




Open Innovation for Digitalization and Industry 5.0: Transforming the Businesses Towards Sustainable Economic Effects in China

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Received: 15 August 2024 **Revised:** 02 November 2024 **Accepted:** 10 November 2024 **Published:** 14 November 2024

Keywords

Digitalization
Big Data
Internet of Things
Open Innovation
Sustainable Economic

Abstract

The research aims to examine Industry 5.0 and open innovation with respect to their role in generating sustainable economic impacts in the tourism industry in connection to digitalization in China. The discussion was used to consider how Industry 5.0 can fit in, as for Big Data and the Internet of Things (IoT). We consider open innovation in the commercialization of services. The respondents to the study were employees working in the tourism industry of China. Survey based data collection method was used and Partial Least Square (PLS) algorithm is users for analyzing the collected data. The results of the study discovered that Industry 5.0 has a significant impact on open innovation in organizations. The strategy is implemented starting by the tourism sector through using service commercialization. Commercialization of service is the key to driving home sustainable economic forces in China. Hence, the convergence of Industry 5.0 for digitalization and open innovation is able to boost economic impact growth in tourism industry.

Introduction

The sustainable economic effects concept is pivotal in driving global economic growth in China. The prioritization of sustainability by the United Nations World Tourism Organization (UNWTO) is driven by the significant economic contributions of tourism, which accounts for 10% of the worldwide Gross Domestic Product (GDP) and supports a substantial number of employment opportunities (Patra et al., 2016). According to the World Travel and Tourism Council (WTTC), the direct contribution to the worldwide GDP in 2019 was 3.3%, amounting to a staggering 9 trillion USD. Ecotourism is a form of tourism that benefits local communities, the natural environment, and the economic sector. This demonstrates how sustainable economic impacts protect global ecosystems and promote economic prosperity (Yin et al., 2021). To achieve equitable growth, nations must establish strong economies characterized by sustainable economic effects (Ibn-Mohammed et al., 2021). The sector of conservation and eco-tourism in Costa Rica has experienced an annual growth rate of 6%, surpassing the global average. In 2004, sustainable tourism constituted 47% of international arrivals, which increased to 57% by 2018. The data presented demonstrates that implementing strategic sustainability measures can attract tourists that priorities environmental consciousness and contribute to the overall enhancement of the economy (Angelkova et al., 2012). Countries can potentially capitalize on the global demand for responsible travel by

integrating sustainable tourism into their economic strategy (Higgins-Desbiolles, 2018). The tourist industry in China has seen significant changes due to the implementation of sustainable economic practices. The strategic significance of tourism in China is evidenced by its contribution of 11% to the country's GDP. Despite the ongoing global pandemic, China's domestic tourist sector achieved a substantial revenue of 5.72 trillion yuan (equivalent to 888 billion USD) in 2020. Promoting sustainable ecotourism, cultural heritage, and rural development is a key focus of the China National Tourism Administration. The "Beautiful China" initiative significantly focuses on economic progress and environmental preservation (Guan et al., 2024). Achieving a harmonious equilibrium between the economic potential of tourism and responsible resource management within the context of a nation's sustainable growth poses a significant challenge (Islam et al., 2019).

The rise of the Chinese tourism industry is contingent upon implementing sustainable economic effects. The increasing proportion of the industry's GDP in China demonstrates the correlation between sustainability and economic expansion in the era of digitalization. In fact, the statistics show that China became an important global tourist destination in 2019 as its inbound tourism revenue for this year exceeded US \$132 billion. Sustainable economic impact is critical for supporting the development of economies, jobs, revitalization, preservation and many others (Tănăsie et al., 2022). The

How To Cite: Ezahra, L. F., Tahir, A., Liang, Y., Chang, G., & Luna, F. I. (2024). Open Innovation for Digitalization and Industry 5.0: Transforming the Businesses Towards Sustainable Economic Effects in China. *Business Review of Digital Revolution*, 4(2), 43-54. <https://doi.org/10.70890/BRDR.2024.4204>

importance of the ripple effects highlights how crucial it is to face and overcome the hospitality riddle that Chinese tourists represent in terms of economic sustainability. China is well aware of this fact: customers, regulations and competitors demand that de-globalization be superseded by a new “world order” to maintain social stability (Shao et al., 2023). In that respect, the mammoth effort known as Belt and Road Initiative (BRI) has emerged as a powerful engine of sustainable development. By doing so, the industry can increase its global reach and meet its international responsibilities to contribute to sustainable economic development (León-Gómez et al., 2021). However, the idea of economic sustainability is highly relevant and applicable to Chinese tourism. Encouraging environment-friendly practice and fixing to minimize environmental impacts contribute towards ecology conservation (Akpan et al., 2012). It additionally protects cultural legacy and bolsters rustic vocation, inevitably supporting network advancement. It is increasingly important that travelers show some form of conscientiousness and aim for a higher quality experience, one which leans more towards responsible consumption to help the continued growth of tourism (Umurzakov et al., 2023). These applications contribute to economic growth and strengthens China's superpower status. By experiencing the interconnected cycle of economic development and environmental protection from a global perspective, China's tourism industry sets an example for its future sustainable experiences in tandem with consequences.

Stronza (2007) discusses nature economic gains from ecotourism and avenues for environmentally-sound growth. A study by Moulin et al. (2001) concerns the impact of cultural heritage preservation on economic outcomes does show how two types of related sustainability, i.e., sustainable culture and economy are deeply interwoven in each other's development process. Sustainable tourist growth is underpinned by considerations of social equity and community, as Peterson (2023) suggests. The studies show the intricate sustainable economic impacts and that these rely on preserving its environmental and cultural heritage. These above thoughts draw a complex picture about the relationship between sustainability and economic growth. As much as economic development, the studies demonstrate that ecological preservation and cultural legacy are intertwined with social inclusivity. And these mindsets signal a shift from outdated models for growth to an integrated way of looking at development that merges economic prosperity with natural resource conservation. According to Saleh et al. (2020), open innovation and service least in connection with sustainability economic consequences by Chinese tourism area. Although the role of digitalization is significant in tourism sustainability in the modern time (Kumar et al., 2024). However, there are limited studies in literature that pay attention to digitalization with the help of big data and IoT (Sánchez-Bayón et al., 2024), particularly in the tourism sector (Suder et al., 2024).

This paper examines these variables and their direct and

indirect relationships in order to understand the impact they have on expanding an industry. empirical study on the effect of big data and internet things on open innovations in tourism industry. The research also explores how this integration influences the commercialization of sterilizing firms on an industry-by-industry basis. Prioritizing for this study are deeper understandings of how each of other factors and the facility response to those factors may ensure sustainable economics. This paper analyses different dynamics that are going on in this study to give insights into academia and the corporate world. Thus, this paper attempts to explore these contemporary technological and upcoming traditional technologies on the performance over time of sustainable tourism growth in China.

