Assessment of the development potential of the tourism industry in Czechia on the basis of smart specialization

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Abstract: *The tourism industry is constantly evolving and requires the introduction of the latest technologies and development tools, such as smart specialization, which contributes to the economic development of countries, the welfare of the population, and an increase in foreign exchange earnings. The aim of the article is to assess the potential for the development of the Czech tourism industry on the basis of smart specialization using the integral indicator of smart specialization potential. The research methodology includes mathematical and economic, abstract and logical statistical, and expert analyses. The introductory part defines the content and components of smart specialization. At the next stage, the level of innovation, economic and investment, social and scientific components of Prague and other regions of Czechia was assessed, which determined the potential for the development of the Czech tourism industry on the basis of smart specialization using the integral indicator of smart specialization potential. The research results suggest ways to introduce smart specialization into the Czech tourism industry, including investment support for the implementation of smart strategies of the Czech regions; improvement of the regulatory framework for creating new business models for the development of tourism enterprises; ensuring the development of transport infrastructure, power grids, and digital networks; and improving social support for citizens; creating an environment in which it is possible to create and implement. The originality of the study is an approach to assessing the potential for the development of the Czech tourism industry on the basis of smart specialization using the proposed integral indicator of smart specialization potential. The practical significance is due to the possibility of using the integral indicator of smart specialization potential as a tool for allocating investment resources to ensure the development of the tourism industry of Czechia and its regions, which will be useful for the Czech government agencies to increase the potential of the country's tourism industry.*

Keywords: *Smart specialization, tourism, innovation, assessment, potential.*

JEL Classification: *O14, Z32.*

Introduction

The aim of the article is to assess the potential for the development of the Czech tourism industry on the basis of smart specialization using the integral indicator of smart specialization potential.

The current model of sustainable development of the Czech economy in the tourism sector as a whole and in its regional components is based on the continuous transformation of modern scientific and technical progress into advanced technologies, quality goods, and services.

The specified topic is the subject of own research, which is the basis for continuing scientific research in a certain direction (But, 2023; But et al., 2023; But, 2024a,b). It is the basis for further research on the development of the Czech tourism industry by assessing the potential for the development of the Czech tourism industry on the basis of smart specialization. To determine the priority areas of regional development and the introduction of smart technologies, the authors propose to use an integral indicator of the smart specialization potential. This indicator helps to identify areas of innovative potential for the development of the Czech tourism industry based on the fact that each region can find its own competitive advantages in the use of smart technologies. This study should determine which tourist flows allow the effective use of regional resources and provide better service for tourists.

This necessitates the development and implementation of effective measures at both the state and regional levels to concentrate resources and efforts on the priority areas of scientific, technical, social, and economic development of the tourism industry within a market economy, improve living standards, and ensure compliance with social standards guaranteed by the state for every citizen.

One such measure is the inclusion of smart specialization in the strategic planning framework for regional development, which is already provided for in the relevant legal framework. In this context, it is particularly important to define strategic guidelines for the long-term development of the Czech tourism sector.

The smart specialization approach determines the innovative potential of a region and contributes to the transformation of its economy (Berezina, 2018). This approach identifies regional development actors that operate within the framework of regional strategies with specific strategic goals and objectives for economic development. Fig. 1 shows what a smart specialization is.
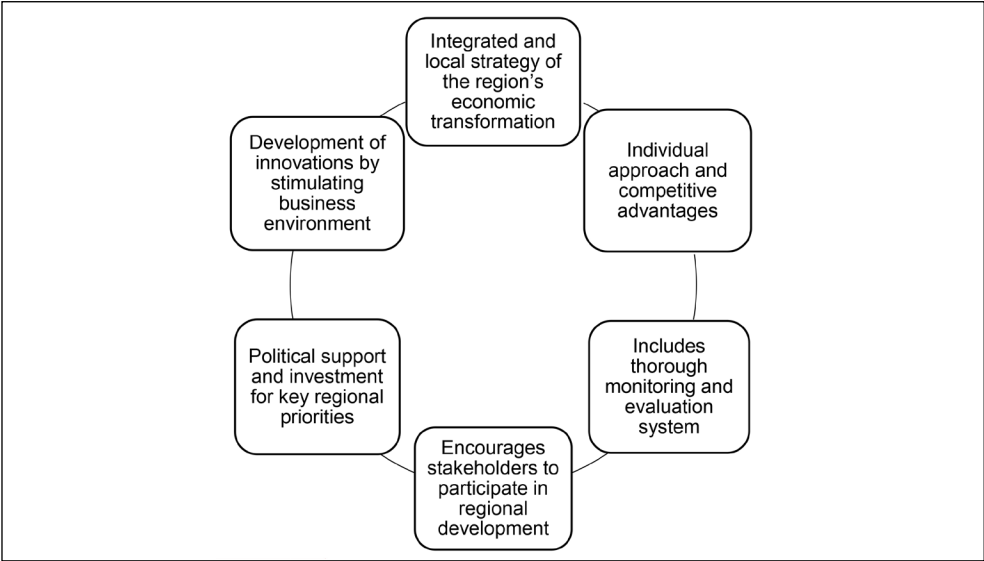

