

Digital economy drives tourism development—empirical evidence based on the UK

Rui Tang

To cite this article: Rui Tang (2023) Digital economy drives tourism development—empirical evidence based on the UK, Economic Research-Ekonomska Istraživanja, 36:1, 2003-2020, DOI: [10.1080/1331677X.2022.2094443](https://doi.org/10.1080/1331677X.2022.2094443)

To link to this article: <https://doi.org/10.1080/1331677X.2022.2094443>



© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 12 Jul 2022.



Submit your article to this journal [↗](#)



Article views: 3532



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 6 View citing articles [↗](#)

Digital economy drives tourism development—empirical evidence based on the UK

Rui Tang 

Academy of Strategy for Innovation and Development, Anhui University, Hefei, China

ABSTRACT

The digital economy has become a driving force in global tourism development. The data from 2011 to 2019 is used to study the influence of the digital economy on tourism in the UK. It is found that the digital economy of each country (region) had a driving effect on the UK's tourism with a marginal increasing trend. Heterogeneity tests show that the digital economy had positive effect on the tourism business and holiday market, and the increasing level of digital economy in Europe and OECD countries also contributed to the development of tourism in the UK. According to the influence mechanism, the digital economy of various countries (regions) could promote the tourism development by improving the quality of the regime, strengthening market control capability and increasing freedom of trade. Finally, relevant suggestions were put forward from the perspectives of government regulation, digital infrastructure construction, and applications of digital technology.

ARTICLE HISTORY

Received 23 November 2021

Accepted 21 June 2022

KEYWORDS

Digital economy; UK; tourism source countries (regions); tourism segmented markets; influence mechanism

JEL CODES

Z31; Z32; R11

1. Introduction

The digital economy emerged on the basis of the rapid development of digital technologies such as artificial intelligence, cloud computing, and mobile communications (Brennen & Kreiss, 2016). The proliferation of digital technologies has contributed to their 'ubiquity' (Robert et al., 2021). The digital economy helps countries around the world to switch their economic development momentum and improve total factor productivity (Hu et al., 2021). Numerous countries are focusing on digital economy and fostering it as an engine of economic development (Nakatani, 2021). The global digital economy has increased from 40.3% of GDP in 2018 to 41.5% of GDP in 2019 and its contribution to the global economy continues to grow.¹ Both developed and developing countries have seen varying degrees of growth in the digital economy, which helped to narrow the global economic gap and drive the economic recovery (Legowo, et al., 2021). As the digital economy relies on the ever-changing Internet technology with features such as industrial model innovation and inclusive growth, it

CONTACT Rui Tang  1079505255@qq.com

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

will become the field with the greatest potential and fastest development in the future (Jinghua & Xianmei, 2021) and possesses a non-negligible role in achieving rapid economic development.

Along with the transmutation of experiencing way and consumption concept, big data, short video and virtual reality give rise to the new tourism business models, accelerating the innovation of tourism consumption scenario and the formation of customized consumption mode, which strongly promotes the high-end tourism industry (Maslova et al., 2020). The UK is a key region influencing global tourism development with its rich tourism resources and strong consumer market. In 2019, the number of inbound tourist arrivals to the UK was 39.4million, ranking 9th in the world and 5th in Europe. Total tourism receipts were 52.7 billion USD, after the US (199.4 billion USD), Spain (79.7 billion USD) and France (63.5 billion USD). The receipts per arrival was 1338 USD, after the US (2510 USD), Thailand (1500 USD) and Japan (1445 USD),² meaning that the inbound tourism market of UK is globally competitive. The inbound tourism source countries (regions) of UK are distributed around the world and all have been greatly influenced by the digital economy. The improvement of digital economy in different tourism source countries (regions) not only promotes the development of outbound tourism, but also strengthens the connection of tourism trade between countries (regions) and the UK, which is of great significance to the global tourism prosperity. This paper takes different inbound tourism source countries (regions) in the UK as research subjects and examines the effects and mechanisms of the digital economy in each country (region) on the UK tourism industry, it is found that the digital economy of different inbound tourist source countries (regions) had a positive influence on the tourism development of the UK, and the influence varies greatly in different tourism segmented markets and types of countries (regions). The main contributions of this paper are as follow. a) The inclusion of the digital economy in the analytical framework of tourism development, which enriches the understanding of the factors influencing tourism development. b) The heterogeneous influence of the digital economy on the tourism segmented market in each country (region) is studied, along with the role of the digital economy in different types of countries (regions). c) The influence mechanism of the digital economy on tourism development is explored in depth, which is conducive to further clarifying their intrinsic connection and grasping the interaction law between them.

The remainder of this paper is organized in the following manner. The next section is literature review. Section 3 introduces the model settings, variable descriptions and data sources. Section 4 is the empirical part, which includes benchmark regression, heterogeneity test, endogeneity and robustness test. Finally, Section 5 concludes the analysis.

2. Literature review

The digital economy has become a hot research topic after Tapscott first introduced the concept of digital economy in 1996. In 2016, the *G20 Initiative on Development and Cooperation in the Digital Economy* gave a relatively authoritative definition of the digital economy: it is a series of activities that rely on digital knowledge and

information, use information networks as a carrier, and achieve efficiency improvement and economic structure optimization through the effective use of information technology. The digital economy mainly has the following characteristics: First, the information elements that the digital economy depends on are non-exclusive and non-competitive to a certain extent, and users can obtain and exchange information at a relatively low cost (Kim, 2018). Second, unlike traditional economic activities that follow the law of diminishing marginal returns, the expansion of the digital products can serve more users at 'zero marginal cost' and generate network value-added effects (Zhenyu, 2020). Third, the digital economy facilitates the real-time interface between producers and consumers and promotes the transformation of production models to customization and personalization. The network behaviors of consumers can be tracked by big data in the digital era (Kotler et al., 2020). These unique attributes of the digital economy have profound impacts on all areas of the national economy (Carlsson, 2004). The digital economy has widely promoted industrial innovation, enhanced regional innovation efficiency (Sorescu & Schreier, 2021) and corporate entrepreneurial activity (Tao et al., 2020), which facilitates the formation of regional competitive advantages in innovation (Audretsch et al., 2015). The spread of the digital economy alleviates the problem of information asymmetry and enhances market effectiveness (Ancarani & Shankar, 2004). Currently, the digital economy has become an important source of increased profits (Carlan et al., 2017) and labor productivity growth (Vu & Hartley, 2022) in the actual sector of the economy. The increase in the UK's ability to use digital technologies has expanded the scale of product exports (Lee-Makiyama & Verschelde, 2017), increased foreign investment (Driffield & Karoglou, 2019), and enhanced its position in global value chains (Gereffi, 2019). Some scholars also pointed out the disadvantages of the digital economy, where the development of the digital economy leads to industry monopolies (Belykh et al., 2021), which can prevent effective market competition and maximization of consumer welfare (Heng et al., 2020). Cyber security (Leahovcenco, 2021), the lag in institution building (Molchanova et al., 2020) and the decrease in the ability to coordinate with informal governance mechanisms also distort the function of the digital economy (Keller et al., 2021).