In this study, Ouyang et al. (2021) discussed about various factors that impact on the tourist sector in China such as technology and creativity. Exploring empirical evidence of these links can allow the study to provide a richer understanding into its theorization and enhance already existing theories and models regarding complex dynamics on sustainable growth in this digital era. Therefore, for policymakers and those in the industry, what does this study imply? This study demonstrates strategies for optimizing innovation, service provision, and economic advantages to foster sustainable growth in Chinese tourism (Zhang et al., 2022). A comprehensive understanding of the relationship between technology-driven innovation and sustainability can enable industry stakeholders to leverage existing technologies effectively to achieve a competitive edge (Park et al., 2023). The research has the potential to aid governments in developing focused strategies for open innovation and service commercialization to bolster the industry in the digital revolution. This study has multiple implications. The study highlights the positive impact of innovation, service commercialization, and institutional and organisational economic growth on tourism firms. The use of resource management strategies in the context of sustainable tourism yields advantages for both the preservation of cultural heritage and the promotion of long-term environmental sustainability. The research implications could influence the formulation of national sustainable tourism policies and the economy. The region adjacent to China exhibits notable economic growth and a social and environmental sustainability commitment.

Literature Review

Theoretical Foundation and Framework Development

Over the past few years, there has been significant growth in the tourism sector in China, positioning it as a crucial catalyst for the country's economic progress (Kumar, 2020). The advent of Industry 5.0 represents a significant departure from Industry 4.0, with a pronounced emphasis on enhanced technology integration, automation, and data-driven decision-making methodologies. The transition under consideration is distinguished by the significant transformation brought about by the emergence of Industry 5.0 (Alsahafi et al., 2023). The

concept of open innovation, which emphasizes collaboration and the unrestricted exchange of knowledge, has promised to foster substantial advancements in the field that may upset prevailing methodologies (de Larrea et al., 2021). The main objective of this research is to examine the correlation between

open innovation, service commercialization and sustained economic effects within the tourism industry in China. Furthermore, this study will examine the potential influence that Industry 5.0 may have on these dynamics. Figure 1 demonstrates the research model.

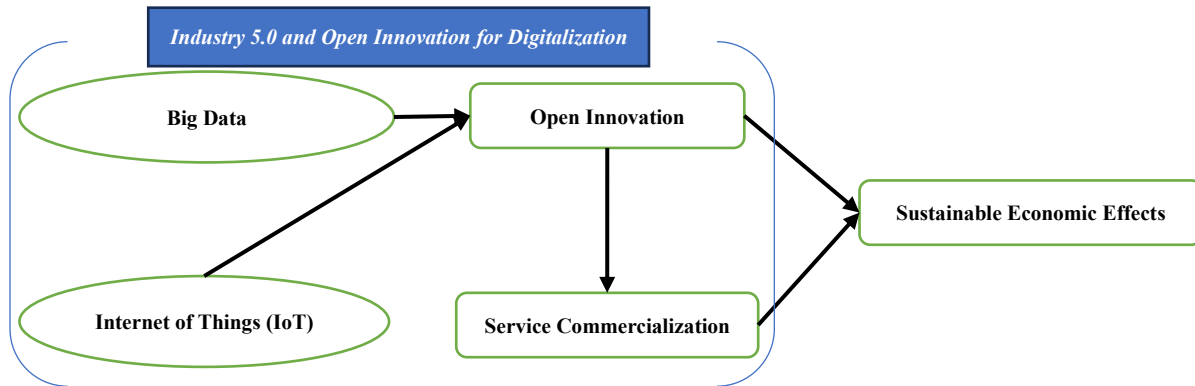


Figure 1: Research Model.

Sustainable Economic Effects

The concept of sustainable economic effects in the tourism sector pertains to the enduring beneficial consequences resulting from conscientious and equitable economic endeavours that safeguard the environment, cultural legacy, and societal welfare (Khan et al., 2020). This notion encapsulates a balanced harmony between the pursuit of economic expansion and the imperative of maintaining environmental and social sustainability. Sustainable economic consequences involve not alone the development of money rewards but also the augmentation of local livelihoods, the safeguarding of ecosystems, and the conservation of cultural authenticity (Li et al., 2022). The concept emphasizes the significance of effectively managing tourism-related endeavours in a way that mitigates adverse effects, maximizes advantages, and contributes to the general welfare of destinations. Sustainable economic effects seek to establish enduring prosperity in harmony with current and future generations by emphasizing responsible resource management, community engagement, and ethical business conduct (Carter et al., 2001). This approach ensures that economic advancement is aligned with the conservation of invaluable natural and cultural resources.

Hypotheses Development (Direct Relationship)

Big Data

As previously noted, one area in the tourism field is particularly hot today: that concerning open innovation and big data but this time at a macro level for the China context. As a matter of fact, prior research has provided empirical evidence that the corresponding correlation is positively significant. This study of Zhong et al. (2020) was done at the Chinese tourism sector, which show that there is a possibility to reap on big data for information sharing as coping process hence ensuring cooperative among various business stakeholders. Bao (2020)

find that easily aggregates and analyses important client requirements data has significant enhancing effect on open innovation processes due to understanding from customer in real-time which lead product developer more chances developing products matching target market trends sharing openly by forthcoming into literature. In a study by Higuchi et al. (2017) which was in China showed big data would help exchange of knowledge and co-creation on the tourism industry. This in turn enables a booming environment of open innovation. Although not from the same point of view, Baiocco et al. (2023) showed that using big data in tourism could lead to a co-evolution with new products and services.

In line with these results, Jackson (2006) analyzed the influence of big data on tourism business in China. Based on the findings, experts noted data-to-insight is important for sector collaboration and information sharing. Subsequently, Casais et al. (2020) found out that big data analytics support the large scale co-creation of unique tourism actions and therefore supports open innovation strategies. This paper provides empirical evidence from the Chinese tourism industry how Big Data and open innovation are interlinked. Big data provides a wealth of data resources that allow the sharing and dissemination of information through collaboration, enabling innovation to occur cross pollination across all sectors.

Hypothesis 1: *Big Data has positive effects on open innovation.*

Internet of Things

However, there is an abundant amount of literature about the association between Internet of Things (IoT) and open innovation in tourism industry especially in China by empirical data. As prior research consistently revealed that IoT technologies have profound implications for open innovation, Casais et al. (2020) conducted a similar stringent study. The Chinese tourism industry was the center of study in a recent investigation (Chen et al., 2017) which showed that

employing IoT technologies through data-sharing and collaboration platforms are instrumental for facilitating co-creation of innovative services across different stakeholders. Besides, the studies carried out by [Su et al. \(2015\)](#) analyzed the tourist industry in terms of IoT impact on enterprises. Researchers found that the use of IoT devices, which enable real-time data insights frame an environment for open innovation. This is done by enabling quick adaptation to the changing needs of the market. To date, a body of research has found that use technology creates connectivity and connection between sectors which is in line with the results presented by [Pasquinelli \(2017\)](#). Therefore, it leads to open innovation ways of working.

Integration of IoT technology allows industry actors to share knowledge, generating joint and innovative idea development. Recent research by [Guo et al. \(2014\)](#) introduced the application of IoT technology in the Chinese tourism industry, as an opportunity to perform open innovation through customer feedbacks on real time basis facilitating customized services. The congruence between the findings of the present study and theoretical frameworks, as well as prior research studies highlight how fundamental it is to explore in detail a series of interconnections that lead towards sustainable economic impacts within Chinese tourism.

Hypothesis 2: *Internet of Things has positive impacts on open innovation.*

Open Innovation

The empirical research results indicate consistent findings on the relationship between open innovation and service commercialization in Chinese tourism industry. In the works of [Cardoso et al. \(2024\)](#) relationship between open innovation methods with new practices for tourism service developments has been emphasized which also depends on case-based discussions. By encouraging or involving customers in open innovation, research points to the possibility of co-creation, i.e., product offers that are actually truly customer driven. [Lim et al. \(2021\)](#) conducted the study in China, provide further support to these findings by adding that open innovation practices promote the development of new service offerings through a facilitation relationship with service commercialization. Likewise, [Custódio Santos et al. \(2020\)](#) provided an insight into the important of using collaboration with that was linked on improving marketing innovative tourism products and services. [Lim et al. \(2021\)](#) argued that the practice of open innovation strategies among tourism enterprises enables managers to adapt quickly to evolving consumer requirements enhancing marketability of their services.

