

Thermalism & Sustainable Development: A Journey of Well-Being in Samos Island in Greece

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Abstract: The purpose of this research is to explore the potential for developing thermalism and wellness tourism in Samos. This study aims to document the current landscape, introduce a new model of alternative tourism, and propose a wellness center focused on rejuvenation, preventive medicine, and holistic. Gathering feedback from stakeholders regarding the island's tourism activity will contribute to the formation of a municipal strategy aimed at promoting a diversified tourism product. This product will address the needs of the modern visitor and incorporate characteristics of sustainability and environmental stewardship.

The research objectives include: (a) highlighting, recognizing, and utilizing Samos' therapeutic natural resources; (b) establishing a thermal center, based on the Potami thermal spring, which will connect with the island's history and cultural heritage, creating a unique tourism product; (c) supporting various forms of preventive and wellness therapies, using therapeutic resources and methods such as hydrotherapy, climatotherapy, cave therapy, thalassotherapy, and mud therapy, which aim to care for both physical and mental health; (d) linking the thermal center with various forms of alternative tourism (religious, conference, nature-based, and gastronomic tourism); (e) conducting scientific research to assess the therapeutic indications of natural resources and organize scientific meetings that support the sustainable development of these resources.

Keywords: Sustainable Development; Thermalism; Samos Island; Greece; Wellness Tourism.

Literature Review and Theoretical Framework

At the beginning of the 21st century, a clean and healthy environment is considered a fundamental prerequisite for quality of life and societal well-being. The global goal is the sustainable development of tourism, achieved through the rational use of natural resources. In line with this principle, governments develop policies to promote this type of tourism.

The International Union for Conservation of Nature and Natural Resources (IUCN) highlights that “sustainable development means harmonious living between people and nature, while a strategy for achieving sustainability leads to development that genuinely improves human quality of life, while preserving Earth's biological diversity” (ICUN/UNEP/WWF, 1991:8). Sustainable development is seen as a complex process requiring structural changes in the

natural and human environment to preserve resources and promote social benefit, welfare, and quality of life, both now and in the future.

The concept of "sustainable tourism" emerged in the 1990s. According to the World Tourism Organization (UNWTO) (2005:11-12), "sustainable tourism is one that takes into account current and future economic, social, and environmental impacts, and addresses the needs of visitors, the tourism industry, the environment, and host communities." The Globe '99 Conference held in Vancouver in 1999 outlined several benefits provided by sustainable tourism, including:

- Encouraging awareness of tourism's benefits to the natural, cultural, and social environment
- Ensuring fair distribution of profits and costs
- Creating jobs in the tourism industry and supporting complementary activities
- Revitalizing local businesses
- Diversifying the local economy, particularly in rural areas where agricultural employment may be seasonal or insufficient;
- Improving local transportation and telecommunications networks;
- Helping to preserve historical monuments and sites;
- Elevating the social level of tourism and facilitating communication among people of different backgrounds (Patroni, Poulaki, 2024).

Thermalism, Medicinal Tourism, Sustainable Development, and Wellness Tourism in Europe and Greece

Thermalism, medicinal tourism, sustainable development, and wellness tourism represent four contemporary tourism trends that are rapidly growing both globally and within Europe. Greece, with its rich tradition of natural thermal springs and favorable geographical position, plays a significant role in these fields, offering unique experiences that combine natural healing, cultural heritage, and sustainability (Rachiotis, Poulaki, 2024).

Thermalism

Thermalism, the use of natural hot springs for therapeutic purposes, is an ancient practice rooted in ancient Greece and Rome. The Greeks and Romans used thermal springs to treat various ailments, primarily musculoskeletal and skin conditions, and public baths served as significant social hubs.

Europe. In Europe, many countries have a longstanding tradition of thermalism, and thermal springs are major tourist attractions. Prominent examples include:

Italy: Home to some of the most famous spas, like the Montecatini baths, which have been operating for centuries, offering excellent facilities for restoration and healing.

- **France:** Vichy is one of Europe's most well-known thermal centers, combining medical treatment with wellness. Thermalism in France has substantial historical and economic significance, drawing tourists worldwide.
- **Germany:** Baden-Baden, a renowned spa resort in southwestern Germany, is known for its thermal waters with reputed healing properties.

Greece. Greece boasts rich geothermal activity and many thermal springs with various properties and temperatures, appreciated since ancient times. Today, the country has over 750 thermal springs, with significant thermal areas including:

- **Pozar Baths:** Located in Central Macedonia, they are known for their natural baths and hot springs, surrounded by enchanting natural landscapes.
- **Kamena Vourla:** A town in Central Greece famous for its sulfur-rich thermal springs, which are effective in treating musculoskeletal and respiratory conditions.
- **Aidipsos:** Greece's most famous thermal area, with over 80 hot springs used therapeutically since ancient times.

Medicinal Tourism

Medicinal tourism focuses on using thermal springs and hot baths for medical purposes, such as relieving musculoskeletal, respiratory, and dermatological ailments. The therapeutic properties of thermal waters, which contain minerals like sulfur, calcium, and magnesium, can alleviate various diseases and improve overall wellness (Patroni, Poulaki, 2024).

Europe In Europe, medicinal tourism has become a well-established form of health tourism in many countries. Some standout examples are:

- **Hungary:** Budapest, known as the "City of Spas," has over 100 hot baths. The region's thermal waters are ideal for treating arthritis, neuralgia, and other conditions.
- **Czech Republic:** Karlovy Vary is one of Europe's top destinations for medicinal tourism, known for its thermal springs and spa facilities offering therapeutic treatments.
- **Slovakia:** Piestany is a thermal and medicinal tourism center that attracts international visitors for its thermal spring treatments.

Greece. In Greece, medicinal tourism is linked to the country's natural wealth and numerous thermal springs. These resources offer excellent potential

for health tourism, with the most famous areas including Aidipsos, Pozar Baths, and Kamena Vourla. Recently, Greece has invested in upgrading its thermal and medicinal tourism facilities, aiming to attract tourists seeking natural and medical treatments. Collaborating with local and international bodies and promoting Greece as a medicinal tourism destination is a core strategy for strengthening this sector (Patroni, Poulaki, 2024).

