu, Browne, and Iossifova (2022); Noviello and Smętkiewicz (2019); Pina and Martins (2022); Rocha and Brandao (2014), and Stavroula and Vasiliki (2020)

3.2.1. Demand and Motivations

Thermal tourism has grown into a vibrant niche within the broader health and wellness tourism sector, driven by a global shift toward preventive health, mental well-being, and immersive nature experiences (Kervankıran, 2016; Pereira et al., 2023). Today's tourists are motivated by a variety of reasons—from seeking relaxation and relief from physical discomfort to reducing stress and escaping the routines of daily life by connecting with nature (Chen et al., 2013; Clark-Kennedy & Cohen, 2017). There is also a shift in their behavior as they have started to prefer wellness and leisure over traditional experiences, especially after the COVID-19 pandemic (Loureiro et al., 2023). Additional factors such as accommodation quality, ease of access, and reliance on inbound tourists are vital for the success and appeal of thermal destinations (Medai et al., 2022). Some unique features of these destinations (e.g., geology, cultural heritage, authenticity, and nostalgic charm) also increase their demand and economic viability (Brandão et al., 2021; Chrobak et al., 2020).

The recent global health crises caused by COVID-19 have not just shifted tourists' behaviors but also revealed gaps in current knowledge about their expectations and preferences. For example, there is limited understanding of the factors influencing their decision-making about traveling to seek thermal tourism in light of the continuous changes and concerns in health and wellness trends. Examining the new demands of tourists through long-term and comparative research (pre- vs. post-COVID) is extremely important to create personalized experiences with greater emphasis on health safety in this new era. Also, comparing what tourists want with expert views on the cultural and geological value of destinations could reveal important differences. Addressing these gaps could help create more innovative and well-rounded thermal tourism experiences particularly when combined with geotourism approaches.

Another important area for future research is the role of microeconomic factors and shifting market dynamics. For instance, understanding niche segments within thermal tourism means looking at things like household income, local economic conditions, and spending habits, especially among travelers from diverse economic backgrounds. In emerging markets, the growing middle class represents a significant opportunity for expansion. Researchers should also explore how social and cultural influences, along with digital platforms like social media, shape demand and visitor choices. Since climate often affects when and how appealing thermal tourism is, more attention should be given to how seasonal weather patterns influence tourist flows. These insights can help develop more targeted marketing, improve resource management throughout the year, and leverage technologies such as virtual wellness tours to reach a broader audience and meet the changing motivations of today's thermal tourists.

3.2.2. Tourists' Behaviors and Satisfaction

Increased health awareness and changing consumer expectations have made understanding tourist behavior and satisfaction key to the strategic growth and long-term sustainability of thermal tourism (Handler & Kawaminami, 2023). Tourists today place greater importance on mental health, emotional well-being, and high-quality, restorative experiences (Huang et al., 2022). They now expect clean environments, personalized services, and meaningful social interactions. Because of this, destinations need to adapt their offerings to create memorable on-site experiences that build strong connections to the place, encourage loyalty, and boost the likelihood of repeat visits (Liu et al., 2019; Moreno-González et al., 2025).

Enjoyable and nostalgic aspects such as dining and cultural activities also play a significant role in shaping travelers' intentions, especially for those seeking emotional comfort and connection (Chang et al., 2022; Chen et al., 2023). Service quality and fairness have become increasingly important for brand perception and recovering from service issues, particularly in luxury thermal hotels (Japutra et al., 2023). Psychological well-being and culinary experiences are now crucial predictors of whether visitors intend to return, depending on their own health status (Lin, 2012). Practical factors such as food and beverage options, pricing, facility standards, and the perceived value of the environment continue to influence how relaxed and satisfied visitors feel (Alén, 2018; Kaya, 2018; Mi et al., 2019; Rodrigues et al., 2020). Demographic and socioeconomic factors also shape behavior; older tourists tend to prioritize

health, relaxation, and safety, while younger visitors often seek longer stays and more social interaction (Anaya-Aguilar et al., 2021; Esiyok et al., 2018). Catering to senior travelers means understanding their diverse needs, including financial limits, health concerns, and a stronger preference for personalized and secure experiences (Handler, 2022).

