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Bioeconomy-based tourism: A new concept responding to the support of bioeconomy

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Tourism has experienced dynamic development in recent decades and has become one of the fastest growing industries; however, the COVID-19 pandemic caused unprecedented changes and declines in revenues and tourism trends. With the strong support of bioeconomy (BE) this period brings a great opportunity to transform the entire tourism sector into a model responding to that concept. The main aim of this article is to prove whether and under what possible conditions tourism is a part of the concept of BE. Selected European Union (EU) countries have been chosen so that every geographical area is represented. This analysis was therefore carried out for a total of 12 states and the EU as a whole (13 entities). Of these 13 entities, seven have their own BE strategy and six do not. According to the level of emphasis on the field of tourism in the examined documents, we divided the states into three categories. Although the selected and analysed countries mention tourism in their BE strategies with various emphasis and approach, the inclusion of tourism under this concept is evident. Bioeconomy-based tourism has been designed as a new concept that considers the approach of BE. It focuses above all on a sustainable level of tourism in the connection of economic and environmental pillars, where the main emphasis is placed on the effective use of natural resources and maximum effort not to waste these resources, as well as to support economic growth.

KEYWORDS

sustainability, bioeconomy, sustainable development, sustainable tourism, strategy, bioeconomy-based tourism

1 Introduction

Tourism has experienced dynamic development in recent decades and has become one of the fastest growing industries (Jurkus et al., 2022; 2011; UNWTO, 2022a); however, in 2020 and 2021 there was a significant halt in the growth trend in connection with the spread of COVID-19 and the travel restrictions of various countries, (Anguera-Torrell et al., 2021; Harchandani and Shome, 2021; Lagos, Poulaki, Lambrou, 2021). During these two years, tourism experienced unprecedented changes that had an impact on the economic stability of a number of countries (Duro et al., 2021; Zhong et al., 2021). There was a sharp drop in the number of international arrivals and revenues in countries; however, in 2021 international tourism grew by 4%, but still remained 72% below pre-pandemic levels (UNWTO, 2022b). Tourism is therefore a leading export item and an important job creator. The United Nation's World Tourism Organization (UNWTO) promotes the great need for responsible tourism growth (UNWTO, 2022a) because the tourism industry is now the core of global development policies, especially in rural areas, where creating jobs and opportunities drive economic growth and preserve nature and culture heritage.

The current idea of economic growth and sustainable development in modern societies is strongly influenced by the current concept of bioeconomy (BE). This is a concept which is considered by many authors (De Besi and McCormick, 2015; Mougnot and Doussoulin, 2022) as an economic path leading to the achievement of an optimal relationship between sustainable development and economic profit which responds to current global challenges (climate change, lack of natural resources, post COVID-19 pandemic era, etc.). It is broadly defined as a transition from a traditional economy based on the use of non-renewable fossil resources (El-Chichakli et al., 2016; Böcher et al., 2020) with the aim of maximizing economic profit to an economy using renewable and biological resources leading to sustainable development in many areas of society (Ramcilovic-Suominen and Pülzl, 2018; Pyka et al., 2022). From this point of view, BE supports biological diversity, uses originally unprocessed residues (e.g. from forest biomass) (Moreira et al., 2021; Kumar Sarangi et al., 2022), ensures rural development and comprehensive sustainability (Wilke, Schlaile, Urmetzler, 2021). Some authors (e.g., Stegmann et al., 2020; Holden, 2022, etc.) also mention circular bioeconomy as an expanding concept and its relationship to the original BE concept (Viaggi and Zavalloni, 2021). According to Kershaw et al. (2021), circular bioeconomy gains importance by connecting circular economy with the concept of BE and thus contributes significantly to sustainability (by linking social, environmental, and economic aspects).

There is no unified definition of the concept of BE (Issa et al., 2019), although a large number of authors are devoted to this topic (e.g. Böcher et al., 2020; Toppinen, et al., 2020; D'Amato, et al., 2017; Bugge et al., 2016, etc.). However, there is expert consensus that BE includes all types of industry based on the use of natural resources (agriculture, forestry, fishing, etc.) and related industries such as the timber industry, construction sector, food industry, paper industry, chemical industry, biotechnology, and bioenergy. (Birner, 2017; D'Amato et al., 2017; EC, 2012; Kylvilahti et al., 2020; Ronzon et al., 2017; EC, 2018), including industries leading to sustainable rural development (Johnson and Altman, 2014; Halonen et al., 2022). At least from some countries' perspective (e.g. Italy), an important aspect of BE is the emphasis on education and technological progress (Korhonen et al., 2021) and decision-making based on scientific knowledge (Borge and Bröring, 2020; Falcone et al., 2020). The European Union (EU) as a whole has taken a clear approach to the BE concept since 2012 (EC, 2012; Patermann and Aguilar, 2018) and, with the subsequent amendment in 2018, the relevant strategy including the tools for its implementation is part of EU policies (Ludvig, Zivojinovic, Hujala, 2019).

The field of tourism is sometimes considered as a part of the broad concepts of BE (Marin-Pantelescu et al., 2019; Fritsche et al., 2020). Although it never occupies a fundamental position in this concept, it has a potential to bring opportunities in the future (Luhás et al., 2021). According to Ronzon et al. (2022), the tourism sector can be considered a BE service called "output-based". The appropriate affiliation to the BE services is not judged on the basis of input (as, for example, in agriculture), but on the basis of the outputs it brings to society (Iost et al., 2019). Regarding services within BE, according to Marsden (2013), these are economic activities that use natural resources in a more sustainable and ecologically efficient way.

The connection between tourism and BE has not yet been published in the scientific literature in detail and in depth. Baicu et al. (2019) mention the example of sustainable hospitality industry.