The large-scale application of information technology is a prerequisite for the digital economy to drive tourism development (Buhalis & Law, 2008). The investment and construction of digital economy infrastructure represented by ICTs has promoted tourism innovation (Ulrike & Uglješa, 2021) and reshaped the relationship between tourism producers and consumers (Marino & Pariso, 2021). The digital economy contributes to tourism development by increasing total factor productivity, optimizing industrial structure and sharing economic outcomes (Anamaria, 2016). It is imperative to seize the opportunity of the digital economy to promote sustainable tourism development (Jiechang et al., 2020). At the macro level, the digital economy has laid the technological foundation for tourism development and stimulated the growth of tourism demand (Jiang, 2021). At the micro level, the digital economy establishes and maintains a good relationship between tourism firms and consumers by providing high-quality e-services (Laakkonen & Kivivirta, 2021) and enriches consumer choice with technological advantages. Meanwhile, more alternative tourism products and services have been created (Wallsten, 2015), which enhance tourist satisfaction (Shin

et al., 2021). However, the digital economy also has negative impacts on traditional tourism and traditional tourism may suffer in the early stage of new technology application (Zervas et al., 2017), for example, the cost-effective housing offered by Airbnb captures the traditional hotel industry market (Tussyadiah & Pesonen, 2016). But on the other hand, the digital economy will force the traditional tourism to improve the quality of products and services, which in turn increases consumer welfare (Wang & Nicolau, 2017). Thus, it is clear that the digital economy has become an important factor in the tourism development that cannot be ignored.

In summary, many scholars have explored the related academic fields of digital economy and tourism development, which provides a good theoretical foundation for this paper, but the following deficiencies still exist: Firstly, most of the literature only focused on the total effect of the digital economy on tourism, the understanding of the role of the digital economy in different types of segmented market is not clear enough; Secondly, some scholars neglected to discuss the influence mechanism, which makes it difficult to clarify the inner connection between digital economy and tourism, and is not conducive to the formation of scientific knowledge of the interaction rule between them; Finally, there is a paucity of country-specific studies in academia. The UK is not only a leading global digital economy, but also a world-renowned tourism destination, and the UK-based empirical test is more representative. Based on this, this paper studies the heterogeneous effect and influence mechanism of digital economy on tourism with the UK as the research object, hoping to provide a reference basis for decision making for countries around the world to use digital economy to promote tourism development.

3. Model settings, variable descriptions and data sources

3.1. Construction of the indicator system of digital economy

According to the classification of the official website of VisitBritain (<https://www.visitbritain.org/>), there are 54 inbound tourism source countries (regions) in the UK,³ which is the research subject of this paper. The time period of the study is from 2011 to 2019. According to Qi & Ren's (2020) method, the indicator system to measure the development level of digital economy in each country is established from three dimensions: digital infrastructure construction, digital economy development environment, digital economy outward competitiveness, and Table 1 shows the details of the indicator system.

The indicator system of digital economy

Due to the non-uniformity of the scale of different Tier 2 indicators, this paper adopts the entropy weight method to normalize each indicator, and then calculates the final score of each country's digital economy development level. The calculation steps are as follows:

The indicators are standardized based on the extreme difference method.

$$\begin{aligned} Y_{ij} &= (x_{ij} - x_{ij\min}) / (x_{ij\max} - x_{ij\min}) \text{ Positive indicators} \\ Y_{ij} &= (x_{ij\max} - x_{ij}) / (x_{ij\max} - x_{ij\min}) \text{ Negative indicators} \end{aligned} \quad (1)$$

Table 1. The indicator system of digital economy.

Tier 1 indicators	Tier 2 indicators	Data source
Digital infrastructure construction	Mobile telephone subscriptions (per 100 people)	WDI
	Fixed telephone subscriptions (per 100 people)	WDI
	Fixed broadband subscriptions (per 100 people)	WDI
	Individuals using the Internet (% of population)	WDI
	Quality of electricity supply (1–7)	WEF
Digital economy development environment	Intellectual property royalties received (US Dollar)	WDI
	Venture capital availability (1–7)	WEF
	Availability of latest technologies (1–7)	WEF
Digital economy outward competitiveness	Higher education enrollment (% of total population)	WDI
	Communications, computers, etc. as a percentage of service exports	WDI
	High-tech exports as a percentage of manufactured exports	WDI
	ICT product exports as a percentage of total product exports	WDI

Note: WDI is the World Bank’s *World Development Indicators database*, WEF is *The Global Competitiveness Report* published by the World Economic Forum.
Source: author own manual production.

In the equation (1), Y_{ij} is the standardized value of each index, x_{ij} is the actual value of each index, x_{ijmax} and x_{ijmin} are the maximum and minimum values of the index respectively. All indicators are positive indicators.

The entropy weight method continues to be applied to assign weights to the indicators. The entropy weight method can avoid the influence of human subjective factors and retain the original information of indicators, which can better maintain the objectivity of indicators (He et al., 2021). The calculation method is:

$$P_{ij} = Y_{ij} / \sum_{i=1}^m Y_{ij} \quad (i = 1, 2, \dots, m; j = 1, 2, \dots, n) \tag{2}$$

In the equation (2), i is the number of inbound tourism source countries (regions) in the UK, and j is the number of indicators.

$$E_j = -t \sum_{i=1}^m P_{ij} * \ln P_{ij} \quad (i = 1, 2, \dots, m; j = 1, 2, \dots, n) \tag{3}$$

In the equation (3), $t = 1/\ln m$, if $P_{ij} = 0$, then define $\lim_{P_{ij} \rightarrow 0} P_{ij} * \ln P_{ij} = 0$, E_j is the entropy value of the index j , suppose W_{ij} is the entropy weight of the indicator j , the calculation method is:

$$W_{ij} = \frac{1 - E_j}{\sum_{j=1}^n (1 - E_j)} \quad (i = 1, 2, \dots, m; j = 1, 2, \dots, n) \tag{4}$$

