

The Impact of Digitalization on Tourism Sustainability: Comparative Study between Selected Developed and Developing Countries

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Abstract

Tourism is considered as one of the first industries to digitize business processes on a worldwide scale, pioneering the online booking of flights and hotels. It was one of the early sectors that got use of new technologies and platforms as information and communications technology (ICT) became a global phenomenon. To maintain its competitiveness, growth, and long-term development, a digitized tourism must innovate and create new business prospects, where the major goal is the contribution to the United Nations' Sustainable Development Goals (SDGs). A strategy embedding technology, innovation, sustainability, accessibility, and inclusivity forms a complete tourism cycle, as the future of travel is technology-based, also tourism jobs that will require both technical and advanced skills, where 1 in every 10 jobs worldwide will be affected by digitalization and will help in generating new employment opportunities. Regarding sustainability, the wide reach of tourism into different sectors such as infrastructure, energy, transport and sanitation, and the huge impact of the sector on job creation, make it as an essential contributor to 2030 Agenda for Sustainable Development. Governments has a major role in connecting startups with investors to facilitate innovation, entrepreneurship, employment. This research will study the impact of digitalization on tourism and sustainability by using an econometric model. It will also check the impact of technology in tourism sector and how this will impact the SDGs. The study will also include analysis of both developed and developing countries, and how technology and digitalization impact the tourism sector in the selected countries.

Keywords: sustainability, SDGs 2030, blockchain, digital tourism, COVID-19.

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Introduction:

Economy and society have been transformed by the digital revolution. The growth of a linked economy, marked by widespread Internet use and the deployment of broadband networks, occurred first. Growth of a digital economy was then followed by the increased usage of digital platforms for the supplying goods and services in an increasing way nowadays. The current trend is toward a digitalized economy, in which all economic, social, and environmental components of economic functions as production and consumption are depending on the integration of digitalization and technologies.

Digital technologies have expanded at an exponential rate, and their use has spread all over the world. As a result of the massive use of smartphones and social networks, most of humans now has constant and continuous connectedness. The rapid advancement of technology in the digital sphere has made the usage of cloud computing, big data analysis, blockchains, and artificial intelligence in devices and applications commonplace.

COVID-19 pandemic has driven the globe to its hugest economic crisis since long time, with consequences on jobs, wages, and the fight against poverty and inequality. Digital technology has been critical in combating the pandemic's consequences (UN, 2022, P.7). Regarding tourism, the pandemic made it harder for countries to welcome mass tourism. Currently, some countries and tourism activities are embracing the new normal, however, in many regions of the world, the situation remains critical. The tourism industry requires significant changes to cope with potential tourists, and technological advancement is the industry's most promising future. For increasing the effectiveness of the tourism industry, we can better utilize technology and information technology (I.T.) development by using virtual reality, which is one of the industrial revolution's modern advancements, where it provides virtual tourism that is a better and safer option, it also helps in enhancing virtual travel, allowing people to experience visiting new touristic places without leaving the location they are present at (Akhtar, N, et al, 2021, P.3). It is said to be that the Internet of Things, including artificial intelligence help in reducing the stated global carbon emissions by 15%, with the proposed reduction for the year 2030 (UN, 2021, P.15).

This study assumes that there is a direct impact of digitalization on tourism sustainability, as digital innovations contribute to sustainability by reducing environmental impacts and maximizing resource utilization. The hypothesis of the study is indicating a favorable impact of digitalization on tourism sustainability, where internet allows tourism gain a greater share of online trading markets in the tourism sector, that is reflected by tourism receipts, the hypothesis with be divided into two sub hypotheses that state:

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H1: Digitalization has a positive impact on tourism sector in the developed countries and this contributes positively to sustainability.

H2: Digitalization has a positive impact on tourism sector in the developing countries and this contributes positively to sustainability

Literature Review:

Research in tourism field nowadays has been focusing on the created applications of high technology for marketing goals through mobile phones, mobile apps, and virtual reality, which are examples of technology that can be used for marketing objectives and locations. Virtual reality is one of the most innovative mediums.