According to them it can be closely linked with bioeconomy concept by applying practices such as: minimizing water and energy consumption, reducing pollution, using renewable and local resources and products, reducing solid waste, etc. They argue that corporate social responsibility practices of tourism companies could play an important role in achieving the goals of sustainable development and bioeconomy. Also Baros and Dávid (2007) claim, that especially large hotels tend to be encouraging to support bioeconomy concepts more than small ones due to market pressure to adopt green approach. The majority of authors include tourism among other concepts, e.g. the concept of forest-based BE (Hurmekoski et al., 2019; Lovrić et al., 2021; Luhás et al., 2021) while some national concepts of tourism connect this industry with rural development (e.g. Czech or Romanian). Some authors mention this area separately (e.g. Ngammuangtueng et al., 2020), but there are very few. The field of tourism also appears in the literature in connection with the regional concept of BE (e.g. Maugeri et al., 2017; Przezbórska-Skobiej, 2017), i.e. the development of a specific regional area. In this context, it becomes more important as the opportunities for tourism are based on the assumptions of the given region. There are also some authors (e.g. Cingiz et al., 2021) who do not include services like tourism into BE as it is not directly linked *via* the use of biomass.

During the COVID pandemic, the tourism sector was one of the most affected (Nicola et al., 2020; Galanakis et al., 2022). During this period, traditional tourism was banned to varying degrees, so people looked for other permitted ways of spending their free time and getting to know nature and their surroundings (Rousseau and Deschacht, 2020; Jarský et al., 2022). In addition, during the pandemic, thanks to the outflow of people from the cities, the issue of rural development became very widespread. This period brings with it a great opportunity to transform the entire tourism sector into a model supporting BE (Prideaux et al., 2020).

Analysing tourism, it is worth mentioning that over the last few years a number of specific forms of tourism have emerged. As the number of participants in the tourism industry grew, so did the need for its diversification. New forms of tourism and their characteristics are still appearing; however, a clear definition is not always possible to use, so the characteristics often intertwine and are not uniformly grasped across countries (Frechtling and Hara, 2016; Korstanje, 2021).

In relation to nature and its resources, the four basic approaches of tourism are the most used, namely: sustainable tourism; ecotourism; natural tourism; and rural tourism. The big phenomenon in particular in recent years is sustainable tourism, which is occurring in many strategies of organizations (Sadiki, 2012; UNWTO, 2022c; FAO, 2022). According to Dávid, 2011, sustainable tourism is characterized by ecological endurance, is economically beneficial, and ethically and socially acceptable in relation to the local inhabitants. Sustainable tourism should provide possibilities for natural resource restoration and the local population should benefit from tourism. Sustainable tourism is the way tourism should be developed and, under certain conditions, can include most forms of tourism. So, it is a kind of concept and an umbrella term. There is also an effort to unify the approach to sustainable tourism development. The Global Sustainable Tourism Council (GSTC) serves as the global organization to set standards for sustainability in tourism. Four main pillars are considered: sustainable management; socioeconomic impact; cultural impact; and environmental impact

(e.g., reduction of pollution and consumption of natural resources as well as efforts to conserve biodiversity and landscape) (GSTC, 2022).

Another umbrella term for tourism activities which take place in countryside and are connected with nature is rural tourism. Rural tourism has appeared in literature since the end of the 19th century (Perales, 2002); however, its characteristics and definitions also vary. According to UNWTO, rural tourism is considered as a special type of tourism in which the tourist's main purpose for travelling is related to nature-based activities, rural lifestyle or culture, agriculture, angling, or sightseeing. Nature-based activities take place in a rural area which is characterized by three main factors: low population density; landscape and land-use dominated by forestry and agriculture; and traditional social structure and lifestyle (UNWTO, 2022d).

However, in scientific literature a universal definition of rural tourism also does not exist (Pina and Delfa, 2005; de Sousa and Kastenholz, 2015); rural tourism is therefore a complex term which embraces multifaced activities and its definition differs across countries and regions (Pina and Delfa, 2005; Rosalina et al., 2021). Rural tourism is rather a set of categories and types of tourism and is not a concrete form of tourism (Dávid, 2011). Overall it satisfies tourists who seek recovery in the nature environment (Özdemir and Yildiz, 2020) or for psychological and physical wellbeing activities (Zhu and Deng, 2020; Wen et al., 2021).

Sometimes the term nature (based) tourism also appears separately without rural tourism. Nature tourism is among the fastest growing kinds of tourism (Dávid et al., 2007) and involves excursions to national parks and wilderness areas where high biodiversity is concentrated (Christ et al., 2003; Kuenzi and McNeely, 2008). Nature tourism has arisen in the tourism industry as a result of mass tourism becoming unsustainable in some locations. Destination managements realized that models of responsibility and sustainability have to be adopted (Quintana, 2017). Stakeholders are not only landowners, managers of rural areas or nature protection organizations, but also resource users (forestry, agriculture, fisheries, hunting) (Fredman and Tyrväinen, 2010). Nature tourism includes tourists whose main purpose for travelling is to stay in a natural environment. Ecotourism, sailing, nature photography, cross-country skiing, hiking, climbing, animal and plant watching are also components of nature tourism (Dávid, 2011) as well as fishing and hunting tourism (Dávid et al., 2007). Nature tourism may also include adventure tourism, which is additionally characterized by physical risks. Some authors (Abraham et al., 2010; Korpela et al., 2014; Oh et al., 2017) within adventure or outdoor tourism focus on the positive effects of forests and green areas on the health and wellbeing of humans during their recreation. Calina et al. (2018) deals with ecological principles of nature tourism which should be stimulated by forestry funds to contribute to the rural tourism sector, as well as encourage biodiversity conservation *via* sustainable forms of nature-based tourism. In connection with the development of nature (based) tourism, it is necessary to consider the rights of landowners (Øian and Skogen, 2015). Hence, support for tourism from forest owners is a very important factor to be considered while preparing tourism strategies.