Although tourist satisfaction and behavior have received significant attention in the literature, future research should adopt a multidimensional approach to satisfaction incorporating cognitive, emotional, and behavioral perspectives to support the development of resilient, customer-centric thermal tourism ecosystems. For example, while current studies have identified some key experiential factors, there remains a need to explore underexamined constructs such as compensatory experience quality, perceived restorativeness, and resort typologies to better align service offerings with tourists' evolving expectations. From planning before the visit, through the journey itself, to reflections after the trip, future research should also examine tourist behavior across all phases of travel to enhance the overall visitor experience. Researchers should further investigate how on-site experiences impact both satisfaction and future travel decisions. To support personalized and culturally sensitive marketing strategies, factors such as food quality, multi-modal accessibility, and long-term data should be studied. Creating innovative marketing strategies that can engage consumers, shape their travel plans, and enhance their satisfaction by utilizing online reviews and digital platforms is also a significant step that needs to be taken. For instance, innovative storytelling and digital marketing strategies can help attract younger, tech-savvy tourists while preserving cultural heritage and emphasizing wellness (Montargot et al., 2023). Adopting these new and creative approaches in marketing such as incorporating humor and cultural heritage in storytelling could offer valuable insights into thermal tourist engagement and overall regional tourism development.

The interaction between psychological well-being, culinary experiences, and revisit intentions has not been sufficiently examined across different health segments. Segmenting tourists based on motivations, health risk perceptions, and travel behaviors is crucial to uncover deeper patterns in how their behavior is changing. Other factors like age, income, travel distance, and seasonality also provide valuable insights into how often and how long people participate in thermal tourism. For example, cultural influences on tourists' behavior still require further investigation especially among senior travelers. Furthermore, when examining what drives revisit intentions and satisfaction, broader factors such as corporate reputation, service fairness, and business performance should be considered. Improving human resource skills and enhancing service delivery to meet evolving customer expectations is also crucial to achieving visitor satisfaction.

3.2.3. Quality and Resource Management

The sustainability of this sector, along with achieving better tourist satisfaction and loyalty and meeting their expectations, starts with better resource management and ensuring high-quality services. For example, the peacefulness of rural settings, combined with the healing benefits of thermal baths, can be utilized to offer more diversified services and attract a broader range of tourists (Vuković et al., 2015). However, previous research indicates that it is essential to develop skills in personalized service and customer care, along with investing in staff training, as these areas are still lacking (Vaz et al., 2023).

A deeper understanding of the current thermal systems' hydrogeological and geochemical characteristics would maximize the economic value and appropriate management of these hydrothermal resources (Pavić et al., 2023). Another important aspect of managing these resources and ensuring the highest quality of the provided experiences is studying and managing climate change. Climate plays a significant role in enhancing year-round utilization of these establishments and increasing the appeal of thermal experiences, as favorable weather conditions boost tourist flow (Tretiakova et al., 2018; Wang et al., 2023).

Quality and service management in thermal tourism also encompasses many aspects, such as ensuring smooth operations, protecting the environment, and enhancing public health. For example, maintaining and improving water

temperature, pH levels, disinfectant concentrations, and microbiological quality of thermal water are vital parts of this management (Fu & Tzeng, 2016). Continuous investments from thermal tourism providers, combined with strong oversight from governments, can regulate these resource management practices and ensure safe and high-quality experiences for tourists.

Developing standardized safety indicators and evaluating how various safety management systems are applied across different thermal destinations is essential, as currently there is a lack of comprehensive safety metrics. Future research should provide a deeper understanding of how factors such as facility cleanliness and compliance with health and safety measures (e.g., hygiene and social distancing) affect tourists' trust and satisfaction. These issues are important under normal conditions, but they become even more critical during public health crises like COVID-19, when travelers need to feel both physically and emotionally secure.

