Forest Therapy and Well-Being Tourism Literature Review – With Assessment of Potential for Slovenia

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In addition to the fact that in Slovenia we nurture sustainable development and are committed to enforcing the principles of endogenous policy, we are also increasingly striving for innovative development solutions. This opens up new opportunities for the development of forest well-being tourism and forest-therapy tourism. The research problem refers to the growing tourist use of socio-cultural forest values for therapeutic tourism purposes on the one hand and an insufficient amount of literature on the other. The aim of the paper is to present a literature review that defines the beneficial effects of the forest on humans, and also to connect these findings with a tourism practice activity. We highlighted the potential and importance of forest therapy tourism and forest well-being tourism. Based on the 29 relevant papers from the Scopus database and studied examples of good practices, we gave an assessment of the potential for the development of therapeutic forest tourism in Slovenia. Examples of good practice are given. Opinion on the applicability of the implementation of forest therapeutic tourism in Slovenia is included.

Keywords: forest therapy, forest tourism, well-being

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Introduction

During the last decade, new and innovative sustainable development solutions in the field of traditional as well as non-traditional tourist use of nature, especially the forest, have been created. Sensual pleasures in audible and visual perception of the forest as well as of wild bee honey and beeswax (Sanesi et al., 2010; Ohe et al., 2017; Ikei et al., 2015; Nilsson et al., 2011, p. 3) are considered to be traditional relaxing and leisure activities as well as beekeeping, hunting and photo-hunting, gathering fruits, herbaceous plants, mushrooms, and wild animals (Article 5 of the Zakon o gozdovih, 1993). On the other hand, new tourist forest practices have emerged, such as forest bathing, called shinrin-yoku. In Europe and the western world, it is a rather new tourist experience (but not in Japan and China) which has increased the number of forest tourist well-being products (Farkic et al., 2021). Forest selfness (Konu, 2015), reflexology, naturopathic elements (Marselle et al., 2021), etc., are considered to be non-traditional relaxing and leisure activities. They refer to physical, mental, and social well-being dimensions such as quality and performance of bodily functioning, both cognitive and emotional. A significant positive factor influencing the development of non-traditional tourist and recreational forest use is also the rise of the green consumption movement (Collier et al., 2004).

Non-traditional relaxing and leisure activities are rapidly growing, and, in some places, they have even become a trend, such as restorative trips into areas rich in nature, which have become a leading wellness trend (Global Wellness Summit, 2019). Furthermore, spending time in green space is suggested as an important adjunct therapy to clinical therapies (Koselka et al., 2019). At the same time, researchers and service providers have focused on the valuation of the

tourist use of forests and the challenges posed by the increased extent of tourist activities in the forest along with sustainable and multi-purpose forest management, and tourism has finally been defined as a specific type of destination (Cvikl, 2020). A greater understanding of the therapeutic potential of profound use of nature can contribute to the reduction of all sorts of modern diseases such as respiratory diseases, psychosomatic diseases, mental illnesses, cardiovascular diseases, lifestyle disorders, oncological diseases, neurological diseases and some orthopedic diseases, and preventively strengthens human physical and mental health (Schuh & Immich, 2019). There have been many beneficial effects of biodiversity on human health, such as reducing harm (e.g. provision of medicines, decreasing exposure to air and noise pollution), restoring capacities (e.g. attention restoration, stress reduction) and building capacities (e.g. promoting physical activity, transcendent experiences) (Marselle et al., 2021). As a result, new and innovative sustainable development solutions in the field of traditional as well as non-traditional tourist use of the forest have emerged. It is claimed on the Forest-based Sector Technology Platform (2020) that the added value from new markets for non-wood forest goods such as mushrooms, berries, and clean water as well as services such as recreation, tourism, and climate change mitigation has increased tenfold. Non-wood forest products include food, decorative and ornamental plants, other plant products, extracts, dyes, raw materials for medicines, aromatic products, meat of wild forest animals, wild honey and beeswax, tanned hides, and trophies. The market value of non-wood products in Europe is estimated at € 2.3 billion and the value of social, ecological and biosphere services at € 619 million (Ministerial Conference on the Protection of Forests in Europe, 2015, p. 26).

This shift has been initiated by significant development documents (Ministerial Conference on the Protection of Forests in Europe, 2015; Food and Agriculture Organizations of the United Nations, 2015; Millennium Ecosystem Assessment, 2005, 8). They indicate the importance of sustainable development and management of natural resources which, in addition to economic indicators, also take into account other indicators such as environmental, social and climate. Furthermore, recent development documents drafted by some institutions and countries (European Commission, n.d.; The World Bank, 2016; Ministerial Conference on the Protection of Forests in Europe, 2015; GoS, 2014) encourage development of non-wood forest products, innovative solutions (European Commission, n.d.), strengthening the multifunction value of forests from the aspect of economic and social benefits and ask managers to apply more up-to-date methods of forest management in the sense of exploiting all forest ecosystem services. Last but not least, there have been some big changes in the economic sector, especially in the tourism industry, due to restrictions caused by the COVID-19 pandemic. Turnšek et al. (2020) also find that the COVID-19 lockdown has changed Slovenian tourists' perceptions. They suggest that the recovery of tourism should focus on domestic tourists and on local attractions. These changes are not only current but should also be taken into account in development plans as the effects of global change will require a transformation of sustainable tourism business (Gössling et al., 2020).