Ecotourism arose as a strategy for reconciling wildlife conservation within sustainable development (Meletis and Campbell, 2007) and many definitions of ecotourism exist in the literature (Weaver, 1998; Kiss, 2004; Lee and Jan, 2018). Dávid, (2011) consider ecotourism as form with four main features: small number of visitors; sustainable control; based on nature values; and an educational part. Responsible tourism is another term used in

sustainable tourism (Spenceley, 2008), where tourists must act non-destructively regarding nature. According to the World Conservation Union (IUCN), ecotourism is characterized as environmentally responsible travel and visits to natural areas with the aim of enjoying nature and promoting conservation (Ceballos-Lascuráin, 1996). The promotion of ecotourism has mainly occurred in developing countries (Weaver, 1998; Campbell 1999); however, it has become a trend in many developed countries as well (Moons et al., 2020). Participants in ecotourism should have low visitor impact on the natural environment and local population. The International Ecotourism Society (TIES) refers to ecotourism as “*responsible travel to natural areas that conserves the environment and improves the wellbeing of local people*” (TIES, 2022). Alongside the name ecotourism, so-called green tourism also appears. Green tourism (Law, Delacy, McGrath, 2017) refers to small-scale tourism that involves travelling into natural areas with minimal impact on the environment. Green tourism is used interchangeably with concepts such as nature tourism, ecotourism, responsible tourism, and rural tourism. Additionally, international governments and organizations have defined the concept in line with the notion of sustainable tourism, which covers dimensions other than only environmental protection.

Next to these main concepts, a number of special forms of tourism, which are determined by the main motivation for travel, can be included into the ones mentioned above (e.g., agritourism, hunting and fishing tourism, sport, medical and health tourism, but also urban, spa, cultural, and shopping tourism). In order to fulfil the concept of tourism sustainability, it is necessary to consider the specific tourism services provided (Vargova et al., 2021). The main services include accommodation, catering, and transport (Chun, 2017). These specific services and their means of provision must be incorporated into accepted tourism concepts to achieve the result.

1.2 Main objective of the article and research questions

In the context of the BE concept containing the requirement for sustainable development and the question of tourism as an important generator of economic wealth, the main aim of this article is to prove whether and under what possible conditions tourism is part of the concept of BE in various countries. The aim is also to find out whether it is possible to design a new tourism concept based on BE based on the obtained results. For the research, the selected 12 EU countries and EU as an umbrella institution were chosen.

Based on the above, several research questions (RQ) were posed.

RQ1: Is the field of tourism anchored in the concept of bioeconomy of the European Union (EU) states?

RQ2: Is the emphasis on tourism similar in the bioeconomy perspectives of the EU states (if tourism is anchored in them)?

RQ3: Is it possible to identify the parameters under which tourism can be considered as a part of bioeconomy?

On the basis of a literature review, we present the presupposition that the field of tourism will not be equally represented in bio-economic concepts. At the same time, we expect that, in order to

TABLE 1 Studied documents in selected countries and EU regions and their tourism position.

Country	Region represented	Bioeconomy strategy	Another strategy containing information on bio-economic areas	Share of travel and tourism's total contribution to GDP (%)	TTCI overall score/ rank out of 117 countries
EU	Not applicable	A Sustainable Bioeconomy for Europe: Strengthening the connection between economy, society and the environment: updated bioeconomy strategy (EC, 2018)	EU Bioeconomy Strategy Progress Report (EC, 2022b)	6,6	-
Finland	Northern Europe	The Finnish Bioeconomy Strategy (FG, 2022)	-	5,5	4,7/18
Denmark	Northern Europe	-	Denmark's Integrated National Energy and Climate Plan (DMoCUE, 2019)	4,6	4,7/17
Lithuania	Northern Europe	-	Lithuanian Bioeconomy Development Feasibility Study (ASU, 2017)	3,3	4,3/42
Latvia	Northern Europe	Latvian Bioeconomy Strategy 2030 (LUoLSaT, 2016)	-	4,3	4,2/48
Italy	Southern Europe	BIT II Bioeconomy in Italy (BIT II, 2019)	-	9,1	4,9/10
Spain	Southern Europe	Estrategia española de bioeconomía (MEIC, 2012)	-	8,5	5,2/3
Slovenia	Southern Europe	-	Roadmap towards the circular economy in Slovenia (MoESP, 2018)	7,7	4,3/39
			Integrated National Energy and Climate Plan for Slovenia (EC, 2020)		
France	Western Europe	A bioeconomy strategy for France (MASA, 2017)	The national strategy for the use of biomass (MEET, 2018)	6,5	5,1/4
Germany	Western Europe	National Bioeconomy Strategy (FG, 2020)	Forest Strategy 2020 (FMoFAaCP, 2011)	6,4	5,1/5
Romania	Eastern Europe	-	Integrated National Energy and Climate Change Plan for 2021–2030 (RG, 2020)	3,8	4,1/53
			Romanian Strategy for Competitiveness 2014–2020 (ME, 2016)		
			Strategy for the development of the agri-food sector on average- and long-term 2020–2030 (MADR, 2015)		
Czechia	Eastern Europe	-	The concept of the bioeconomy in Czechia from the perspective of the MoA for 2019–2024 (MoA, 2019)	3,6	4,5/26
Slovakia	Eastern Europe	-	Economic policy strategies of the Slovak Republic until 2030 (MoESR, 2018)	3,8	4,1/56
			PROPOSAL FOR AN INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN (SMOE, 2018)		
			GREENER SLOVAKIA—THE STRATEGY OF THE ENVIRONMENTAL POLICY OF THE SLOVAK REPUBLIC UNTIL 2030 (MŽPSR, 2019)		

answer RQ3, it will be necessary to find identical parameters of individual forms of tourism that will appear in concepts of BE.

