Analysis of Factors Influencing the Development of Health and Wellness Tourism in the Context of Sustainable Urban and Regional Development in Uzbekistan

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Abstract. This study examined the role and significance of wellness tourism in the advancement of sustainable urban and regional development in Uzbekistan. The combination of healthcare, environmental sustainability and economic development that characterizes wellness tourism ensures sustainability not only at the local level but also at the regional level. The study aims to study the main factors influencing the demand for wellness tourism in Uzbekistan and its role in regional sustainable development. The relationship of wellness tourism with economic, demographic and tourism-related factors was assessed using the OLS regression model based on data from the Agency for Statistics of the Republic of Uzbekistan for 2010–2023. The results showed that the most important factors in the demand for wellness tourism are population income, the volume of healthcare services, domestic and inbound tourism. An increase in these factors significantly contributes to higher demand for wellness tourism. At the same time, increasing the number of new sanatoriums and resorts does not directly affect the demand for wellness tourism. On the contrary, it is more important to increase the capacity of existing sanatoriums and improve the quality of service. These results provide useful recommendations for organizations responsible for state policy, investors and tourism specialists.

Keywords: Wellness Tourism · Sustainable Development · Sanatorium-Resort Services · Domestic Tourism · Inbound Tourism

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1 Introduction

In recent years, health and wellness tourism has become an important part of how cities and regions can develop in a way that is good for the environment and society. This type of tourism combines healthcare services with travel experiences. According to the Global Wellness Institute (GWI), the global wellness tourism market was valued at 650.7 billion USD in 2022 [1]. The GWI anticipates that the market will reach 1.4 trillion USD by 2027 [1]. It does not only help the economy but also protects the environment and improves the well-being of society [2–4]. In many countries, wellness tourism is seen as an important sector that helps the local economy, supports public health initiatives, and creates international cooperation in the medical and hospitality industries. Uzbekistan is a country with great potential for wellness tourism [5]. The country's rich natural resources, healing springs, balneological sanatoriums and traditional medicine methods serve as a solid foundation for the development of wellness tourism [6]. However, this sector is not yet fully developed in Uzbekistan. Identifying the key factors influencing the demand for wellness tourism services is crucial for formulating effective development strategies.

Wellness tourism has been widely studied in terms of the interaction between economic development, healthcare infrastructure, and tourism demand [7, 8]. Studies show that quality healthcare services have a significant impact on the demand for wellness tourism [9, 10]. Domestic tourism is an important factor in the sustainability of this sector, and the preference of domestic tourists for short-distance travel increases the demand for wellness tourism [11]. At the same time, it has been observed that international wellness tourists tend to choose high-quality sanatoriums and natural healing resorts [9, 12]. However, empirical research on the factors influencing the demand for wellness tourism in Uzbekistan is lacking. This study aims to fill this gap by empirically assessing the impact of economic, demographic and other factors on wellness tourism.

This study aims to analyze the factors influencing the growth of wellness tourism in Uzbekistan and assess its role in sustainable regional development. Using the OLS regression model, the impact of factors such as population, income, number and capacity of sanatoriums, volume of health services and the level of domestic and foreign tourism on the demand for wellness tourism is assessed. A deeper understanding of this relationship provides important recommendations for state policymakers, entrepreneurs, and investors in the development of wellness tourism.

The analysis of the most influential factors that shape wellness tourism demand is beneficial to scholars and practitioners alike. While wellness tourism is a subject in international tourism studies, there is not enough focus on its particulars in Uzbekistan. This research hopes to fill that by providing actionable and data-informed strategies on how the sector can achieve growth and sustainability.

2 Materials and Methods

We use annual data from the Statistics Agency of Uzbekistan for the period 2010 to 2023 to identify factors influencing the number of people accommodated in sanatorium-resort institutions and recreation organizations (SanAccom) in Uzbekistan. The dataset

includes key economic, demographic, and infrastructural variables expected to influence SanAccom. Table 1 provides an overview of these variables, their definitions, and units of measurement.

Table 1. Determinants of sanatorium-resort accommodation demand.