On the other hand, due to restricted travelling conditions since 2020, destination management has been striving for the transformation of the activity. A regional approach has become more important, activities have been redirected from distant destinations to domestic, often underestimated, destinations. To this, we can add the finding that transformations take place not only in terms of activities but also in terms of the perception of residents (Juvan et al., 2021). Destination organisations and tourism providers should investigate which aspects of tourism lead to higher levels of contentment and enjoyment of hosts. Satisfied and happy residents may become an important destination attribute. Entrepreneurship has created completely new and innovative market approaches on the supply as well as on the demand side (Brouder, 2020, p. 486). This is also reflected in the increased tourist use of forests, as in the last 18 months public use of forests has increased substantially. On the one hand, spending time in the forest is a counterbalance to tiresome and fast everyday work and on the other as escapism, as a result of the epidemiologic measures. Forests pro-

vide a passive as well as active experience, and give the feeling of being connected with ourselves and with the nature around us. Those changes are not only momentary but also have to be taken into account in development plans as the effects of global changes will require sustainable tourism activities to be transformed (Gössling et al., 2020).

Forest well-being tourism and forest therapy tourism belongs to these new tourist activities, posing challenges to researchers during last five years. They are both based on innovative use of those forest attributes which have healing and beneficial effects on people: the non-wood potential of forest products, and on social and cultural resources, provided by ecosystem services. Some examples of good practice concerning the potential for the development of forest therapy and well-being tourism in Slovenia have been given. On the basis of the results obtained and the review of literature, we provide some avenues for the development of this particular form of tourism based on forest bathing.

Forest Therapy Tourism and Well-Being Tourism

Over the past ten years, researchers in various fields of expertise, such as environmentalists, geographers, psychologists, and public health professionals, have addressed in depth the beneficial effects of forests on humans (Marselle et al., 2021). Nevertheless, very few articles have been published on the topic of therapeutic or well-being forest tourism. At first, the researchers studied nature as a unique attribute, which represents 25% of the whole well-being experience (Konu et al., 2011), but later on, they started to think about what aspect of nature makes it so special and gives added value to tourists as a well-being destination, and mention the wholesomeness of forest berries and the health effects of exercising in forest areas (Konu et al., 2011). On the other hand, many researchers from the medical field started to study forests from the therapeutic point of view. A major natural resource and tourist capital source for the development of forest therapy and well-being tourism are phytoncides. They are also called natural antibiotics or air vitamins. During their evolution, trees have developed unique chemical defence systems which are based on advanced functional molecules. Therefore, they are extremely rich in bioactive, protective substances, which are found in antioxidants, anticanceroid substances and oestrogens, which have an extremely positive affect on the human immune system and mental well-being. They include bioactive compounds, found in trees, and which contain flavonoids, lignans, stilbenes, terpenoids, phyitosterols, fatty acids and vitamins. Bioactive compounds, obtained from wood, are used as additives or independently in the pharmaceutical and food industry; such products, derived from wood, are considered non-wood products (Nilsson et al., 2011, p. 7). Researchers discovered that forests are therapeutic and relieve numerous symptoms of respiratory diseases; psychosomatic, mental, and cardiovascular illnesses; disorders connected with lifestyle; oncological, neurological and some orthopaedic diseases; and have a preventive function of strengthening physical and mental health (Schuh & Immich, 2019). Li et al. (2007) was the first to prove the positive and healing effects of the forest on people by medically conducted physiological and psychological research.

The reason why forest therapeutic tourism and the well-being forest type of tourism have developed is because of relaxation in the forest as a respite from various stress factors. It is a relatively new tourist activity, although therapeutic tourist activity has been a well-established practice in the last 30 years. Some countries, with Japan and China being among the first (Chen & Nakama, 2013), and also Sweden (Nilsson et al., 2011), promote public health in the forest in addition to forest tourist activities. Konu defined forest well-being tourism in 2015, and six years later forest therapy tourism was defined by Ohe et al. (2017), and is becoming trendy.

Forest therapy tourism originates from Japan, emerging when the providers of tourist activities included forest therapy. It is focused mainly on preventive medicine, and unlike well-being forest activities, it is based on medically conducted research and well-founded evidence. It is a profitable tourist activity, focused mainly on relaxation effects, with the emphasis mostly on relaxation activities rather than healing (Ohe et al., 2017; Ochiai, Ikei, Song, Kobayashi, Miura et al., 2015; Ochiai, Ikei, Song, Kobayashi, Takamatsu et

al., 2015). Forest therapy programmes include walking in the forest, anti-stress exercises which stimulate all the senses, visualisation and other psychological techniques, music therapy, chromotherapy, climate therapy, heliotherapy, aromatherapy, eating organic food, art therapies and workshops, massage techniques and various other activities which bring us closer to nature, culture, and the tradition of the forest where forest therapies are provided.

Examples of Good Practice

In accordance with the World Health Organisation (WHO),[1] health is regarded as complete physical, mental, and social well-being and not only absence of illness or helplessness. Consequently, a genuine relationship with nature has to be established for a healthy life (Mlakar Močilnik & Pirnat, 2010, p. 180). Japan offers a relatively new tradition of maintaining personal health and well-being, the so-called 'forest bath' (or *shinrin-yoku*), a type of forest relaxation theory, combined with recreation (Li, 2010; Konu, 2015, p. 6). It belongs to tourist products of well-being on the basis of forest. This theory explains how natural environments can help people renew exhausted capacities for focusing, mutual flexibility and merging (Nilsson et al., 2011, p. 9) and to eliminate or mitigate psychosomatic illnesses and mental stress. The forest is the first among green natural environments where people can relax most easily as connection with the forest increases the level of psychological well-being (PWB).

The Medical Spa Association of Serbia[2] offers a product in well-being tourism, developed recently, called forest hamam. It is practiced in the form of workshops conducted in protected forest areas. The author attended one of those workshops in Serbia (Belgrade) on 24 and 25 May 2016.[3] It was conducted by Amos M. Clifford, the founder and director of the Renovation Process Centre in California. He is a psychotherapist with 40 years' experience in connecting people with nature. In Finland, Sweden and Norway the forest is included in the regular school curriculum. In Sweden a network of therapeutic gardens has been developed over a long period of time (Nilsson et al., 2011, p. 3). A similar practice is also implemented at the Faculty of Forest Industry in Belgrade where students do a three-day practical work on the mountain meadow Goč at Kraljevo in order to learn about the protection of trees and strengthening humanity as a value (personal communication, June 1, 2016).