The $Digital_i$ indicates the overall score of the digital economy of each inbound tourism source country (region) (the value of $Digital_i$ ranges from 0 to 1, the closer the value is to 1 the more developed the digital economy of the country or region), $Digital_i$ is calculated as follows:

$$Digital_{ij} = \sum W_{ij} \times Y_{ij}, W_{ij} \geq 0, = 1, \quad j = 1, 2, \dots, n \tag{5}$$

3.2. Econometric model setting and variable interpretation

The following econometric model is constructed for empirical test:

$$\begin{aligned} \ln Spend_{it} = & \alpha + \beta_1 \ln Digital_{it} + \beta_2 \ln Digital_{it}^2 + \beta_3 \ln Dis_{it} + \beta_4 \ln Income_{it} \\ & + \beta_5 \ln Env_{it} + \beta_6 \ln Air_{it} + \beta_7 \ln Open_{it} + \mu_{it} + \varepsilon_{it} \end{aligned} \quad (6)$$

Spend is the dependent variable in the above equation and is the total amount of money (£million) spent by visitors to the UK from different source countries (regions). Tourism consumption is reflected in the purchase of tourism products and services, which eventually translates into revenue for the destination. Therefore, tourism consumption can effectively measure the level of tourism development in a place. The data is from *Office for National Statistics, International Passenger Survey* published by website of VisitBritain. *Digital* is the level of digital economy development of each country (region) and is the core explanatory variable. Considering that the digital economy amplifies the effect of network externalities, in line with the ‘Metcalfe’s law’ (Leo, 2016), which states that the value of the network grows at the squared rate of the number of users, the impact of digital economy development on tourism may have a non-linear character, so the squared term of *Digital* is also added to the econometric model. *Dis* is the distance between the UK and different inbound tourism source countries (regions), tourism activity follows the law of ‘spatial decay’ (Voltes-Dorta & Inchausti-Sintes, 2021) and longer distance from the destination reduces the willingness of tourist. The data is from CEPII Databases. *Income* is the income of residents in each country (region), the higher the income, the stronger the propensity to spend on outbound travel, and the income is the basic factor for tourists to travel across borders. GNI per capita is used to measure the income level of residents. *Env* stands for stability of macro environment (The more stable the macro environment is if the value is smaller), tourism activities are extremely sensitive to changes of macro environment and a stable macro environment is a prerequisite for tourism development (Sujatha & Sridhar, 2021). *Air* is tourism traffic, air passenger volume is selected to measure the level of tourism traffic in each country (region) since international tourists mostly rely on air travel (Tang, 2020). *Open* is the degree of external dependence, one country has stronger openness to the world with higher degree of external dependence and is more inclusive and optimistic about international tourism development. Higher external dependence could promote cross-border tourism activities (Rui, 2021) and is measured by total exports and imports as a share of GDP. In addition to the data of *Env* is from the *World Uncertainty Index*, the data of *Income*, *Air*, and *Open* are from WDI. All variables are logarithmic. Table 2 is the descriptive statistics results of each variable.

4. Empirical test

4.1. Benchmark regression test

OLS, LSDV, Fixed effects regression and Comprehensive FGLS are used to perform benchmark regression test, respectively. From Table 3, the estimated coefficients of

Table 2. Descriptive statistics results.

Variable name	Mean	Std. dev	Min	Max
lnSpend	5.444	1.117	2.417	8.375
lnDigital	-1.606	0.554	-3.951	-0.314
lnDigital ²	2.886	2.058	0.099	15.618
lnDis	8.121	1.100	5.780	9.859
lnIncome	9.875	1.118	6.886	11.466
lnEnv	0.568	0.346	0	1.851
lnAir	16.967	1.380	13.568	20.647
lnOpen	-0.496	0.613	-1.771	1.301

Source: author own manual production.

Table 3. Benchmark regression results.

	OLS	LSDV	Fixed effects regression	Comprehensive FGLS
lnDigital	1.640*** (0.250)	0.409*** (0.076)	0.649*** (0.227)	4.918* (2.398)
lnDigital ²	0.477*** (0.065)	0.081*** (0.022)	0.144** (0.060)	0.605*** (1.046)
lnDis	-0.175*** (0.034)	0.038 (0.033)	0.003 (0.031)	0.110 (0.644)
lnIncome	0.351*** (0.047)	0.774*** (0.238)	0.539* (0.293)	0.601** (0.252)
lnEnv	-0.587*** (0.102)	0.046 (0.045)	0.036 (0.049)	-0.402** (0.187)
lnAir	0.406*** (0.030)	0.396*** (0.089)	0.214 (0.129)	0.093 (0.305)
lnOpen	0.152** (0.066)	0.566*** (0.126)	0.567** (0.212)	1.143** (0.469)
Constant	-2.653*** (0.930)	-10.587*** (1.469)	-3.773 (2.857)	0.272 (0.307)
Year effects	Controlled	Controlled	Controlled	Controlled
Country (region) effects	Controlled	Controlled	Controlled	Controlled
R ²	0.569	0.961	0.405	
Prob > F	0.000	0.000	0.000	0.000
Number of observation	486	486	486	486

Note: ***, **, * represent significance levels of 1%, 5%, and 10%, respectively.

Source: author own manual production.

lnDigital and its squared term are significantly positive for either method, indicating that the enhancement of digital economy in different inbound tourism source countries (regions) stimulated tourists' spending and promoted the development of the UK tourism industry, and the promotion effect showed a marginal increasing trend. The digital economy has profoundly changed the way tourism enterprises operate and tourists' travel. Tourism is a typical market-oriented and labor-intensive industry that requires effective supply and demand matching to achieve market clearance, which cannot be achieved without the support of the digital economy (Ramón-Rodríguez et al., 2021). Firstly, the digital economy has reduced the cost of creating, acquiring and exchanging tourism market information, alleviated the problem of information asymmetry, promoted the accurate matching of information in the inbound tourism markets of different countries (regions) and formed a more perfect price mechanism. Secondly, the digital economy has the characteristics of both economies of scale, economies of scope and long-tail economies (Hong, 2018), which is conducive to tapping the potential demand of tourists from different inbound tourism source countries (regions), expanding the effective supply of the UK tourism industry and forming a higher level of market equilibrium. Finally, the 'knowledge spillover'

effect generated by the digital economy improved labor efficiency, accelerated the optimal allocation of tourism production factors, and increased the total factor productivity of the industry (Wenjun & Baowen, 2019). In conclusion, the digital economy has enhanced tourism cooperation across countries, bringing more spin-offs and added value to the tourism industry (Akhtar et al., 2021), which is essential for the UK tourism industry to flourish.