Sustainable Development in Tourism

Sustainable tourism development involves the balanced management of resources and tourism activities to preserve the natural environment and strengthen local communities and economies. It aligns closely with the rising demand for ecological responsibility and social sensitivity. Travelers now seek destinations that apply practices to reduce environmental impact and promote sustainable resource management (Patroni, Poulaki, 2024). According to the World Tourism Organization (UNWTO), sustainable tourism can significantly contribute to the United Nations Sustainable Development Goals (SDGs), particularly through supporting local communities, conserving ecosystems, and reducing negative environmental impacts. Specifically:

Europe. Europe leads the way in sustainable tourism development, with many countries implementing strategies to minimize tourism's environmental impact and promote greener practices. Key examples include:

- **Scandinavia:** Known globally for its commitment to sustainable development, Sweden, Norway, and Denmark have ambitious ecotourism programs focused on preserving natural landscapes, protecting wildlife, and reducing carbon footprints.
- **Austria and Switzerland:** These countries have adopted practices to minimize tourism's impact, focusing on renewable energy use in tourist accommodations and preserving natural landscapes.

Greece In Greece, sustainable tourism development is essential for preserving the natural environment and rich cultural heritage. Initiatives for biodiversity conservation and ecotourism promotion are developing in many areas, particularly on islands like Crete and Rhodes. The government and local bodies aim to incorporate environmental awareness into tourism infrastructure planning, promoting renewable energy use and ecosystem protection.

Wellness Tourism

Wellness tourism is a rapidly growing sector in the tourism industry, as people seek travel experiences that focus on physical and mental health. This type of tourism includes activities such as yoga, meditation, detoxification, and relaxation programs that promote wellness and renewal. According to the Global Wellness Institute (GWI), the global wellness tourism market reached \$639 billion in 2017 and is expected to hit \$919 billion by 2022. Wellness tourism's

share of total tourism revenue is steadily increasing, with an annual growth rate of 6.4%, twice the rate of traditional tourism. :

Europe

- **Spain and Portugal:** These countries host numerous wellness tourism destinations, with centers combining natural treatments and high-quality spas.
- **Switzerland:** Luxury spas and wellness clinics in Switzerland offer advanced treatments and renewal services, attracting tourists globally.

Greece

In Greece, wellness tourism draws from the ancient Greek tradition of healing arts and combines it with the country's natural beauty. Greece offers ideal conditions for wellness tourism, with numerous hotels and spa centers providing programs focused on holistic health. The combination of natural landscapes, blue seas, and wellness makes destinations like Mykonos, Santorini, and Crete ideal for travelers seeking to rejuvenate body and spirit.

Statistics and Data on Wellness Tourism

- Europe holds a significant share of the global wellness tourism market, accounting for about 30% of global wellness tourism revenue.
- Wellness tourists spend an average of 53% more per trip compared to other tourists, according to GWI. Wellness travelers seek multi-dimensional experiences that combine relaxation and physical wellness with spiritual renewal. Spa and thalassotherapy treatments are particularly popular in countries like Greece and Italy, which leverage their natural resources and thermal waters. In Greece, wellness tourism is rapidly growing, with areas like Santorini, Crete, and the Sporades being popular destinations for vacations that combine spas and healthy eating.

Best Practices in Wellness Tourism with Statistics

- **Holistic health and relaxation programs:** Hotels and wellness centers that implement holistic programs, such as the Euphoria Retreat in Sparta, offer comprehensive treatments for physical and mental health. The Euphoria Retreat has attracted international tourists, contributing to the local economy and enhancing Greece's brand as a wellness destination.
- **Promotion of local products and sustainable diets:** Wellness centers and spas offering local organic products and diets based on natural and healthy foods are in high demand. According to GWI, 60% of wellness tourists seek healthy eating experiences, with programs that include organic products and local cuisine. Sustainability in wellness tourism is

also connected to the use of natural resources, such as thermal springs, which promote natural healing without environmental impact. The combination of traditional healing techniques with modern holistic medicine enhances the attractiveness of wellness destinations internationally.

Conclusions Greece and Europe offer vast potential for the development of thermalism, medical tourism, sustainable development, and wellness tourism. Greece, with its unique geography and wealth of natural resources, can play a leading role, while Europe continues to lead in innovative sustainable tourism practices. These forms of tourism can boost local economies, improve the quality of life for residents, and attract tourists seeking health, wellness, and sustainable experiences (Patroni, Poulaki, 2024).

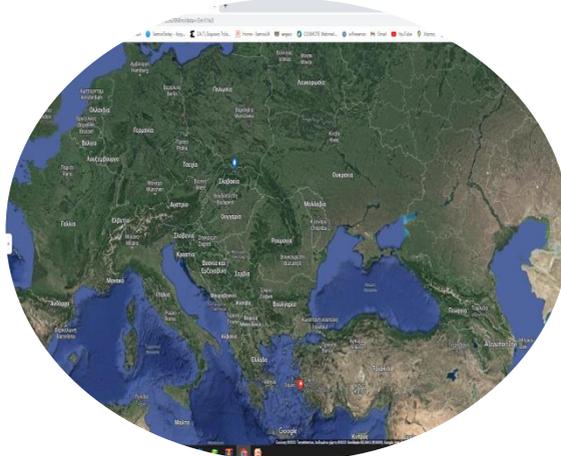
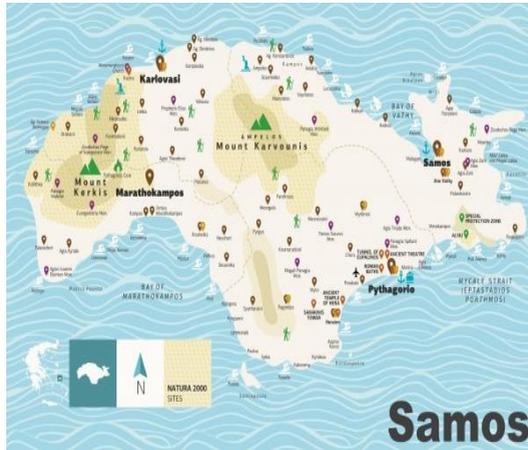
The Island of Samos



Samos is the eighth largest Greek island, covering an area of 477 square kilometers with 32,642 inhabitants. It is in the northeastern Aegean Sea, near Asia Minor (Poulaki et al., 2015). In 2019, before the pandemic, it experienced the highest tourist influx, with 298,525 visitors. Access to the island is by air, through the state airport "Aristarchos of Samos," a recently renovated airport managed by Fraport Greece, and by sea, as it has two main ports in the towns of Vathy and Karlovasi, which serve as the island's main urban and administrative centers.