With the answers to the above research questions, we can predict what emphasis individual states will place on the development of tourism linked to BE.

2 Material and methods

Several methodological approaches were used in this article. For the purposes of this research, we have identified the concept of BE in selected member states of the EU as the main area of investigation

(Table 1). The reason for focusing on the EU is that the European Commission came up with a clear vision of BE as one of the main trends of its own development. Each of the member states also adopted the given concept to a certain extent and adapted it to their conditions based on the geography of the given country (Issa et al., 2019).

The selection of countries was chosen in such a way that every geographic region of the EU (according to WorldAtlas) is always represented by at least one country. In geographic regions, countries have similar conditions and prerequisites (mainly geographical shape, similar structure of industry, etc.) for grasping BE. Table 1 provides an overview of the states included in the analysis.

In the first phase, we analysed in detail strategic documents related to the field of BE in selected countries. The selection of suitable documents was made with respect to the principles of systematic sampling (Krippendorff, 2019). The analysed documents represent official documents related to the studied topic and were listed on the official governmental sources of specific states. For this reason, it is possible to understand all the strategies and documents mentioned as a source of data for assessing the understanding of the field of tourism in the concept of BE. EU member states have approached this concept in different ways (EC, 2022a)—some have adopted their own strategy (e.g., Spain, Italy, Germany), others have not yet done so (Czechia, Poland, Croatia, Belgium, etc.). Such states have the topic of BE mentioned in several documents of different strategic importance (see Table 1). Due to the absence of a separate strategy in some states, a qualitative content analysis was used which identifies and searches latent concepts and topics related to BE (Mayring, 2014; Tight, 2017).

For countries in which a BE strategy is being developed, these documents were considered essential. For countries where such a strategy has not been developed, the official documents closest to this topic were evaluated. Figure 1 shows the approach to the bioeconomy in our selected countries. Specifically, the analysis was based on the following documents listed in Table 1 below.

In the analysis the share of tourism in GDP was compared for each country. Data were obtained from Statista for the year of 2021. Also, overall scores from the Competitive Travel and Tourism Index (TTCI) from 2021 were also considered. This report includes 117 countries from all over the world and countries are compared according to 17 main pillars. Overall scores range from 1 to 7 where 1 = worst and 7 = best. Specifically, the tourism prioritization indicator was also compared for countries. Prioritization of Travel and Tourism measures the extent to which the government and investors actively promote and invest in the development of the travel and tourism sector. The extent to which the government prioritizes the travel and tourism sector has an important impact on travel and tourism development. This pillar also includes measures of government spending and country branding (WEF, 2021).

This analysis was therefore carried out for a total of 12 states and the EU as a whole (13 entities). In the context of the identified areas of tourism mentioned in the strategies, an analysis of these terminologically different concepts was carried out. According to the level of emphasis on the field of tourism in the examined documents, we divided the states into three categories. Using the synthesis, we identified the parameters that tourism must meet in order to be part of BE.

Qualitative content analysis of above-mentioned documents (Babbie, 2020) was suitable to answer our first research question—if

the field of tourism is anchored in the concept of BE in the EU states. Most of the above-mentioned documents were analysed in English. It was always an official translation of the document. The exceptions were the documents of the Czech Republic and Slovakia, whose importance the authors of the article could assess in their original languages. The analysis was conducted according to the principles of structured coding (Gibbs, 2008). The essence of the analysis was the search for the key words “tourism” (“cestovní ruch, turismus” in Czech and “cestovný ruch, turismus” in Slovak), “recreation” (“rekreace” in Czech and “rekreácia” in Slovak). In the case of the occurrence of these formulations, the text was subjected to a detailed assessment from the point of view of the exact meaning.

We used the results from the analysis of policy documents on bioeconomy from a tourism perspective for the next part. Based on the formulations regarding tourism in the strategies, we confronted the results with the definitions of the four most used forms of tourism—sustainable tourism, rural tourism, ecotourism, and nature tourism. In this way, we obtained mutually comparable information with generally accepted concepts.

The obtained results serve to answer RQ1 and RQ2.

To obtain answers to RQ3, it is necessary to consider the concept of service as a BE. Ronzon et al. (2022) deals with the measurement of services related to BE. It is primarily based on the NACE categories and further divides the relevant services into four categories according to the approach to BE. Tourism can be included in the category “Natural environment-related services of BE” (accommodation in the countryside, activities of travel agencies, activities in the field of landscaping, cultural, sports and recreational activities, and ecosystem services). These are services that, due to their intangible nature, cannot be measured and related to BE from the point of view of the use of biomass. Ronzon et al. (2022) mentions an “output-based” approach in the sense that the bio-economic nature of a service is evaluated based on the characteristics of the outputs, not on the basis of the inputs it uses (similarly as LUKE, 2020).

To identify the parameters according to which it is possible to consider tourism as part of BE, we used the character of these outputs and their relationship to BE. The basis was also a conceptual analysis of the concept of tourism in BE-related documents of the countries researched. Last but not least, we also used the literary research of the aforementioned areas of tourism for our outputs (sustainable tourism, ecotourism, natural tourism, rural tourism).