In terms of the controlling variables, the estimated coefficients of *lnIncome*, *lnAir*, *lnOpen* are significantly positive and the estimated coefficients of *lnEnv* is significantly negative, indicating that the growth of residents' income, a stable macro environment, developed air passenger transport, active opening to the world in different tourism source countries (regions) were all conducive to the development of inbound tourism in the UK, and this result is in line with expectations (Massidda et al., 2022). However, most regression methods show that the estimated coefficients of *lnDis* are not significant, indicating that spatial distance is no longer a constraint to the development of cross-border tourism in the UK and other countries (regions).

4.2. Heterogeneity test

Since Comprehensive FGLS takes into account within-group autocorrelation, between-group heteroskedasticity and contemporaneous correlation, which is more efficient in conducting panel data regression (Chuanqing & Ziyi, 2018), so it is used for subsequent empirical tests. Further examining the influence of the digital economy on the tourism segmented markets of the UK (Tourism segmented markets include markets of Business, Holiday, Study, VFR), the tourists spending of each segmented market is taken as the dependent variable and logarithmized. As can be seen in Table 4, the digital economy has contributed to the growth of the business tourism and holiday tourism markets. Business tourism is a kind of strategic tourist product and complimentary product for leisure tourism (Marques & Pinho, 2021). Exhibitions, conferences, negotiations, scientific and cultural exchanges, and political visits can generally be included in business tourism, which requires tourism companies to provide specialized management program solutions to effectively reduce travel costs. Digital technology has improved the efficiency of companies in organizing travel services and enhanced their ability to solve operational problems (Radygina & Okhrimenko, 2020), giving rise to conveniences in the tourism business market. The prevalence of mobile terminals has created ease of access to information, product purchase, and service evaluation for tourists, who tend to use digital technology to select holiday itineraries and book accommodations (Maslova et al., 2020), driving the digitization of the holiday market. Meanwhile, the use of digital technology by holiday product providers has greatly improved the satisfaction of visitor. However, the influences of digital economy on segmented markets of Study and VFR were not obvious.

The last four columns of Table 4 show the influences of the digital economy on the UK tourism industry in European and non-European, OECD and non-OECD countries. European and OECD countries are mostly developed countries with rapidly advancing digital economy, which provides a good technological basis for tourism

Table 4. Test results of heterogeneity test.

	InBusiness	InHoliday	InStudy	InVFR	Europe	Other continents	OECD	Non- OECD
InDigital	1.270* (0.727)	11.462** (5.080)	0.448 (1.902)	0.130 (0.630)	4.674*** (1.425)	0.624 (0.534)	1.616* (0.947)	-1.767** (0.701)
InDigital ²	0.292* (0.151)	3.092** (1.241)	-0.025 (0.399)	0.052 (0.131)	1.532*** (0.512)	0.128 (0.102)	0.343 (0.345)	-0.282** (0.131)
InDis	-0.012 (0.211)	1.057 (1.495)	-0.074 (0.510)	-0.064 (0.183)	-0.014 (0.102)	-0.038 (0.427)	0.030 (0.094)	-0.264 (0.495)
InIncome	1.570*** (0.289)	1.145*** (0.084)	0.345 (0.810)	0.488* (0.251)	1.389*** (0.246)	0.204 (0.203)	0.271 (0.201)	0.872*** (0.244)
InEnv	0.082 (0.083)	-0.173 (0.186)	-0.192 (0.221)	-0.030 (0.072)	-0.094 (0.062)	0.072 (0.063)	0.007 (0.048)	-0.024 (0.083)
InAir	-0.157 (0.135)	0.044 (0.265)	0.226 (0.381)	0.426*** (0.117)	-0.055 (0.085)	0.540*** (0.116)	0.266*** (0.079)	0.193 (0.132)
InOpen	0.231*** (0.083)	0.462*** (0.583)	1.767*** (0.514)	0.567*** (0.159)	0.625*** (0.212)	373*** (0.126)	0.616*** (0.152)	0.541*** (0.151)
Constant	-7.749* (3.979)	0.964*** (0.301)	-5.431 (10.214)	-2.020 (3.451)	-5.495* (3.086)	-7.353* (4.333)	-0.232 (2.645)	-7.532 (5.102)
Year effects	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Country (region) effects	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of observation	486	486	486	486	216	270	270	216

Note: ***, **, * represent significance levels of 1%, 5%, and 10%, respectively.

Source: author own manual production.

(Fernández-Portillo et al., 2020). In addition, European and OECD countries have long and extensive exchanges with the UK in the fields of culture, history and economy, and the income and tourism consumption of resident are higher, making them the main source regions of inbound tourism for the UK. However, the development of the digital economy in non-OECD countries had a negative impact on domestic travelers to the UK, suggesting that there is a 'Baumol cost disease' in outbound travel in non-OECD countries. According to the Baumol-Fuchs hypothesis, the service sector is a technological 'stagnant sector', while the development of the technological 'progressive sector' (represented by manufacturing industry) on the one hand leads to an increase in nominal wages across the industry, increasing the output costs of the service sector. On the other hand, a large amount of labor is squeezed out, leading to an influx of surplus labor into the service sector and putting pressure on it (Daniel, 2021). The tourism production process relies more on manual services, and the substitution of technology for labor is limited. Most non-OECD countries are developing countries and there is an obvious 'digital gap' with developed countries, which weakens the role of digital economy in promoting tourism.