The COVID-19 pandemic also heightened these concerns and raised tourists' awareness of such vital issues. Moreover, in thermal facilities, there is still a lack of strict safety measures in high-risk zones such as bathing and spa facilities, which inhibit consistent monitoring and quality assurance. Thus, advancements in safety management systems including the use of data analytics and risk assessment tools should be addressed by further research. Integrating safety-focused practices into broader quality management strategies will help providers proactively mitigate potential hazards, enhance visitor confidence, and promote long-term loyalty thereby bolstering the resilience, competitiveness, and sustainability of thermal tourism destinations.

3.2.4. Strategic and Sustainable Development

Thermal tourism has great potential in the sustainability and viability of the tourism industry. It has some unique characteristics, such as the ability to diversify services, reduce seasonality, and stimulate regional economic development (Rocha & Brandao, 2014). Also, through its operation as a year-round economic engine, it has other potentials such as reducing seasonality, attracting long-term investments, and stabilizing local economies (Emir & Saraçli, 2014; Stavroula & Vasiliki, 2020). Despite this potential, sustainability in this field is undermined due to uneven success and resources across establishments. This means that while some thermal destinations benefit from well-established infrastructure and strong reputations, others struggle with underdevelopment and face the risk of facility closures (Bozóti, 2015). Thus, it is necessary for these establishments to take some steps to ensure sustainable strategic growth and enhance competitiveness. For example, they should effectively integrate strategic management, marketing, and quality assurance practices into their operations (Del Río-Rama et al., 2018). Their services must also align with the current socio-economic realities of host communities, and they should address key challenges such as inadequate accommodations, legal restrictions, and a lack of complementary cultural programming (Pina & Martins, 2022). This includes considering factors such as pricing strategies, local partnerships, and community-based governance (e.g., coordinated price regulation) to foster long-term development (Kurata & Ohe, 2020). In addition, integrating local voices into planning processes is essential for ensuring both this field's sustainability and the equitable distribution of tourism benefits to the host communities and providers (Bertan, 2019).

Following the COVID-19 pandemic, the shift in tourist preferences towards more health-conscious choices indicates the necessity for thermal establishments to adopt flexible strategies that prioritize health, safety, and digital innovation in thermal experiences (Antunes et al., 2023). This will rebuild trust and enhance resilience while unlocking the great potential thermal tourism holds to breathe new life into historical sites by blending wellness services with cultural heritage experiences. Furthermore, sustainability in thermal tourism does not only involve tourists and providers—it also involves combating environmental challenges. For instance, measures to prevent spatial inequality and gentrification, as well as conservation-focused policies for geothermal and water resources, must be ensured along with the active involvement of local communities to promote sustainability (Liu et al., 2022; Noviello & Smętkiewicz, 2019). Future investigations should adopt an interdisciplinary approach to evaluate the environmental, economic, and social impacts of thermal tourism across the entire thermal tourist journey to set

priorities. For example, they should explore how geothermal assets can be utilized to reduce regional inequalities and shape inclusive policies. Furthermore, to enhance market competitiveness and reach, the digital shift should be utilized through various digital tools such as virtual tours, online booking platforms, and social media. However, in order to do this, further research should be done to provide sufficient insights to various stakeholders, especially on how tourists seek and interpret information.