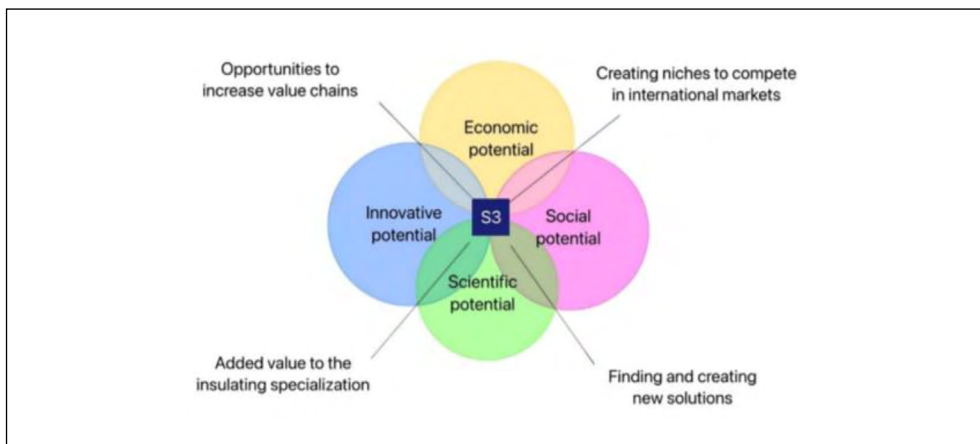Fig. 1: Smart specialization

Source: own

The components of the smart specialization concept are shown in Fig. 2. Components of smart specialization maximize our strengths and unique combination of capabilities, combining our economic past with our research and innovation capabilities.

Innovation potential includes the availability of an innovatively open business environment and a powerful educational sphere that will provide highly qualified personnel in the labour market and increase the competitiveness of scientific personnel. Scientific potential is made up of the availability of a competitive sectoral scientific sphere through the use of economic and scientific potential of young foreigners, the level of human resources, their qualifications, and scientific and technical capabilities. Social potential implies satisfying the level of quality of life, its improvement, a high level of medicine, access to free education, and birth rate. Investment potential consists of the availability of sufficient investment and financing in the region's educational and scientific spheres. The economic potential involves the total amount of tourism services provided, the number of tourism enterprises, the number of full-time employees at tourism enterprises, and the average monthly salary of tourism employees. Therefore, the integral indicator of the smart specialization potential for innovative development of the Czech tourism industry will be determined by assessing the scientific, social, investment, and economic potential of Czechia.

In particular, the study of the development of the tourism industry is carried out either by individual regions or a specific method. For example, an analysis of the social and economic potential of the tourism industry in some regions was conducted by Burda et al. (2023), where qualitative research methods were used, using questionnaires and structured interviews. The social, economic, and innovative potentials of the tourism industry in the Czech region were studied by But (2024) using such methods as Porter's model of the five forces of competition, ABC analysis, and strategic mapping. The indicators of the social and economic potential of the tourism industry are studied by the method of cluster analysis in Gudz et al. (2023).

All these and other methods are focused on the study of satisfaction with the population's quality of life and do not simultaneously consider the components of innovative scientific, social, investment, and economic potentials. Therefore, we will assess the potential for the development of the Czech tourism industry based on these components based on smart specialization by determining the integral indicator of the smart specialization potential for the innovative development of the Czech tourism industry, which determines the relevance of the chosen topic.

1. Theoretical background

The concepts of "smart" and "smart specialization" defined above are general concepts that almost everyone has encountered. Taking into account the introduction of intelligent components into the European model of regional development, the realization of scientific, social, investment, and economic potentials is studied through integrated approaches to the use of all components in urban community development strategies. Therefore, the collection of scientific literature sources was focused on researching scientific approaches to smart specialization, smart cities, and tourism development.

Šulyová and Kubina (2022) studied the comparison of the currently identified elements that influence the development of the sustainable development concept of a smart city in Slovakia by taking into account the best practices of cities around the world. This approach reflects the social, environmental, technological, and governance components of cities, which are useful for the city authorities.

The problematic areas of implementing the smart city concept for Bratislava on the example of Vienna, which is considered one of the best smart cities in Europe, were studied by Adamuscin et al. (2016). The research points to the impact of transformational changes in the economy and technological processes arising from integration and globalization. This approach has revealed the interdependence of smart specialization and the quality of urban life. The imperfection of the economy, social environment, urban culture, and human and social capital define the problems of implementing the smart strategy in the European cities.

The concept of "smart cities" in relation to social innovations was studied by Husar and Ondrejicka (2019). This approach focuses on creating an environment for social innovation based on smart specialization by using information and communication technology (ICT) tools.

Fernández and Peek (2020) studied urban initiatives to understand the extent to which smart cities can be a response to climate change based on innovative efforts. The analysis of this approach demonstrates the interaction between technology and nature and points to the importance of adapting smart infrastructure and its impact on the climate, which puts the environment at the center of its development.

Saketh and Puppala (2023) explored the mission of "smart city," aimed at modernizing the existing cities by improving core infrastructure through the introduction of smart objects and cybersecurity, which are useful for effective management in tourism. This approach will improve the information and innovation resources for implementing smart specialization through effect variables.

Researchers Jurigová and Tučková (2018) evaluated the economic indicators used by hotel companies to manage their economic performance on the example of the hotel business in the Zlín region of Czechia. This approach introduced a system of indicators of economic sustainability of the hotel business and indicated what economic components make up the economic potential of the tourism industry.

Farmaki et al. (2021) used a multi-criteria decision-making method for medium-sized European tourist cities using 10 criteria. The researchers used 11 measures of urban mobility to assess smart specialization in tourism. This approach points to using smart specialization models (personalized plans and smart applications) in shaping future sustainable mobility policies in urban tourist destinations, which are a priority in improving the quality of life and well-being of the citizens.

Panyadee et al. (2023) explored smart wellness cities with the help of the latest achievements of this type of tourism, analyzing the development of these cities. This approach points to developing tourism through the latest technologies under the influence of innovation potential, strategic planning, management, marketing, and competitiveness of all stakeholders.

Meyer et al. (2022) studied the tourism of the cultural and creative industries of the South Baltic Sea, which are part of the economic ecosystem and make a powerful contribution to the revival of sustainable development in this region. This approach to studying the resilience and restoration of sustainable tourism development in the post-pandemic era on the basis of smart specialization has pointed to the lack of interconnection between the potential of the creative and cultural industries and their contribution to the co-creation of a smart specialization strategy.