4.3. Influence mechanism test

This paper constructs a behavioral interaction framework between government, market, and trade liberalization to illustrate the influence mechanism of digital economy in different tourism source countries (regions) on tourism industry of the UK. Firstly, the development of the digital economy has accelerated the reform of the public administration, providing governments with more decentralized information management solutions and making public administration more transparent and efficient (Kassen, 2021). The digital economy boosted the construction of digital government

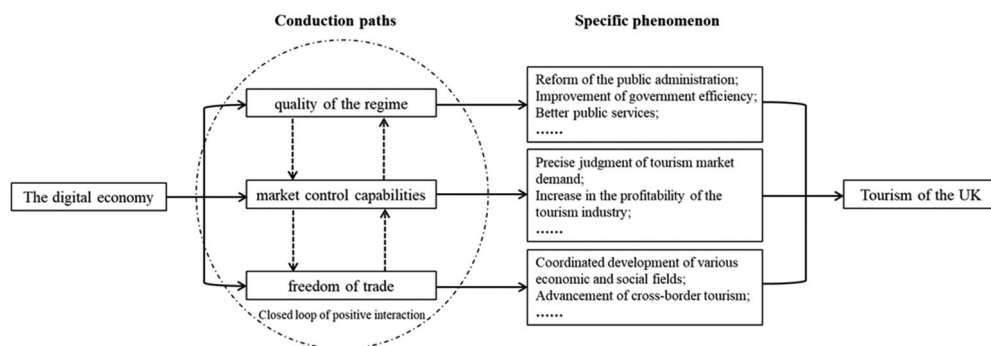


Figure 1. The influence mechanism of digital economy on tourism industry of the UK.
Source: author own manual production.

of each inbound tourism country (region) in the UK, enhancing their government effectiveness and leading to continuous improvement in the quality of the regime (Jian et al., 2019), which provided better public services for cross-border travelers. Secondly, the process of digitalization enhanced the connection of products, the value chain and users to achieve a production cycle as sustainable as possible (Cricelli & Strazzullo, 2021). The application of digital technology helped tourism market players to effectively expand the boundaries of production possibilities, break the temporal and spatial constraints of products and services, and use data resources to accurately study and judge tourism market demand, thereby improving the profitability of the tourism industry. Thirdly, the digital economy pushed forward the development of global supply chains and is conducive to global economic integration (Arvin et al., 2021). The development of the digital economy has narrowed the gap between different countries and promoted the coordinated development of various economic and social fields in all countries (Borowiecki et al., 2021). Thanks to the widespread application of digital technology, the degree of trade liberalization in services represented by cross-border tourism has increased significantly. In summary, the digital economy promoted the tourism development of the UK by improving the quality of the regime, enhancing the market control capabilities of tourism companies, and increasing the freedom of global trade. In the new era of rapid development of the digital economy, the quality of the regime, the market control capabilities of tourism companies, and the freedom of trade have formed a closed loop of positive interaction that continues to drive the progress of global tourism. The influence mechanism is shown in Figure 1.

The influence mechanism is conducted based on the Sobel mediating effect test, the econometric model is as follows:

$$\ln SQ_{it}(\ln EF_{it}, \ln MD_{it}) = \alpha_0 + \beta_1 \ln Digital_{it} + \beta_2 \sum_{j=1}^N X_{it} + \mu_{it} + \varepsilon_{it} \quad (7)$$

$$\ln Spend_{it} = \alpha_0 + \beta_1 \ln Digital_{it} + \beta_2 \ln SQ_{it}(\ln EF_{it}, \ln MD_{it}) + \beta_3 \sum_{j=1}^N X_{it} + \mu_{it} + \varepsilon_{it} \quad (8)$$

Table 5. Test results of influence mechanism test.

	lnSQ	lnEF	lnMD	lnSpend	lnSpend	lnSpend
lnDigital	0.069* (0.027)	0.124*** (0.023)	0.214*** (0.048)	1.681*** (0.249)	1.617*** (0.257)	1.226*** (0.237)
lnDigital ²	-0.030** (0.012)	0.023*** (0.006)	0.066*** (0.012)	0.459*** (0.065)	0.472*** (0.066)	0.348*** (0.062)
lnSQ				0.583** (0.238)		
lnEF					0.478** (0.181)	
lnMD						1.929*** (0.220)
Adj-R ²	0.782	0.553	0.381	0.567	0.562	0.622
Controlling variables	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Number of observation	486	486	486	486	486	486

Note: ***, **, * represent significance levels of 1%, 5%, and 10%, respectively.

Source: author own manual production.

In the above equation, *SQ*, *EF*, and *MD* are the three mediating variables of quality of the regime, market control capability, and freedom of trade respectively. Quality of the regime is measured by the *Worldwide Governance Indicators* (WGI), which includes indicators of Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption. The average of all indicators is used to measure the overall level of quality of the regime in each country (region). The data of *EF* comes from the indicator *Extent of market dominance* in WEF, the value of this indicator ranges from 1 to 7, the larger the value the stronger the market control capability of tourism companies. The degree of economic freedom is used to measure the freedom of trade. The data of *MD* comes from the annual report *Economic Freedom of the World* issued by the American Heritage Foundation. All variables are logarithmic. The Sobel test coefficients of the variables *SQ*, *EF*, and *MD* are 0.407, 0.059, 0.413 respectively, which are significant at the 1% level, and the mediating variable effects account for 24.96%, 13.8%, and 25.22%, indicating that the mediating effect is significant. From the [Table 5](#), the digital economy in each tourism source country (region) of the UK had a positive effect on quality of the regime, market control capability, and freedom of trade. The digital economy could promote the UK tourism by improving the quality of the regime, strengthening market control capability and increasing freedom of trade in different tourism source countries (regions).

4.4. Endogeneity and robustness tests

There are endogenous problems with the influence of the digital economy on the UK tourism industry in each country (region), which can lead to biases in the estimated results. The digital economy and the overall economic development level are closely related. Generally speaking, developed countries and regions have a good technology accumulation and R&D environment, which lays the foundation for the development of the digital economy. Judging from the geographical distribution of countries (regions) in the world, most developed countries and regions have higher latitudes. Therefore, the latitudes of countries (regions) are selected as the instrumental

Table 6. Test results of endogeneity test.

	Dependent variable	lnLat	lnDigital	Constant	Controlling variables	R ²	Prob > F	Number of observation
The first stage	lnDigital	0.052*** (0.005)		-1.678*** (0.240)	Controlled	0.945	0.000	486
The second stage	lnSpend		0.770*** (0.022)	-8.488*** (1.793)	Controlled	0.460	0.000	486

Note: ***, **, * represent significance levels of 1%, 5%, and 10%, respectively.

Source: author own manual production.

variables of the digital economy for endogeneity test. Latitude is able to influence the digital economy, but the digital economy cannot influence latitude, thus overcoming the two-way causality problem. Latitude of countries (regions) is expressed in *Lat* and logarithmic. The two-stage least squares (2SLS) method is used for endogeneity test. As shown in Table 6, the estimated coefficients of *lnLat* in the first stage and *lnDigital* in the second stage are significantly positive, indicating that latitude is a good instrumental variable for the digital economy. Further testing with the limited information maximum likelihood method, which is insensitive to weak instrumental variables, it is found that the estimated results are similar to those of the two-stage least squares method, indicating that there is no weak instrumental variable problem. Meanwhile, the result of Anderson Lagrangian statistic test is 0.461, which rejects the original hypothesis at the 1% level and avoids the under-identification problem.