There is a positive and negative impact of digitalization on the environment, as increasing digital progress, on the other hand, has negative consequences on the environment due to the increased energy consumption, polluting hardware (screen) manufacturing processes, and marketing models that incentivize quick gadget replacement.

(Bănescu et al., 2021), studied the digitalization impact on the services that tourism provides as this is investigated using panel data regression models, which estimate how percentage of people who plan their trips online is affected by economic development, education, and Internet knowledge, as well as the safety of ICT infrastructure. The data covers different 29 country from Europe over the period (2010-2018), the study showed that Western European countries with a high level of economic development have a favorable attitude toward digitalization in tourism, whereas Eastern European countries with a lower level of economic development, primarily former communist countries, have a negative attitude toward digitalization in tourism.

(Saseanu et al., 2020, P.3), analyzed the impact of digitization on visitor preferences for accommodation and economic well-being, assuming sustainability, the study was conducted by using regression analysis and principal component analysis. As tourist preferences for green destinations as well as the use of internet in travel planning, is having a substantial impact on tourism sustainability. The study included 30 European countries' behavioral models in terms of tourism sustainability and digital transformation to keep the long-term viability of the industry.

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Virtual Reality is one of the major components that is shaping the future of digitalized tourism sector, where virtual things are displayed in the actual world using augmented reality devices, this may include travel assistants that guide users through complex public transportation systems, which is used to replace traditional marketing also gamification and AVE in the targeted locations can enrich the visitor's experience (OECD, 2021). Some researchers as (Tussyadiah et al., 2018. P.4-7) have argued that virtual reality in tourism provides more engaging content for tourists. It's also changing people's perceptions and intentions about destination travel in a positive way by boosting tourists' enjoyment of the VR experience through the virtual environment.

(Zarzuela et al., 2013, P.383) show how tourism in education can be built in a entertaining way using a VR Serious Game, implying a link between VR involvement that helps tourists learning about various touristic locations of a city.

According to (Hojeghan, S., et al, 2011, P. 308), shifting the structure of the economy towards information technology and web interface that is user friendly is supported nowadays by governments, where the e-commerce security systems have an essential role in supporting the digitalization in tourism industry, where there is a link between e-commerce and tourism.

(Sylaiou et al., 2010, P.243) looked at the link between virtual museums, and the enjoyment level received and found that there is a substantial positive relationship between the two variables, where this indicates the possibility of the presence during a VR experience with a tourism location and the VR experience's satisfaction.

E-commerce is another component that is shaping the future of digitalized tourism sector, where it refers to a service that is allowing people to shop by using modern technologies at their current homes.

(Ying, M., 2017, P.239) stated a positive relationship between e-commerce in the tourism sector and the development of tourism and has mentioned that it is recommended to depend on e-commerce in the tourism sector for its development through planning and the engagement of tourism businesses.

One other form of digitalization is the usage of cloud computing and the construction of mobile technologies, (Kim, D., Kim, S., 2017), determine the state and function of mobile technology in attaining sustainable and smart tourism. The study indicates that mobile technology is expected to create novel practices for consumers as well as a sustained competitive advantage

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for tourism destinations and tourism-related providers and the development of smart tourism competences.

Consumers use mobile devices and mapping systems to get enough information, plan routes to destinations, they can take advantage of opportunities and create value by adopting mobile technologies. Destinations determination by tourists can employ data collection and big data depending on sensors that respond to potential harmful environmental impacts ahead of time, where firms, as suppliers, can add economic value by offering personalized information derived from context-aware data obtained based on the customers' lifestyle and location." (Kim, D., Kim, S., 2017)

(Buhalis & Amaranggana, 2014) studied smart tourist destinations applications, where tourism has been one of the fastest expanding economic sectors in recent years, the industry must stay up with the latest technologies, as big data and technology are anticipated to be the most significant technology shaping the travel industry, according to one of the most recent Euromonitor International travel industry reports.