3 Results

3.1 Tourism in the concept of BE of the countries examined

Table 2 shows that at least a mention of “tourism” and/or “recreation” appears in some of the researched BE-related documents for all selected states. However, there are significant differences in the extent and space devoted to tourism.

Based on the qualitative analysis, the states can be divided into three groups.

- Tourism is significantly emphasized in the concept of BE
- Tourism is a part of BE; however, it is not prioritized
- Tourism is marginally mentioned in the concept of BE

TABLE 2 Wording related to tourism in selected countries.

Wording related to tourism	Selected countries												
	EU	Finland	Denmark	Lithuania	Latvia	Italy	Spain	France	Germany	Romania	Slovenia	Czechia	Slovakia
Health tourism	-	✓	-	-	-	-	-	-	-	-	-	-	-
Nature tourism (ecotourism, bio tourism)	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓
Green tourism	-		-	-	-	-	-	-	-	-	✓	✓	✓
Food tourism	-	✓	-	-	-	-	-	-	-	-	✓	-	-
Wellbeing tourism	-	✓	-	-	-	-	-	-	-	-	-	-	-
Sustainable tourism	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓
Agrotourism	-		-	-	-	-	-	-	-	✓	-	✓	✓
Sea based/marine tourism	-	-	-	-	-	✓	-	-	-	-	-	-	-
Cycling tourism	-	-	-	-	-	-	-	-	-	-	✓	-	✓
Fuel tourism	-	-	-	-	-	-	-	-	-	✓	-	-	✓
Rural tourism	✓	-	-	-	-	-	-	-	-	✓	-		✓
Coastal tourism	-	-	-	-	-	-	-	-	-	✓	-	-	-
Environmentally friendly cruise tourism in the Baltic Sea	-	-	✓	-	-	-	-	-	-	-	-	-	-
Tourism as a part of forest ecosystem services	-	✓	-	✓	✓	-	✓	✓	-	-	✓	-	✓
Consider the requirements of tourism when harvesting wood and growing practices	-	-	-	-	-	-	-	✓	-	-	-	-	-
Recreation in the forest	-	-	-	-	-	-	-	-	✓	-	-	-	-
Support for tourism from forest owners	-	-	-	-	-	-	-	-	✓	-	-	-	-
Principles of circularity in tourism	-	-	-	-	-	-	-	-	-	-	✓	-	-

A) Tourism is significantly emphasized in the concept of BE–Finland, Italy, Slovenia, Slovakia

It is clear from the qualitative analysis that the field of tourism has a firm place in the concept of BE of all of the above-mentioned states directly in their strategies for BE. Development factors are based on natural wealth and cultural tradition. The focus of tourism in these countries is not the same as it very much reflects the geographical, natural, and climatic conditions of the countries.

Specifically, in the case of Finland, the Finnish Tourism Strategy is part of the national concept of the Bioeconomy Strategy. Ecosystem services also include the field of tourism and bring potential for further development. Finland sees an opportunity for new business models in the combination of nature (land, forests, and air) and natural products and new forms of tourism (health tourism). In the Finnish concept of nature tourism, it is possible to find areas such as cycling, fishing, and hunting tourism. In the Italian concept of BE, tourism has a strong position, especially in relation to the Mediterranean Sea. Among the opportunities, the development of ecotourism and other activities related to the coast, fishing, etc. is mentioned. The Slovenian concept is captured in several strategies in which the emphasis is placed on sustainable tourism and ecotourism touching many spheres of life (food, forest-based value chain, cycling, etc.). An interesting emphasis is placed on sustainable tourism with IT-based marketing and networking helping to increase the quality of the services provided. Tourism in the Slovak sense is perceived as a part of regional development. It is based on the natural and cultural-historical conditions of Slovakia. It emphasizes concepts related to nature (forestry, nature conservation, environmental education), sport (cycling, hiking), the cultural-historical dimension, and the concept of tourism as a significant contributor to increasing GDP.

B) Tourism is part of BE; however it is not prioritized–Lithuania, Latvia, Romania, Czechia

Strategic documents related to BE of the above-mentioned states attach importance to the field of tourism; however, they mostly do not specify in detail its opportunities, directions of development, etc. Lithuania and Latvia have their own BE strategy, in which tourism is mentioned. In the case of Lithuania, it is again primarily connected with the concept of nature, with great emphasis on forestry. The Latvian concept mentions tourism as part of sustainable development with a positive impact on the commercialization of intangible values of nature capital. The Czech example strongly emphasizes rural development and, within it, sustainable tourism (including green tourism and agritourism) as part of ecosystem services. Green tourism is perceived as an ecologically oriented form of tourism. The Romanian concept of tourism includes a wide range of areas (from tourism supporting rural development and agritourism, through tourism in large cities, to tourism in coastal areas). Tourism has been identified in Romania as one of the ten sectors with high growth potential in order to increase the competitiveness of the state.

C) Tourism is marginally mentioned in the concept of BE–Denmark, Spain, Germany, France

The concept of tourism in BE by these states is grasped very imprecisely and peripherally, even though Germany, Spain, and France have their own strategies for BE. This fact does not mean

TABLE 3 Sustainable tourism, ecotourism, nature tourism, and rural tourism in selected countries.