This paper first replaces the explanatory variables for robustness test. The number of tourists and the tourism revenue of a destination are closely linked, the large number of tourists could expand the base of tourism revenue and cause an increase in tourism revenue, which is a better proxy indicator of tourism revenue, and the number of visitors to the UK from different source countries (regions) is indicated by *Visits*. Meanwhile, total nights spent is an important component of the total amount of money spent by visitors to the UK, total nights spent tends to increase along with total spent and the correlation between them is positive. Total nights spent is represented by *Nights*. The data of *Visits* and *Nights* are come from *Office for National Statistics, International Passenger Survey* published by website of VisitBritain and both variables are logarithmized. In addition, replacing the original method with the approach of System-GMM further addresses the effect of endogeneity on model, while alleviating problems such as potential bias caused by differential GMM. Finally, robustness test is conducted using the method of replacing core explanatory variable. The digital economy is more dependent on information infrastructure, and this paper selects the number of Internet servers in different countries (regions) to measure the level of information infrastructure construction, and uses this variable as a similar variable for the digital economy to conduct econometric model. The number of Internet servers is represented by *Inter*, the data is from WDI and logarithmized. It can be seen from Table 7 that the test results of different methods are similar to the estimated results of the benchmark regression, indicating that the results of econometric test are robust and reliable.

5. Concluding remarks

This paper analyzes the effects and mechanisms of the digital economy in different inbound tourism source countries (regions) on the UK tourism industry, and

Table 7. Test results of robustness test.

	InVisits	InNights	SYS-GMM	Replacement of explanatory variable
Lagged item of Spend			0.243*** (0.076)	
InDigital	6.032** (3.055)	1.575*** (0.288)	0.525** (0.215)	
InDigital ²	1.516** (0.758)	0.346*** (0.075)	0.116*** (0.015)	
InInter				0.047* (0.025)
InInter ²				-0.003 (0.002)
InDis	-0.139 (0.234)	-0.298*** (0.039)	-0.180* (0.093)	0.025 (0.115)
InIncome	1.264** (0.585)	0.822*** (0.118)	0.371*** (0.141)	0.698*** (0.166)
InEnv	-0.033 (0.065)	0.047 (0.054)	0.062 (0.068)	0.048 (0.046)
InAir	0.133*** (0.038)	0.338*** (0.035)	0.224*** (0.084)	0.185** (0.074)
InOpen	0.248 (0.201)	0.179** (0.076)	0.480*** (0.104)	0.513*** (0.103)
Constant	0.551*** (0.166)	5.035*** (1.072)	-2.448 (1.690)	-6.067*** (2.097)
AR (1)			-2.871***	
AR (2)			1.145	
Sargan test			6.566	
Year effects	Controlled	Controlled	Controlled	Controlled
Country (region) effects	Controlled	Controlled	Controlled	Controlled
Prob > F	0.000	0.000	0.000	0.000
Number of observation	486	486	486	486

Note: ***, **, * represent significance levels of 1%, 5%, and 10%, respectively.

Source: author own manual production.

concluded that the progress of the digital economy in each country (region) promoted the tourism development of the UK and the promoting effect showed a marginal increasing trend. The heterogeneity test indicates that the digital economy had the most significant positive effect on the tourism business market and the holiday market, while the effect on the tourism segmented markets of Study and VFR is not significant. The development of the digital economy in European and OECD countries, which are closely linked to the UK in economic, social and cultural areas, has also contributed to the growth of tourism in the UK. It is worth noting that the digital economy in non-OECD countries had a negative impact on tourism due to 'Baumol cost disease' and the 'digital gap'. The influence mechanism shows that the digital economy of various countries (regions) could promote tourism development by improving the quality of the regime, strengthening market control capability and increasing freedom of trade. The above results are still valid after the endogeneity and robustness tests are carried out.

The research conclusions have important implications for countries around the world to take advantage of digital economy to develop tourism and some suggestions are provided: (1) Governments of various countries (regions) should formulate detailed digital economy development plans, cultivate the digital economy as a leading force in promoting economic development, and promote the in-depth integration of the digital economy and various segments of the tourism industry; (2) Strengthening the construction of tourism digital infrastructure, improve the level of

infrastructure such as tourism information centers and tourism information networks, promote the exchange and sharing of tourism information between the UK and other countries (regions), and speed up the 'multi-network integration' of global tourism business; (3) Accelerating the breadth and depth of application of digital economy in tourism enterprises, aggregate tourism information resources to achieve precise matching of supply and demand, help enterprises to tap the value of data flow, precisely meet the customers' need, and continuously explore the potential of tourism market segments.

Several limitations are noted here. First, there is no consensus in the academic community on the measurement method of the digital economy, the inconsistency of the method creates difficulties for empirical studies. Second, this article focuses on the influence of the digital economy of different countries (regions) on the tourism industry of the UK and does not discuss the links between the UK's digital economy and the tourism industry in-depth. Third, as the actual situation in different countries (regions) varies greatly, the influence mechanism of the digital economy on tourism also varies, the study that focuses on the UK, may have weaker implications for policy guidance in countries that are more disparate from the UK in terms of their development.

Future research can continuously supplement the indicator system of the digital economy according to the latest trend and practices to improve the accuracy of measurement results. Scholars can also consider the relationship between the digital economy and tourism development in different regions within the UK, and to further clarify the effects and mechanisms of the digital economy on tourism development in the UK. Meanwhile, the discussion of typical countries (regions) other than the UK or comparative analysis of the UK and other developed or developing countries will also expand the research perspective and enrich the research field related to digital economy and tourism.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. The data is from the research report *A New Picture of the Global Digital Economy (2020) - New Dynamics for Sustainable Development under the Great Change* released by the China Academy of Information and Communications Technology.
2. The data is from the COUNTRY PROFILE – INBOUND TOURISM of tourism dashboard in World Tourism Organization (UNWTO) Official Website: <https://www.unwto.org/tourism-data/country-profile-inbound-tourism>.
3. The 54 countries are Argentina, Australia, Austria, Bahrain, Belgium, Brazil, Bulgaria, Canada, Chile, China, Czech, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Irish, Israel, Italy, Japan, Kenya, Kuwait, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Oman, Pakistan, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, United Arab Emirates, USA.

Funding

Anhui Province Philosophy and Social Science Planning Projects“Research on the effect and mechanism of digital economy driving high-quality development of cultural tourism industry in Anhui Province” [grant no. AHSKQ2021D161].