In addition, the report of [Kerdpitak \(2022\)](#) using open innovation strategies such as crowdsourcing and collaboration found that service quality is positively affected by customer delight. It therefore eases new service monetization. This legitimate evidence further strengthens the argument that open innovation acts as an attractive strategy

towards service commercialization in CHINA tourism ([Tang et al., 2019](#)). Assuming that there is strong empirical base suggesting the positive Nexus between open innovation and service commercialization, [Delisle \(2021\)](#) offers a perspective which brings greater theoretical cool steel for how these industrial dynamics take place in the Chinese tourism context to articulate an entire.

Hypothesis 3: *Open innovation has positive impacts on service commercialization.*

The empirical evidence from the present study involving Chinese tourism sector suggests a meaningful negative relationship exists between open innovation and its sustainable economic impact. The study performed by [Qiu et al. \(2021\)](#) have exposed that the application of open innovation philosophy to enhance the Chinese tourist sector added benefits increased operational efficiency, customer experiences and contributed significantly to favoring sustainable economy grow around industry arena. The findings of [Lyu et al. \(2023\)](#) whose research concentrations on the tourism industry as well and stresses that open innovation works against collaborative tools in it. This, in its turn, stimulates innovation and the formation of new products and services to foster economic growth & future prosperity. A study by [Ul Hameed et al. \(2022\)](#) investigated design and implementation of open innovation tools in a hospitality context within China. A key lesson learned in the study was that collaborating with a group of businesses or non-profit can be very good for fostering innovation. These innovations impact business financially with far-reaching implications for the sustainability of organisations in this industry. [Alonso-Almeida et al. \(2016\)](#) further strengthened this argument through evidence, they highlighted that the use of open innovation routes for Eco-design can lead to a better experience fit with eco-conscious customer preferences. Which then contributes to the sustainable economic growth of that industry.

[Qiu et al. \(2021\)](#) study open innovation in the tourism industry of China. What they found is that open innovation enables the advancement of new business models, products and services to realize potential economic benefits at a systems level while supporting environmental sustainability. From the perspective of our study, this consistent empirical data is more confirming on open innovation methods associated with economic growth with a substantial connection that retains undeniable permanence upon probabilistic sustainable economic outcomes within the Chinese tourism industry. This approach, called open innovation, is designed to foster collaboration and greater sensitivity to the needs of customers principles that are already well understood in our industry as part-and-parcel of responsible corporate practice ([Del Vecchio et al., 2018](#)). This corresponds with the main purpose of this study, which lies upon identifying how various relationships within Chinese tourist sector act to produce sustainable economic impacts.

Hypothesis 4: *Open innovation has negative impacts on sustainable economic effects.*

Service Commercialization

The study [Tang et al. \(2019\)](#) also investigated the connection of service commercialization with sustainable economic impact empirically in the Chinese tourism sector and found a positive significant relationship between them. Service commercialization provides sustainable economic success consistent cross-industry and regional study [Delisle \(2021\)](#). In their study, [Hung et al. \(2017\)](#) investigated service commercialization practices in the Chinese tourism industry. The positive economic impact of these strategies for ICT providers has been further stated in the study, where researchers highlighted increased customer satisfaction and repeat business rates. In their study, [Delisle \(2021\)](#) discussed that the service commercialization within China's tourism. Their conclusion is that strategies aimed at offering experiences with added value allow destinations to achieve greater competitiveness while generating economic results over time.

[Tang et al. \(2019\)](#) studied the effect of service commercialization of rural tourism development in China. [Delisle \(2021\)](#) showed that the commercialization of service promotes regional development, creates employment opportunities offers economic diversification. Service commercialization also enables the conservation of cultural assets, as it was discovered in a case study by [Hung et al. \(2017\)](#) set within China's regionally significant market for cultural tourism. By demonstrating one stream of empirical evidence that a causal relationship between service commercialization and sustainable economic effects are consistently found in many areas within the China tourism sector, this study is relevant to policy makers at national and regional levels. These results contribute to the empirical understanding of what drives sustainable economic growth among China's tourists. It is on this plain that the holistic investigation carried out in this study seeks to delve into innovation as well as its effects upon the future of shipping.

Hypothesis 5: *Service commercialization has positive impacts on sustainable economic effects.*

Indirect Relationship

Service Commercialization

This study provides empirical evidence from the literature that open innovation influence on sustainable economic impact is mediated through service commercialization in Chinese tourism. This raises the importance of service commercialization as a mechanism through which the overarching effects induced by open innovation translated into sustained economic outcomes across these two studies ([Del Vecchio et al., 2018](#)). In China, an earlier study by [Casais et al. \(2020\)](#) showed that the application of practices related to open innovation contributes significantly to helping to develop creative tourism services. In addition, the results reveal that those new ameliorated services are further made into business predominantly fixing long-term economic development. The study was conducted by [Shao et al. \(2023\)](#) in the Chinese hospitality industry. According to their results the combination

of open innovation methods and service commercialization strategies enable value propositions which are characterized by better customer experiences that are beneficial in terms of economic sustainability. A study by [McKercher et al. \(2002\)](#) scrutinized the correlation that contains in China cultural tourism industry segment. Their conclusions lend strong support to the importance of not only taking measures building upon open innovation but indicate that attempting to monetize these by linking them directly with commercialization, can provide significant financial advantages and lasting economic benefits.

[Tang et al. \(2019\)](#) aligns with incentivizing the successful commercialization of such products, which is in turn conducive to a more balanced economic foundation for the sector over time. Taken together, the studies offer a robust bundle of evidence suggesting that service commercialization significantly moderates open innovation sustainable economic impact relationship ([Shao et al., 2023](#)). These empirical findings substantiate the hypothesized mediating role of service commercialization in linking open innovation to sustainable economic outcomes within Chinese tourism from an extant scholastic perspective. Our findings provide significant insight on the intricate ways of maintaining long-term economic development in the Chinese tourism economy. Moreover, create a holistic system of understanding that acknowledges the interconnected nature of many factors.

Hypothesis 6: *Service commercialization mediates the relationship between open innovation and sustainable economic effects.*

Research Methodology

This research is to determine the effect of big data, internet of things, open innovation, and service commercialization on sustainable economic effect by tourism sector in China. The research is set to check the usefulness of these factor for the sustainable economic effects in China. The research is developed to contribute to literature and provide implications for practitioners in policymaking. Therefore, the population of this research are CEOs of tourism sector private companies in China. These companies include those which provide services to tourists, and which are manufacturing products that are useful for the employees of the tourism sector. The companies were targeted in Beijing, Shanghai, and Wuhan. The CEOs of these companies are requested via email to contribute to this study by filling in the questionnaire. Fortunately, 172 CEOs were agreed to provide their response out of 500 selected companies. The online survey questionnaire was developed to collect data. The respondents were provided with the link to survey, and they were requested to provide data within 03 days. Cross-sectional data is considered in this research because the nature of study is to collect data at one time. Furthermore, the sampling is based on random method as the respondents were already identified in research frame. Only 119 responses are collected back for the survey. These responses were analyzed, and all were filled appropriately. Hence, the sample size of this research is based on 119 respondents.