4. CONCLUSION

This research successfully achieved its objective of providing both quantitative and qualitative insights into the literature on thermal tourism. The findings reveal steady growth in research output, despite temporary setbacks during the COVID-19 pandemic. However, despite this growth, gaps remain in comprehensive studies, particularly regarding customer experience, marketing strategies, segmentation, sustainability, safety, and the long-term economic impacts of global disruptions such as COVID-19. Thus, the study outlines a future research agenda with significant potential for growth among academics and industry stakeholders. To address these gaps, ongoing collaboration among researchers, industry professionals, and other stakeholders, along with sustained funding, is essential. Countries with well-established thermal resources such as Portugal, China, Spain, and Turkey continue to lead in both market development and scholarly output. However, further exploration is needed to understand how these destinations are adapting to evolving post-pandemic consumer behaviors. The results also suggest that the increasing interest in thermal tourism aligns with broader global trends toward wellness, health-related motivations, and preventive care. Thus, in addition to research collaborations, stakeholders such as tourism authorities, industry professionals, and policymakers should take concrete steps to enhance the competitiveness, sustainability, and resilience of the thermal tourism sector. They should integrate health and wellness goals into national tourism strategies, upgrade infrastructure, develop and enforce enhanced safety protocols, and provide comprehensive workforce training. They should also support regional planning that combines thermal, rural, and cultural tourism, and implement creative marketing strategies by investing in digital technologies and infrastructure. These changes will support the promotion of sustainable practices, which are critical to meeting tourist expectations and ensuring long-term success in the industry.

5. LIMITATIONS

The bibliometric analysis conducted in this study focused on a narrow scope, primarily aimed at quantifying the literature while providing complementary quantitative insights through content analysis. The study relied on Web of Science, which, while a comprehensive and widely recognized database, may have overlooked valuable articles published in other databases. To gain a more holistic understanding of the field, future research should expand the scope by including additional databases such as Scopus and PubMed, as well as grey literature resources, compare findings across different platforms, and conduct bibliometric analyses from broader perspectives. This analysis only considered English-language articles. Therefore, future studies should address this limitation by incorporating research in other languages.

Funding: This study received no specific financial support.
Institutional Review Board Statement: Not applicable.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.
Disclosure of AI Use: The author used OpenAI's ChatGPT (GPT-4) to edit and refine the wording of the Introduction and Literature Review. All outputs were thoroughly reviewed and verified by the author.

REFERENCES

Alén, E. (2018). Reflections on "assessing tourist behavioral intentions through perceived service quality and customer satisfaction". *Journal of Global Scholars of Marketing Science*, *28*(4), 358-362. https://doi.org/10.1080/21639159.2018.1509364

Anaya-Aguilar, R., Gemar, G., & Anaya-Aguilar, C. (2021). A typology of spa-goers in Southern Spain. *Sustainability*, *13*(7), 3724. https://doi.org/10.3390/su13073724

Antunes, V., Gonçalves, G., & Estevão, C. (2023). A theoretical reflection on thermalism and communication: Future perspectives in times of crisis. *Journal of Hospitality and Tourism Insights*, *6*(4), 1618-1638. https://doi.org/10.1108/JHTI-08-2021-0231

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Bertan, S. (2019). Residents' perception towards thermal tourism impacts. *Anais Brasileiros de Estudos Turísticos: ABET*, *9*(1), 1–8. https://doi.org/10.34019/2238-2925.2019.v9.27326

Bozóti, A. (2015). Health tourism competitiveness – A complex approach. *DETUROPE – The Central European Journal of Regional Development and Tourism*, *7*(2), 157–174. https://doi.org/10.32725/det.2015.021

Brandão, F., Liberato, D., Teixeira, A. S., & Liberato, P. (2021). Motives for thermal tourism: An application to North and Central Portugal. *Sustainability*, *13*(22), 12688. https://doi.org/10.3390/su132212688

Chang, J., Lin, S. H.-H., & Wu, L.-S. (2022). Searching memories of pleasures in local cuisine: How nostalgia and hedonic values affect tourists' behavior at hot spring destinations? *British Food Journal*, *124*(2), 493-513. https://doi.org/10.1108/BFJ-04-2021-0387