Samos' climate is mild and humid in winter, while summer is dry. Samos is one of the sunniest places in Europe, with approximately 3,300 hours of sunshine per year (or 74% of the year).

Picture1: Map of Samos



Source: Tourist Guide “The Triangle of Happiness” and Samos Google maps

The Tourism Product of Samos

The tourism product of Samos has a wealth of natural resources for the development of specialized forms of alternative tourism and a range of activities, including its rich geothermal potential and the radioactive thermal spring, which is the focus of this research. The research aims to explore the potential of thermalism and wellness tourism on Samos as a complementary tourism product that can be developed to extend the tourist season and increase per capita income. However, the actual image of Samos’ tourism product remains largely based on the 3S tourism model (Sea, Sun, Sand), due to the Mediterranean climate and countless free, cosmopolitan, organized, and unorganized beaches, which offer opportunities for sports such as windsurfing, kite surfing, sailing,

water skiing, and the exploration of diving parks with trained personnel and modern equipment, as well as yacht rentals for sea excursions to accessible or inaccessible beaches of the destination. Although the island is characterized as a developing destination, with infrastructure gradually increasing and improving, it experiences significant seasonality in demand, a characteristic shared by all Greek islands.

Available Tourism Activities

Samos has unique trails and paths, forests, and mountains, ideal for hiking and biking, such as Seitan Beach, Mount Kerkis, Pythagoras' Cave, unexplored caves, and more. Additionally, climbing routes with different difficulty levels have been mapped, making Samos an ideal destination with significant potential for alternative tourism, catering to various needs, preferences, and recreational interests, aiming at modernizing the area and improving tourism demand. Key examples include:

- Recreational sports tourism
- Cultural tourism
- Marine tourism
- Rural tourism
- Gastronomic tourism
- Health and wellness tourism
- Speleological tourism

Thermomineral Springs of Samos Island

In 1981, the then Ministry of Coordination and the General Directorate of Public Investments and Regional Development commissioned a consulting company to study the utilization of thermomineral springs on Samos Island. The study identified thermomineral springs in the Potami area of Karlovasi, located in the northwest part of the island, and therapeutic mud in the area west of Pythagoreio, in the island's southeast.

According to the 1981 study, a karst water lake is found in the area west of Pythagoreio. Springs emerge north of the lake near limestone formations, while significant quantities of therapeutic mud surround the lake, extending to the springs and the nearby beach. The lake's water temperature was recorded at 21°C, with radon levels of 2.5 Mache units. The spring water temperature was measured at 26°C, with radon levels in the therapeutic mud reaching 3.5 Mache units. The study proposed creating a therapeutic mud bath facility in the Pythagoreio area, with a capacity of 500 baths per 8-hour period.

Geographical Location of the Potami Therapeutic Spring

The Potami thermal spring, located in Potami within the municipality of West Samos, emerges inside a tunnel leading to the beach, west of New Karlovasi, about 1,500 meters from the town's boundaries. The spring area lies

within a designated NATURA protection zone. The water temperature at the spring's exit reaches 30.5°C. Its coordinates (in EGSA '87) are X=734083 and Y=4185438, at an elevation of approximately 2.00 meters above sea level. Physicochemical measurements were conducted on July 27 and December 1, 2016, along with chemical and microbiological sample analyses.

Picture 2: Narrow study area, Potami source, Samos Municipality. The image shows the footprint of the tunnel (double blue line).



Source: Land Register SA, date of download: 2015

The Potami spring is classified as sub thermal, strongly chlorinated sodium, magnesium-rich, and slightly alkaline. It is mildly radioactive, making it suitable for external therapeutic use, per the Health Report on indications and contraindications (Article 4 of Law 3498/2006, Government Gazette 230/A/24.10.2006). Its chemical composition makes the water suitable for balneotherapy.

Development Proposal for the Potami Therapeutic Spring

Considering the natural sensitivity of the resource, as well as the protected zones that prohibit development within 1,000 meters of a designated therapeutic source, and based on research showing that 67.9% of Samos tourism stakeholders favor the creation of a hydrotherapy facility, an investment plan has been drafted. The plan proposes the creation of a first-class hydrotherapy complex in the Panaitsa Xirokampou area (formerly the Leprosy Hospital of Samos) within the Karlovasi region of West Samos Municipality.

Main Idea and Historical Background of the Plan

The Potami spring development plan includes transferring the therapeutic waters to the Panaitsa Xirokampou area, formerly the Leprosy Hospital, to renovate and repurpose it into a modern hydrotherapy center (sanatorium) and

wellness, spa, and rejuvenation center. The distance from the spring to the leprosy hospital area is 7,641 meters, with eight nearby hotels located between 2,460 and 5,268 meters from the spring.

Picture 3: View of the "Leprokomeio" area



Source: Archive of the Technical Service of the Municipality of Western Samos, date of download: 2018

The proposal includes modifying land use with new urban plans from the Ministry of Environment, Spatial Planning & Public Works (YPEXODE), transforming the leprosy hospital area from agricultural land to a recreation-tourism zone. This will allow the establishment of accommodations and wellness tourism facilities, supporting the development of health and spa tourism.

The Karlovassi Leprosy Hospital, owned by the Public Property Management Company (ETAD), is an emblematic building of the island's Hegemonic period with significant historical and emotional importance, awaiting restoration and repurposing for years. Once a place burdened by the suffering of leprosy patients, this site could be transformed into a state-of-the-art wellness and rejuvenation center—a sanatorium where visitors can find peace and healing through the use of therapeutic water.