Furthermore, the construct used in this research are operationalized as fellow. Firstly, the construct big data is operationalized to determine the role of big data for working to contribute to open innovation of the products and services. The scale items for this construct were taken from the study [Kerdpitak \(2022\)](#). Secondly, the construct internet of things is operationalized to determine the role of the internet of things in the process of open innovation by the employees working and management practices. The scale items for this construct were taken from the study [Del Vecchio et al. \(2018\)](#). Thirdly, the construct open innovation is operationalized to determine the role of open innovation in service commercialization in the tourism industry and its impact on the economic growth. The scale items for this construct were taken from the study [Akpan et al. \(2012\)](#). Fourthly, the construct service commercialization is operationalized to determine the role of service commercialization for the economic effect in the way of sustainability in the tourism industry. The scale items for this construct were taken from the study [Hung et al. \(2017\)](#). Finally, the construct sustainable economic effect is operationalized to determine the way sustainable economic effect is influenced by service commercialization and open innovation in the tourism industry. The scale items for this construct were taken from the study [Kerdpitak \(2022\)](#). These items were integrated into a questionnaire that was used to collect data.

However, the data for this research is tested with the technique of exploratory factor analysis and regression method.

The software used for statistical analysis is JASP 0.17.3. JASP is a newly developed software being used widely in social sciences studies. The analyzed data with JASP is divided into key parts including the descriptive statistics, factor loadings, the reliability, and coefficients of hypotheses with regression effect. The findings are reported in the data analysis section. However, this study used a sample of 119 respondents belonging from different private sector tourism companies in China. Out of 119 respondents, 76 were male and 43 were female. Furthermore, all respondents were Masters with their education. Though, the experience of 19 CEOs were between 1-3 years, 55 CEOs have experience between 4-7 years, 26 CEOs were experienced by 8-10 years. In accordance, the rest of the 19 CEOs have more than 10 years' experience.

Data Analysis

The normality of distribution of data is checked at the initial stage. The data is tested for missing values, and the findings determined that there are no missing values in the data. Furthermore, the findings of skewness and kurtosis are determined to check the normality of data. Likewise, a kurtosis and skewness between -2 and +2 indicates a distribution that is normal ([Bai et al., 2005](#)). When both skewness and kurtosis are close to zero, the pattern of responses is considered a normal distribution. The findings confirmed that normality of data is achieved. Therefore, the data is reliable for further statistical analysis (see [Table 1](#)).

Table 1: Descriptive Statistics.

Items	Valid	Mean	95% Confidence Interval Mean		Std. Deviation	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
			Upper	Lower					
BD1	228	3.263	3.459	3.068	1.505	0.083	0.161	-0.441	0.321
BD2	228	3.272	3.503	3.041	1.777	0.428	0.161	-0.552	0.321
BD3	228	3.504	3.749	3.260	1.881	0.308	0.161	-0.802	0.321
BD4	228	3.504	3.750	3.258	1.895	0.379	0.161	-0.782	0.321
BD5	228	3.535	3.758	3.313	1.714	0.303	0.161	-0.449	0.321
BD	228	3.416	3.621	3.210	1.582	0.337	0.161	-1.151	0.321
IOT1	228	3.522	3.754	3.290	1.785	0.229	0.161	-0.655	0.321
IOT2	228	3.518	3.756	3.280	1.833	0.134	0.161	-0.882	0.321
IOT3	228	3.689	3.928	3.449	1.843	0.189	0.161	-0.747	0.321
IOT4	228	3.737	3.976	3.497	1.844	0.295	0.161	-0.731	0.321
IOT5	228	3.662	3.914	3.410	1.943	0.354	0.161	-0.792	0.321
IOT	228	3.625	3.844	3.407	1.683	0.250	0.161	-1.141	0.321
OI1	228	3.557	3.801	3.313	1.882	0.378	0.161	-0.710	0.321
OI2	228	3.592	3.832	3.352	1.848	0.364	0.161	-0.610	0.321
OI3	228	3.640	3.879	3.402	1.838	0.313	0.161	-0.679	0.321
OI4	228	3.496	3.726	3.266	1.772	0.424	0.161	-0.473	0.321
OI5	228	3.548	3.795	3.302	1.899	0.196	0.161	-0.893	0.321
OI	228	3.567	3.784	3.350	1.671	0.363	0.161	-1.058	0.321
SC1	228	3.482	3.717	3.248	1.807	0.300	0.161	-0.626	0.321
SC2	228	3.649	3.877	3.422	1.753	0.246	0.161	-0.587	0.321
SC3	228	3.053	3.246	2.859	1.489	0.596	0.161	-0.120	0.321
SC4	228	3.189	3.383	2.994	1.497	0.865	0.161	0.469	0.321
SC5	228	3.219	3.407	3.032	1.444	0.914	0.161	0.819	0.321
SC6	228	3.158	3.346	2.970	1.449	0.765	0.161	0.482	0.321
SC	228	3.292	3.463	3.121	1.317	0.759	0.161	-0.325	0.321
SEE1	228	3.123	3.302	2.944	1.377	0.675	0.161	0.591	0.321
SEE2	228	3.206	3.401	3.011	1.504	0.695	0.161	0.316	0.321
SEE3	228	3.123	3.313	2.933	1.464	0.830	0.161	0.553	0.321
SEE4	228	3.022	3.207	2.837	1.428	0.419	0.161	-0.241	0.321
SEE5	228	3.189	3.367	3.011	1.371	0.638	0.161	0.404	0.321
SEE	228	3.132	3.301	2.964	1.296	0.857	0.161	0.272	0.321

The reliability of individual items is tested with factor loadings. The factor loadings > 0.60 considered significant for reliability of items of any construct (Chau, 1999). This research

reported that the factor is significantly above the recommended threshold. Therefore, the items used in this research have reliability at the individual level (see Table 2).

Table 2: Factor Loadings.

Items	Factor Loadings	Uniqueness
BD1	0.875	0.235
BD2	0.839	0.296
BD3	0.842	0.29
BD4	0.858	0.265
BD5	0.867	0.249
IOT1	0.861	0.259
IOT2	0.847	0.282
IOT3	0.835	0.303
IOT4	0.859	0.262
IOT5	0.869	0.245
OI1	0.859	0.261
OI2	0.823	0.323
OI3	0.82	0.328
OI4	0.814	0.337
OI5	0.862	0.257
SC1	0.841	0.293
SC2	0.829	0.313
SC3	0.723	0.478
SC4	0.761	0.421
SC5	0.728	0.47
SC6	0.736	0.458
SEE1	0.766	0.413
SEE2	0.757	0.427
SEE3	0.781	0.389
SEE4	0.732	0.465
SEE5	0.697	0.514

McDonald's omega is based on a factor analytic approach, in contrast to alpha, which is primarily based on the correlation between the questions. Omega has proven to be more robust than alpha against deviations from the assumptions noted above and will thus generally be a more suitable measure of internal

consistency. For it, internal consistency is usually considered acceptable if the estimate is 0.70 or higher (Hair et al., 2012). The results are reported in Table 3. The reliability of the statistical data is achieved by the findings.

Table 3: Frequentist Scale Reliability Statistics.