Brumen et al. (2016) studied the impact of ICT (information and communication technologies) on tourism by correlating statistical indicators and determined that only 30% of the web pages of tourism enterprises are in the internet

database. This approach has shown that the development of regional tourism indicators is driven by a smart specialization strategy.

Romao (2020) studied the impact of innovative technologies on regional tourism. The scientist found out the high tourism potential of regions affected by smart specialization strategies. The study has shown the positive impact of the smart specialization strategy on the high potential of the tourism sector due to the interaction of unrelated destination sectors.

Chamusca (2023) investigates smart specialization in tourism through the use of smart strategies, which resulted in the importance of creating networks and partnerships in Europe for economic, social, and environmental development. This approach emphasizes the possibility of developing tourism by increasing investment and innovation potential.

Ndou et al. (2023) investigated a methodological framework aimed at supporting the creation of a smart tourism destination using the example of the southeastern Adriatic-Ionian region as part of the European macro-region; along with the objectives of the EU's Smart Specialization Strategy, several initiatives aimed at innovating the tourism offer in this region have been supported. This approach also points to introducing innovative potential into the tourism industry.

The above approaches and methods of using smart strategies determine the positive impact of smart specialization on the development of European countries and the development of the tourism industry. However, it is necessary to find out whether the smart specialization strategy in Czechia is effective, how it affects the potential for tourism development in the country's regions, and whether it improves the welfare of the population. To do this, we will diagnose the social, economic, scientific, and innovative potentials of the Czech tourism industry, which are components of smart specialization, which will allow us to achieve the purpose of the study and determine the relevance of the chosen topic.

2. Research methodology

In the course of the study, the following methods of economic research were used: a mathematical and economic one to develop a methodology for calculating the integral indicator (when assessing the smart specialization potential of the Czech tourism industry); an abstract and logical one (for theoretical generalizations and formulation of conclusions); a statistical one

(for diagnosing the social, economic, scientific, and innovative potentials of the Czech tourism industry, which are components of smart specialization); and an expert method of collecting primary information and processing the collected secondary information.

The research was facilitated by the documentation of the Czech and international authorities: Ministry of Industry and Trade Czech Republic (National research and innovation strategy for smart specialisation of the Czech Republic 2021–2027 – National RIS3 strategy); Czech Statistical Office; CzechTourism (Marketing and destination management plan 2023; Shaping the image of the Czech Republic – CCCR annual report 2022; Concept of unified foreign presentation of the Czech Republic); Research, Development and Innovation Council Czech Republic (Innovation strategy of the Czech Republic 2019–2030. The country for the future); UN Tourism (World tourism barometr 2023; Global tourism code of ethics; Tourism in the 2030 agenda); European Travel Commission (Climate action plan 2050); Economic Commission for Europe (Applying principles of circular economy to sustainable tourism); CAREC (Tourism development strategy CAREC 2030).

The study to assess the potential for the development of the Czech tourism industry on the basis of smart specialization was conducted based on statistical data from the city of Prague and 13 regions of the country and in the following stages, which are shown in Fig. 3.

The levels (P_l) of innovative, social, economic, and investment potentials were assessed on the basis of the data from the main city of Czechia, Prague, using the following methodology:

$$P_l = \sum P_i * W_i \qquad (1)$$

where: P_i – an expert assessment of using innovative, social, economic, and investment potentials (points); W_i – the weighing coefficient of the elements of innovative, social, economic and investment potentials.

The integral indicator of smart specialization potential is determined by the following methodology:

$$P_{SM} = \sqrt[4]{P_{in} * P_n * P_s * P_{sc}} \qquad (2)$$

where: P_{SM} – the potential of smart specialisation; P_{in} – innovative potential, P_s – social;
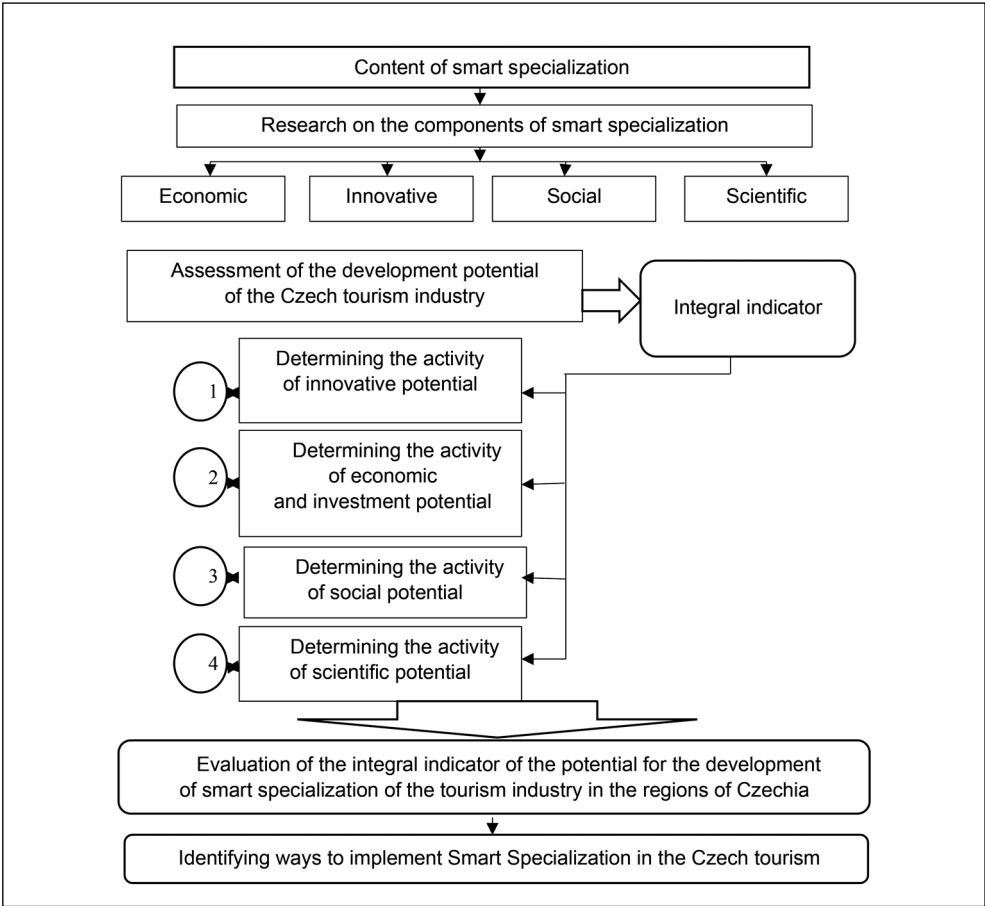
P_n – economic and investment; P_{sc} – scientific.