(UNWTO, 2016) predicted that the number of tourists arriving and utilizing the internet to book vacations increased by 4.6 percent (or 52 million individuals) in 2015. Simultaneously, the rapid advancement of information technologies, particularly via the cloud introduced a new paradigm of smartness in all aspects of human life (Buhalis & Amaranggana, 2014, PP.553-562).

(Yallop & Seraphin, 2020) examined the growing technology trend of big data and analytics in travel and hospitality industry and determined potential opportunities and threats. While big data is widely thought to be useful to tourist and hospitality businesses, it is some ethical privacy, and security concerns. This paper states that data governance in tourism and hospitality is needed to expand to include more effective data solutions.

Different sectors and industries, such as health, government, and tourism, have expressed a strong desire to adopt and utilize this cutting-edge technology, where online payments are conducted directly between two parties without the involvement of a financial institution. This notion was initially realized in the form of the well-known cryptocurrency Bitcoin that was introduced by (Nakamoto, 2008).

The blockchain technology has appeared after then and its goal was to create a decentralized database of records in which all transactions and data are not controlled by a third party, where

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each transaction's information is shared among all participants, and is known as nodes; this feature ensures that the system is transparent, and data in this condition cannot be edited or erased, where the capacity to track transactions inside a decentralized databases, prevent fake operations to take place and fraud. Another important feature of blockchain technology is the anonymity and this is conducted by networked computation which allowed more security (Yli-Huumo J, et al, 2016).

(Tyan et al., 2020), constructed a study that aims at better knowledge of blockchain usage in the tourism industry, it has been successfully implemented by significant travel companies in the tourism industry. Companies which use blockchain technology in reservations, and payment systems like CheapAir can accept bitcoin payments, and blockchain technology for tickets sale. When it comes to the impact of blockchain on the tourism industry, it demonstrates that blockchain technology will reduce costs in certain areas while increasing costs in others, resulting in organizational and market structure adaptation, which influences inter- and intra-organizational functions and management structures, which will eventually affect the company's competitiveness, by the appearance of the decentralized apps, DApps, and blockchain based products in tourism industry.

Defining Sustainable Tourism:

According to the world tourism organization, sustainable tourism is defined as *“type of tourism that aims in achieving an appropriate balance between environmental, economic, and socio-cultural components of development, and is critical to biodiversity conservation. It must participate to little impact on the environment and local culture so that it will be available for future generations, while also contributing to the development revenues, employment opportunities, and at the same time the preservation of local ecosystems”* Sustainable tourism affects positively to biodiversity protection and, as a result, to poverty reduction and the fulfilment of common development goals. Revenues from visitor spending are frequently reinvested in environmental conservation or capacity-building programs to help local communities manage protected areas (UNWTO, 2005, PP. 11-12).

The major goal of developing a sustainable tourism is the increase in number of tourists while maintaining the sustainability principles. This can be done through the development marketing plan activities for the region that adheres with sustainability concepts while at the same time maintaining the economic profitability side and taking into consideration the expenditure of tourists in the area, and regarding the environmental aspect, this includes two main sub objectives which are, effective waste management and clean environment, that target

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minimizing the usage of non-renewable resources and the wastes generated by tourists. The third aspect is the socio-cultural that contain welfare of the community, cultural wealth and meeting the expectations of the visitors (Florek, I., 2012).

Digitalization and Tourism Sustainability in SDGs 2030:

Sustainable tourism which refers to *"tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities"* (UNWTO, 2021). This needs to be achieved by all key players that are integrated in the tourism industry, as many territories have been deteriorated because of the increased number of the inflow of tourists and the failure to regulate their access to the destination areas. Over tourism has also increased visitor dissatisfaction, as tourists are unable to experience the "hospitality atmosphere as it should be. We need to focus on tourism sustainability through the interactions among local actors including the community, the public and the private sector (Buffa, U., 2020, P.1).