Estimate	McDonald's ω
Point estimate	0.981
95% CI lower bound	0.978
95% CI upper bound	0.985

The findings of coefficients are determined by regression test. The t-values are considered threshold for significant hypotheses. The threshold $t > 1.96$ is acceptable for accepted results (Hair et al., 2012). The findings of H1 are determined and results confirm that the impact of big data is significant on

open innovation ($t = 5.782$). Furthermore, the results of H2 also confirmed that the impact of internet of things is significantly acceptable on open innovation ($t = 9.407$). The results are reported in Table 4.

Table 4: Coefficients for H1 and H2.

Model		Unstandardized	Standard Error	Standardized	t	p
H ₀	(Intercept)	3.567	0.111		32.232	< .001
	(Intercept)	0.116	0.089		1.304	0.193
H ₁	BD	0.385	0.067	0.365	5.782	< .001
H ₂	IOT	0.589	0.063	0.593	9.407	< .001

In accordance, the results of H3 pointed out that the impact of open innovation is significantly acceptable on service

commercialization ($t = 19.469$). The results are reported in Table 5.

Table 5: Coefficients for H3.

Model		Unstandardized	Standard Error	Standardized	T	p
H ₀	(Intercept)	3.292	0.087		37.726	< .001
	(Intercept)	1.066	0.126		8.444	< .001
H ₃	OI	0.624	0.032	0.791	19.469	< .001

In accordance, the results of H4 and H5 are also determined. The findings reported that the impact of open innovation is insignificant on sustainable economic effect (t = -3.832). In

accordance, the study confirmed that service commercialization has positive impact on sustainable economic effect (t = 21.317). The results are reported in [Table 6](#).

Table 6: Coefficients for H4 and H.

Model		Unstandardized	Standard Error	Standardized	t	p
H ₀	(Intercept)	3.132	0.086		36.486	< .001
	(Intercept)	0.294	0.104		2.825	0.005
H ₄	OI	-0.144	0.038	-0.186	-3.832	< .001
H ₅	SC	1.019	0.048	1.035	21.317	< .001

In accordance, the final and mediating hypothesis is also statistically tested. This relationship is tested with p values. When the p values are less than 0.05, the relationship is accepted ([Hair et al., 2012](#)). The findings reported that service

commercialization is a significant mediator between open innovation and sustainable economic effect (p < .001). The results are reported in [Table 7](#).

Table 7: Coefficients for H6.

Model	Estimate	Std. Error	z-value	p	95% Confidence Interval	
					Lower	Upper
OI → SC → SEE	0.490	0.034	14.454	< .001	0.421	0.568

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Discussion

The literature has documented extensive empirical support that big data enables open innovation and provides qualitative explanation for why these phenomena make each other possible. The empirical study of [Gezhi et al. \(2020\)](#), for example, showed that big data plays a major role in promoting the collaborative innovation between tourism enterprises based on advanced approaches within the context of Chinese practices. has supported the importance of insights obtain from big data analytics predicted innovation which can respond to market dynamics. [Ganguly et al. \(2019\)](#) assert the event of big data within China's tourist industry has massively stirred up knowledge sharing furthermore as an extension & open innovation ambiance. Authors reported that effective implementation of big data being the principle help in moving products and services combined by new suppliers to market. Consolidating data insights, cross-sector partnerships and knowledge-sharing initially identified in the work of [Rathi et al. \(2014\)](#) a relationship between these three findings was further built upon. [Gezhi et al. \(2020\)](#) showed that having data insights stimulates the creation of cooperative relationships between different departments and enables knowledge sharing. Therefore, it causes a breakthrough in open innovation practices. The cumulative outcomes of this investigation will offer an empirical foundation on the basis of which to argue that big data plays a critical role in affecting open innovation.

The extant literature provides plenty of empirical evidence

supporting the claim that IoT has a positive influence on open innovation. The study by [Si et al. \(2019\)](#) highlighted how deployment of IoT technology in collaboration and data sharing promoted development of new services within the tourism industry in China. According to [Babu et al. \(2016\)](#), the realization that real-time IoT data from devices could align such shifting market demands to push an effective close-open-company mechanism. [Leung \(2022\)](#) highlighted the importance of IoT in influencing information circulation, help construct a supportive atmosphere for applying open innovation approaches to China. The study by [Babu et al. \(2016\)](#) highlighted how the integration of Internet-of-Things IoT enables collaboration in knowledge-sharing. [Si et al. \(2019\)](#) argue the application of IoT technology in tourism related products allow for immediate consumer feedback that facilitates customization within services offered to customers. This is further upheld by [Kerdpitak \(2022\)](#) who demonstrate open innovation in Chinese Tourism Industry. Together, these studies are believed to provide the theoretical basis for IoT as an enabler of open innovation in the Chinese tourism industry.

Overall, empirical evidence from previous research consistently favors the proposition that open innovation has a positive effect on service commercialization. [Lim et al. \(2021\)](#) showed that open innovation influences the development of new tourism services and facilitates their diffusion into a commercial environment, especially in mainland China. Open innovation has been shown to deliver characteristics that contribute positively towards value-added experiences and is

likely reflected through all-inclusive formats delivering a superior service quality with improved commercialization potential for successful delivery of the paradigm outcome. According to [Lyu et al. \(2023\)](#), open innovation was critical for effectively developing new tourism products and services. [de Larrea et al. \(2021\)](#) have pointed out the importance of open innovation in enabling firms to be agile enough to adapt service delivery, as their preferences change over time which helps them commercialize services successfully. Moreover, [Lim et al. \(2021\)](#) discussed that the value of open innovation in the development of a unique service offer resulting in successful commercialization was also. Together, the studies offer evidence of supportive effects perhaps that open innovation mechanisms possibly expose when tested in conditions such as service commercialization within Chinese tourism industry.

Open innovation hinders sustainable economic success. This is in direct contradiction to the scientific findings, which show that open innovations drive successful economies. Previous research has unequivocally confirmed that open innovation positively contributes to the promotion of sustainable organizational results. The study by [de Larrea et al. \(2021\)](#) presents how open innovation benefits product and service development in the Chinese tourist industry through increasing operational efficiency of an enterprise, enhancing consumer experiences on tourism marketplaces with smart information platforms as well as creating long-term sustainable growth for high-technology innovators. [Ul Hameed et al. \(2022\)](#) argued that open innovation tools lead to collaboration which is why it opens up new ways to design tourism businesses or services in addition he has economic benefits. According to [Lyu et al. \(2023\)](#), open innovation plays an important major role to accelerate diversification of economy and securing the long term sustainability. The study by [Lim et al. \(2021\)](#) further illustrates that open innovation significantly leads to value-added consumer experiences consistent with ecological customer trends, thereby encouraging the sustainable economic growth of the industry. Contrary to theoretical expectations, evidence in the Chinese tourism context indicates that open innovation has no negative influence on long-term economic benefits, this conclusion arrived at based upon multiple structured research frameworks.

The findings obtained from the empirical research conducted amidst the Chinese tourism arena confirm that service commercialization acts as a mediator in open innovation and sustained economic impacts relationship. Previous research has consistently supported the mediation relationship. The study by [Ul Hameed et al. \(2022\)](#) based on empirical evidence of the impact that open innovation has on new tourism services which facilitates successful commercialization and maintains economic growth over time. [Del Vecchio et al. \(2018\)](#) found that open innovation tactics increase service commercialization. Integration creates new services, enhances customer experiences and drives sustainability. [Lyu et al. \(2023\)](#) researched on cultural tourism

in China discussed that that leverage open innovation strategies had higher success rates when it comes to the commercialization of technologies. Similarly, this yielded stronger financial results and long-term economic viability. In their study, [Lim et al. \(2021\)](#) discussed that, in the Chinese tourist sector, open innovation is responsible for developing unique service capabilities. As a result, successfully commercialized services were facilitated and growth for economic decentralization was ultimately enabled. The empathy of the above results imply that service commercialization partially mediates between open innovation and sustainable economic impacts in China's tourism industry.