Chen, K.-H., Liu, H.-H., & Chang, F.-H. (2013). Essential customer service factors and the segmentation of older visitors within wellness tourism based on hot springs hotels. *International Journal of Hospitality Management*, *35*, 122-132. https://doi.org/10.1016/j.ijhm.2013.05.013

Chen, Y.-C., Li, M.-C., Weng, S.-D., & Wang, Y.-C. (2023). A descriptive survey of atmospheric music broadcasting in hot spring hotels and its further marketing strategy. *Sage Open*, *13*(1), 21582440221147145. https://doi.org/10.1177/21582440221147145

Chrobak, A., Ugolini, F., Pearlmutter, D., & Raschi, A. (2020). Thermal tourism and geoheritage: Examining visitor motivations and perceptions. *Resources*, *9*(5), 58. https://doi.org/10.3390/resources9050058

Clark-Kennedy, J., & Cohen, M. (2017). Indulgence or therapy? Exploring the characteristics, motivations and experiences of hot springs bathers in Victoria, Australia. *Asia Pacific Journal of Tourism Research*, *22*(5), 501-511. https://doi.org/10.1080/10941665.2016.1276946

Del Río-Rama, M. de la C., Maldonado-Erazo, C. P., & Álvarez-García, J. (2018). State of the art of research in the sector of thermalism, thalassotherapy and spa: A bibliometric analysis. *European Journal of Tourism Research*, *19*, 56-70. https://doi.org/10.54055/ejtr.v19i.325

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Dutheil, F., Chaplais, E., Vilmant, A., Courteix, D., Duche, P., Abergel, A., . . . Boirie, Y. (2019). Stress management in obesity during a thermal spa residential programme (ObesiStress): Protocol for a randomised controlled trial study. *BMJ Open*, *9*(12), e027058. https://doi.org/10.1136/bmjopen-2018-027058

Emir, O., & Saraçli, S. (2014). Determination of the thermal hotel location: Application of analytic hierarchy process. *Tourism and Hospitality Management*, *20*(1), 71-83. https://doi.org/10.20867/thm.20.1.6

Esiyok, B., Kurtulmuşoğlu, F. B., & Özdemir, A. (2018). Heterogeneity in the determinants of length of stay across middle age and senior age groups in thermal tourism. *Journal of Travel & Tourism Marketing*, *35*(4), 531-540. https://doi.org/10.1080/10548408.2017.1374906

Fu, H.-H., & Tzeng, S.-Y. (2016). Applying fuzzy multiple criteria decision making approach to establish safety-management system for hot spring hotels. *Asia Pacific Journal of Tourism Research*, *21*(12), 1343-1356. https://doi.org/10.1080/10941665.2016.1175487

Global Wellness Institute. (2021). *The global wellness report: Looking beyond COVID*. United States: Global Wellness Institute.

Global Wellness Institute. (2023). *Global tourism and COVID-19: Implication for theory and practice*. United States: Global Wellness Institute.

Global Wellness Institute. (2024). *Global wellness economy monitor 2024*. United States: Global Wellness Institute.

Handler, I. (2022). Can senior travelers save Japanese hot springs? A psychographic segmentation of visitors and their intention to visit Onsen establishments during COVID-19. *Sustainability*, *14*(4), 2306. https://doi.org/10.3390/su14042306

Handler, I., & Kawaminami, J. (2023). Why do Japanese people visit hot springs during a pandemic? A psychographic segmentation analysis. *Journal of Outdoor Recreation and Tourism*, *41*, 100530. https://doi.org/10.1016/j.jort.2022.100530

Huang, X., Zhang, Y., & Li, C. (2022). Assessing the compensatory potentiality of hot spring tourism in the COVID-19 post-pandemic environment. *Sustainability*, *14*(14), 8579. https://doi.org/10.3390/su14148579

Japutra, A., Loureiro, S. M. C., Molinillo, S., & Primanti, H. (2023). Influence of individual and social values on customer engagement in luxury thermal spa hotels: The mediating roles of perceived justice and brand experience. *Tourism and Hospitality Research*, *25*(1), 90-103. https://doi.org/10.1177/14673584231188847

Kalyoncuoğlu, Y. (2021). *1 million 300 thousand foreigners chose Türkiye for health tourism in 2020*. Ankara, Turkey: Anadolu Agency.