The data for the study of innovation, social, economic and investment potentials were selected for the period 2021–2022 based on the latest available data from the Czech and national economies (BusinessINFO.cz, 2023; CSO, 2023; UNWTO, 2023).

3. Results and discussion
3.1 Analysis of the tourism potential of the Czech regions

The European Union has 120 smart strategies at the regional and national levels (Fig. 2). This approach is already being applied in 12 countries.

Czechia has developed a National RIS3 strategy for 2021–2027. Also, some Czech regions have developed a separate RIS3 strategy for 2021–2027. The long-term strategic vision of the national RIS3 of a sustainable economy based on knowledge and innovation formulates the main direction of Czechia's development (Ministry of Industry and Trade, 2021). It emphasizes the knowledge economy and the transformation of the economy in such a way as to increase competitiveness based on innovation rather than low costs. The strategy identifies areas of applied research in which it makes sense to invest from the state and EU funds since 2021 over the next six years.

It should be noted that the unification of the European Union is taking place, among other things, due to the existence and implementation of the smart specialization strategy, which is a fundamental condition for the implementation of political measures. The EU sets seven criteria to fulfil this basic condition.

Therefore, Czechia has the directions for the tourism industry development specified in the smart strategy for regional development. The top five leaders in terms of tourism potential by area were the city of Prague, Liberec, Hradec Králové, Moravian-Silesian, and Zlín regions. The top five leaders in terms of point potential were the regions of Central Bohemia (including Prague), South Bohemia, South Moravia, Pilsen, Moravian-Silesian, and Zlín (CSO, 2023).

The study found that the city of Prague, South Moravian, Hradec Králové, South Bohemia, and Central Bohemia regions have particularly favourable conditions for the tourism industry development, while the other regions have to determine the specific activities that will form the basis of their region's smart specialization.

3.2 Assessment of the development potential of the Czech tourism industry

A methodical approach to assessing the prerequisites for the implementation of smart specialization in the Czech regions is proposed, which is based on an integral indicator of smart specialization potential that includes the diagnosis of four potentials: innovative, social, economic and investment, and scientific, based on the method of expert assessments, namely the Delphi method. Experts are proposed to evaluate the researched object using this method. It consists of a survey in several iterations. In particular, each expert quantitatively evaluates the object. Next, the average value of the grades and their deviation from it are calculated. For experts who evaluated the object with the maximum deviation from the average value, it is recommended to justify their decisions. They are brought to all other experts and a second iteration of the survey is developed. A characteristic feature of the method is the reduction of the dispersion of experts' estimates from iteration to iteration and the increase of their consistency. Iterations are stopped if there is sufficient agreement between the experts' evaluations (link). The components and parameters of elements

of the potential of smart specialization were determined by experts. Heads of tourism departments of ten regional administrations were appointed as experts.

The integral indicator of smart specialization potential is determined by Equation (3):

$$P_{SM} = \sqrt[4]{P_{in} * P_n * P_s * P_{sc}} \qquad (3)$$

where: P_{SM} – the potential of smart specialisation; P_{in} – innovative potential; P_s – social; P_n – economic and investment; P_{sc} – scientific.

It is advisable to assess the level of the integral indicator of the potential of smart specialization on the following scale: 0 to 5.5 – low level, 5.5 to 8.0 – medium level, and from 8.1 to 12.0 – high level.

It is the integral indicator of smart specialization potential that makes it possible to assess the prospects for the development of the Czech tourism industry. Tab. 1 shows the procedure for assessing the innovative potential of the development of the tourism industry of Prague.

$$P_{in} = \sum P_i * W_i \qquad (4)$$

where: P_{in} – innovative potential of the tourism industry in the city of Prague; i – the number of the element of the innovative potential of the tourism industry in Prague; P_i – the expert assessment of using the element of innovation potential of the tourism industry in Prague (points); W_i – the weighting coefficient of the element of the innovation potential of the tourism industry in Prague.

$$P_{in} = \sum P_i * W_i = 1.28 + 1.98 + \\ + 1.7 + 1.92 + 1.76 + 1.19 = 9.83 \qquad (5)$$

The level of innovation activity of tourism enterprises in Prague is assessed on the following scale: 0 to 5.5 – low level, 5.5 to 8.0 – medium level, and from 8.1 to 12.0 – high level. The analysis showed that the tourism industry in Prague has a high level of innovation activity (9.83).