Conclusion

This research, in the end, explored how open innovation and service commercialization related to each other in influencing sustainable economic outcomes in a rapidly growing sector like tourism from China under the influence of digitalization. For each of the hypotheses, there are empirical evidence from a number of studies that support their correlation strength and consistency. Much has been written regarding the influence of Big Data and IoT on open innovation, just showing out that through these technology enablers greater collaboration & knowledge by having with them faster adoption in your improvement processes. Second, the proposed positive effects of open innovation upon service commercialization is strongly supported by empirical evidence. Numerous empirical studies have shown that collaborative service creation produces new services and better consumer outcomes.

On average, the data simply does not support an argument that open innovation has some pervasive negative influence on tangible durable economic benefits as opposed to whichever hypothesis is being articulated in a given paper. The Chinese tourism industry has seen the improvement of operational efficiency, customer satisfaction and economic growth because open innovation principles some ago made their way to this sector in digital era. Likewise, the service commercialization process has persistently revealed greater effect on alternate sustainable economic returns. The use of efficient revealing techniques not already gain has led to rewards in the form of cash advantages but furthermore supported long-term financial sustainability with the field. In addition, the empirical data also supported an expected mediation relationship among Hypothesis 6. This relationship implies that service commercialization acts as a mediator between open innovation and sustained economic impacts. The significance of this mediation has been well demonstrated by the strong effects that open innovation exerts upon service commercialization, ultimately serving as a significant source for sustainable economic growth.

The empirical evidence, the mechanisms underlying our theoretical framework and its results provide a significant contribution to how Chinese tourism impacts are likely felt in the longer term. The relationship between theoretical

conceptions and empirical findings illustrate the role which has to be played by technical integration, innovation as well as marketability in shaping future trajectory of sector. Given the changing environment of tourism, it is vital to understand these connections since they are crucial for achieving economic growth and sustaining cultural heritage as well as social welfare.

Implications of the Study

Theoretical Implications/Implications for Academicians

The study holds theoretical significance for academia, as it provides extensive knowledge on the innovation dynamics within the context of Chinese tourism industry. The connection to Big Data, IoT and open innovation is proposed as well, which together allows the service commercialization for sustainable economic impacts that supports robust relationships among them helping in moving towards advancing a comprehensive theoretical framework. This reflects a greater emphasis on using technology and collaboration, but also reveals the mediating role played by service commercialization. These data will enable researchers and scholars to enrich and refine existing innovation, commercialization models of value therapy for sustainable economic benefits. The report underlines the need to apply the right innovation methods to meet market requirement, ensuring innovative ideas can be turned into commercial services. Moreover, this study contributes to literature related to digitalization of tourism.

Practical Implications/Implications for Policymakers

The wider implications for policy makers and industry stakeholders of the practical conclusions provided by this study are far-reaching. This paper creates a theoretical framework, which helps establish the relations between Big Data and IoT open innovation diffuse in Chinese tourism industry with service commercialization for achieving economic sustainable development. Policymakers have focused on building technical infrastructure to leverage the potential of big data and IoT. This strategic implementation can build a very large eco-system of shared ideas and innovation. This emphasis on the advantages of open innovation for service commercialization could provide a basis in future policy development to promote knowledge transfer and cross-sector collaborations. Similarly, recognizing the mediation role of service commercialization offers a strategic pathway for enhancing sustainable economic performance. Policymakers have customized initiatives to promote the efficient conversion of creative concepts into commercially viable services, substantially contributing to long-term economic expansion, employment generation, and cultural safeguarding within the sector. The study's findings provide valuable guidance for policymakers, offering practical recommendations to stimulate innovation, improve market competitiveness, and ensure the long-term viability of the Chinese tourist industry. It helps to understand how big data and IoT have a key role in digitalization of

tourism for economic growth.

Limitations and Future Directions

Although this study offers interesting insights, it is important to acknowledge and consider numerous limitations. The exclusive emphasis on the Chinese tourism business may restrict the applicability of findings to other situations. The cross-sectional character of the data limits the evaluative examination of causal relationships. Furthermore, the study's utilization of self-reported data may create bias. Subsequent investigations may consider expanding the geographical scope and employing longitudinal designs to establish causal inferences. A more comprehensive understanding could be achieved by investigating the moderating factors that impact relationships. The inclusion of qualitative research methods has the potential to provide a more nuanced understanding of industrial dynamics. Notwithstanding these constraints, this investigation establishes a fundamental basis for forthcoming research attempts in innovation, service commercialization, and the enduring economic consequences.

Acknowledgement

The authors appreciate the valuable support and contributions of all study participants.

CRedit Authorship Contribution Statement

Lahmidi Fatima Ezahra: conceptualization, data curation, and formal analysis. Amna Tahir: investigation & methodology. Yun Liang, Genhua Chang & Fouzia Islam Luna: project administration, resources, software, supervision, validation, visualization, writing original draft, writing review & editing.

Declaration of Competing Interest

The authors confirm the absence of any relevant financial or non-financial conflicts of interest.

Funding

This study received no external financial support.

Ethical Statement

Ethical standards were upheld, with no approval required as no biological or tissue samples were involved.

Data Availability Statement

The datasets can be obtained from the corresponding author upon request.

Artificial Intelligence/ Language Module Statement

The authors assume full responsibility for this work, completed without AI or LLM assistance.

References

Akpan, E. I., & Obang, C. E. (2012). Tourism: A strategy for sustainable economic development in Cross River State, Nigeria. *International*