Forest therapy and well-being tourism has also been developing in the institutional sense. In 2007 the International Association for studying the effects of forest on human health was founded within the international organisation IUFRO, followed by the International Organisation for Forest (INFOM), founded in 2011. In the field of forest medicine, the International Society of Nature and Forest Medicine,[4] and International Society of Forest Therapy (ISFT),[5] have been founded. Within the programme, Public Health Ludwig-Maximilians-Universität from Munich opened a department for medical climatology, medical spa medicine and prevention, and also founded a Competency Centre for forest medicine and therapy in the natural environment.[6] Forest therapy and forest bathing are offered as forest tourist products, and certain forest areas also as forest health resorts. For example, in the north of Germany in the coastal beech forest Heringsdorf, the first certified European forest, offering the programmes of forest medicine, was opened in 2016. The situation in Korea is similar. In 2021 the first healing forest for children in Europe[7] was opened due to the fact that in Germany more than 30% of children, who spend too much time in the digitalised world, suffer from anthropogenic sleeping disorders, which has resulted in completely different clinical images of children. Therapeutic forest activities which have already been carried out include naturopathic elements such as water immersion (e.g. Kneipp therapy) and climatotherapy (climatic terrain cure, heliotherapy, fresh-air rest cure) to enhance the health benefits

[1] https://www.who.int/.

[2] https://mspaasrbije.wordpress.com/.

[3] https://www.youtube.com/watch?v=CHkj-FlusNQ.

[4] https://www.infom.org/aboutus/introduction.html.

[5] https://www.natureandforesttherapy.org/.

[6] https://www.komp-wald-natur.de/.

[7] https://www.heilwald-heringsdorf.de/en/Children-s-Healing-Forest.

(Stier-Jarmer et al., 2021, p. 2), forest mindness mindfulness and nutritional therapy (p. 29).

We can also include atmospheric healing (Rikli & Zolam, 1895; Schuh & Immich, 2019, p. 52) in therapeutic forest activities, as well as colour and music forest therapy (Vukin & Isailović, 2018) and the so-called boulder forest therapy within the Rehabilitation Center for the Treatment of Non-Chemical Addictions, which is currently still in the project phase (Lukovac, 2020). All of the above can be considered as examples of forest therapeutic tourism activities.

In Slovenia, there have been or were also some tourist practices which offer(ed) forest-oriented therapeutic tourist products and services. Climate healing and strengthening of the body with natural attributes, which took place in forests for tourist-healing purposes, was started in the 19th century. In 1854, Arnold Rikli (born in 1823, died in 1906) developed the first wellness spa for strengthening of health and healing illnesses with the help of forest, air, water and sun. In 1857 he wrote a book *Aufruf an die kranke Menschheit an Körper und Geist, nach den Gesetzen der Natur-Heillehre zu genesen, oder leicht faßliche Darstellung der Natur.* He founded and directed a Natural Healing Centre in Bled in Slovenia for helio-hydrotherapy climate healing in the heart of forests and other natural characteristics of the Gorenjska region. The tourist forest product called forest selfness has received a lot of international attention in the last few years, including the award Snovalec 2014 as the most innovative tourist idea; it is among the first to apply an innovative tourist approach in forests in the field of well-being tourism in Slovenia.[8] The first presentation of the project abroad was at the conference of the Japan Society for Science Policy and Research Management in Kusatsu, Japan in October 2014.

The fact is that Slovenia has 99.2% or 1,237.40 million hectares of forest area (measuring a total of 1,184, 526 hectares of forest) accessible for recreational purposes and for the use of public benefit (Ministerial Conference on the Protection of Forests in Europe, 2015, p. 311). Of this, only 2.2% or 27,900 hectares have been originally designated and managed for recreational and leisure purposes. Slovenian forests provide a fairly good production capacity, which is also systematically recorded, while there is no recorded data on annual tourist visits in the entire tourist and recreational forest area in Slovenia. There are 96 forest learning trails registered in Slovenia, according to The Slovenia Forest Service, which performs public forestry service in all Slovenian forests of which 16 are directly included in the tourist offer. Two European footpaths (E6 and E7) run through Slovenian forests. Within the register of immovable cultural heritage by type of unit, Slovenia also has 226 units of registered cultural landscapes, 228 units of garden-architectural heritage and 23 units of historical landscapes within the register of immovable cultural heritage. By type of heritage, there are 217 units of registered immovable cultural heritage of parks and gardens and 318 registered cultural landscapes.[9]

Methods

The research problem refers to the growing tourist use of socio-cultural forest values for therapeutic tourism purposes in practice on the one hand, and to the insufficient amount of literature that would link therapeutic forest practices with forest therapeutic tourism on the other. Despite the fact that many articles have already been published on the topic of the physiological and psychological effects of forest baths or forest therapy, we find that very few of them are related to the tourism industry, although most of the findings point to the development of such leisure activities based on the perception and enjoyment of the natural resources of the forest. That is why we decided to create a literature review related to forest therapy or forest well-being effects with connection to tourism activity.

We anticipated that forest therapy and the practice of forest bathing are justifiably associated with tourism due to the growing trend. To this end, we first presented the definition of forest tourism, forest therapeutic tourism and well-being forest tourism. For this purpose, we looked for the literature that first defines the beneficial effects of the forest on humans, and also the main literature dealing with healing and benefi-

[8] https://www.gozdni-selfness.si/en/home/

[9] http://www.zgs.si/eng/homepage/index.html

cial effects of the forest on people in connection with tourism practice activity. The study protocol for the selection of literature was designed to present some relevant findings from the field of medical research proving the healing effects of the forest on humans. In the first place, we wanted to show the connection between medical studies of forest bathing, and then connect them with tourist activity. In order to be able to connect the beneficial and healing effects that are obtained through forest bathing, we also presented some of the contributions that were among the first to actually recognise their tourist potential.