Acronym	Variable name	Unit of measure
SanOrg	Number of sanatorium-resort facilities and recreational organizations	Units
SanPlace	Number of available places in sanatorium-resort facilities and recreational organizations	Thousand units
Income	Real total income per capita	Thousand UZS
Population	Permanent population	Thousand people
RecBases	Number of recreational centers and tourist bases	Units
HospBeds	Number of hospital beds per 10,000 people	Units
HealthServ	Volume of healthcare services	Billion UZS
DomTourism	Domestic tourism	Persons
InbTourism	Inbound tourism	Persons
SanAccom	Number of people accommodated in sanatorium-resort institutions and recreation organizations	Thousand units

Before conducting regression analysis, it is necessary to examine the distribution of the main variables used in the study. Table 2 presents descriptive statistics for each variable for the period 2010–2023.

Table 2. Descriptive statistics of the variables.

Variable	Obs	Mean	Std Dev	Min	Max
SanAccom	14	582.871	157.432	285.6	887.4
SanOrg	14	414.714	85.725	278	591
SanPlace	14	57.857	13.592	34.7	99.5
Income	14	7834.107	5079.274	2038.7	18201.2
Population	14	33.914	12.858	16.9	72.3
RecBases	14	217	56.907	132	298
HospBeds	14	45.014	2.514	41.1	47.9
HealthServ	14	2565.921	2568.41	258	8621.7
DomTourism	14	348884.43	179968.62	150233	728581
InbTourism	14	184489.36	85112.557	21693	348731

The Income has high standard deviations from the mean, indicating a significant change in per capita income over time. Similarly, SanAccom ranges from 285.6 to 887.4 thousand, indicating a shift in the demand for wellness tourism. However, there was a sharp decline in 2020, when the number decreased to 285,600, primarily due to the COVID-19 pandemic and the associated travel restrictions. The sector recovered in the following years, reaching 887,400 in 2023 (Fig. 1)

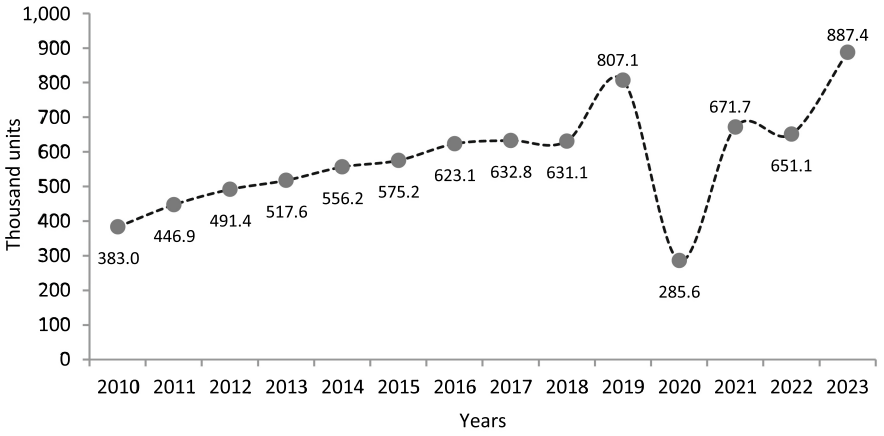

Fig. 1. Number of people accommodated in sanatorium-resort institutions and recreation organizations in Uzbekistan (2010–2023). Source: Statistics Agency of Uzbekistan

We can see that the variables DomTourism and InbTourism vary significantly, in particular, the number of DomTourism ranging from 150,233 to 728,581 and InbTourism ranging from 21,693 to 348,731 (Table 2). This variability reflects trends in tourism demand, potentially influenced by economic conditions, policy changes, and infrastructure development. In particular, DomTourism and InbTourism showed steady growth until 2019, before experiencing a sharp decline in 2020 due to COVID-19 restrictions. However, the variables have recovered significantly in the following years as the pandemic restrictions have eased (Fig. 2)

To analyze the relationship between SanAccom and the independent variables, we use the ordinary least squares (OLS) regression model. OLS is widely used to estimate linear relationships between a dependent variable and multiple independent variables due to its efficiency and interpretability [13]. The general form of the model is expressed as follows:

$$SanAccom_t = \beta_0 + \sum_{i=1}^{9} \beta_i X_{i,t} + \varepsilon_t \quad (1)$$

where: $SanAccom_t$ – Number of SamAccom at time t; $X_{i,t}$ – the explanatory variables from Table 1; β_i – the coefficients showing how much each explanatory variable influences SanAccom; ε_t – the error term, which accounts for other factors not included in the model.