The result of the calculated assessment indicates the successful implementation of information technologies and automation by tourism infrastructure departments (hotel and restaurant, transport, and entertainment). New technologies make it possible to organize high-quality leisure activities in a flexible and segmented manner, which is more competitive compared to traditional offers. Mass, standard,

| Tab. 1: | Expert assessment of the state of the elements of innovation potential of development of the tourism industry in Prague |

| Components | Parameters | Weight | Prague | |
			Points (1–3)	Balanced assessment
1. Resource provision	1.1 The degree of using tourist infrastructure	0.16	3	1.28
	1.2 The level of progressiveness of the applied service delivery technologies		2	
	1.3 The degree of tourist services flexibility		3	
	Final score		8	
2. Human resources	2.1 Level of staff qualifications	0.18	3	1.98
	2.2 The degree of staff's readiness for changes in tourism enterprises		2	
	2.3 Development of the staff motivation system		3	
	2.4 The degree of staff's creative initiative		3	
	Final score		11	
3. Scientific and technical capabilities	3.1 The level of expenditures on scientific research in the field of tourism	0.17	2	1.70
	3.2 The number of new types of tourist services		3	
	3.3 The number of new technologies		3	
	3.4 A share of staff engaged in scientific research of the total staff number		2	
	Final score		10	
4. Marketing capabilities	4.1 Rationality of using distribution channels for tourism services	0.16	3	1.92
	4.2 Flexibility of pricing policy		3	
	4.3 The level of advertising		3	
	4.4 Efficiency of the system of providing tourist services		3	
	Final score		12	
5. Organizatio-nal capabilities	5.1 Degree of innovation orientation of organizational structures	0.16	2	1.76
	5.2 The level of compliance of organizational culture with the innovative development of tourism enterprises in the regions		3	
	5.3 The level of managers' competence		3	
	5.4 Development of the information support system		3	
	Final score		11	
6. Scientific capabilities	6.1 The number of applications for utility models in the field of tourism	0.17	2	1.19
	6.2 The number of patents for inventions		2	
	6.3 The number of doctors of sciences		1	
	6.4 The number of candidates of sciences		2	
	Final score		7	
Weighted average final score			9.83	

Source: own

and comprehensive tourism is being replaced by new types of tourism developed by request and based on demand. Today, the transformation of tourism services digitalization is facilitated by introducing the latest e-tourism, e-travel, and tourism information systems.

An assessment of the economic and investment potential of the development of the tourism industry in Prague is presented in Tab. 2.

Based on the results of assessing the constituent elements of the economic and investment potential of the tourism industry in Prague,

we will determine the economic and investment opportunities of the tourism industry in Prague. It should be noted that the higher the level of using the constituent elements of the economic and investment potential of the tourism industry development in Prague, the more competitive advantages the tourism industry enterprises have for the implementation of effective economic and investment activities of the tourism industry in Prague.

The final stage of assessing the economic and investment potential of Prague involves

Tab. 2:	Expert assessment of the state of the elements of economic and investment potential of development of the tourism industry in Prague – Part 1			
			Prague	
Components	Parameters	Weight	Points (1–3)	Balanced assessment
1. Tourism enterprises	1.1 The number of tourism enterprises	0.09	3	1.08
	1.2 A share of unprofitable tourism enterprises		3	
	1.3 The number of tourism enterprises that implemented innovations (units)		3	
	1.4 A share of innovatively active tourism enterprises (% of the total number of surveyed tourism enterprises)		3	
	Final score		12	
2. Total volume of tourism services	2.1 Total volume of tourism services provided in actual prices (CZK million)	0.08	3	0.24
	Final score		3	
3. State of accommodation facilities	3.1 Availability of accommodation facilities	0.1	3	0.90
	3.2 A share of accommodation facilities in the total cost (%)		3	
	3.3 Degree of depreciation of accommodation facilities		3	
	Final score		9	
4. State of restaurant services	3.1 Availability of restaurant business establishments	0.09	3	0.81
	3.2 A share of restaurant business establishments in the total value (%)		3	
	3.3 Degree of depreciation of restaurant business establishments		3	
	Final score		9	
5. Operating profitability of tourism enterprises (%)	5.1 Operating profitability of tourism enterprises (%)	0.09	3	0.27
	Final score		3	

Tab. 2:	Expert assessment of the state of the elements of economic and investment potential of development of the tourism industry in Prague – Part 2				

Components	Parameters	Weight	Prague	
			Points (1–3)	Balanced assessment
6. Investments in the tourism industry in actual prices (CZK million)	6.1 Investments in the tourism industry in actual prices (CZK million)	0.09	3	0.27
	Final score		3	
7. State of labour market	7.1 The number of full-time employees of tourism enterprises (thousand people)	0.09	3	0.54
	7.2 Average monthly salary of employees in the tourism sector (CZK)		3	
	Final score		6	
8. Level of productive forces development and state of investment market	8.1 State and structure of tourism services	0.10	3	0.90
	8.2 Level of the labour force development		3	
	8.3 State of the investment market and investment goods of the stock market		3	
	Final score		9	
9. Political will of the authorities and the legal framework of the state	9.1 Existence of an appropriate legislative and regulatory framework	0.08	3	0.96
	9.2 Stability of the national currency		3	
	9.3 Currency manipulation		3	
	9.4 State of the market of investments and investment goods of the stock market		3	
	Final score		12	
10. State of the financial and credit system and the activities of financial intermediaries	10.1 Investment activities of banks (their level)	0.09	3	0.99
	10.2 Achieving stability of the national currency		2	
	10.3 Investment policy of the national bank		3	
	10.4 Regime of foreign investment		3	
	Final score		11	
11. Status of a foreign investor	11.1 International institutional finance and loans	0.10	3	0.80
	11.2 Free offshore economic zones		3	
	11.3 Relations of transparency in the state		2	
	Final score		8	
Weighted average final score			7.76	

Source: own

determining the level of economic and investment activity of the tourism industry in Prague. Using the generalizing indicator – the coefficient of economic and investment activity of the tourism industry, which is calculated according to the following methodology:

$$P_{in} = \sum P_i * W_i = 1.08 + 0.24 + \\ + 0.9 + 0.81 + 0.27 + 0.27 + 0.54 + \quad (6) \\ + 0.9 + 0.96 + 0.99 + 0.8 = 7.76$$

where: P_{in} – the level of economic and investment activity of the tourism industry in Prague;

P_i – an expert assessment of the use of economic and investment potential of the tourism industry element in Prague (points); W_i – the weighting coefficient of the element of economic and investment potential of Prague.