Systematic review protocol was based on the following steps. The first step was to formulate a research problem and define research objectives. The research problem refers to the absence of literature dealing with forest therapy in connection with tourism activity. Secondly, the relevant literature and search strategy are identified through the Scopus database, which is also used in several relevant reviewed papers, and presented in results (Stier-Jarmer et al., 2021; Doimo et al., 2020; Grilli & Sacchelli, 2020; Hansen et al., 2017). Two other databases were also used for searching relevant articles at the beginning: Web of Science and ScienceDirect. However, due to a large number of irrelevant hits, we finally focused on Scopus hits as the most relevant ones. The review period from 1998 to 2021 is covered.

By using the Scopus database, current literature on forest therapy tourism and forest well-being tourism has been reviewed. First, we entered keywords relevant to our research area: forest 'and' therapy 'and' tourism and obtained 11 documents and 4 secondary documents. Then we entered the keywords: forest 'and' wellbeing 'and' tourism and received 12 scores and 5 secondary documents. 16 articles from the Scopus database were searched manually and 1 article from 2021 was found in Annals of Tourism Research Empirical Insights. We focused on contributions highlighting the positive psychological and physiological effects of the forest and the forest atmosphere on human health. Within these, we further searched those articles where findings are related to forest therapy or forest well-being effects with tourism activity.

All together 49 paper abstracts from obtained hits were screened. After abstract screening, study data were consolidated and extracted in order to obtain three types of papers. The search identified and selected 29 relevant papers. We divided them into three different tables. In Table 1, review articles are presented. Table 2 presents contributions with medical findings of psychological and physiological effects on human well-being. Table 3 provides an overview of contributions where forest therapy or forest well-being effects are related to tourism activity. Information about the author, year of publication, the examined parameter and main findings are given in each table. The connection of forest therapy with tourism and/or forest well-being with tourism potential is given.

For the basic forest therapy tourism papers criterion selection, we followed the definition given by Ohe et al. (2017) and were looking only for tourist activities with forest therapy included. We also followed the definition given by Konu (2015) about well-being forest tourism activities.

Ohe et al. (2017, p. 323) defined forest-therapy tourism as one of the emerging tourism activities. Forest-therapy tourism originates from Japan, and it was created with the emergence of the providers of tourist activities in combination with forest therapy. Forest therapy programmes are based on medically guided research and substantiated evidence and therefore should be accompanied by implemented protocols to confirm the effects of forest bathing. Forest-based well-being tourism, according to Konu (2015, p. 6), can be defined as based on the forests as the core resource. It takes place in or near a forest environment. The aim of forest therapy tourism is to develop a range of well-being tourism products highlighting the special characteristics of forests and focusing on how to use natural resources for well-being purposes. *Shinrin-yoku* is the term originally created in Japan and it represents one of their traditional forest relaxation practices. Literally translated, it means 'forest dive' or 'diving into the forest atmosphere.' It is a good example of using the socio-cultural values of the forest for tourism and relaxation purposes.

The selection criteria for particular papers mentioned below is the connection between medical and well-being findings and the shinrin-yoku method with

forest tourist activity, especially therapy tourism and well-being tourism. Therefore, the first article is placed chronologically in 2007, when the connection between forest bathing and the beneficial effects on human psychophysical well-being began. There is a huge amount of literature on the healing effect of nature (not just the forest) on human public/environmental health, but Lee was the first to prove these effects based on shinrin-yoku practice. This information is important because shinrin-yoku is the basis on which international centres of restorative and therapeutic forest practices in the Western world have developed since then (they have existed in Japan and China for much longer). Those criteria were chosen because shinrin-yoku practice is the link which stimulated Konu in 2015 and Ohe et al. in 2017 to connect these practices with new tourism products and point out the potential of the forest as a destination for therapeutic and well-being forest tourist activities and the tourist use of non-timber forest products in general. It means that we were looking for papers based on medically conducted research, with measuring of the effects of forest and the natural environment on the human immune system. As a result, 29 relevant papers were reviewed and presented. It includes information on the author, year of publication, the examined parameter of effect, main findings, and the connection of individual research with forest therapy tourism and/or forest well-being tourism.

Results

The results of browsing the Scopus database show that contributions where forest therapy is linked to tourism are derived from different subject areas, such as Forestry, Tourism, Leisure and Hospitality Management, Public Health, Social Science, Medicine, Environmental and Occupational Health, General Arts and Humanities, Nature and Landscape Conservation, General Environmental Science and Physical Therapy, Sports Therapy and Rehabilitation. The results of 29 papers are given in Table 1, Table 2, and Table 3. 7 papers represent review papers (Stier-Jarmer et al., 2021; Roviello et al., 2021; Andersen et al., 2021; Doimo et al., 2020; Rajoo et al., 2020; Yau & Loke, 2020; Hansen et al., 2017). Medically conducted research with psychological and physiological responses after a forest therapy programme was carried out in many papers, but we decided to present the most relevant 9 (Peterfalvi et al., 2021; Grilli & Sacchelli, 2020; Bielinis et al., 2019; Schuh & Immich, 2019; Korpela et al., 2017; Ochiai, Ikei, Song, Kobayashi, Miura et al., 2015; Ochiai, Ikei, Song, Kobayashi, Takamatsu et al., 2015; Li et al., 2009; Li et al., 2007). 13 papers promote forest therapy or forest well-being tourism as new promising and dynamic types of forest tourism (Buckley et al., 2021; Wajchman-Świtalska et al., 2021; Zhao & An, 2021; Gűrbey, 2020; Sacchelli et al., 2020; Wu et al., 2019; Dzhabarova et al., 2018; Huang & Xu, 2018; Farkic et al., 2021; Ohe et al., 2017; Cvikl & Vodeb, 2016; Konu, 2015; Konu et al., 2011). In all the cases concerned, forest bathing or forest therapy is included.