The Investment Plan Concept

The feasibility study was conducted to explore the impact of wellness tourism development on Samos, with a focus on creating a thermal tourism center. The goal is to utilize the thermomineral waters of Potami, boost winter and summer tourism, and extend the tourist season. The facility would offer not only medicinal baths but also serve as a holistic retreat for physical and mental relaxation. The Karlovassi Thermal Tourism Center would differentiate itself

from other Greek springs—particularly in Ikaria, which attracts international clientele with exclusive therapeutic bath services—by offering a unique wellness experience focused on relaxation and rejuvenation, with options for other special interest and alternative forms of tourism.

The innovation lies in using therapeutic water for rejuvenation and well-being, incorporating dietary programs based on the Pythagorean diet and philosophy, with ingredients sourced from Samos' natural produce. Unique experiences with innovative beauty and wellness programs, including music therapy (featuring the Pythagorean monochord) and local herbs and aromatic plants, would stimulate the senses of urban dwellers and attract special interest visitors, such as senior tourists seeking relaxation and a sense of mystique. Samos would become a journey of the senses—a unique experience where visitors can rediscover their inner selves through different sights, sounds, smells, and touches.

Samos and the Blue Zones

According to data from ELSTAT, the aging index of Samos Island is significantly higher than the national average in Greece, attributed to the quality of life of the island's residents. The Samos prefecture, represented by the island of Ikaria, is officially classified among the Blue Zones of the planet. These are five areas identified by National Geographic explorer Dan Buettner, where notably high rates of longevity are observed. The secret to this longevity lies in a diet that is 95% plant-based, the consumption of pure, preservative-free wine, and herbal infusions containing beneficial phytochemicals. The calm lifestyle, social cohesion, the environment, and the unique culture, along with the adoption of healthy habits, demonstrate that the long-lived Ikarians show no signs of dementia or other chronic illnesses.

Diet, fasting, and exercise are factors associated with the Blue Zones. The term "Blue Zone" is a non-scientific designation for geographical areas with the lowest rates of chronic diseases and the highest life expectancy, home to some of the oldest people in the world. Researcher Dan Buettner and his team of demographers found that all Blue Zone areas share nine specific lifestyle habits known as the Power 9. These habits serve as guidelines for improving our health and well-being: move naturally without mechanical conveniences, find your life purpose, moderate stress, follow the 0% rule (eat until your stomach is 80% full early in the evening and then nothing for the rest of the day), maintain a plant-based diet (beans, fava, lentils), consume wine in moderation, belong to a community with shared interests, show love and cohesion to all family members, and cultivate deep friendships and relationships with healthy behaviors.

This significant announcement about longevity in Ikaria sparked an epidemiological study on the island, primarily aimed at investigating the unique demographic, social, environmental, and genetic characteristics that grant the residents of Ikaria the coveted privilege of longevity. Professor of Cardiology Christodoulos Stefanadis, Director of the Athens Heart Center, and cardiologist

Panagiota Pietri, Director of the Hypertension Unit at the Athens Heart Center, presented the results of the "IKARIA" study. The study revealed an increased adoption of the Mediterranean diet model, with a high consumption of olive oil (5-7 times/week), fruits (4-5 times/week), and vegetables (4-5 times/week), moderate fish consumption (2 times/week), and low meat consumption (1-2 times/week). Furthermore, the Mediterranean diet was associated with reduced uric acid levels, while fish consumption was linked to good kidney function and a decreased likelihood of experiencing depressive symptoms. Omega-3 fatty acids, found in foods like fish, have been noted for their antioxidant and anti-inflammatory properties, which could, to some extent, explain their beneficial effects on the cardiovascular system. The Mediterranean diet, which should also include coffee consumption, has beneficial effects on cardiovascular and overall health, promoting longevity.

Finally, the most striking finding about the island of longevity is that all the lifestyle and habits of the residents identified through the "IKARIA" study were highlighted nearly 400 years ago by an Archbishop. Joseph Georgirinis, Archbishop of Samos, in his book published in London in 1677, described the situation in the islands of Samos, Ikaria, Patmos, and Mount Athos after returning from Samos.

According to an article published on August 16, 2023, titled "Energetic Healing and Energetic Places in Greece as Areas of Good Energy," references are made to geomagnetic bridges and Ley lines that traverse the earth. These are alignments between various historical constructions, prehistoric sites, and prominent landmarks. Ley lines represent a concept that has gained significant attention due to their perceived secret and spiritual dimensions of the world. These energy lines are believed to act as conduits connecting sacred and important sites throughout the landscape of the Earth. The energy described at each location is subjective and lacks scientific documentation but reflects the perceptions of individuals who have visited these sites and felt a particular energetic force.

Among the places with intense energy, the island of Samos (26-A1, A2) has been recognized, encompassing isolated locations with properties related to fairy-tale-like places, evoking feelings of joy, sadness, meditation, contemplation, and contact with the divine.

Samos and Pythagorean Philosophy

Pythagoras of Samos (570-470 BC) was born on the island of Samos and is one of the foremost mathematicians, philosophers, and astrophysicists of Ancient Greece, renowned for the "Pythagorean Theorem," the globally recognized theorem in geometry that bears his name. Through mathematics, with numerical and geometric proofs, he created a complete system for the science of celestial bodies and was the first to use the word "Kosmos," meaning the order that governs the universe. He referred to the "music of the celestial spheres," which

describes the sounds produced by planets as they rotate. He discovered the numerical ratios of the octave and constructed the monochord.

The monochord is an ancient musical and scientific instrument, which is inextricably linked to the work of the ancient philosopher and music theorist Pythagoras, who used it to teach his students philosophy. In its simplest form, the monochord has a string stretched over an acoustic resonator (the main body of the instrument). The controlled alteration of pitch is based on a mathematical relationship. "All things are done by number," he used to say, believing that numbers express not only quantitative but also qualitative relationships and form the basis of his philosophical teachings. Thus, if we understand numerical and mathematical relationships, we will understand the structure of the universe. For Pythagoras, music plays an extremely important role. It enables the maintenance of the harmony of the soul through purification. Music acts on the soul as medicine does on the body. Health is a harmonious balance of the soul and body that must be maintained. The soul itself is a kind of music, the harmonic sum of the parts that constitute it. Therefore, music, as the medicine of the soul, acquires a moral and pedagogical mission.