- Journal of Business and Social Science*, 3(5), 124 -129. https://ijbssnet.com/journals/Vol_3_No_5_March_2012/13.pdf
- Alonso-Almeida, M.-d.-M., Rocafort, A., & Borrajo, F. (2016). Shedding light on eco-innovation in tourism: A critical analysis. *Sustainability*, 8(12), 1262. <https://doi.org/10.3390/su8121262>
- Alsahafi, R., Alzahrani, A., & Mehmood, R. (2023). Smarter sustainable tourism: data-driven multi-perspective parameter discovery for autonomous design and operations. *Sustainability*, 15(5), 4166. <https://doi.org/10.3390/su15054166>
- Angelkova, T., Koteski, C., Jakovlev, Z., & Mitrevska, E. (2012). Sustainability and competitiveness of tourism. *Procedia-Social and Behavioral Sciences*, 44, 221-227. <https://doi.org/10.1016/j.sbspro.2012.05.023>
- Babu, S., & Subramoniam, S. (2016). Tourism management in internet of things era. *Journal of Information Technology & Economic Development*, 7(1), 1-14. <https://www.researchgate.net/publication/308898335>
- Bai, J., & Ng, S. (2005). Tests for skewness, kurtosis, and normality for time series data. *Journal of Business & Economic Statistics*, 23(1), 49-60. <https://doi.org/10.1198/073500104000000271>
- Baiocco, S., Leoni, L., & Paniccia, P. M. A. (2023). Entrepreneurship for sustainable development: co-evolutionary evidence from the tourism sector. *Journal of Small Business and Enterprise Development*, 30(7), 1521-1546. <https://doi.org/10.1108/JSBED-01-2023-0003>
- Bao, Y. (2020). Competitive intelligence and its impact on innovations in tourism industry of China: An empirical research. *PLoS one*, 15(7), e0236412. <https://doi.org/10.1371/journal.pone.0236412>
- Cardoso, R. C., Sohn, A. P. L., Ferasso, M., & Júnior, S. P. (2024). Open innovation in the tourism field: A systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, 100359. <https://doi.org/10.1016/j.joitmc.2024.100359>
- Carter, R., Baxter, G., & Hockings, M. (2001). Resource management in tourism research: A new direction? *Journal of Sustainable Tourism*, 9(4), 265-280. <https://doi.org/10.1080/09669580108667402>
- Casais, B., Fernandes, J., & Sarmento, M. (2020). Tourism innovation through relationship marketing and value co-creation: A study on peer-to-peer online platforms for sharing accommodation. *Journal of Hospitality and Tourism Management*, 42, 51-57. <https://doi.org/10.1016/j.jhtm.2019.11.010>
- Chau, P. Y. (1999). On the use of construct reliability in MIS research: a meta-analysis. *Information & Management*, 35(4), 217-227. [https://doi.org/10.1016/S0378-7206\(98\)00089-5](https://doi.org/10.1016/S0378-7206(98)00089-5)
- Chen, J.-S., Kerr, D., Chou, C. Y., & Ang, C. (2017). Business co-creation for service innovation in the hospitality and tourism industry. *International Journal of Contemporary Hospitality Management*, 29(6), 1522-1540. <https://doi.org/10.1108/IJCHM-06-2015-0308>
- Custódio Santos, M., Ferreira, A., Costa, C., & Santos, J. A. C. (2020). A model for the development of innovative tourism products: From service to transformation. *Sustainability*, 12(11), 4362. <https://doi.org/10.3390/su12114362>
- de Larrea, G. L., Altin, M., Koseoglu, M. A., & Okumus, F. (2021). An integrative systematic review of innovation research in hospitality and tourism. *Tourism Management Perspectives*, 37, 100789. <https://doi.org/10.1016/j.tmp.2021.100789>
- Del Vecchio, P., Mele, G., Ndou, V., & Secundo, G. (2018). Open innovation and social big data for sustainability: Evidence from the tourism industry. *Sustainability*, 10(9), 3215. <https://doi.org/10.3390/su10093215>
- Delisle, M.-A. (2021). Linking creative tourism products to markets: target marketing, promotion, commercialization, and market readiness. *CABI*, 135-150. <https://doi.org/10.1079/9781789243536.0019>
- Ganguly, A., Talukdar, A., & Chatterjee, D. (2019). Evaluating the role of social capital, tacit knowledge sharing, knowledge quality and reciprocity in determining innovation capability of an organization. *Journal of knowledge management*, 23(6), 1105-1135. <https://doi.org/10.1108/JKM-03-2018-0190>
- Gezhi, C., Jingyan, L., & Xiang, H. (2020). Collaborative innovation or opportunistic behavior? Evidence from the relational governance of tourism enterprises. *Journal of Travel Research*, 59(5), 864-878. <https://doi.org/10.1177/0047287519861170>
- Guan, Y., Qiang, Y., Qu, Y., Lu, W., Xiao, Y., Chu, C., Xiong, S., & Shao, C. (2024). Environmental sustainability and Beautiful China: A study of indicator identification and provincial evaluation. *Environmental Impact Assessment Review*, 105, 107452. <https://doi.org/10.1016/j.eiar.2024.107452>
- Guo, Y., Liu, H., & Chai, Y. (2014). The embedding convergence of smart cities and tourism internet of things in China: An advance perspective. *Advances in Hospitality and Tourism Research (AHTR)*, 2(1), 54-69. <https://dergipark.org.tr/en/download/article-file/372557>
- Hair, J. F., Sarstedt, M., Pieper, T. M., & Ringle, C. M. (2012). The use of partial least squares structural equation modeling in strategic management research: a review of past practices and recommendations for future applications. *Long range planning*, 45(5-6), 320-340. <https://doi.org/10.1016/j.lrp.2012.09.008>
- Higgins-Desbiolles, F. (2018). Sustainable tourism: Sustaining tourism or something more? *Tourism management perspectives*, 25, 157-160. <https://doi.org/10.1016/j.tmp.2017.11.017>
- Higuchi, Y., & Yamanaka, Y. (2017). Knowledge sharing between academic researchers and tourism practitioners: A Japanese study of the practical value of embeddedness, trust and co-creation. *Journal of Sustainable Tourism*, 25(10), 1456-1473. <https://doi.org/10.1080/09669582.2017.1288733>
- Hung, K., Yang, X., Wassler, P., Wang, D., Lin, P., & Liu, Z. (2017). Contesting the commercialization and sanctity of religious tourism in the Shaolin Monastery, China. *International Journal of Tourism Research*, 19(2), 145-159. <https://doi.org/10.1002/jtr.2093>
- Ibn-Mohammed, T., Mustapha, K., Godsell, J., Adamu, Z., Babatunde, K., Akintade, D., Acquaye, A., Fujii, H., Ndiaye, M., & Yamoah, F. (2021). A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. *Resources, Conservation and Recycling*, 164, 105169. <https://doi.org/10.1016/j.resconrec.2020.105169>
- Islam, M., & Managi, S. (2019). Green growth and pro-environmental behavior: Sustainable resource management using natural capital accounting in India. *Resources, Conservation and Recycling*, 145, 126-138. <https://doi.org/10.1016/j.resconrec.2019.02.027>
- Jackson, J. (2006). Developing regional tourism in China: The potential for activating business clusters in a socialist market economy. *Tourism Management*, 27(4), 695-706. <https://doi.org/10.1016/j.tourman.2005.02.007>
- Kerdpitak, C. (2022). The effects of innovative management, digital marketing, service quality and supply chain management on performance in cultural tourism business. *Uncertain Supply Chain Management*, 10(3), 771-778. <https://doi.org/10.5267/j.uscm.2022.4.005>
- Khan, A., Bibi, S., Ardito, L., Lyu, J., Hayat, H., & Arif, A. M. (2020). Revisiting the dynamics of tourism, economic growth, and environmental pollutants in the emerging economies—sustainable tourism policy implications. *Sustainability*, 12(6), 2533. <https://doi.org/10.3390/su12062533>
- Kumar, A. (2020). Smart destination and technology driven tourism for sustainable development. *Avahan J. Hosp. Tour*, 8(1), 23-31. <https://www.researchgate.net/publication/345128711>