Papers dealing with a systematic review of physical activity as well as forest-bathing on the immune systems and general human well-being are given in Table 1.

However, some limitations have been underlined. Small sample sizes and skewed distributions in the age and/or gender of study participants were found. Secondly, some of the results of physiological tests were not statistically significant (Andersen et al., 2021). Also, it is insufficiently researched whether a particular forest or tree species composition or environmental feature, such as microclimate, have specific benefits. There is a lack of consideration for the synergic effects of the numerous features composing a forest ecosystem that are simultaneously experienced by all the five senses. Also, the timing and duration of forest bathings were different, as well as the weather. A limitation of the research is also the fact that a systematic review of papers did not take place in several databases. We found that a huge number of hits were obtained when we browsed the posts on the phrase: forest 'and' therapeutic 'and' 'tourism' and on the phrase: forest 'and' well-being 'and' 'tourism,' but not many relevant ones. We also found that the relevant hits in both databases were identical to those obtained in the Scopus database.

Papers dealing with medically conducted research are given in Table 2. The healing powers of forests were first researched by Li et al. (2007). It is primarily due to

Table 1 Papers with Review of Systematic Review of Physical Activity as Well as Forest-Bathing on the Immune System's and General Human Well-being with Some Healing and Beneficial Effects of Forest on People

Paper	Parameter examined	Main finding	Connection
Stier-Jarmer et al. (2021) 'The Psychological and Physical Effects of Forests on Human Health: A Systematic Review of Systematic Reviews and Meta-Analyses'	Systematic review of systematic reviews was conducted in eight databases to identify, summarise, and synthesise the available evidence of systematic reviews (SRS) and meta-analyses (MAS) on the preventive and therapeutic psychological and physical effects of forest-based interventions.	Authors argue that forest-based interventions have a positive impact on the cardiovascular system; some immunological and/or inflammatory parameters; and mental health in the areas of stress, depression, anxiety, and negative emotions.	Forest therapy; forest bathing; shinrin-yoku; forest medicine.
Roviello et al. (2021) 'Forest-Bathing and Physical Activity as Weapons Against COVID-19: A Review'	The effects of particular immune-strengthening activities performed in forest areas have been reviewed.	Physical exercise in forests, as well as 'forest-bathing,' has strengthening effects on the immune system's ability to fight disease, especially as it relates to COVID-19.	Some activities typical of outdoor tourism are recommended. Aerobic and resistance training like respiratory muscle gentle strengthening exercises, such as tai chi and yoga have been suggested as stress-reducing and immune-boosting exercises that should be practised in forests for individuals who are in good health, for the prevention of COVID-19.
Andersen et al. (2021) 'Nature Exposure and Its Effects on Immune System Functioning: A Systematic Review'	Systematic review of papers by measurements of physiological and psychological effects of forest on people, conducted in the period from 1995 to 2018.	General anti-inflammatory effects of volatile substances of plants in the selected forest ecosystem on people and strengthening of immune system have been proved.	Some of the research concerned was conducted in the forest with a Japanese forest bath or shinrin yoku, identified as an anti-stress forest product.

Continued on the next page

human exposure to phytoncides, a volatile substance emitted by plants. Measurements were mostly focused on stress markers. Results were obtained from physiological parameters that measured systolic and diastolic blood pressure, pulse rate, heart rate and heart rate variability, salivary or serum cortisol levels, cardiovascular and metabolic parameters. The psychological measurements included different parameters such as mood state, depression, anxiety, negative emotions, anxiety level, happiness level and quality of life. For example, physiological measurements included measuring systolic blood pressure (Peterfalvi et al., 2021), stress hormones, most often cortisol (Ochiai, Ikei, Song, Kobayashi, Miura et al., 2015; Ochiai, Ikei, Song, Kobayashi, Takamatsu et al., 2015), and pulse and movement of natural killer (NK) cell activity (Li et al., 2007). The most common subject of psychological testing was measuring feelings, for example tension, anxiety, depression, anger, stress, hostility, tiredness, and confusion. Most often, medically conducted research measured the healing and beneficial effects of the volatile substances, phytoncides, on the human immune system and general well-being.

Healing and beneficial effects of forest bathing and

Table 1 Continued from the previous page

Paper	Parameter examined	Main finding	Connection
Doimo et al. (2020) 'Forest and Wellbeing: Bridging Medical and Forest Research for Effective Forest-Based Initiatives'	An overview of existing literature on the emerging topic of human well-being with forest contact.	Summary of results of the literature analysis showed that all papers have measured more than one health parameter. The most mentioned effects are psychological (82%), while physiological effects (77.4%) and social effects (10.7%) are followed. Medicine and forestry discipline are included in coding criteria, but tourist industry is not.	Findings provide a preliminary framework of users' well-being in connection with forest contact.
Rajoo et al. (2020) 'The Physiological and Psychosocial Effects of Forest Therapy: A Systematic Review'	Systematic review of literature of forest therapy physiological and psychosocial effects (2010–2020), such as cortisol level, systolic blood pressure, diastolic blood pressure and pulse rates.	Based on the research data forest therapy plays an important role in preventive medicine and stress management for all age groups.	The aim of the research is not only to evaluate the psychosocial and physiological effects but also to encourage healthcare professionals and the general public to fully utilise forest therapy as a form of preventive medicine.
Yau & Loke (2020) 'Effects of Forest Bathing on Pre-Hypertensive and Hypertensive Adults: A Review of the Literature'	To explore the physiologically and psychologically therapeutic benefits of forest bathing on adults suffering from pre-hypertension or hypertension.	The natural atmosphere of forests is beneficial to human health. Exposure to forest-derived phytoncides could increase NK cell activity and improve overall immunity function.	
Hansen et al. (2017) 'Shinrin-yoku (Forest Bathing) and Nature Therapy: A State-of-the-Art Review'	A thorough review of papers that evaluated the use of shinrin-yoku for various populations in diverse settings.	Nature therapy as a health-promotion method and potential universal health model is implicated for the reduction of reported modern-day 'stress-state' and 'technostress.'	Shinrin-yoku as a practice to decrease undue stress and potential burnout.

socio-cultural values of forests in connection with forest therapy tourism or well-being tourism is shown in Table 3.