Tourism generally has impact on majority of SDGs 2030 by a way or another, Tourism generates revenue and provides income sources through creating jobs at the domestic levels. Women also can be empowered by providing low skills job opportunities that increases the recruitment levels and this helps in achieving the 1st and the 5th as well as the 8th and 10th goal, which refers to ending poverty, achieving gender equality, promoting sustainable economic growth, and reducing inequality among countries respectively.

Regarding ending hunger, it also can help in promoting sustainable agriculture by encouraging the production and supply of local products to hotels, as well as selling of the domestic products to tourists. Agrotourism has the potential to produce additional revenue while also improving the value of the tourism experience. Through generated tourism's income tax, countries can use this income to be reinvested in the health care sector, this can improve the reduced rates of child mortality, enhancing the maternal health and preventing several diseases. With respect to goal 4 that ensures equitable quality education, tourism sector is helping in enhancing this sector as this sector cannot thrive without a skilled staff, where it provides direct and indirect job vacancies of whom should benefit from educational opportunities.

This sector also has the potential to improve urban infrastructure, stimulate protection of cultural and natural heritage as well as marine resources through seas and oceans, also green infrastructure investment including more efficient transportation, lower air pollution that

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should result in smarter and greener communities for residents and tourists alike, where this promotes goal 6,7,9, 11, 14 and 15 (UNWTO, 2018).

Technology and digital solutions are essential for achieving all these goals through tourism sector, the role of technology and new energy-efficient equipment is essential when it comes to companies that is engaged in tourism sector, where many of these companies aim to reduce weight by introducing lighter equipment such as seats, service carts, and cargo containers, as weight is a major driver of aircraft fuel efficiency. Airlines also want to lower their carbon footprint by using more energy-efficient technologies to help in lighting onboard or on the ground.

The digital economy is changing the way of communication with tourists and the way of providing tourism services and improving the tourist's experience. This is done through providing chances to use digital innovations in managing transactions, acquiring, and processing tourism supply and demand data, as well as optimizing and integrating operations across tourism value chains and ecosystems. Increased use of digital platforms to help in the planning stage of the travel experience by using websites and social media, with decreased use of offline sources, there is a greater tendency to stay online and connected by searching and exploring, sharing experiences, and being updated, also this increased the use of e-commerce payment rather than the usage of the cash (Visa, 2017, P.11). It is obvious that millennials and Gen Z have a higher level of engagement in the sharing rather than ownership and this is seen in accommodation sharing, ride sharing, currency swapping, and crowdsourcing than prior generations (OECD, 2021).

Based on UNWTO and UNDP report, there are some challenges and threats that face tourism sector in achieving the 17 stated SDG, as SDGs 11, 12, and 14 on 'Sustainable Cities and Communities,' 'Responsible Production and Consumption,' and 'Life below Water,' are impacted by challenges such as unsustainable consumption and production, as well as poor management of natural resources and waste. Furthermore, numerous countries indicate that there are some external threats such as global economic instability, natural disasters, climate change, biodiversity loss, and regional and international security issues that threaten tourism's ability to drive sustainable development, as shown in figure 1.

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Figure 1: Tourism share in the different 17 SDGs 2030



Source: Tourism for SDGs Website, 2022. <https://tourism4sdgs.org>

Econometric Model:

According to (Dimoska & Petrevska, 2012) tourism industry need to be sustainable, in both the supply (tourism product suppliers) and the demand (tourism product users) need to be assessed. That's why we will be engaging tourism expenditure, tourist arrivals from one side which is reflecting the demand side of tourism and we will also engage No. of establishments, and No. of rooms available to represent the supply side of tourism.