Concept of tourism	Selected countries												
	EU	Finland	Denmark	Lithuania	Latvia	Italy	Spain	France	Germany	Romania	Slovenia	Czechia	Slovakia
Sustainable tourism	-	✓	-	-	-	-	-	-	-	-	✓	✓	✓
Ecotourism	-	✓	-	-	-	✓	-	-	-	✓	✓	✓	✓
Nature tourism	✓	✓	-	-	-	✓	-	-	✓	✓	✓	✓	✓
Rural tourism	✓	-	-	-	-	-	-	-	✓	-	-	-	✓

that tourism is not prioritized at the state level, but it is true that it is not understood as an essential part of BE. In the case of Spain, tourism is mentioned directly in the BE strategy as part of products and services associated with forestry. In the German and French strategies, tourism is not mentioned at all, but it appears marginally in BE-related documents. In the case of Germany, it is part of the Forest Strategy, i.e. the recreational function of the forest is emphasized. The French concept also emphasizes forest ecosystem services, which includes recreational activities and tourism. In addition, tourism should be considered when planning cultivation and felling activities. The Danish mention only relates to shipping in the form of support for more environmentally friendly cruise tourism in the Baltic Sea.

Share of travel and tourism's total contribution to GDP vary from 3,3% to 9,1%. The lowest share of tourism in GDP was recorded in Lithuania, the Czech Republic, Slovakia and Romania. On the contrary, the highest share of tourism has long been held in Italy, Spain and France. The TTCI score for selected countries ranged from 4.1 (Romania, Slovakia) to 5.2 (Spain). Specifically, the tourism prioritization indicator was also compared for countries, which ranged from 4.1 (Romania) to 5.9 (Spain). Although the share of tourism and its prioritization among countries is different, it does not correspond to the division of our approach to determining the strategy of tourism within the bioeconomy. In other words, it is not the case that countries with a higher share of tourism in GDP include tourism to a greater extent in their bioeconomy strategies or approaches.

Considering the four basic approaches to tourism that are the most used (sustainable tourism, ecotourism, natural tourism, rural tourism) and the information in Table 2, we can present our results in Table 3.

Tourism is similarly vaguely grasped in the concept of BE by the EU. It is not explicitly mentioned in the strategy. In the EU Bioeconomy Strategy Progress Report, rural and nature tourism is included among the nature environment-related services of BE associated with the natural environment. It includes rural activities, landscape services and culture, sport and recreation activities.

Some countries mention tourism concepts (sustainable tourism, rural tourism) in their BE strategies, while others mention specific forms (health tourism, wellbeing, fuel tourism, cycling). The remaining states do not specify a specific concept or form of tourism, but focus on linking forestry with recreation in forests or adjacent areas. Above all, for some countries (Germany, Lithuania, Latvia, Spain, France) the accent on tourism connected with forestry is essential. This fact confirms the important role of forest BE in the entire concept of BE.

It is evident from the above that it is not possible to unify and clearly define the approach according to which it will be possible to include tourism under the concept of BE. Due to the interdisciplinary connection of tourism, it is more appropriate to focus on the main services provided within tourism so that they can be part of BE.

On the basis of conceptual BE-related documents analysis, literature research, common features of individual forms and concepts of tourism were identified, according to which the new concept of BE-based tourism was proposed.

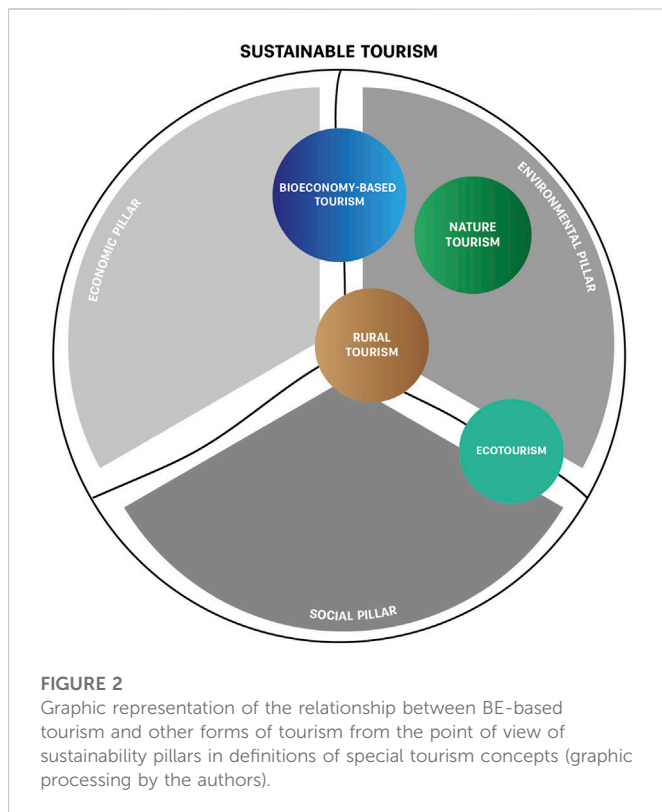
3.2 Parameters under which tourism can be considered as a part of the BE: Bioeconomy-based tourism

In order to include tourism in a country under BE-based tourism, it is necessary that the tourism is provided in rural areas (with an



emphasis on forest and open-landed environment) by doing outdoor activities, nature reserves activities (natural environment related services), etc. Within the concept of BE-based tourism, the main issue is to use nature resources efficiently (but with economic accent), minimize their waste, and ensure their renewability (similarly to Baicu et al., 2019). Pollution is limited to the degree that natural systems can cope with. The principle of proportionality of costs states that the costs incurred for a measure should always produce an optimal effect. The activities in each sustainable pillar must consider the impacts on the other pillars in order to find their mutually balanced synergistic effect; in the case of alternative solutions, preference should be given to those that induce favourable direct or secondary effects in all strategic dimensions—the principle of the ecosystem approach, i.e. a complex, structural and functional approach to the environment. Renewable sources should always be preferred over non-renewable ones. And, last but not least, the environmental limits of economic development should not be exceeded.