To sum up, the findings show that on the basis of the healing and beneficial attributes of forests, forest therapy tourism and well-being forest tourism are developing rapidly (Zhao & An, 2021). Forest tourism (Cvikl, 2020; Chen et al., 2019; Chen & Nakama, 2013, p. 2), forest well-being tourism (Konu, 2015) and forest therapy tourism (Ohe et al., 2017) are defined. Other tourist forest products, such as therapeutic forest trails (Gűrbey, 2020; Ohe et al., 2017), forest selfness and mindfulness (Farkic et al., 2021; Cvikl & Vodeb, 2016), are developing extremely fast all around the world, even for disabled individuals (Wajchman-Świtalska et al., 2021).

Table 2 Positive Physiological and Psychological Effects of Forest Climate on General Well-Being and on the Immune System

Paper	Parameter examined	Main finding	Connection
Peterfalvi et al. (2021) 'Forest Bathing Always Makes Sense: Blood Pressure-Lowering and Immune System-Balancing Effects in Late Spring and Winter in Central Europe'	Systolic blood pressure.	Forest baths, conducted in late spring in May and in winter in January, showed statistically significant decrease of systolic blood pressure.	Forest bathing; forest walking.
Grilli & Sacchelli (2020) 'Health Benefits Derived from Forest: A Review'	Activities ('walk') and performances ('concentration') are investigated in general terms ('subject') or for specific age and status ('student').		It appears that the tourism tendency of forest bathing, i.e. shinrin-yoku, is emphasised from the results, particularly for 'Japan.'
Bielinis et al. (2019) 'The Effect of Recreation in a Snow-Covered Forest Environment on the Psychological Well-being of Young Adults: Randomized Controlled Study'	The young adults were exposed to a snow-covered environment.	Forest recreation, during winter and with snow cover, continues to have a significant influence on the psychological relaxation of young females.	Findings contribute to seasonality elimination. Such therapy practice recreation could be successfully conducted during winter in a forest with snow cover, and there should still be a positive effect on psychological parameters.
Schuh & Immich (2019) *Waldtherapie: Das Potenzial des Waldes für Ihre Gesundheit*	Examination of healing and beneficial effects of forest climate on people.	Definition of healing and therapeutic forests and their effects on human health.	Dealing with forest bathing and shinrin yoku as a global trend.
Korpela et al. (2017) 'Enhancing Wellbeing with Psychological Tasks along Forest Trails'	Significant *F*-test values in the change in restorative experiences, overall satisfaction with the trail, willingness to recommend the trail to friends, and satisfaction with the number of signposts.	Experience on a well-being theme trail showed positive and statistically significant changes in two measurements: restorative change and willingness to recommend the trail to friends.	Well-being theme trails in different countries.

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Forest therapy is recognised as a mental health activity with beneficial effects on human well-being and a powerful tourism attraction and economic opportunity (Buckley et al., 2021). For example, in Japan as many as 59 forest therapeutic bases in each of the provinces and 6 therapeutic trails have been registered since the foundation of the Forest Therapy Programme in 2004. China founded 500 forest therapeutic bases in the period from 2015 to 2020 (Wu et al., 2019; Gűrbey, 2020; Ohe et al., 2017, p. 326). South Korea, China, the USA, Finland, Sweden, Northern Ireland, England, Slovenia, Croatia, and Montenegro have also started developing forest therapeutic procedures and medical tourism.

Findings

Based on the findings of the literature review and in relation to what is already happening in Slove-

Table 2 Continued from the previous page

Paper	Parameter examined	Main finding	Connection
Ochiai, Ikei, Song, Kobayashi, Miura et al. (2015) 'Physiological and Psychological Effects of a Forest Therapy Program on Middle-Aged Females'	Physiological and psychological parameters (pulse, level of cortisol in saliva and psychological indexes) were measured one day before the forest therapy and on the day of the forest therapy.	Forest therapy resulted in significant decrease of pulse rate, decrease of the level of cortisol in saliva, increase of positive feelings, and decrease of negative feelings.	Guided and controlled programme of forest anti-stress therapy.
Ochiai, Ikei, Song, Kobayashi, Takamatsu et al. (2015) 'Physiological and Psychological Effects of Forest Therapy on Middle-Aged Males with High-Normal Blood Pressure'	Physiological and psychological parameters (pulse, level of cortisol in saliva and psychological indexes) were measured one day before the forest therapy and on the day of the forest therapy.	Forest therapy resulted in decreased systolic and diastolic blood pressure (BP), adrenaline in urine and serum cortisol ($p < 0.05$). Similarly, negative parameters, such as tension/anxiety, confusion, anger/hostility, and mood swings improved.	Guided and controlled programme of forest anti-stress therapy.
Li et al. (2009) 'Effect of Phytoncide from Trees on Human Natural Killer Cell Function'	The effect of inhaling various phytoncides – essential oils of trees – on human immune function, namely on enhanced human natural killer (NK) cell activity.	The examined physiological test proved significant increase of natural killer (NK) cell activity, but without statistically significant results. The psychological test concerned (POMS) showed decrease in tension, anxiety, depression, anger, hostility, tiredness, and confusion. Only statistically significant were the results of the factor of tiredness.	Forest therapy tourism and forest well-being tourism deal with stress factors in order to decrease their effects on human spiritual well-being (131 citations).
Li et al. (2007) 'Forest Bathing Enhances Human Natural Killer Activity and Expression of Anti-Cancer Proteins	Effects of the forest bath conducted on natural killer (NK) cell activity.	Report, researching direct effect of forest baths on human activity. A physiological test, which showed substantial increase of natural killer (NK) cell activity and positive effect of forest bathing on the human immune system, was conducted for the first time.	Forest bath as therapeutic activity (161 citations).