Pythagoras was the first to discover the golden ratio, the ideal proportion that we now know exists everywhere in nature, architecture, and painting, and is related to the Fibonacci sequence (the sequence of numbers in which each number is equal to the sum of the two preceding ones: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89... and continues indefinitely).

He created a philosophical movement characterized by the qualitative evolution of individuals, the immortality of the soul, and the cycle of reincarnation of souls until the attainment of perfection. The Pythagorean exhortation, as known from the writings of Iamblichus (a biographer of Pythagoras), presents the principles of a balanced life with key characteristics of measure and harmony:

"You must not neglect your physical health, but maintain moderation in drinking, eating, and exercising. By moderation, I mean that which you will not regret. Learn to live a pure, simple life, and guard against doing those things that provoke envy. Do not waste aimlessly, as those who are ignorant of the good do. Nor should you deprive yourself, for the best is moderation in all things. Act in ways that will not harm you, and think before you act." Pythagoras applied the principle of measure in his diet, stating that "man is what he eats, drinks, and thinks."

He invented the Just Cup, applying the laws of physics—an ingenious cup, as we might call it today, a masterpiece of ancient Greek hydraulic technology but also a means of teaching. In Pythagoras's clever cup, there was a line that determined how full it should be filled. A single drop over that line would cause all the liquid inside the cup to spill out. In this way, Pythagoras wanted to teach his students moderation in wine consumption, self-restraint, and adherence to measure. He applied these principles to his diet, urging his students to refrain from rich and extravagant dinners. Exceeding measure, he said, is hubris, which

results in punishment, tithing. He established healthy eating as a prerequisite for the basic evolution and physical health of people.

Pythagoras taught that every kind of food and drink we consume produces a distinct effect, either poisonous or beneficial, not only for our physical health but also for our emotional and intellectual expressions, desires, and passions. He was the most renowned conscious vegetarian of antiquity, adopting one of the first recorded vegetarian diets, emphasizing in his speeches the inextricable connection between food, soul, body, and mind. Fruits, vegetables, grains, honey, nuts, olive oil, legumes, and dairy products are considered the foundation of the Pythagorean diet. Today, all these foods are recognized as essential for our body and are basic elements of the Mediterranean diet. They are rich in vitamins and strengthen the immune system, possess anti-aging properties, and contribute to longevity and vitality, serving as excellent sources of energy.

It is known that vegetarians in Europe, from ancient times until the establishment of the Vegetarian Society in 1847 and the Vegan Society in 1944, were called "Pythagoreans," and vegetarianism was referred to as "Pythagorean Diet." This is found in the book by the Italian doctor Antonio Cocchi, published in 1743 in Florence, titled "Del vitto Pitagorico per uso della medicina" (The Pythagorean Diet as Medicine), which was translated the same year into English in London as "The Pythagorean Diet of Vegetables Only" and into French in Geneva as "Du regime de vivre Pythagoricien."

Today, people's eating habits show significant discrepancies and differences depending on location, continent, cultural backgrounds, habits, and the availability or lack of goods. The industrialization of food production, the lack of time for daily meal preparation, long hours of work away from home, sedentary lifestyles, and the prevalence of ready-made meals have led to the consumption of many processed foods, resulting in obesity and the emergence of diseases.

In Greece, particularly in island areas, food represents sharing, hospitality, love, socialization, and often serves as the basis for establishing relationships and collaborations. Nutrition, together with the exercise of the mind and body, creates the conditions not only for physical but also for mental health, and consequently, quality of life.

Samos, the birthplace of Pythagoras, seeks to anticipate developments and highlight the importance of Pythagorean nutrition through the qualitative enhancement of agricultural crops and the exquisite quality of the local products of Samos. The efforts of those in art, spirit, and hospitality aim to seek new avenues of expression and creation in order to claim their place on the global map of gastronomic identity, which was first established by the philosopher, mathematician, musician, and astronomer Pythagoras.

Innovation & Wellness Programs

The Karlo Potami Thermal Spa was designed in the preserved building of the Leprosy Hospital, with the possibility of deviations of up to 20% in the

minimum dimensions of the spaces of the preserved building where this is required by the need to maintain the architecture of the spaces. The construction of the building has been made with natural materials such as wood and stones, while suitable materials have been used for the frames in wood imitation, and the roof was constructed with Byzantine tiles. The surrounding auxiliary buildings remain discreet in the space, and architecturally they have been clad with large mirrors so that there is no violent intervention in the relief of the surrounding area, which by itself carries intense emotional weight. Architecturally, there is a reflection of the natural landscape from the colors of the blue sky and sea combined with the earthy colors of nature under the bright light of the Aegean Sea.

Vision

The vision of the “Karlo Potami Thermal Spa Experience” is to offer, through innovation and differentiation, a global solution for treatment, spiritual awakening, and balance in the life of the modern, weary individual. It aims to become a unique destination for wellness and rejuvenation.

The “Karlo Potami Thermal Spa Experience” is designed to provide a unique life experience, a holistic program for the rejuvenation of the body, mind, and soul through the use of thermal water. It emphasizes comprehensive health and wellness care for the body, mind, and soul. The spa offers a therapeutic program based on the power of water and the Pythagorean system of sound vibration, featuring individualized body treatments inspired by ancient Greek traditions as well as therapeutic techniques from the East. Nutrition programs are based on the dietary values of Hippocrates, Pythagorean nutrition, products from the Samos region, and Omega-3 fatty acids abundant on the beautiful island of Samos, promising visitors a journey of relaxation, spiritual exploration, and healing.