ORCID

Rui Tang  <http://orcid.org/0000-0003-3189-6340>

References

- Tussyadiah, I. P., & Pesonen, J. (2016). Impacts of peer-to-peer accommodation use on travel patterns. *Journal of Travel Research*, 55(8), 1022–1040. <https://doi.org/10.1177/0047287515608505>
- Akhtar, N., Khan, N., Mahroof Khan, M., Ashraf, S., Hashmi, M. S., Khan, M. M., & Hishan, S. S. (2021). Post-COVID 19 tourism: Will digital tourism replace mass tourism? *Sustainability*, 13(10), 5352. <https://doi.org/10.3390/su13105352>
- Anamaria, T. (2016). How to make a destination more competitive in tourism. *Annals - Economy Series*, 3, 78–81.
- Ancarani, F., & Shankar, V. (2004). Price levels and price dispersion within and across multiple retailer types: Further evidence and extension. *Journal of the Academy of Marketing Science*, 32(2), 176–187. <https://doi.org/10.1177/0092070303261464>
- Arvin, M. B., Pradhan, R. P., & Nair, M. (2021). Uncovering interlinks among ICT connectivity and penetration, trade openness, foreign direct investment, and economic growth: The case of the G-20 countries. *Telematics and Informatics*, 60, 101567. <https://doi.org/10.1016/j.tele.2021.101567>
- Audretsch, D. B., Heger, D., & Veith, T. (2015). Infrastructure and entrepreneurship. *Small Business Economics*, 44(2), 219–230. <https://doi.org/10.1007/s11187-014-9600-6>
- Belykh, V. S., Bolobonova, M. O., & Konkov, K. A. (2021). Issues and prospects of determining the dominant position in the conditions of the digital economy. *Courier of Kutafin Moscow State Law University (MSAL)*, (11), 202–210. <https://doi.org/10.17803/2311-5998.2020.75.11.202-210>
- Borowiecki, R., Siuta-Tokarska, B., Maroń, J., Suder, M., Thier, A., & Źmija, K. (2021). Developing digital economy and society in the light of the issue of digital convergence of the markets in the European Union countries. *Energies*, 14(9), 2717. <https://doi.org/10.3390/en14092717>
- Brennen, J. S., & Kreiss, D. (2016). Digitalization. *The International Encyclopedia of Communication Theory and Philosophy* 198(10), 1–11.
- Broto, L. M., Antoneus, S. F., & Steph, S. (2021). Digital economic model to encourage national economic recovery during Covid-19 pandemic. *Proceedings of the Conference towards ASEAN Chairmanship 2023*.
- Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research. *Tourism Management*, 29(4), 609–623. <https://doi.org/10.1016/j.tourman.2008.01.005>
- Carlan, V., Sys, C., Vanelslander, T., & Roumboutsos, A. (2017). Digital innovation in the port sector: Barriers and facilitators. *Competition and Regulation in Network Industries*, 18(1-2), 71–93. <https://doi.org/10.1177/1783591717734793>
- Carlsson, B. (2004). The digital economy: What is new and what is not? *Structural Change and Economic Dynamics*, 15(3), 245–264. <https://doi.org/10.1016/j.strueco.2004.02.001>
- Chuanqing, W., & Ziyi, S. (2018). Study on the measurement and affecting factors of agricultural green total factor productivity in the Yangtze river economic belt. *Science & Technology Progress and Policy*, 35(17), 35–41.

- Cricelli, L., & Strazzullo, S. (2021). The economic aspect of digital sustainability: A systematic review. *Sustainability*, 13(15), 8241. <https://doi.org/10.3390/su13158241>
- Driffield, N., & Karoglou, M. (2019). Brexit and foreign investment in the UK. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 182(2), 559–582. <https://doi.org/10.1111/rssa.12417>
- Fernández-Portillo, A., Almodóvar-González, M., & Hernández-Mogollón, R. (2020). Impact of ICT development on economic growth. A study of OECD European union countries. *Technology in Society*, 63, 101420. <https://doi.org/10.1016/j.techsoc.2020.101420>
- Gereffi, G. (2019). Global value chains and international development policy: Bringing firms, networks and policy-engaged scholarship back in. *Journal of International Business Policy*, 2(3), 195–210. <https://doi.org/10.1057/s42214-019-00028-7>
- He, H., Xing, R., Han, K., & Yang, J. (2021). Environmental risk evaluation of overseas mining investment based on game theory and an extension matter element model. *Scientific Reports*, 11(1), 16364. <https://doi.org/10.1038/s41598-021-95910-x>
- Heng, X., Yilin, Z., & Yujia, C. (2020). Digital economy, technology spillover and dynamic cooperation policy. *Management World*, 36(11), 63–84. <https://doi.org/10.19744/j.cnki.11-1235/f.2020.0169>
- Hu, L., Yao, S., Zhou, Z., & Miao, N. (2021). The Importance of the construction of digital economy major under the background of new liberal arts. *World Scientific Research Journal*, 7(8), 104–111. [https://doi.org/10.6911/WSRJ.202108_7\(8\).0020](https://doi.org/10.6911/WSRJ.202108_7(8).0020)
- Jian, H., Jiwei, C., & Yayun, X. (2019). Digital trade negotiation and rule competition—A Study based on text quantification of regional trade agreement. *China Industrial Economics*, 18(11), 117–135. <https://doi.org/10.19581/j.cnki.ciejournal.2019.11.007>
- Jiang, X. (2021). Digital economy in the post-pandemic era. *Journal of Chinese Economic and Business Studies*, (3), 1–7.
- Jiechang, X., et al. (2020). The realistic basis and main trend of global tourism innovation and development. *Journal of Urban Studies*, 41(06), 14–19.
- Jinghua, Y., & Xianmei, S. (2021). Political economics analysis of competition and monopoly in the digital economy era. *Economic Review Journal*, 2021(03), 18–26. <https://doi.org/10.16528/j.cnki.22-1054/f.202103018>
- Kassen, M. (2022). Blockchain and e-government innovation: Automation of public information processes. *Information Systems*, 103, 101862. <https://doi.org/10.1016/j.is.2021.101862>
- Keller, J., Burkhardt, P., & Lasch, R. (2021). Informal governance in the digital transformation. *International Journal of Operations & Production Management*, 41(7), 1060–1084. <https://doi.org/10.1108/IJOPM-09-2020-0660>
- Kim, M. C. (2018). Characteristics and nature of digital economy. *Journal of Social Thoughts and Culture*, 21(01), 81–105. <https://doi.org/10.17207/jstc.2018.3.21.1.81>
- Kotler, M., Cao, T., Wang, S., Qiao, C., & Zhang, Y. (2020). Recognize in the 4Rs: Digital profiling and recognition of consumers. World Scientific Book Chapters., in: *Marketing strategy in the digital age applying Kotler's strategies to digital marketing, chapter 3, pages. 125–161*, World Scientific Publishing Co. Pte. Ltd.
- Laakkonen, M. P., & Kivivirta, V. (2021). Customer value of smart grid application: Implications for E-Service design in smart cities. *International Journal of Innovation in the Digital Economy*, 12(1), 27–41. <https://doi.org/10.4018/IJIDE.2021010102>
- Leahovcenco, A. (2021). Cybersecurity as a fundamental element of the digital economy. *MEST Journal*, 9(1), 97–105. <https://doi.org/10.12709/mest.09.09.01.13>
- Lee-Makiyama, H., & Verschelde, B. (2017). Retraction note to: OECD BEPS: Reconciling global trade, taxation principles and the digital economy. In: Boccia F., Leonardi R. (eds) *The challenge of the digital economy*. Palgrave Macmillan.
- Marino, A., & Pariso, P. (2021). E-tourism: How ICTs help the local tourist district drive economic vitality. The case of Campania, Italy. *International Journal of Innovation and Technology Management*, 18(03), 2150009. <https://doi.org/10.1142/S0219877021500097>