nia, we can conclude that forest therapy could provide several benefits for the Slovenian tourism industry. Biodiversity-health framework references with an environmental and socio-cultural context are needed (Marselle et al., 2021) such as registered cultural landscapes and garden-architectural heritage units. Rich Slovenian forests provide all of the above, as they have exceptional geomorphological, atmospheric, and climatic conditions. On those bases nature therapy, nature-based rehabilitation and nature-based treat-

Table 3 Healing and Beneficial Effects of Forest Bathing in Connection with Forest Therapy Tourism or Well-being Tourism

Paper	Parameter examined	Main finding	Connection
Buckley et al. (2021) 'Mental Health Key to Tourism Infrastructure in China's New Megapark'	Conflicts between road and roadless-access tourism in the Sanjiangyuan National Park, Qinghai, which offers jing hua xin ling to domestic tourists from eastern-seaboard cities.	In Western nations currently, there is widespread recent recognition of the value of nature for mental health and of digital detoxification. These factors create the health services value of parks and the resulting new opportunity for nature tourism.	Mental health benefits provide a powerful tourism attraction, and hence economic opportunity, for the region around the park.
Farkic et al. (2021) 'Forest Bathing as a Mindful Tourism Practice'	Sensory ethnography was used to study the ways in which the senses were engaged, activated and deepened through guided forest bathing walks, but also what the experience meant in the broader context of the participants' well-being.	Findings suggest how forest practices that induce well-being states exhibit latent potential as touristic experiences.	The processes of awareness, attentiveness, focus and reflection that were distilled in the analysis have ultimately led to conceptualise the Japanese practice of forest bathing as a mindful tourism practice.
Wajchman-Świtalska et al. (2021) 'Recreation and Therapy in Urban Forests – The Potential Use of Sensory Garden Solutions'	15 gardens and one sensory path have been studied. The inventory was carried out on the basis of the features considered important in spatial orientation by blind and partially sighted people.	The results showed that the solutions used were only partly adequate for the needs of selected users. We found neither tactile walking surface indicators (e.g. communication lines and terrain), spatial models, nor applications in mobile devices.	Forest therapy leisure activity for disabled individuals.
Zhao & An (2021) 'Behavioural Intention of Forest Therapy Tourism in China: Based on Health Belief Model and the Theory of Planned Behaviour'	The study aimed at verifying a new behavioural attitude pattern after the peak of the epidemic on the basis of the health belief model (HBM).	This study expands the health belief model (HBM) with the variable of attitude. Practical implications are offered for the government suffering from the epidemic and for the tourism industry.	The study provides the benefits of forest therapy in tourism.

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ment programmes can be developed (Schuh & Immich, 2019). It is evident from findings that socialising in the forest not only increases natural killer (NK) cell activity, decreases tension, anxiety, depression, anger, hostility, tiredness, confusion, systolic and diastolic blood pressure (Peterfalvi et al., 2021; Ochiai, Ikei, Song, Kobayashi, Miura et al., 2015; Ochiai, Ikei, Song, Kobayashi, Takamatsu et al., 2015) etc, but also that forest habitat along with forest climate is one of the basic attributes for the development of forest therapeutic and well-being tourism. Furthermore, exercise in forests has strengthening effects on the immune system's ability to fight against viral diseases, especially as it relates to COVID-19 (Roviello et al., 2021). Significant improvements in depressive symptoms were also found in almost all the primary studies (Stier-Jarmer et

Table 3 Continued from the previous page

Paper	Parameter examined	Main finding	Connection
Gürbey (2020) *New Trends in Ecotourism: Forest Bathing/Forest Therapy in the World and Turkey*	Therapeutic forest centres and trails in the world.	Forest therapy provides benefits and beneficial effects on physiological and psychological health, protects forest biodiversity and offers diversification of economic effects arising from tourist and recreational activities.	Development of therapeutic forest trails and forest centres in the world.
Sacchelli et al. (2020) 'Neuroscience Application for the Analysis of Cultural Ecosystem Services Related to Stress Relief in Forest'	In order to analyse stress relief, the study applies a Restoration Outcome Scale (ROS) questionnaire and a neuroscientific technique grounded on electroencephalographic (EEG) measurement.	Results show different outcomes for coniferous and broadleaf forests. The self-assessed stress levels before and after exposure to different types of forest show that a forest with a high density of conifers and a low density of broadleaves seems to be the proper combination for stress recovery.	A categorisation of forest for health promotion and disease prevention, mindfulness and forest bathing, outdoor activities and tourism is needed.
Wu et al. (2019) 'Assessing and Mapping Forest Landscape Quality in China'	Assessing and mapping forest landscape quality in order to establish an evaluation index system.	In 2018, the number of tourists to forest parks exceeded 1.6 billion in China, accounting for nearly 30% of the domestic tourist market.	Forest tourism has become the most dynamic and promising sector in China.
Dzhabarova et al. (2018) 'The medical-recreational and balneotherapeutic regions of the Krasnoyarsk Territory'	Systematisation of the available data characterising the balneotherapeutic and recreational conditions of the Krasnoyarsk Territory were studied.	Comprehensive assessment of the landscape and climatic conditions of the medical-recreational regions of the southern part of the Krasnoyarsk Territory with favourable bioclimatic conditions and unique therapeutic resources.	Balneotherapeutic regions represent great potential for the development of climatic spa and health resort facilities.
Huang & Xu (2018) 'Therapeutic Landscapes and Longevity: Wellness Tourism in Bama'	Conducted interviews concerning the therapeutic landscape theory.	The results provide a multi-scale interpretation of wellness tourism to explore how wellness tourists achieve health in healing places.	Conceptualisation and interpretation of the therapeutic landscape within wellness tourism.