To study the impact of digitalization on tourism sector, we choose tourism receipts to be the dependent variable that reflects tourism sector, as tourism sustainability is connected to the increase in number of tourist's arrivals and to tourism receipts, where one of the major goals of sustainability in tourism sector is to enhance tourism receipts, and we focused on secured internet servers to reflect the independent variable in order to measure the digitalization of a certain economy. We focused on the coefficient β_1 of the core independent variable (servers)

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to determine whether there is a significantly positive relationship between digitalization and tourism sustainability or not. According to Neagu, which is consistent with the theoretical model:

$$TRREC_{it} = \beta_0 + \beta_1(Servers)_{it} + \beta_2 X_{it} + \epsilon_{it}, \quad (1)$$

where i represents the i -th country, t represents the t -th year, Tourism receipts (TRREC) is the dependent variable, servers are the core explanatory variable, and X represents the control variables arrivals, tourism expenditures, co2 emissions and No. of rooms.

In the light of the differences among different countries, we first constructed two cross sectional models, one is reflecting set of developed countries and another model that is reflecting the impact of digitalization on tourism sustainability on a set of developing countries.

To divide the countries into two sets, we used the data of the world bank, world development indicators (WDI) and according to the income level of the countries, there were two sets the first set is composed of the high income and middle upper income countries that included 73 different country but due to full data availability the analysis was made on 64 country only, and this set reflects the developed countries, while the other set was composed of the low income and low middle-income countries, that included 56 different country, but due to data availability there were only 39 country, to form the developing countries set. Year 2018 was chosen to conduct the analysis on, as it was the latest year with the updated variables.

Estimated Results and Discussions:

Basic Regression Results for Developed Country Cross Section Analysis:

The set of data for this group of countries (developed countries) include 64 countries, with a dependent variable, tourism receipts, and the main independent variable is the number of secured internet servers that is reflecting digitalization and a number of other independent variables that includes the following:

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Table 1: Description of used variables in the developed countries model

Symbol Used	Used Variable	Source
TRREC	International tourism, receipts (current US\$)	World Development Indicator, World Bank
TOUREXP	International tourism, expenditures (current US\$)	World Development Indicator, World Bank
ARRIVALS	International tourism, number of arrivals	World Development Indicator, World Bank
GDPCAPGR	GDP per capita growth (annual %)	World Development Indicator, World Bank
CO2KT	CO2 emissions (kt)	World Development Indicator, World Bank
SERVERS	Secure Internet servers	World Development Indicator, World Bank
ROOMS	Number of available rooms for receiving tourists in this country	United Nations World Tourism Organization

Source: World Development Indicators, World Bank, 2022

Table 2: Application of variables using EViews

Dependent Variable: TRREC

Method: Least Squares

Date: 24/1/22 Time: 17:10

Sample (adjusted): 73

Included observations: 64 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.35E+09	1.46E+09	0.923265	0.3598
TOUREXP	0.350179	0.087931	3.9824	0.0002
ARRIVALS	123.5610	36.74070	3.363055	0.0014
GDPCAPGR	3.36E+08	4.31E+08	0.780666	0.4382
CO2KT	-9794.965	5277.534	-1.855974	0.0686

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SERVERS	1701.201	1204.864	1.411945	0.1634
ROOMS	30855.01	5651.601	5.459516	0.0000
R-squared	0.953976	Mean dependent var		1.58E+10
Adjusted R-squared	0.949131	S.D. dependent var		3.27E+10
S.E. of regression	7.36E+09	Akaike info criterion		48.38074
Sum squared resid	3.09E+21	Schwarz criterion		48.61687
Log likelihood	-1541.184	Hannan-Quinn criter.		48.47376
F-statistic	196.9131	Durbin-Watson stat		1.711108
Prob(F-statistic)	0.000000			

Table 2: Linear Regression Model Applied by the researcher for set of developed countries using Eviews software.

The adjusted R-squared of the model is around 0.949. The estimates are robust to model specifications, as the set of the independent variables in the model explains about 95% of the changes that takes place in the international tourism receipts as the dependent variable; this means that the model is well fitted.