- Marques, J., & Pinho, M. (2021). Collaborative research to enhance a business tourism destination: A case study from Porto. *Journal of Policy Research in Tourism, Leisure and Events*, 13(2), 172–187. <https://doi.org/10.1080/19407963.2020.1756307>
- Maslova, T., Pletneva, N., Althonayan, A., Tarasova, E., & Krasnov, A. (2020). Transformation of consumer behavior in the tourism industry in the conditions of digital economy. *IOP Conference Series: Materials Science and Engineering*, 940(1), 012070. <https://doi.org/10.1088/1757-899X/940/1/012070>
- Massidda, C., Piras, R., & Seetaram, N. (2022). Analysing the drivers of itemised tourism expenditure from the UK using survey data. *Annals of Tourism Research Empirical Insights*, 3(1), 100037. <https://doi.org/10.1016/j.annale.2022.100037>
- Molchanova, S. M., Varfolomeeva, V. A., Ivanova, N. A., & Shmatko, A. (2020). Providing incentives under the “Digital economy” program. *IOP Conference Series: Materials Science and Engineering*, 940(1), 012035. <https://doi.org/10.1088/1757-899X/940/1/012035>
- Nakatani, R. (2021). Total factor productivity enablers in the ICT industry: A cross-country firm-level analysis. *Telecommunications Policy*, 45(9), 102188. <https://doi.org/10.1016/j.telpol.2021.102188>
- Radygina, Y. G., & Okhrimenko, E. I. (2020). *The Role of Digital Technologies in Increasing the Tourist Attractiveness of the Sverdlovsk Region* [Paper presentation]. 2nd International Scientific and Practical Conference “Modern Management Trends and the Digital Economy: From Regional Development to Global Economic Growth, (MTDE 2020).
- Ramón-Rodríguez, A. B., Such-Devesa, M. J., Perles-Ribes, J. F., & Moreno-Izquierdo, L. (2021). Competitiveness, intelligence and sustainability in consolidated destinations: What we know and pending research challenges. *Tourism*, 69(2), 281–299. <https://doi.org/10.37741/t.69.2.8>
- Robert, A., Valerie, J., Vincent, L., Filippou, P., Ieva, R., & Lara, V. (2021). The digital economy and the euro area. *Economic Bulletin Articles*, European Central Bank, 8.
- Shin, H. H., Jeong, M., & Cho, M. (2021). The impact of smart tourism technology and domestic travelers’ technology readiness on their satisfaction and behavioral intention: A cross-country comparison. *International Journal of Tourism Research*, 23(5), 726–742. <https://doi.org/10.1002/jtr.2437>
- Sorescu, A., & Schreier, M. (2021). Innovation in the digital economy: A broader view of its scope, antecedents, and consequences. *Journal of the Academy of Marketing Science*, 49(4), 627–631. <https://doi.org/10.1007/s11747-021-00793-z>
- Sujatha, E. R., & Sridhar, V. (2021). Landslide susceptibility analysis: A logistic regression model case study in Coonor, India. *Hydrology*, 8(1), 41. <https://doi.org/10.3390/hydrology8010041>
- Tang, R. (2020). Does trade facilitation promote the efficiency of inbound tourism?—The empirical test based on Japan. *International Journal of Tourism Research*, 1–17.
- Tao, Z. (2020). Digital economy, entrepreneurship, and high-quality economic development: Empirical evidence from urban China. *Management World*, 36(10), 65–76. <https://doi.org/10.19744/j.cnki.11-1235/f.2020.0154>
- Voltes-Dorta, A., & Inchausti-Sintes, F. (2021). The spatial and quality dimensions of Airbnb markets. *Tourism Economics*, 27(4), 688–702. <https://doi.org/10.1177/1354816619898075>
- Vu, K., & Hartley, K. (2022). Effects of digital transformation on electricity sector growth and productivity: A study of thirteen industrialized economies. *Utilities Policy*, 74, 101326. <https://doi.org/10.1016/j.jup.2021.101326>
- Wallsten, S. (2015). *The competitive effects of the sharing economy: How is Uber changing taxis*. Technology Policy Institute.
- Wang, D., & Nicolau, J. L. (2017). Price determinants of sharing economy based accommodation rental: A study of listings from 33 cities on Airbnb. com. *International Journal of Hospitality Management*, 62, 120–131. <https://doi.org/10.1016/j.ijhm.2016.12.007>
- Wenjun, J., & Baowen, S. (2019). Digital economy promotes high-quality economic development: A theoretical analysis framework. *Economist*, (02), 66–73. <https://doi.org/10.16158/j.cnki.51-1312/f.2019.02.008>

- Zervas, G., Proserpio, D., & Byers, J. W. (2017). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of Marketing Research*, 54(5), 687–705. <https://doi.org/10.1509/jmr.15.0204>
- Zhenyu, Y. (2020). Regional marketization level and digital economic competition—Based on the analysis of digital economic index inter-provincial spatial distribution feature. *Jiangnan Tribune*, 2020(12), 23–33.