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al., 2021). To sum up, the physiological and psychological relaxation effects of forest therapy and well-being tourism are verified. According to Ohe et al. (2017) and Li et al. (2007), these effects last three to five days.

Regardless of the identified advantages, certain negative aspects and findings have to be mentioned as well. The limitations mentioned in the results should be also taken into account, especially regarding the methodological approach and the protocol of further researches. Although positive findings were reported

Table 3 Continued from the previous page

Paper	Parameter examined	Main finding	Connection
Ohe et al. (2017) 'Evaluating the Relaxation Effects of Emerging Forest-Therapy Tourism: A Multidisciplinary Approach'	A multidisciplinary collaborative approach was used to conduct medical research of physiological and psychological relaxation effects of forest-therapy tourism.	The results verified physiological and psychological relaxation effects, which lasted from three to five days after forest therapy.	Forest therapy tourism definition.
Cvikl &Vodeb (2016) 'The Potential of Non-Wood Products for Development of Forest Tourism'	Use of forest socio-cultural values as natural tourism capital for the development of forest tourism.	Social and cultural benefits of forest tourism. New green tourist product – Forest Selfness.	Forest selfness as a tourist product.
Konu (2015) 'Developing a Forest-Based Wellbeing Tourism Product together with Customers – An Ethnographic Approach'	Case study of involving consumers in NDS – new service development in tourism.	Developing a forest-based well-being tourism product.	Forest well-being tourism definition.
Konu et al. (2011) 'Wellbeing Tourism in Finland: Finland as a Competitive Wellbeing Tourism Destination'	Destination product features of the Nordic countries and Nordic Well-being concept.	Definition of Nordic Well-being concept.	Forest Nordic Well-being activity.

in almost all studies, in some cases the results of physiological tests were not statistically significant, sample sizes were too small and the range of exposure time to the forest atmosphere was very different. In summary, forest-based interventions are beneficial to the cardiovascular system, immune system, and mental health in adults and to atopic dermatitis with children. To be able to develop climatic spa and health resort facilities (Dzhabarova et al., 2018), categorisation of forest for health promotion as well as conceptualisation and interpretation of the therapeutic landscape within wellness tourism (Huang & Xu, 2018) is needed (Sacchelli et al., 2020).

The potential for service providers and the tourism industry in Slovenia is huge as none of the abovementioned types of forest tourism activity is developed or systemically monitored at the institutional level. If a destination wants to systematically develop this specific type of tourism, it has to make an assessment of the potential healing forest attributes and determine the sufficient interest of providers to certify forests and develop a compatible destination offer. In addition, in order to start forest therapy tourism practice implementation in Slovenia, it is necessary to assure planning and development of marketing activities, such as segmentation of target groups of tourists. Service providers can then develop products for a new innovative type of tourism and highlight the special characteristics and comparative advantages of this specific type of tourism. As can be seen from the findings, the use of forest socio-cultural values as the natural tourism capital for the development of forest tourism is highly applicative. With the development orientation towards therapeutic forest tourism, which is sustainable and based on ecoremediation principles, Slovenia can gain a completely new competitive advantage in the tourism market.

Appropriate funding for further research under the auspices of the state institution is needed in order to reach an understanding of relations between biodiversity and health (Marselle et al., 2021).

Conclusion

Based on the results of the review of literature, the healing and beneficial effects of the forest do affect people in a positive and healthy way. Also, the connection between forest therapy and well-being activity and tourism is evident. Medically conducted

researches usually measured the positive physiological (i.e. included measuring systolic blood pressure, stress hormones, most often cortisol, etc.) and psychological (i.e. measuring feelings, for example, tension, anxiety, depression, anger, stress, hostility, tiredness, and confusion) effects of the forest climate on general well-being and on the immune system. However, better-designed studies with appropriate parameters are needed. Sufficient exposure to the forest healing atmosphere, terpene concentration, microbial diversity, biodiversity, noise or quiet (psychoacoustics), light conditions, forest composition, and climatic factors should be included in studies.

Slovenia provides the most suitable environment for the development of forest therapy and well-being tourism with anti-stress practices. With many registered cultural landscapes and garden-architectural heritage units for recreational and leisure purposes, Slovenia can develop a unique competitive advantage over other tourist destinations and countries whose attractiveness relies on natural resources. Therefore, it would also be reasonable to develop forest therapeutic tourism in Slovenia on the above-mentioned basis. Practitioners should be involved in research because they are already implementing some good practices around the world, but it seems they are not aware that they could also be applied internationally. From the results in Table 1, it is evident that there is a tourist forest therapeutic potential, which can be said to have healing, therapeutic, or beneficial properties.

The problem, associated with the practice of forest therapeutic tourism, refers to capturing empirical knowledge and horizontal integration in the fields of different professions such as health, tourism, environment, and social sciences with research groups from different disciplines and professions, such as forestry, psychology, and landscaping. It can be concluded that forest therapy tourism it is a type of tourism which is in demand and that forest-therapeutic and well-being tourism have a great development potential. The facilitated opening of forest therapeutic bases in Japan and China and Korea reflects high demand for therapeutic forest tourist products that could also be applied in Slovenian forests. By orienting towards the development of forest therapy and well-being tourism, Slovenia could achieve extreme advantages in comparison with other green outdoor destinations. By developing forest tourist infrastructure and competency centres for the verification of forest health tourism, Slovenia could become a leading destination for forest therapy tourism in the world. Last but not least, it is obligatory to underline, in order to preserve the integrity of the ecosystem services, that forest managers must make tourism development and management an important part of their work.

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