It is advisable to assess the level of economic and investment activity of Prague on the following scale: from 0 to 5.5 – low level, 5.5 to 8.0 – medium level, from 8.1 to 12.0 – high level. The analysis showed that the city of Prague has a medium level of economic and investment activity (7.76).

The EU has not yet recovered from the COVID-19 crisis, as its investment activity has declined due to the global economic crisis. Therefore, investment revenues are a key component of economic policy in the EU in the long run.

One of them is to use the EU budget's capacity in the form of refundable financial instruments as a meaningful alternative to the principle of redistributive subsidies. The contribution of the InvestEU program should lead to an increase in investment activity in the long term (EUR 15.2 billion to create a guarantee base of EUR 38 billion). It is essential to mobilize a total of EUR 650 billion of investment across the EU by 2027, make a role for the financial market stronger, including for projects of public interest, and a more efficient allocation of the EU budget that will pass the test of the natural market thanks to the payback element (European Committee of the Regions, 2022).

Czechia ranks first in terms of foreign investment. Data results among Central and Eastern European countries are presented by the Government Agency for Foreign Direct Investment (BIDA, 2023). To implement investment projects, Czech-Invest supports innovative start-up companies of foreign investors who are just entering the Czech tourism market. An assessment of the social potential of the development of the tourism industry in Prague is presented in Tab. 3.

The final stage of assessing the social potential for the development of the tourism industry in Prague involves determining the level of social activity of the tourism industry in Prague with the help of the generalized indicator – the coefficient of social activity of the tourism industry in Prague, which is calculated according to the following methodology:

$$P_s = \sum P_i * W_i = 1.14 + 1.14 + 1.47 + 0.9 + 4.83 = 9.48 \tag{7}$$

where: P_s – the level of social activity of the tourism industry in Prague;

Tab. 3: Expert assessment of the social potential of development of the tourism industry in Prague – Part 1

Components	Parameters	Weight	Prague	
			Points (1–3)	Balanced assessment
1. Economically active population	1.1 Of working age	0.19	3	1.14
	1.2 Older than of working age		3	
	Final score		6	
2. Employed	2.1 Of working age	0.19	3	1.14
	2.2 Older than of working age		3	
	Final score		6	
3. Unemployed	3.1 Of working age	0.21	2	1.47
	3.2 Older than of working age		3	
	3.3 Level of registered unemployed (%)		2	
	Final score		7	

Tab. 3:	Expert assessment of the social potential of development of the tourism industry in Prague – Part 2				

Components	Parameters	Weight	Prague	
			Points (1–3)	Balanced assessment
4. Economically inactive population	4.1 Of working age	0.18	2	0.9
	4.2 Older than of working age		3	
	Final score		5	
5. Efficiency of labour market	5.1 Average salary in the region	0.23	3	4.83
	5.2 Average income level of the population		3	
	5.3 Cooperation in employee-employer relations		3	
	5.4 Flexibility in setting wages		3	
	5.5 Hiring and firing practices		3	
	5.6 Remuneration and productivity		3	
	5.7 Rate and professional management		3	
	Final score		21	
Weighted average final score			9.48	

Source: own

P_i – an expert assessment of the use of social potential of the tourism industry element in Prague (points); W_i – the weighting coefficient of the social potential element of the tourism industry in Prague.

It is advisable to assess the level of activity of the social potential of the tourism industry in Prague on the following scale: from 0 to 5.5 – low level, 5.5 to 8.0 – medium level, from 8.1 to 12.0 – high level.

The analysis showed that Prague has a high level of activity of the social potential of the tourism industry (9.48).

Social development in Czechia is facilitated by wide availability of an educated, relatively inexpensive labour force; the reduction of unemployment due to the growth of the migrant labour force; unemployment insurance and other social protection programs for workers dismissed for economic reasons; and increasing wages and living standards. According to the OECD, the Czech Republic is considered to be one of the countries with the lowest poverty and unemployment rates, as well as the lowest income inequality in OECD countries caused by taxes (OECD, 2018).

Despite the improvement in labour productivity, it is lagging behind the OECD average. This is due to the problems associated with the economic downturn during the pandemic. Some innovative developments in the business environment and investment in the industry are not strong enough and are burdensome for tourism development.

The assessment of the scientific potential of the development of the tourism industry in Prague is presented in Tab. 4.

$$P_{sc} = \sum P_i * W_i \tag{8}$$

where: P_{sc} – the level of scientific activity of the tourism industry in Prague; P_i – an expert assessment of the use of scientific potential of the tourism industry element in Prague (points); W_i – the weighting coefficient of the scientific potential.

$$P_{sc} = 0.48 + 1.98 + 1.36 + \\ + 1.36 + 1.6 + 1.6 = 8.38 \tag{9}$$

It is advisable to assess the level of scientific potential of the tourism industry in Prague on the following scale: 0 to 5.5 – low level, 5.5 to 8.0 – medium level, and from 8.1 to 12.0 – high level. The analysis showed that the tourism industry in Prague has a level of scientific potential activity of 8.38.