Wellness and Rejuvenation Programs

Returning to ancient teachings, the “Karlo Potami Thermal Spa Experience” adopts techniques from great spiritual teachers in Japan, India, and Thailand to create a unique thermal wellness center with innovative therapeutic programs. Specialized staff and experienced personnel will offer medical and aesthetic treatments to help reduce the damage to the human body, providing the following services:

1. **Nutritional Packages Based on Pythagorean Nutrition:** This primarily vegetarian diet, supported by international scientific studies in nutrition and dietetics, provides a protective shield for the body, as it contains a multitude of ingredients, vitamins, and other chemical compounds with antioxidant properties. The Pythagorean diet includes a variety of fruits, vegetables, whole grains (such as brown rice, barley, oats, quinoa, etc.), legumes, nuts, tofu, seeds, herbs, and spices. These options can create delicious and healthy combinations. Alternative products with similar nutritional values are noted, such as chickpeas and

beans instead of meat and poultry, mushrooms and eggplants instead of eggs, tofu and chickpea flour, along with many other “smart” recipes as detailed in the well-known book by Margarita Ikariou titled “Pythagorean Nutrition: From Antiquity to the Modern Vegan Trend.” This book features 24 original vegan recipes by Executive Chef Evangelos Bilimpas, along with nutritional analyses by dietitian Panagiotis Varagiannis, M.Med.Sc.

2. **Massage:** The art of massage holds a significant place as a therapeutic method in Greek medicine. Anatripsis (meaning “to rub”) was developed by Hippocrates as a friction method to enhance circulation and eliminate pathogenic waste and toxins from the body. Using pure extra virgin olive oil mixed with pure essential oils from Greek herbs and flowers, the therapist performs a full-body massage, applying pressure to relax and "open" tight muscles and energy meridians. The massage concludes with a focus on the neck, head, and face, an area Hippocrates termed “release of tension” (especially the jaw, which tightens even when someone has negative thoughts).
3. **Hydromassage:** Hydromassage is a type of hydrotherapy and a thermotherapeutic method that offers significant healing benefits to the human body. It increases the temperature of body areas, and the soothing action of jets enhances lymphatic and blood circulation, aiding in the absorption of edema and bruising. It achieves muscle relaxation, boosts metabolism, assists in detoxification, and aids in treating rheumatic diseases and injuries. Additionally, hydromassage combats cellulite and localized fat, expands skin pores for deep cleansing, creates a sense of well-being and relaxation, and effectively reduces stress and anxiety while addressing insomnia and hyperactivity. At the Karlo Potami Thermal Spa, pools will operate with 100% thermal water, allowing visitors to enjoy both the luxurious environment and the benefits of thermal water. Individual large bathtubs will allow guests to enjoy warm thermal water alone or in combination with essential oils and salts. Individual baths in which water is jetted onto the body will provide a unique sensation of relaxation and well-being while simultaneously offering treatment from the properties of thermal water. The presence of Jacuzzis with thermal water will provide perfect relaxation and a unique sense of luxury.
4. **Meditation and Breathing Techniques (Yoga and Pranayama):** Meditation is a form of spiritual concentration achieved through deep relaxation, removing every thought and external stimulus from daily life, representing a unique experience and a necessity in our multifaceted lives. Meditation relates to calming a busy mind. The more one manages to quiet their thoughts through meditation, the more they feel a sense of true presence. The benefits of meditation through yoga techniques (from the word "yuj," meaning union) extend beyond stretching, strengthening,

and toning the body. This technique brings holistic health benefits, reaching all body systems and promoting a state of harmony, inner connection, mental calmness, and emotional stability. It represents a discipline that describes the union between the individual and the transcendent self through the use of the body and meditation. Pranayama is the control of breath. “Prana” refers to breath or bioenergy (vital energy) in the body, while “ayama” signifies expansion and control. Pranayama consists of a series of exercises aimed at bringing more oxygen to the blood and brain. It not only automates blood flow but also regulates the proper functioning of thoughts and desires. Pranayama aids in reducing various types of illnesses and is vital for our survival, representing one of the most important ways we can eliminate waste and toxins from our bodies. This disciplined breathing helps focus the mind, enabling us to achieve well-being and longevity.

5. **Sound Therapy:** As previously mentioned, the therapeutic role of music was significant for the Pythagorean philosophers in ancient Greece. Sound therapy synchronizes brain waves to achieve deep relaxation states and helps restore the normal vibration frequencies of our body cells. Sound vibrations have a profound impact on human functionality and influence our emotions like no other source of input or expression. Sound, as a form of vibration, is “heard” not only by our ears but also by our bones and every cell in our body. The gong is one of the most powerful sound therapy tools, as its vibrations, harmonic sounds, and frequencies synchronize our physical and spiritual bodies, transporting us through sound waves to the Theta waves of deep relaxation. On a physical level, the gong releases tension and blockages in the body. It stimulates a higher level of function for the glandular and nervous systems and improves circulation. The sound and frequencies of the gong develop in a spiral motion and connect with Pythagoras’ “Music of the Spheres” theory. The Karlo Potami Thermal Spa will provide a transformative acoustic experience of sacred and healing sounds in the enchanting seaside area of the former historic monument of the Leprosy Hospital of Karlovasi, through specially constructed and restored spaces of the former therapeutic facility.
6. **Monochord Table or Pythagorean Monochord Bed:** During the era of music therapy and wellness, sound massage is a well-known and widely used relaxation technique applied in various ways and combinations. The monochord table (or monochord bed or sound bed) is one of these methods of relaxation and healing. During the session, the visitor can listen to, feel, and experience powerful frequencies of homophony, harmony, and octave (the distance of eight notes from a base, either ascending or descending) through the “sound” carpet, activating a deep resonance and internal healing response, allowing the body-mind-spirit to resonate at its optimal frequency. This vibrational therapy provides a

range of benefits that balance heart rate and blood pressure, increase circulation, reduce chronic muscle tension, activate moods and emotions, and effectively reduce stress.