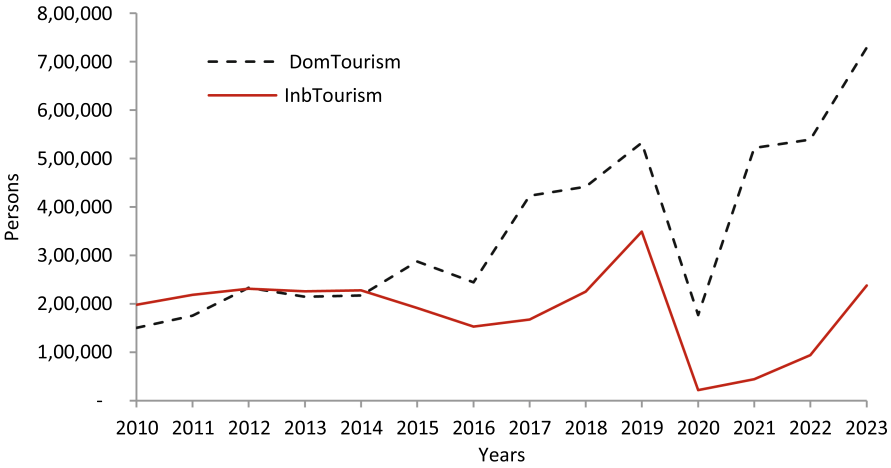

Fig. 2. Trends domestic tourism and inbound tourism in Uzbekistan (2010–2023). Source: Statistics Agency of Uzbekistan.

Regression analysis is performed using Stata 17 statistical software, which provides robust estimation and standard diagnostic tests for model validation. During the research, we test the following hypotheses:

H_0 – the factors in Table 1 do not have a statistically significant effect on SanAccom;
H_1 – the factors in Table 1 do have a statistically significant effect on SanAccom.

These hypotheses are tested using OLS regression. Robustness checks, including multicollinearity tests, heteroskedasticity tests, and residual analysis, will be performed to ensure the reliability of the results.

3 Results

Before conducting regression analysis, a correlation matrix (Table 3) was created to assess the relationships between variables.

To ensure the reliability of the regression analysis, it is necessary to resolve the multicollinearity problems between independent variables. To detect multicollinearity, we conducted a correlation analysis using the Chaddock scale [14], which classifies correlation coefficients above 0.7 as strong multicollinearity. From the correlation matrix (Table 3), we observed a high correlation (above 0.7) between several independent variables, particularly between Income and HealthServ (0.988), Income and DomTourism (0.847), Population and SanPlace (0.879) and DomTourism and SanAccom (0.888). To address this, we constructed three separate models, each incorporating different sets of independent variables to avoid severe collinearity while preserving the explanatory power of the regression. Furthermore, variables with low correlation (below the 10% critical value of 0.3613) with the dependent variable (SanAccom) such as Population (0.056), RecBases (0.058), and HospBeds (−0.099) were excluded from the regression models, as their inclusion would not meaningfully contribute to the explanation of wellness tourism demand.

Table 3. Matrix of correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) SanAccom	1.000									
(2) SanOrg	0.563	1.000								
(3) SanPlace	0.373	0.068	1.000							
(4) Income	0.598	0.608	0.446	1.000						
(5) Population	0.056	-0.341	0.879	0.007	1.000					
(6) RecBases	0.058	0.573	-0.077	-0.136	-0.104	1.000				
(7) HospBeds	-0.099	-0.067	0.006	0.320	-0.128	-0.499	1.000			
(8) HealthServ	0.618	0.578	0.379	0.988	-0.064	-0.235	0.374	1.000		
(9) DomTourism	0.888	0.614	0.436	0.847	0.036	-0.041	0.205	0.856	1.000	
(10) InbTourism	0.386	0.161	-0.370	-0.333	-0.345	0.236	-0.094	-0.271	0.086	1.000

Note: 10% critical value (two-tailed) is 0.3613 n = 14

The first regression model (Table 4) examines the impact of SanOrg, SanPlace, Income and InbTourism on SanAccom. The model explains 82.7% (R2 = 0.827) of the variation in wellness tourism demand.