Specifically, in the application for the individual services provided, it is necessary to fulfil the points mentioned above. For example, in the case of accommodation services, it should be considered whether accommodation facilities belong to local residents, recycled materials are used, if materials come from certified sources (PEFC, FFS, EU labels), and if the principle of not wasting water and energy is observed. In a catering establishment, in the concept of BE-based tourism, local food and producers should be used and preferred as well as returnable packaging and materials, certified ecologically friendly products, or organic farming products. Transport within the concept of BE-based tourism should prefer a carbon-free form of transport to reduce negative impacts on the environment. Within BE-based tourism the activities should be done in rural areas with respect to



nature protection and supporting rural development of local areas. From perspective of the selected states, it is obvious that a huge emphasis is put on activities related to forests and forestry. Thus, the role of forestry should be emphasised.

According to our results we can conclude that bioeconomy-based tourism is a concept of tourism that lead to maximization of economic benefits in the long-term sustainable use of renewable and biological resources while applying practices that respect natural environment and limit the waste of these resources.

On the basis of the above-mentioned signs, it is possible to present bioeconomy-based tourism role in relation to other forms of tourism (Figure 2). It is clear from the concept that it is an integral part of sustainable tourism, especially in its economic and environmental pillar. It could touch the social pillar only in the area of activities supporting community development. It is the emphasis on economic growth that distinguishes it from the concept of ecotourism or rural and nature tourism. We add that this graphic representation reflects the definition concept of four forms of tourism in a simplified way. It means that we can find some aspects of all pillars in all concepts, but only some pillars occur in tourism's definitions themselves.

4 Discussion

A certain limit for interpretation of the above results can be the selected qualitative analysis of the documents which were selected on the basis of their connection to the topic of BE (Kleinschmit et al., 2016; Heslinga et al., 2018). For countries that have their own BE strategy, it was a qualitative analysis of these documents, similar to the concept of De Besi and McCormick (2015). For states that do not have their own strategy, BE-related documents were considered (similarly

to Lovrić et al., 2021). These were official policy documents in which a connection with the concept of BE was noted (both explicitly and implicitly). Table 2 shows that, for states that do not have their own BE strategy, it was possible to identify a greater number of connections with tourism in general.

The presented approach reflecting qualitative analysis of strategic documents could be supplemented with semi-structured interviews with stakeholders from individual countries (similar to Stone and Nyaupane, 2016) who are in charge of strategic development of tourism and/or BE, or use the Delphi methodology for example (as D'Amato et al., 2020). The research would also be enriched by the perception of individual actors. In the future, it is also possible to use software support for the analysis of professional articles related to the topic of tourism and the BE of selected countries (similar to Loulanski and Loulanski, 2011), or the PRISMA technique, similar to Menon et al., 2022. However, the condition for this is a sufficient number of publications devoted to this topic (Bielański et al., 2022). Another possible investigation aspect could be a quantitative analysis dealing with the provision of public funds in the field of tourism with the aim of supporting BE (similar to Whitelaw et al., 2014). This would complement the mosaic of declared support from the state level with real financial resources flowing into the sector.

Finland, the leader identified above, confirms its emphasis on tourism by already identifying the financial impact of tourism linked to BE (LUKE, 2020). The Finnish concept of BE perceives tourism as nature tourism and recreation activities and recreational hunting and fishing (Ronzon et al., 2022); through this concept they are able to identify financial benefits for the state. A similar method could also be used by other countries, especially Italy, Slovenia, and Slovakia.

The above conclusions reflect the situation in EU countries. A selected set of states always considers tourism in the BE concept at least partially. More detailed conclusions could be drawn if we considered all EU states. However, this selection was sufficient for our analysis, which consists in finding out whether tourism appears in BE strategies.

Another possibility for the development of research could be to grasp tourism in the concept of BE for the whole world. For an overview, in Table 4 below we present selected countries from individual continents with their own BE strategy. Countries such as Canada, South Africa, Japan, and India have their own BE strategy, but tourism is not included at all. Thailand, Australia, Columbia, and Costa Rica mention tourism in the concept, and often very significant. Iceland, Greenland, and the Faroe Islands have a common BE strategy. In their strategy, tourism is an essential pillar of BE development. This information suggests that different concepts of tourism in non-EU countries can be further explored across other continents.

Sustainability should be the main concept which is considered with the concept of BE. Prioritizing the economic pillar usually causes overloading of land use, an increase in the volume of waste, and transport problems—e.g. excessive development of tourist areas can lead to their deterioration and subsequent collapse. Prioritizing the social pillar can jeopardize competitiveness if there is fierce economic competition between regions. The prioritization of environmental aspects, e.g. excessively protective approach to the territory, can cause economic hardship, associated with depopulation and stagnation of the region (Huttmanova and Valentiny, 2019). In the short term, it is possible to take operational measures, prioritizing any of the factors for solving urgent economic, social, or ecological

TABLE 4 Concepts of tourism in selected non-EU countries - Future Opportunities for Bioeconomy in the West Nordic Countries (NCoM, 2015); Canada's Bioeconomy Strategy (BIC, 2019); The Bio-economy strategy (DoSaT, 2013); National Bioeconomy Strategy Costa Rica 2020–2030 (McCITT, 2020); Bioeconomy opportunities for four Colombian regions (Ferrini, 2021); Bio-Strategy 2020 (CO, 2019); National Biotechnology Development Strategy 2021–2025 (DoB, 2021); Bioeconomy in Thailand: a case study (Fielding, 2018); National Science and Technology Development Agency (NSTDA, 2022); The National Marine Science Plan 2015–2025 (NMSC, 2015).