Innovation - The Monochord Pythagorean Bed of Karlo Potami Thermal Spa

Construction and Features: The Pythagorean monochord bed will be made of eucalyptus wood. The oil extracted from the leaves of this tree is used in aromatherapy and is known for its calming and therapeutic properties against respiratory inflammation, as well as being used for coughs, sore throats, and asthma. Additionally, it soothes muscle tissue and clears the mind. One of the main benefits in furniture construction is its durability and strength. This dense and hard wood has a high degree of natural oils and resins that make it resistant to wear and insect attacks. As the demand for sustainable and high-quality materials continues to rise, eucalyptus wood proves to be a valuable resource as it offers many health benefits, while its subtle aroma has a calming and relaxing effect, making it a popular choice for saunas, steam baths, and wellness applications.

The shape of the monochord table or Pythagorean bed resembles the main body of a cello. The author's inspiration is based on the sensual and intimate rendition of the single album "Wicked Game" by American singer-guitarist Chris Isaak, presented by Croatian cellist Stjepan Hauser, known professionally as HAUSER, who officially states on his website: "My passion is to show the world the versatility of the cello." According to the author, the bow represents the healer who lovingly assists the visitor, who in turn is the main body of the musical instrument, in a harmoniously coordinated session aimed at healing and rejuvenation through the magical sounds of music.

The visitor lies gently on a slightly curved shell. Their body weight does not affect the tuning, as our Octave Monochord Table is designed so that the area of the Monochord is decoupled. The speaker is curved in two directions, as is customary with quality string instruments, promoting the fullness and resonance of the monochord. A whole range of accessories, particularly sound bowls, can accompany each session. This sound tapestry and the resonance produced in the body transmit a mystical feeling that quickly leads to a soothing state of relaxation.

Proposal 1: Design of Hydrotherapy Equipment

Wooden bed, monochord, soundboard, Pythagorean sound bed, dimensions 204 cm x 80 cm x 70 cm (height) in cello shape, with 30 strings in D in the middle and 30 bass in D on both sides.

Picture 4: Author design proposal with application of artificial intelligence tools (ChatGPT)



DALL·E 2024-09-22 17.36.44 - Therapy bed design inspired by a monochord soundboard, suitable for someone to lie down and relax. The bed retains its cello-like wooden shape

Proposal 2: Creation of Logo for Hydrotherapy Center "Karlo Potami Thermal Spa"

The creation of a logo for the thermal baths "Karlo Potami Thermal Spa, Samos Island, Greece" and the choice of colors was made as a sign of respect for the original desire of the people and members of the "Association of Karlo Vassos Thermal Spring." The ardent wish of the island's people for the utilization of the Thermal Spring of Karlovassi was expressed, according to sources and documents of the time, in the founding title (statute) of the organization in 1957, with the creation of an emblem, seal, and flag (a design proposal that remained lost on paper) for many years. The colors chosen are green, white, and blue. Green represents nature, white the sky, and blue the sea.

Our design proposal thus includes the green color, which represents the lush natural environment with the unique wetlands of Samos. The white color represents the clarity of the Greek sky, and the blue color represents the azure sea of the Aegean Sea. Additionally, elements such as water for healing, air for the scents of aromatic plants and flowers of Samos, and the music of the great philosopher Pythagoras graphically complete, in the form of nine (9) alternative options, the logo of our hydrotherapy center for advertising and marketing needs on social media.

Picture 5: Author logo design proposal with application of artificial intelligence tools (ChatGPT)



DALLE-E 2024-10-09 1354.53 ChatGPT

Benefits of Developing Thermalism and Wellness Tourism

The benefits to the economy of Samos from the utilization of the Thermal Spring can be summarized as follows: In the employment sector, it is estimated that 28 permanent positions will be created at the thermal center, along with about 50 positions at the resort's hotel, plus additional jobs in new infrastructures such as restaurants, cafés, retail shops, transportation, etc. In the field of research and science, there will be multiplicative benefits to the local community from the collaboration of the Thermal Center with the activities of the Pythagorean Academy of Sciences and Values, an International Center for Stress Science and Health Promotion. The Pythagorean Academy of Sciences and Values is an innovative project for the development of medical and educational tourism based in Karlovasi, Samos, successfully offering individual and group programs to the citizens and visitors of Samos. Scientific laboratories for measuring stress with all modern metrics of physical, psychological, social, and chronic stress through

the use of indicators (hair cortisol, etc.), biological age reversal programs, and memory enhancement could be more effectively combined with the application of wellness and rejuvenation treatments at the thermal center being established. However, the thermal waters are a gift from nature to humans, and thus the residents of the island should also be able to enjoy them free of charge. For this purpose, in its simplest form, a seaside area could be developed at the spring's outlet, allowing a quantity of thermal waters to flow and providing access to all who visit the area. Based on research, it is indisputable that Samos possesses an unexploited natural wealth, and the timing for the revision and adjustment of studies regarding the Thermal Spring is particularly significant, in order to implement the most effective investment plan that will lead to the development of thermalism and wellness tourism on the island of Samos.

Research Methodology

The research was conducted using a quantitative method, employing a questionnaire, numerical data, and statistical methods. The design of the structured questionnaire includes an introductory text and four parts:

- The first part presents the stakeholders represented by each respondent and examines their degree of optimism and satisfaction with the development of tourism in Samos.
- The second part attempts to evaluate the existing situation and conducts a S.W.O.T. analysis of the internal and external environment.
- The third part explores the prospects for the development of thermalism and wellness tourism on the island of Samos.
- The fourth part presents the demographic data of the respondents to gather useful information regarding the profile of participants in the research.

The types of questions included are both open-ended and closed-ended. The closed questions include tools for measuring opinions, scales, dichotomous questions, simple and multiple choice, and Likert-type scales.

- The distribution of the questionnaire was conducted online.
- The research was carried out between April 19, 2023, and May 26, 2023.
- The collection of observations was conducted through purposive sampling.

The sample was subjectively chosen and includes units that the researcher perceives as representative of the population.

- The sample size of the research was 106 participants.

Prospects for Developing Sustainable Tourism, Spa Tourism, and Wellness Tourism in Samos

Samos, an island with rich natural beauty, unique historical heritage, and thermal springs, has significant prospects for the development of sustainable

tourism, spa tourism, and wellness tourism, with multiplicative benefits for enhancing the local community. Wellness tourism is a rapidly growing sector worldwide, and Samos can benefit from this trend by showcasing its natural landscape and traditional heritage. The combination of natural thermal resources with comprehensive physical and mental rejuvenation programs can attract tourists seeking holistic health and relaxation experiences. The strategic utilization of the island's natural resources, combined with the implementation of best practices for sustainable development, can make it a magnet for tourists seeking rejuvenation and relaxation in harmony with the environment.