The results showed positive relationship between the number of secured internet servers that is used to reflect digitalization in the different countries and the tourism receipts that is used to reflect tourism in general and sustainable tourism in specific. In order to tackle sustainable tourism, there should be economic profitability side including maximizing the economic benefits of tourism, and regarding the environmental aspect, this includes two main sub objectives which are, effective waste management and clean environment (Florek, I., 2012). These results match the findings of Al-(Mulali et al., 2020) as the research which shows that digital adoption has a positive impact on real tourism receipts for the sample groups, except high-income countries. (Tsaurai & Chimbo, 2019) find that ICT is positively influencing tourism receipts both in the long and short runs. This finding guides us to accept H1 which states that digitalization affects tourism sector in developed countries, and this contributes to sustainability, as the results also showed that there is an inverse relationship between co2 emission and tourism receipts, where co2 emissions reflect the environmental part.

The results also showed that there is a positive relationship between tourism receipts and the following independent variables, TOUREXP, ARRIVALS, GDPCAPGR, ROOMS with probabilities of error of 0.0002, 0.0014, 0.4382, 0.000 respectively.

Tourism expenditure refers to “the total consumption expenditure made by a visitor, or on behalf of a visitor for goods and services during his/her trip and stay at the destination place (country)”. And this reflects the positive relationship that was found between the two stated

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variables, as when tourism expenditure increase, this will automatically increase the tourism receipts.

Tourism arrivals and tourism receipts are positively and significantly associated with one another, according to (Steve et al., 2020), there is a positive relationship, and this matches our results.

Although the results showed that annual change in the GDP per capita is not statistically significant, but research conducted by (Rasool, 2021) has proofed that there is a bi-directional causality between inbound tourism represented by tourism receipts and GDP per capita, which directs the level of economic activity and tourism growth.

Regarding the No. of rooms variable that was used in the analysis, it was used to reflect tourism occupancy statistics in order to determine the capacity in tourist accommodation. According to Eurostat, “*the number of existing rooms is the number the establishment habitually has available to accommodate guests (overnight visitors), excluding rooms used by the employees working for the establishment*”. If a room is used as a permanent residence (for more than a year) it should not be included. The variable was statistically significant at probability of error 0.0000, which reflects a positive relationship between the stated variable and the number of tourism receipts (Eurostat, 2022).

Developing Country Cross Section Analysis:

$$TRREC_{it} = \beta_0 + \beta_1(Servers)_{it} + \beta_2 X_{it} + \epsilon_{it}, \quad (2)$$

where i represents the i -th country, t represents the t -th year, Tourism receipts (TRREC) is the dependent variable, servers are the core explanatory variable, and X represents the control variables arrivals, tourism expenditures, co2 emissions (kg per 2017 PPP \$ of GDP) and No. of establishments.

The set of data for this group of countries (developing countries) include 39 countries, with a dependent variable, tourism receipts, and the main independent variable is the number of secured internet servers that is reflecting digitalization and a number of other independent variables that includes the following:

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Table 3: Description of used variables in the developed countries model

Symbol Used	Used Variable	Source
TRREC	International tourism, receipts (current US\$)	World Development Indicator, World Bank
TOUREXP	International tourism, expenditures (current US\$)	World Development Indicator, World Bank
ARRIVALS	International tourism, number of arrivals	World Development Indicator, World Bank
GDPCAPGR	GDP per capita growth (annual %)	World Development Indicator, World Bank
CO22017	CO2 emissions (kg per 2017 PPP \$ of GDP)	World Development Indicator, World Bank
SERVERS	Secure Internet servers	World Development Indicator, World Bank
ESTAB	Number of available establishments for receiving tourists in this country	United Nations World Tourism Organization

Source: World Development Indicators, World Bank, 2022

Table 4: Application of variables using EViews

Dependent Variable: TRREC

Method: Least Squares

Date: 24/1/22 Time: 15:58

Sample (adjusted): 56

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.14E+08	6.65E+08	1.223241	0.2302
ARRIVALS	602.5928	113.8968	5.290693	0.0000