Table 4. The results of (SanAccom | SanOrg, SanPlace, Income, InbTourism) OLS model.

SanAccom	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
SanOrg	-0.008	0.373	-0.02	0.984	-0.851	0.836	
SanPlace	3.902	1.891	2.06	0.069	-0.376	8.179	*
Income	0.022	0.007	3.08	0.013	0.006	0.038	**
InbTourism	0.001	0.000	4.38	0.002	0.001	0.002	***
Constant	-62.994	170.227	-0.37	0.720	-448.075	322.086	
Mean dependent var		582.871	SD dependent var			157.432	
R-squared		0.827	Number of obs			14	
F-test		10.793	Prob > F			0.002	
Akaike crit. (AIC)		165.742	Bayesian crit. (BIC)			168.938	

*Note: *** p<0.01, ** p<0.05, * p<0.1*

According to the results of model 1, SanOrg (p = 0.984) is statistically insignificant, indicating that the number of sanatorium-resort facilities does not directly increase the number of visitors. SanPlace is marginally significant ($p < 0.1$), implying that facility capacity expansion positively affects accommodation numbers. Also, Income (p = 0.013) and InbTourism (p = 0.002) are statistically significant ($p < 0.05$), confirming that rising Income and InbTourism positively influence wellness tourism demand.

In the second model, HealthServ is added as a predictor (Table 5). The model slightly improves explanatory power (R2 = 0.829), reinforcing that quality and availability of healthcare services are essential determinants of sanatorium-resort utilization.

The results indicate that an increase in healthcare services significantly enhances wellness tourism demand, with a statistically significant effect at the 5% level.

The final model replaces Income and HealthServ with DomTourism to evaluate its impact on SanAccom (Table 6).

Table 5. The results of (SanAccom | SanOrg, SanPlace, HealthServ, InbTourism) OLS model.

SanAccom	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
SanOrg	0.128	0.340	0.38	0.716	-0.642	0.898	
SanPlace	4.498	1.815	2.48	0.035	0.393	8.604	**
HealthServ	0.038	0.012	3.11	0.012	0.010	0.065	**
InbTourism	0.001	0.000	4.25	0.002	0.001	0.002	***
Constant	-61.392	169.453	-0.36	0.725	-444.722	321.939	
Mean dependent var		582.871	SD dependent var			157.432	
R-squared		0.829	Number of obs			14	
F-test		10.924	Prob > F			0.002	
Akaike crit. (AIC)		165.602	Bayesian crit. (BIC)			168.797	

*Note: *** p<0.01, ** p<0.05, * p<0.1*

Table 6. The results of (SanAccom | SanOrg, SanPlace, DomTourism, InbTourism) OLS model.

SanAccom	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
SanOrg	0.036	0.250	0.15	0.887	-0.528	0.601	
SanPlace	2.082	1.537	1.35	0.209	-1.395	5.56	
DomTourism	0.001	0.000	4.94	0.001	0.000	0.001	***
InbTourism	0.001	0.000	3.30	0.009	0.000	0.001	***
Constant	83.238	136.845	0.61	0.558	-226.328	392.804	
Mean dependent var		582.871	SD dependent var			157.432	
R-squared		0.905	Number of obs			14	
F-test		21.311	Prob > F			0.000	
Akaike crit. (AIC)		157.463	Bayesian crit. (BIC)			160.658	

*Note: *** p<0.01, ** p<0.05, * p<0.1*

DomTourism and InbTourism are highly significant ($p < 0.01$), emphasizing that both domestic and inbound tourism are crucial drivers of wellness tourism demand. The results indicate that the model achieves the highest explanatory power ($R2 = 0.905$), indicating that tourism variables explain over 90% of the variations in wellness tourism accommodation.