Prospects and Best Practices for Sustainable Tourism in Samos

- **Ecotourism:** Developing hiking and biking trails through the island's natural landscapes could attract tourists who love nature and wish to explore its ecosystems. The trails to Mount Kerkis and Mount Ambelos could become popular ecotourism destinations.
- **Agrotourism:** Promoting agrotourism, especially in the production of local products such as wine and honey, can contribute to economic development and the preservation of local traditions. The wineries of Samos, renowned for their sweet Samian wine, offer an authentic experience that combines culture and gastronomy.
- **Creating Infrastructure at Thermal Springs:** The utilization of thermal springs could enhance the visitor experience by attracting high-quality tourism.
- **Combination of Treatment and Recreation:** Establishing a comprehensive wellness center that includes thermal baths, spas, and rehabilitation programs could enhance the island's competitiveness in spa tourism.
- **Yoga and Meditation Programs:** The island's natural spaces, such as beaches and olive groves, can be utilized for wellness programs such as yoga, meditation, and relaxation therapies. Creating specialized facilities for alternative therapies, such as aromatherapy and holistic medicine, could attract high-end visitors.
- **Thalassotherapy:** Samos's geographical location, with its clear beaches and mineral-rich seawater, offers ideal conditions for developing thalassotherapy centers. Thalassotherapy, which uses seawater and seaweed, has been recognized as a method of rejuvenation and healing.

Given that the global spa tourism market is steadily growing, with the sector increasing by approximately 6-8% annually according to the Global Wellness Institute (GWI), tourists seeking spa treatments typically spend more per capita compared to leisure tourists, making spa tourism a high-value market for Samos's economy. The same applies to wellness tourism, which is also growing faster than general tourism. According to GWI, wellness travelers spend 53% more than the average tourist. Europe ranks first in the wellness tourism market,

with about 30% of the global market share. Samos, with its natural beauty and thermal springs, has the potential to capitalize on this emerging tourism trend by offering high-quality services combined with local tradition and sustainable practices.

Global demographic changes make it imperative to diversify the tourism product through the development of specific categories of activities such as senior tourism. Additionally, many travelers choose destinations that provide specialized health services, resulting in tourism businesses and destinations adapting their products, services, and infrastructures to meet the needs of niche travelers. Establishing a spa tourism center on the island of Samos will help rejuvenate the declining population, create incentives for the return of internal migrants to their homeland—people who were forced to emigrate for a better life—and will also motivate the creation of new jobs.

The spiritual and intellectual dimension of wellness, as well as how each person perceives the environment in which they live and operate, requires the preservation of the cultural identity of the destination to remain unique and attractive. Cultural management, according to Dr. Poulaki, should include both Capital Culture, which involves managing cultural identity as part of a broader cultural capital management, and Cultural Heritage management and conservation, which refers to the protection and preservation of elements from the past, in the present and future, relating to both tangible cultural heritage and intangible cultural heritage, such as myths, oral traditions, customs, and dance. Thus, the rational cultural management of local communities constitutes a responsibility in terms of sustainable development and its connection with all forms of tourism, specifically with the development of complementary forms of tourism, spa tourism, and wellness tourism in Samos.

Characteristics of the Potami Karlovasi Area Contributing to the Creation of a Thermal Center

- Natural environment
- Architectural landscape and cultural heritage monuments
- Protected areas and biodiversity
- Unexplored caves
- Restaurants capable of showcasing local products of high nutritional value and promoting local gastronomy

Activities Related to Quality of Life, Physical, Mental, and Social Health (Well-being)

- Caring for personal health with pleasure
- Experimenting with healthy habits, behaviors, and lifestyle
- Increasing individual capacities and decision-making regarding one's health, an activity related to quality of life, health, and well-being

- Recognizing the importance of physical, mental, and spiritual health

The stakeholders almost unanimously believe that the development of spa tourism and wellness tourism will contribute to shaping a quality tourism product with a range of activities that will attract visitors of similar caliber with higher per capita expenditure (95.3%).

The utilization of the Thermal Spring could take the form of:

- Hydrotherapy (67.9%)
- Spa facilities within hotel units (35.8%)
- Hotel Resort (13.2%)

The alternative forms of tourism that can be developed in the area of Western Samos include:

- Gastronomic Tourism
- Cultural Tourism
- Nature Tourism
- Conference Tourism
- Student Tourism
- Transit visitors from both domestic and foreign sources
- Accessible Tourism (for persons with disabilities)
- Religious Tourism

Unique Features of the Tourism Destination According to Stakeholders

- Aegean University and its international recognition
- The nature, environment, and biodiversity of the area
- The traditions and customs of the area
- The architectural landscape
- Its existence as a commercial center
- The night life of Western Samos
- Its role as an administrative center
- Activities and quality of life
- Cultural event center
- The arts and culture of the area and
- The multiculturalism of the Western Samos region

The prospect of creating a thermal center was evaluated as realistic.

Conclusion

In the 21st century, humanity faces various environmental, social, and economic problems. Sustainable development is an issue that concerns states,

businesses, and citizens alike. The need for coordination of various strategies and the implementation of best practices and decisions is a promising solution that requires collective effort and constructive cooperation. The primary goal is human-centered: the survival of humanity, rather than the reckless growth advocated by classical economics, for the simple reason that it imposes limitations.

Therefore, a fundamental prerequisite is the ability of a state, its people, and culture to adapt. However, beyond the capacity for adaptation, the pursuit of sustainable development largely requires innovation in terms of ideas, technology, actions, etc.

The island of Samos can serve as a journey of "well-being" through the utilization of the concept of Social Innovation, Creative Industry, and Social Entrepreneurship, following international experience and adopting alternative development methods through the growth of thermal tourism and wellness tourism in Samos.

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