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TOUREXP	0.535626	0.160148	3.344568	0.0021
GDPCAPGR	40742911	1.36E+08	0.300108	0.7660
CO22017	-7.99E+09	2.99E+09	-2.672706	0.0117
SERVERS	-17070.04	6847.093	-2.493035	0.0180
ESTAB	109722.2	36606.49	2.997343	0.0052
<hr/>				
R-squared	0.913606	Mean dependent var		3.13E+09
Adjusted R-squared	0.897407	S.D. dependent var		5.91E+09
S.E. of regression	1.89E+09	Akaike info criterion		45.72150
Sum squared resid	1.15E+20	Schwarz criterion		46.02009
Log likelihood	-884.5692	Hannan-Quinn criter.		45.82863
F-statistic	56.39904	Durbin-Watson stat		2.009227
Prob(F-statistic)	0.000000			

Table 4: Linear Regression Model Applied by the researcher for set of developing countries using E-views.

Similarly, to the previous model conducted on the developed countries, we used the same variables except for co2KT, we used CO2 emissions (kg per 2017 PPP \$ of GDP) instead, and when it comes to the number of rooms available to tourists that was used in the previous model, we used instead the number of establishments for reflecting better statistical data.

The adjusted R-squared of the model is around 0.897. The estimates are robust to model specifications, as the set of the independent variables in the model explains about 90% of the changes that takes place in the international tourism receipts as the dependent variable; this means that the model is well fitted.

The results showed negative relationship between the number of secured internet servers that is used to reflect digitalization in the different countries and the tourism receipts that is used to reflect tourism in general and sustainable tourism in specific. It is statistically significant but showing an inverse relation. These results match (Tsokota, 2019), that showed that ICT can negatively impact tourism, and thus, should avoid policies, events and activities that can result in bad reputation in the media in case of Zimbabwe. These findings lead us to the decision of rejecting H2 that states that digitalization has positive impact on tourism in the developing countries and this contributes to sustainability.

The results also showed that there is a positive relationship between tourism receipts and the following independent variables, TOUREXP, ARRIVALS, GDPCAPGR, ESTAB with probabilities of error 0.0021, 0.000, 0.7760 and 0.0052 respectively.

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The results also showed that there is an inverse relationship between co2 emission and tourism receipts, where co2 emission is reflecting the environmental part in tourism sustainability.

Conclusion:

This research was mainly conducted to study the impact of digitalization on tourism sustainability, and to compare the findings between the developing and developed countries. The set of data for the first group of countries included 64 developed countries, with tourism receipts reflecting the dependent variable, and the main independent variable is the number of secured internet servers that is used in reflecting digitalization

The results showed positive relationship between the number of secured internet servers that is used to reflect digitalization in the different countries and the tourism receipts that is used to reflect tourism in general and sustainable tourism in specific. This finding guides us to accept H1 which states that digitalization affects tourism sector in developed countries, and this contributes to sustainability.

The other set of data included group of 39 developing countries, with tourism receipts reflecting the dependent variable, and the number of secured internet servers as the main independent variable which is reflecting digitalization and a number of other independent variables. The results showed negative relationship between the number of secured internet servers that is used to reflect digitalization in the different countries and the tourism receipts that is used to reflect tourism in general and sustainable tourism in specific. These findings lead us to the decision of rejecting H2 that states that digitalization has positive impact on tourism in the developing countries and this contributes to sustainability.

So, we have found that digitalization has positive impact on tourism in developed countries which will positively affect sustainability, and negative impact on tourism when it comes to developing countries which will adversely affect sustainability.

Regarding Co2 emission the results showed that there is an inverse relationship between Co2 emission and tourism receipts, where the higher the co2 emission the lower tourism receipts is and vice versa in both sets of data reflecting developing and developed countries.

For better research, we recommend conducting inbound tourism survey in an annual report of each country or for group of countries that will ease the measuring process. We also recommend the construction of an index that reflects tourism sustainability for all countries across the globe that reflects all dimensions of sustainability in the tourism sector, so that tourism sustainability could be measured easily.