Kaya, O. (2018). Exploring the satisfaction and dissatisfaction factors derived from food and beverage services of thermal hotels. *DETUROPE – The Central European Journal of Regional Development and Tourism*, *10*(3), 143-161. https://doi.org/10.32725/det.2018.028

Kervankıran, İ. (2016). *Between traditional and modern: Thermal tourism in Turkey. In: Egresi, I. (eds), Alternative Tourism in Turkey. GeoJournal Library* (Vol. 121). Cham: Springer.

Kurata, S., & Ohe, Y. (2020). Competitive structure of accommodations in a traditional Japanese hot springs tourism area. *Sustainability*, *12*(7), 3062. https://doi.org/10.3390/su12073062

Kyngäs, H. (2020). Inductive content analysis. In H. Kyngäs, K. Mikkonen, & M. Kääriäinen (Eds.), The application of content analysis in nursing science research. In (pp. 13–21). Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-030-30199-6_2

Liao, S.-K., Hsu, H.-Y., & Chang, K.-L. (2019). OTAs selection for hot spring hotels by a hybrid MCDM model. *Mathematical Problems in Engineering*, *2019*(1), 4251362. https://doi.org/10.1155/2019/4251362

Lin, C.-H. (2012). Effects of cuisine experience, psychological well-being, and self-health perception on the revisit intention of hot springs tourists. *Journal of Hospitality & Tourism Research*, *38*(2), 243-265. https://doi.org/10.1177/1096348012451460

Liu, Q., Browne, A. L., & Iossifova, D. (2022). Creating water demand: Bathing practice performances in a Chinese hot spring tourist town. *Journal of Sustainable Tourism*, *30*(4), 685-703. https://doi.org/10.1080/09669582.2021.1876716

Liu, X., Fu, Y., & Li, J. (2019). The effect of on-site experience and place attachment on loyalty: Evidence from Chinese tourists in a hot-spring resort. *International Journal of Hospitality & Tourism Administration*, *20*(1), 75-100. https://doi.org/10.1080/15256480.2017.1359730

Loureiro, I. S., Gomes, H., Costa, V., Ferreira, F. A., Pereira, R., & Nunes, A. (2023). Thermal tourism: Study of the profile and motivations of the practitioner in Portugal. *Journal of Tourism, Sustainability and Well-Being*, *11*(1), 40-51. https://doi.org/10.34623/5cdd-eg26

Medai, N., Okamoto, N., Ogasawara, Y., & Hihara, K. (2022). Factors contributing to tourism demand at major Japanese hot springs. *PLoS One*, *17*(9), e0274681. https://doi.org/10.1371/journal.pone.0274681

Mi, C., Chen, Y., Cheng, C.-S., Uwanyirigira, J. L., & Lin, C.-T. (2019). Exploring the determinants of hot spring tourism customer satisfaction: Causal relationships analysis using ISM. *Sustainability*, *11*(9), 2613. https://doi.org/10.3390/su11092613

Montargot, N., Férérol, M.-E., & Kallmuenzer, A. (2023). Storytelling and digitalization as opportunities for spa towns. *Current Issues in Tourism*, *26*(1), 91-104. https://doi.org/10.1080/13683500.2021.2017410

Moreno-González, A.-A., León, C. J., & Fernández-Hernández, C. (2025). Home-destination spillover effects in health-related spa activities: The case of thermal baths. *Leisure Sciences*, *47*(8), 1951–1978. https://doi.org/10.1080/01490400.2023.2267039