Wording related to "tourism"	Non-EU countries								
	Iceland, Greenland, Faroe Islands	Canada	South Africa	Costa Rica	Colombia	Japan	India	Thailand	Australia
Nature tourism (ecotourism, green tourism, bio tourism)	✓	-	-	✓	✓	-	-	-	-
Food tourism	✓	-	-	-	-	-	-	-	-
Sustainable tourism	✓	-	-	-	✓	-	-	-	-
Sea based/marine tourism	✓	-	-	-	-	-	-	-	✓
Tourism as part of forest ecosystem services	-	-	-	-	✓	-	-	-	-
Combining tourism and reindeer husbandry	✓	-	-	-	-	-	-	-	-
Adventure tourism	✓	-	-	-	-	-	-	-	-
Fisheries related tourism	✓	-	-	-	-	-	-	-	-
Wellness tourism	-	-	-	-	-	-	-	✓	-
Knowledge-based tourism	-	-	-	-	-	-	-	✓	-

problems. But it is always necessary to consider the long-term consequences of these measures and find an appropriate balance.

Many countries experienced local overtourism before the COVID-19 pandemic (Capocchi et al., 2020; Seraphin et al., 2020). The increased numbers of tourists to a destination meant increased income, but were nevertheless associated with negative impacts on the environment and the social sphere. Regulation of the number of tourists should also be part of a BE strategy, not only from the point of view of the long-term use of natural resources, but also of the natural environment of local residents, whether in rural or urban areas. Tourism must help to reduce climate change impact and must not be a burden on nature or the environment.

The concept of BE-based tourism is part of sustainable tourism. However, it primarily focuses on the effective use of natural resources with the aim of maximizing their conservation or supporting their renewal. From the point of view of character, it thus most touches the economic and environmental pillar of sustainable tourism. Although nature-based tourism can also be part of BE-based tourism, if it meets the parameters of BE-based tourism, its main characteristics fall under the environmental pillar within the framework of sustainable tourism. Rural tourism covers all three pillars, but the environmental one occupies the main position (Özdemir and Yildiz, 2020). The last of those considered, i.e. ecotourism, based on its characteristics, extends into the social pillar because, in addition to trying to minimize the negative impact on the environment, it also addresses the impact on the local population. For this reason, the overlap of the mentioned forms and concepts of tourism is evident and mutually complementary.

Baicu et al. (2019) mention the link between BE and sustainable hospitality. In particular, they mention accommodation facilities that have various initiatives to protect the environment and increase tourists' awareness of environmental issues. However, if the bioeconomy concept is only on a voluntary level and is not

financially supported by external funds, most small and medium-sized enterprises will not be able to follow the strategically given goals. With the growing emphasis on the bioeconomy, it can be expected that, especially in developed countries, there will be an increasing emphasis on the reporting of resources associated with the bioeconomy. Many governments support the bioeconomy financially through direct and indirect investments (Wesseler and von Braun, 2017). Currently, the resources provided to the BE area are incomparable between states for many reasons (Rinn et al., 2023). However, if there is any harmonization of this view, it will be appropriate to study more the relationships between the financial impacts of tourism and other economic indicators. The identified characteristics for BE-based tourism are valid, of course, only if the participants of this tourism play a positive role towards nature, rural areas, and other participants. However, according to Capasso (2021), they can also contribute to the degradation of the natural (and rural) areas on which their business depends.

5 Conclusion

From the above results, it is clear that the concept of accentuation of forms of tourism differs in individual EU states but does not differ significantly in individual EU regions. States within one geographical region prefer similar forms of tourism suitable for similar natural conditions.

RA1 (research answer): The aim of our work was to outline the link between tourism and BE in these regions through selected countries from all geographical regions of the EU. Based on the results we found it follows that in all the examined states, tourism is at least to some extent included in the concept of the BE of these states. However, this concept has a different degree of emphasis on this sector—see the breakdown of analysed countries into three groups.

RA2: Although the selected and analysed countries include tourism into the concept of BE, they do it with different emphasis. It follows from Table No. 2 and 3, and subsequent interpretation, that common conclusions cannot be drawn from the data analysed by us for the individual regions of the EU chosen by us, nor for the EU as a whole. The degree of integration of tourism into BE differs across regions in which the given state is located. Although it could be expected that countries where tourism has a larger share in GDP and tourism is considered as a priority would focus more on setting a tourism strategy in relation with the bioeconomy, this has not been confirmed.

RA3: Common characteristics of individual forms and concepts of tourism can be combined under the term sustainability. When creating BE strategies, states should first consider the concept of sustainability, then select specific forms of tourism with potential for future development suitable for their conditions.

Tourism can be part of the BE strategy of states. In particular, those with a higher share of tourism in GDP should perceive the potential for development in the connection of BE and tourism. Current travel and tourism strategies within the concept of BE should be created under sustainable pillars to ensure development which ensure maximum benefits for the current generation, but at the same time preserve these benefits for future generations as well. Bioeconomy-based tourism is a concept that considers the approach of BE in the field of tourism. It focuses above all on a sustainable level of tourism in the connection of economic and environmental pillars, where the main emphasis is placed on the effective use of natural resources and a maximum effort not to waste these resources, as well as to ensure their subsequent renewal.

This article can help to establish a coordinated approach, facilitating sustainable development throughout the tourism industry's system of actors. If the tourism strategy is in line with the concept of economic and environmental pillars of sustainable tourism, then it can be deduced that it is also in line with the concept of BE. For further research, it is proposed to analyse specific parameters of individual forms of tourism leading to inclusion in BE for individual states. Another interesting area of research could be the analysis of the financial support of individual states for tourism fulfilling the essence of BE.

Author contributions

RR and MK contributed to conception, design, investigation and methodology of the study. RR and MK wrote original draft, and VJ

edited and did supervision of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version. All authors have agreed to the published version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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