Tab. 4:	Expert assessment of the scientific potential of development of the tourism industry in Prague – Part 1

Components	Parameters	Weight	Prague	
			Points (1–3)	Balanced assessment
1. The country's scientific organizations	1.1 The number of organizations performing research by city and region of the country (units)	0.16	3	0.48
	Final score		3	
2. Total number of scientific staff	2.1 Number of employees of scientific organizations	0.18	3	1.98
	2.2.Number of employees performing research in the tourism industry		3	
	2.3. Number of PhDs employed in the tourism industry		3	
	2.4. Number of doctors of science employed in the tourism industry		2	
	Final score		11	
3. Financing of scientific work performed in the tourism industry	3.1 Volume of scientific work performed in the tourism industry, total (thousand CZK)	0.17	2	1.36
	3.2 Expenditures on research and development in the tourism industry (CZK million)		3	
	3.3 Domestic current expenditures on research and development in the tourism industry (CZK million)		3	
	Final score		8	
4. Effectiveness of scientific works performed in the tourism industry (%)	4.1 The number of completed tourism works in the tourism industry (copies)	0.17	3	1.36
	4.2 The number of printed works in the tourism industry (copies)		2	
	4.3 The number of applications for copyright protection in patent offices (copies)		3	
	Final score		8	
5. International activities of scientific organizations	5.1 The number of researchers' trips outside the country (persons)	0.16	3	1.60
	5.2 The number of international conferences organized by organizations (units)		3	
	5.3 The number of grants received for research from international funds (copies)		2	
	5.4 The number of researchers who used the grant (persons)		2	
	Final score		10	

Tab. 4: Expert assessment of the scientific potential of development of the tourism industry in Prague – Part 2

Components	Parameters	Weight	Prague	
			Points (1–3)	Balanced assessment
6. Creation and use of advanced technologies and intellectual property	6.1 The number of advanced technologies created and used in the tourism industry	0.16	2	1.60
	6.2 The number of all inventions and utility models used in production		2	
	6.3 Distribution of authors of intellectual property objects in the tourism industry (units)		3	
	6.4 Distribution of rationalization proposals in the tourism industry (persons)		3	
	Final score		10	
Weighted average final score			**8.38**	

Source: own

The results of assessing scientific potential for the development of the tourism industry in Prague indicate the promotion of tourism infrastructure development in the city and the need to ensure the sufficiency and quality of human capital for R&D.

3.3 Assessment of the integral indicator of the smart specialization potential of the tourism industry in the Czech regions

Having studied the activity of the tourism industry in Prague through the potential of development of innovation, economic and investment, social, and scientific components, the integral indicator of the smart specialization potential was determined to be 8.99. This is a high level on the evaluation scale.

Tab. 5 shows the integral indicator of the potential for smart specialization of the tourism industry by the Czech regions.

Based on the results of the expert assessment, an integral indicator of the smart specialization potential of the tourism industry in the Czech regions was calculated. The integral indicator of the smart specialization potential of the tourism industry in the Czech regions can be ranked as follows: 0 to 5.5 – low level, 5.5 to 8.0 – medium level, 8.1 to 12.0 – high level.

Having calculated the integral indicator of the smart specialization potential of the tourism industry in the regions of Czechia on the basis of statistical data and expert opinion, it was found that the highest indicator of the tourism

industry potential is in the city of Prague. Prague has 8.99 points. The lowest indicator was determined in the Pardubice region – 1.72 points. Thus, the integral indicator of the smart specialization potential allows to determine the level of tourism industry development tourism industry in a specific region, to divide regions into groups (clusters) according to the level of the tourism industry development. This makes it possible to determine directions and prospects for the tourism industry development in each region and distribute the amounts of state and grant funding.

3.4 Ways to implement smart specialization in Czech tourism

The development of the Czech economy requires introducing an effective mechanism for achieving positive trends in the competitiveness of the country's regions. International experience has shown that a promising tool for achieving this goal can be smart regional specialization, which consists of a detailed in-depth study of the competitive advantages of a particular territory and, on this basis, a thorough development of an action plan in order to maximize efforts and improve the competitiveness of the region in the chosen area. The study has led to the conclusion that today, in Czechia, it is necessary to control the planned tourism development measures for the studied tourism development strategies in the Czech regions.

The analysis of the volume of investment support for the implementation of Czechia's

| Tab. 5: | Integral indicator of the potential for smart specialization of the tourism industry by the Czech regions | |

Czech regions	Integral indicator
Prague (the capital)	8.99
South Moravian	6.67
Hradec Králové	5.04
South Bohemia	5,03
Cantral Bohemia	4.07
Karlovy Vary	3.97
Liberec	3.82
Moravian-Silesian	3.43
Pilsen	2.74
Zlín	2.76
Olomouc	2.51
Vysočina	2.21
Ústí nad Labem	2.00
Pardubice	1.72

Source: own

smart specialization strategy leads to the conclusion that the EU, through a number of programs and projects, constantly supports financially the implementation of smart strategies in Czechia. Czechia's smart development strategy includes a financial budget for annual use, which is distributed according to its intended purpose.

Also, the Czech Tourism Development Strategy for 2021–2030 sets out indicative financial limits for the Czech Strategy implementation at the expense of the MMF budget (one year), see Tab. 6.