In this study, Variance Inflation Factor (VIF) values were calculated for the three models above to check whether there was a multicollinearity problem. The results showed that none of the variables exceeded the threshold value of $VIF < 5$ [15], which means that multicollinearity is not a serious problem. Although the highest VIF values were recorded for the variables Income (2.67), HealthServ (2.07) and DomTourism (2.25), they remained within the acceptable range. The average VIF values for the three models ranged from 1.64 to 1.93, confirming that there was no strong correlation between the independent variables. Thus, the results indicate that the regression estimates are reliable and do not suffer from significant bias due to multicollinearity.

4 Discussion

The results of this study helped to identify the main factors influencing the development of wellness tourism in Uzbekistan. The results of the research showed that domestic tourism has a greater impact on the demand for wellness tourism than inbound tourism. That is, the main customers of sanatoriums and resorts are local travelers because local tourists prefer short-distance trips [16, 17]. Therefore, to stimulate domestic tourism, it is necessary to implement programs to increase subsidies, discounts for local tourists, and transport amenities. At the same time, advertising campaigns and visa facilitation measures should be taken to attract international tourists.

The results of the study show that an increase in the income of the population leads to an increase in the demand for wellness tourism. People with higher incomes invest more in their health and are more likely to use sanatorium services [11]. Therefore, economic policies aimed at increasing the real income of the population, especially measures to support the middle-income group, will help develop wellness tourism.

The study found that the availability of quality medical services plays an important role in the development of wellness tourism. Scientific research confirms that the availability of quality medical services is an important factor for the development of wellness tourism [10, 18, 19]. Investments in healthcare infrastructure, ensuring that sanatoriums meet international standards, and expanding cooperation with medical centers play an important role in the development of wellness tourism. To attract international clients, it is necessary to develop medical tourism programs and introduce certified wellness programs.

The study showed that increasing the number of new sanatoriums and resorts does not directly affect the demand for wellness tourism. On the contrary, it is more important to increase the capacity of existing sanatoriums and improve the quality of service. Smith and Puczkó [12] also noted the importance of adapting sanatoriums and rehabilitation centers to world standards for the growth of wellness tourism. Therefore, state policy in the development of wellness tourism should be aimed at modernizing existing sanatoriums, improving the quality of service and introducing innovative medical and health programs. In addition, the integration of digital health services into wellness programs can increase guest convenience and further stimulate demand for wellness tourism.

5 Conclusion

This study aimed to study the main factors influencing the demand for wellness tourism in Uzbekistan. Based on the OLS regression model, the most important factors determining the demand for wellness tourism were identified, and the results were evaluated on a scientific basis.

The results of the study showed that domestic tourism, foreign tourism, population income and health services are the main driving factors of wellness tourism. In particular, it was found that domestic tourism has the greatest impact on the demand for wellness tourism, and it was emphasized that it is necessary to strengthen measures to attract domestic tourists. Also, an increase in population income and improvement of health services directly affect the increase in the demand for wellness tourism, which indicates the importance of economic development and investment in medical infrastructure.

One of the important conclusions is that it is more important to increase the capacity and improve the quality of service of sanatoriums than to increase the number of sanatoriums. Simply building new sanatoriums will not lead to an increase in the demand for wellness tourism. On the contrary, modernizing existing infrastructure, improving the quality of service, and expanding sanatorium capacity can yield more effective results.

Based on the results, the following policy recommendations are put forward:

- Develop special programs for the development of domestic tourism, including supporting tourist destinations, providing incentives and discounts, and improving transport infrastructure;
- Invest in health services and integrate wellness programs with high-quality medical services to develop medical and wellness tourism;
- Make sanatorium services more accessible and affordable for a wide range of the population, especially for middle-income groups;
- Prioritize quality over quantity, i.e. improve existing sanatoriums and recreation facilities in accordance with modern requirements and increase the level of services.

This study provides empirically based recommendations for the development of wellness tourism, enabling government agencies, entrepreneurs, and investors to make scientifically sound decisions. With the right strategies and targeted investments, Uzbekistan can become one of the leading countries in the region in the development of wellness tourism, attracting not only domestic but also international tourists.