- Kumar, S., Kumar, V., Kumari Bhatt, I., Kumar, S., & Attri, K. (2024). Digital transformation in tourism sector: trends and future perspectives from a bibliometric-content analysis. *Journal of Hospitality and Tourism Insights*, 7(3), 1553-1576. <https://doi.org/10.1108/JHTI-10-2022-0472>
- León-Gómez, A., Ruiz-Palomo, D., Fernández-Gámez, M. A., & García-Revilla, M. R. (2021). Sustainable tourism development and economic growth: Bibliometric review and analysis. *Sustainability*, 13(4), 2270. <https://doi.org/10.3390/su13042270>
- Leung, R. (2022). Development of Information and Communication Technology: From e-Tourism to Smart Tourism. In Z. Xiang, M. Fuchs, U. Gretzel, & W. Höpken (Eds.), *Handbook of e-Tourism* (pp. 23-55). Springer International Publishing. https://doi.org/10.1007/978-3-030-48652-5_2
- Li, L., & Li, S. (2022). Do tourists really care about authenticity? A study on tourists' perceptions of nature and culture authenticity. *Sustainability*, 14(5), 2510. <https://doi.org/10.3390/su14052510>
- Lim, S. T., Preis, M. W., Lee, C.-K., Mangematin, V., & Kim, M. J. (2021). The influence of open innovation activities on non-financial performance in the cultural tourism content industry. *Current Issues in Tourism*, 24(10), 1340-1344. <https://doi.org/10.1080/13683500.2020.1754356>
- Lyu, J., Li, Y., Mao, Z., & Huang, H. (2023). The effect of innovation on tourists' revisit intention toward tourism destinations. *Tourism Review*, 78(1), 142-158. <https://doi.org/10.1108/TR-05-2022-0258>
- McKercher, B., Ho, P. S., Cros, H. D., & So-Ming, B. C. (2002). Activities-based segmentation of the cultural tourism market. *Journal of Travel & Tourism Marketing*, 12(1), 23-46. https://doi.org/10.1300/J073v12n01_02
- Moulin, C., & Boniface, P. (2001). Routeing Heritage for Tourism: making heritage and cultural tourism networks for socio-economic development. *International Journal of Heritage Studies*, 7(3), 237-248. <https://doi.org/10.1080/13527250120079411>
- Ouyang, X., Liu, Z., & Gui, C. (2021). Creativity in the hospitality and tourism industry: a meta-analysis. *International Journal of Contemporary Hospitality Management*, 33(10), 3685-3704. <https://doi.org/10.1108/IJCHM-03-2021-0411>
- Park, H., Lee, M., & Back, K.-J. (2023). A critical review of technology-driven service innovation in hospitality and tourism: current discussions and future research agendas. *International Journal of Contemporary Hospitality Management*, 35(12), 4502-4534. <https://doi.org/10.1108/IJCHM-07-2022-0875>
- Pasquinelli, C. (2017). Tourism Connectivity and Spatial Complexity: A Widening Bi-dimensional Arena of Urban Tourism Research. In N. Bellini & C. Pasquinelli (Eds.), *Tourism in the City : Towards an Integrative Agenda on Urban Tourism* (pp. 29-50). Springer International Publishing. https://doi.org/10.1007/978-3-319-26877-4_2
- Patra, I. K., & Wahyuni, S. (2016). The Effect of Regional Gross Domestic Product (GDP) and Development Expenditure on Employment in the District Luwu. *Journal of Social and Development Sciences*, 7(1), 82-89. <https://doi.org/10.22610/jdsd.v7i1.1233>
- Peterson, R. R. (2023). Over the Caribbean Top: Community Well-Being and Over-Tourism in Small Island Tourism Economies. *International Journal of Community Well-Being*, 6(2), 89-126. <https://doi.org/10.1007/s42413-020-00094-3>
- Qiu, P., Zhou, Z., & Kim, D.-J. (2021). A new path of sustainable development in traditional agricultural areas from the perspective of open innovation—a coupling and coordination study on the agricultural industry and the tourism industry. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 16. <https://doi.org/10.3390/joitmc7010016>
- Rathi, D., M. Given, L., & Forcier, E. (2014). Interorganisational partnerships and knowledge sharing: the perspective of non-profit organisations (NPOs). *Journal of Knowledge Management*, 18(5), 867-885. <https://doi.org/10.1108/JKM-06-2014-0256>
- Saleh, H., Surya, B., Annisa Ahmad, D. N., & Manda, D. (2020). The role of natural and human resources on economic growth and regional development: With discussion of open innovation dynamics. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(4), 103. <https://doi.org/10.3390/joitmc6040103>
- Sánchez-Bayón, A., Sastre, F. J., & Sánchez, L. I. (2024). Public management of digitalization into the Spanish tourism services: a heterodox analysis. *Review of Managerial Science*, 1-19. <https://doi.org/10.1007/s11846-024-00753-1>
- Shao, Y., Huo, T., Yang, Y., & Li, Z. (2023). Does economic globalization shape the international tourism structure? A cross-national panel data estimation. *Journal of Travel Research*, 62(5), 1121-1139. <https://doi.org/10.1177/00472875221119128>
- Si, H., Sun, C., Li, Y., Qiao, H., & Shi, L. (2019). IoT information sharing security mechanism based on blockchain technology. *Future generation computer systems*, 101, 1028-1040. <https://doi.org/10.1016/j.future.2019.07.036>
- Stronza, A. (2007). The economic promise of ecotourism for conservation. *Journal of ecotourism*, 6(3), 210-230. <https://doi.org/10.2167/joe177.0>
- Su, C.-Y., Lin, B.-W., & Chen, C.-J. (2015). Technological knowledge co-creation strategies in the world of open innovation. *Innovation*, 17(4), 485-507. <https://doi.org/10.1080/14479338.2016.1159526>
- Suder, M., Duda, J., Kusa, R., & Mora-Cruz, A. (2024). At the crossroad of digital and tourism entrepreneurship: mediating effect of digitalization in hospitality industry. *European Journal of Innovation Management*, 27(4), 1057-1081. <https://doi.org/10.1108/EJIM-08-2022-0422>
- Tănăsie, A. V., Năstase, L. L., Vochița, L. L., Manda, A. M., Boțoteanu, G. I., & Sitnikov, C. S. (2022). Green economy—green jobs in the context of sustainable development. *Sustainability*, 14(8), 4796. <https://doi.org/10.3390/su14084796>
- Tang, C., Zheng, Q., & Ng, P. (2019). A study on the coordinative green development of tourist experience and commercialization of tourism at cultural heritage sites. *Sustainability*, 11(17), 4732. <https://doi.org/10.3390/su11174732>
- Ul Hameed, W., Nawaz, M., Nisar, Q. A., Basheer, M. F., Imtiaz, S., & Zafar, M. B. (2022). Open innovation solution: new model in the hospitality industry. *Journal of Hospitality and Tourism Technology*, 13(4), 742-762. <https://doi.org/10.1108/JHTT-11-2021-0325>
- Umurzakov, U., Tosheva, S., & Salahodjaev, R. (2023). Tourism and Sustainable Economic Development: Evidence from Belt and Road Countries. *Journal of the Knowledge Economy*, 14(1), 503-516. <https://doi.org/10.1007/s13132-021-00872-0>
- Yin, C., Zhao, W., Cherubini, F., & Pereira, P. (2021). Integrate ecosystem services into socio-economic development to enhance achievement of sustainable development goals in the post-pandemic era. *Geography and Sustainability*, 2(1), 68-73. <https://doi.org/10.1016/j.geosus.2021.03.002>
- Zhang, X., Guo, W., & Bashir, M. B. (2022). Inclusive green growth and development of the high-quality tourism industry in China: The dependence on imports. *Sustainable Production and Consumption*, 29, 57-78. <https://doi.org/10.1016/j.spc.2021.09.023>
- Zhong, L., Sun, S., Law, R., & Zou, T. (2020). Stakeholders' perceptions of heritage tourism sites development in China. *Tourism Recreation Research*, 45(1), 132-138. <https://doi.org/10.1080/02508281.2019.1680128>