Noviello, M., & Smętkiewicz, K. (2019). The revitalisation of thermal areas in the bagnoli district (Naples) as a chance for tourism development in the campania region in the context of selected European experiences. *Quaestiones Geographicae*, *38*(4), 119–131. https://doi.org/10.2478/quageo-2019-0042

Pavić, M., Kosović, I., Pola, M., Urumović, K., Briški, M., & Borović, S. (2023). Multidisciplinary research of thermal springs area in Topusko (Croatia). *Sustainability*, *15*(6), 5498. https://doi.org/10.3390/su15065498

Pereira, R., Costa, V., & Gomes, H. (2023). Health and wellness tourism: An overview of thermal tourism in Portugal. *Journal of Tourism, Sustainability and Well-being*, *11*(3), 136-147. https://doi.org/10.34623/e2bm-8030

Pina, H., & Martins, F. (2022). The strategic position of health and wellness tourism in the development of the Douro Demarcated Region World Heritage Site. *Hrvatski Geografski Glasnik*, *84*(2), 93-107. https://doi.org/10.21861/HGG.2022.84.02.06

Pinos-Navarrete, A., Shaw, G., & Maroto-Martos, J. C. (2020). Towards wellness? A case study of the profile of tourists visiting a Southern Spanish spa. *International Journal of Spa and Wellness*, *3*(1), 40–55. https://doi.org/10.1080/24721735.2020.1857208

Pranckutė, R. (2021). Web of Science (WoS) and Scopus: The titans of bibliographic information in today's academic world. *Publications*, *9*(1), 12. https://doi.org/10.3390/publications9010012

Rocha, A. S. S., & Brandao, A. (2014). On developing wellness and medical tourism: The characterization of a national termal network. *International Journal of Healthcare Management*, *7*(4), 226-236. https://doi.org/10.1179/2047971914Y.0000000075

Rodrigues, H., Brochado, A., & Troilo, M. (2020). Listening to the murmur of water: Essential satisfaction and dissatisfaction attributes of thermal and mineral spas. *Journal of Travel & Tourism Marketing*, *37*(5), 649-661. https://doi.org/10.1080/10548408.2019.1633986

Stavroula, G., & Vasiliki, D. (2020). Alternative forms of sustainable development: The case of thermal tourism. *International Journal of Environment and Sustainable Development*, *19*(4), 367-377. https://doi.org/10.1504/IJESD.2020.110637

Tretiakova, T. N., Shmeleva, T., & Brankov, J. (2018). Thermal springs and health tourism-the analysis of the meteorological parameters. *Journal of the Geographical Institute" Jovan Cvijic", SASA*, *68*(1), 133-148. https://doi.org/10.2298/IJGI1801133T

Vaz, M., Fernandes, P. O., Ferreira, F. A., Alves, M. J., Costa, V., & Nunes, A. (2023). The importance-satisfaction matrix as a strategic tool for Termas de Chaves thermal spa priority improvements. *Journal of Tourism, Sustainability and Well-Being*, *11*(1), 52-65. https://doi.org/10.34623/x7p9-2266

Vuković, P., Čavlin, G., & Čavlin, M. (2015). Complementarity in the development of rural tourism with the development of thermal baths, spa and welness tourism. *Ekonomika Poljoprivrede*, *62*(1), 259-270. https://doi.org/10.5937/ekoPolj1501259V

Wang, L., Xin, L., Zhu, Y., Fang, Y., & Zhu, L. (2023). Associations between temperature variations and tourist arrivals: Analysis based on Baidu Index of hot-spring tourism in 44 cities in China. *Environmental Science and Pollution Research*, *30*(15), 43641-43653. https://doi.org/10.1007/s11356-023-25404-y

Zhou, M., Luo, H., Hong, J., Gao, D., Shen, Y., & Liang, M. (2023). Establishment of a value evaluation system for health and wellness tourism resources: Reflections on China's official tourism resource evaluation criteria. *PLoS One*, *18*(7), e0288749. https://doi.org/10.1371/journal.pone.0288749