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References

1. BridgetGWI: A Decade of Wellness Tourism: First-Ever Compilation of 10+ Years of Market Data. https://globalwellnessinstitute.org/global-wellness-institute-blog/2024/03/25/a-decade-of-wellness-tourism-first-ever-compilation-of-10-years-of-market-data/. Accessed 06 Feb 2025
2. Caciora, T., et al.: Digitization of the built cultural heritage: an integrated methodology for preservation and accessibilization of an art nouveau museum. Remote Sens. **15** (2023). https://doi.org/10.3390/rs15245763
3. Wendt, J.A., et al.: Natural sources in preventive conservation of naturally aged textiles. Fibres Text. Eastern Europe (2021). https://doi.org/10.5604/01.3001.0014.9309
4. Ilies, D.C., et al.: Indoor air quality perception in built cultural heritage in times of climate change. Sustainability **15** (2023). https://doi.org/10.3390/su15108284
5. Safarov, B., et al.: Prospects of agrotourism development in the region. Economies **12** (2024). https://doi.org/10.3390/economies12120321
6. Yelizarov, M.G.: Development of recreation in improving the health of the population. Acad. J. Digit. Econ. Stabil. **37**, 58–63 (2024). https://doi.org/10.51699/economics.v37i3.125

7. Zhong, L., Deng, B., Morrison, A.M., Coca-Stefaniak, J.A., Yang, L.: Medical, health and wellness tourism research—a review of the literature (1970–2020) and research agenda. Int. J. Environ. Res. Public Health **18**, 10875 (2021). https://doi.org/10.3390/ijerph182010875
8. Mukhammedov, M., Safarov, B., Hasanov, H., Isxakova, S., Buzrukova, M., Hassan, T.H.: Methods for optimizing property relations as a key aspect of stimulating the development of the tourism industry. Geojournal Tourism Geosites **58**, 484–491 (2025). https://doi.org/10.30892/gtg.58145-1430
9. Dimanche, F., Andrades, L.: Health and wellness tourism. In: Tourism in Russia: A Management Handbook. Emerald Group Publishing (2015)
10. Pan, H., Mi, H., Chen, Y., Chen, Z., Zhou, W.: Measurement and evaluation of the development level of health and wellness tourism from the perspective of high-quality development. Sustainability. **16**, 8082 (2024). https://doi.org/10.3390/su16188082
11. Lee, T.J., Han, J.-S., Ko, T.-G.: Health-oriented tourists and sustainable domestic tourism. Sustainability **12**, 4988 (2020). https://doi.org/10.3390/su12124988
12. Smith, M., Puczkó, L.: Health, Tourism and Hospitality: Spas, Wellness and Medical Travel. Routledge (2014)
13. Burton, A.L.: OLS (linear) regression. In: The Encyclopedia of Research Methods in Criminology and Criminal Justice. pp. 509–514. Wiley (2021). https://doi.org/10.1002/9781119111931.ch104
14. Chaddock, R.E.: Principles and Methods of Statistics (1925)
15. Studenmund, A.H.: Using Econometrics a Practical Guide. Pearson Education Limited (2014)
16. Nyaupane, G.P., Graefe, A.R.: Travel distance: a tool for nature-based tourism market segmentation. J. Travel Tour. Mark. **25**, 355–366 (2008). https://doi.org/10.1080/10548400802508457
17. Xue, L., Zhang, Y.: The effect of distance on tourist behavior: a study based on social media data. Ann. Tour. Res. **82**, 102916 (2020). https://doi.org/10.1016/j.annals.2020.102916
18. Aydin, G., Karamehmet, B.: Factors affecting health tourism and international health-care facility choice. Int. J. Pharm. Healthc. Mark. **11**, 16–36 (2017). https://doi.org/10.1108/IJPHM-05-2015-0018
19. Safarov, B., Janzakov, B.: Measuring competitiveness in tourism enterprises using integral index. GeoJournal Tourism Geosites **37**, 768–774 (2021). https://doi.org/10.30892/gtg.37305-707