According to Research, Development and Innovation Council (2019), the estimated allocation of Czech travel agencies for tourism development in Czechia for the year is CZK 562 million (euro exchange rate 25.295 on January 15, 2025; Czech National Bank). The integral indicator of the potential of smart

| Tab. 6: | Estimated financial support for the implementation of Czechia's Smart Strategy at the expense of the MMF budget for 2021–2027 | |

Priority headings/ measures	Allocation for strategy implementation in CZK million/year* MMR budget
Utilizing intellectual solutions in data sharing, information sharing, best practice examples	11
MIS 1	1
Connecting DMO and MIS information systems/e-tourist (one-time cost)	5
Conferences (e.g., TTD, Cr Forum, 360°), seminars, workshops, educational events, exchange of experience	5
Total	**22**

* Euro exchange rate 25.295 on January 15, 2025 (Czech National Bank)

Source: Ministry of Industry and Trade (2021)

specialization of the tourism industry by regions of Czechia allows for optimization of the distribution and redistribution of funding by region. Regions with a low value of the integrated indicator of the tourism industry smart specialization potential need additional research on improving the tourism industry state in the region and additional funding if necessary.

Therefore, the main ways to introduce smart specialization in the Czech tourism industry are as follows: i) financing and support for the implementation of smart strategies in Czechia; ii) creating modern business models with the right regulatory framework; iii) use of modern digitalization, support of citizens by the government according to the theory of change; and iv) providing infrastructure in accordance with standards for the development and effective operation of smart solutions (But et al., 2023).

Smart specialization technologies will increase the tourism potential of Czechia and increase its competitiveness in the tourism market.

3.5 Discussion

Thus, the study results in determining the impact of smart specialization on the Czech tourism industry development using the integral indicator of smart specialization potential. The results obtained indicate the key elements of the tourism industry development under the influence of smart specialization.

As defined above in the theoretical part of the study, scientists have determined that smart specialization in the tourism industry and the economy in general should be based on due consideration of environmental issues (But, 2024a; Šulyová & Kubina, 2022).

The use of smart specialization in European cities is associated with the interconnection of regional authorities with the population, which improves the quality of the urban areas and their impact on the environment (Adamuscin et al., 2016). Such changes are occurring against the backdrop of economic and technological changes caused by the processes of integration and globalization, which are the common challenges that have to be faced in the context of competitiveness and sustainable development of cities.

Using innovative efforts of smart specialization through developed "smart" cities such as Barcelona, Rotterdam, and Vienna, it is indicated to pay attention to the negative changes of climate action. It is necessary to put the environment at the center of development, to protect the smart infrastructure from the impact of climate. There is a growing need to evolve a "smart city" into a "smart sustainable city" by taking into account the interaction between technology and nature, which will facilitate the integration of climate strategies and encourage citizen participation, which is crucial (Fernández & Peek, 2020).

The impact of smart specialization policies is shown in the study by Vanolo (2013). The discourse of the smart city can be a powerful tool for creating compliant subjects and mechanisms of political legitimization. A new vision of smart specialization and the role of private entities and citizens in urban development management is being developed.

Improving the efficiency of management, the quality of life of residents, and tourist experiences is possible through an intelligent approach applied to the processes related to public administration and planning of tourist cities (Ivars-Baidal et al., 2023).

Panyadee et al. (2023) also pointed out that smart specialization innovations are used to improve or assist the ecotourism management system at the destination. At all stages of the journey, technology-based tourism experiences are increasingly helping travellers to co-create values. Ambient intelligence (AmI) tourism is being developed by several new technologies. In addition, technological developments are bringing together a wide variety of stakeholders in the travel industry. Thus, smart technologies help determine the strategic directions of tourism enterprises and their competitiveness.

Thus, a number of problems affect the effectiveness of smart specialization in the Czech tourism industry, namely: i) imperfect legislation; ii) lack of qualified human resources at the municipal level, outdated urban infrastructure, lack of investment for sustainable development of the industry; iii) 50% of the population is not familiar with available mobile applications that improve the quality of life; and iv) the sufficiency and quality of human capital for R&D.

Therefore, we can state that the development potential of the Czech tourism industry depends on the interaction of local assets, potential markets, social challenges, business, and politics. The development of the Czech tourism industry is based on the revival of the ecosystem, the development of rural and peripheral regions, the wise use of information and communication

technologies, innovative strategies, a qualified regional labour force, knowledge, increased cooperation between different levels of government and stakeholders, and mechanisms of political legitimization in urban development management.

Further research will be aimed at creating a multidimensional strategy capable of utilizing the knowledge-intensive dynamics of cooperation within the EU's Neighbourhood Policy to introduce innovations in the "smart" tourism sector.

Conclusions

Based on the results of the study, the potential for the development of the Czech tourism industry on the basis of smart specialization is assessed. At the same time, a methodological approach is proposed using an integral indicator of the potential of smart specialization. This indicator is based on the results of assessing the social, economic and investment, scientific, and innovative potentials of the tourism industry in Czechia. The expert assessment has shown a high level of activity of the tourism industry in Prague due to its innovative, economic, investment, social, and scientific potentials.

The results of assessing the integral indicator of the smart specialization potential of the tourism industry in the regions of Czechia allow comparing the performance of individual regions within the tourism industry, the indicators of the industry development with the indicators of individual regions and allow to optimize the distribution and redistribution of funding by region. It is determined that the smart specialization potential of the tourism industry in Prague is high. The smart specialization potential of the tourism industry in the South Moravian, Hradec Králové, and South Bohemia regions is of an average level. The tourism potential of the remaining regions is low.

In addition, the integral indicator of smart specialization potential can be used as a tool for allocating investment resources to ensure the development of the Czech tourism industry and its regions. Regions with a low value of the integrated indicator of the tourism industry smart specialization potential need additional research on improving the tourism industry state in the region and additional funding if necessary.

The ways of introducing smart specialization into the Czech tourism industry, which will help to improve the country's image in order to attract tourists, are identified: i) financing and support for the implementation of smart strategies in Czechia; ii) creating modern business models with the right regulatory framework; iii) use of modern digitalization, support of citizens by the government according to the theory of change; and iv) providing infrastructure in accordance with standards for the development and effective operation of smart solutions.

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