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References:

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*, 2021, 13, 5352, P.3. <https://doi.org/10.3390/su13105352>

Al-mulali, Usama & Solarin, Sakiru & Andargoli, Amir & Gholipour, Hassan. (2020). Digital adoption and its impact on tourism arrivals and receipts. *Anatolia*. 32. 1-3. 10.1080/13032917.2020.1856692.

Bănescu, C., Boboc, C., Ghiță, S. and Vasile, V., 2021. Tourism in Digital Era. In: R. Pamfilie, V. Dinu, L. Tăchiciu, D. Pleșea, C. Vasiliu eds. 2021. *7th BASIQ International Conference on New Trends in Sustainable Business and Consumption*. Foggia, Italy, 3-5 June 2021. Bucharest: ASE, pp. 126-134 DOI: 10.24818/BASIQ/2021/07/016

Buhalis, D and Amaranggana, A., (2014), "Smart tourism destinations" Z. Xiang and I. Tussyadiah (eds.), *Information and Communication Technologies in Tourism 2014*, DOI: 10.1007/978-3-319-03973-2_40, Springer International Publishing Switzerland 2013, PP. 553- 562.

Buffa, U. (2020), "Marketing for Sustainable Tourism", *Sustainability* 2020, 12, 2014; doi:10.3390/su12052014, P.1.

Bremmer, C. (2019), "The voice of the industry: travel", Euromonitor International, available at: www.portal.euromonitor.com

Dimoska, T. & Petrevska, B. (2012). Indicators for Sustainable Tourism Development in Macedonia, Conference Proceedings, *First International Conference on Business, Economics and Finance "From Liberalization to Globalization: Challenges in the Changing World"*, 13-15 September, 2012, Stip, Macedonia, pp. 389-400.

Eurostat Website, 2022, https://ec.europa.eu/eurostat/cache/metadata/en/tour_occ_esms.htm

Florek, Iwona. (2012). Sustainable Tourism Development. Region formation and development studies - *Journal of Social Sciences*. 157-166. 10.1007/3-540-25815-9_16.

2nd International Conference on Advanced Research in MANAGEMENT, ECONOMICS AND ACCOUNTING



18-20 February 2022
Milan, Italy

Hojeghan, S., Esfangareh, A., (2011), “Digital economy and tourism impacts, influences and challenges”, *Procedia Social and Behavioral Sciences* 19 (2011), pp. 308–316.

Kim, D., Kim, S. (2017), “The Role of Mobile Technology in Tourism: Patents, Articles, News, and Mobile Tour App Reviews”, *Sustainability*, 2017, 9, 2082; doi:10.3390/su9112082, P.2.

Nakamoto, S. (2008) Bitcoin: A Peer-to-Peer Electronic Cash System.
<https://bitcoin.org/bitcoin.pdf>

OECD library, (2021), “OECD Tourism Trends and Policies 2020”, Chapter 2,
<https://www.oecd-ilibrary.org/sites/f528d444-en/index.html?itemId=/content/component/f528d444-en>

Rasool, H., Maqbool, S. & Tarique, M. “The relationship between tourism and economic growth among BRICS countries: a panel cointegration analysis. *Futur Bus J* 7, 1 (2021).
<https://doi.org/10.1186/s43093-020-00048-3>

Saseanu, A., Ghita, S., Albastroiu, I., Stoian, C., (2020), “Aspects of Digitalization and Related Impact on Green Tourism in European Countries”, *Information* 2020, 11, 507; doi:10.3390/info11110507, P.3.

Steve Yaw Sarpong, Murad A. Bein, Bright Akwasi Gyamfi, Samuel Asumadu Sarkodie, 2020, “The impact of tourism arrivals, tourism receipts and renewable energy consumption on quality of life: A panel study of Southern African region”, *Heliyon*, Volume 6, Issue 11.

Sylaiou, S., Mania, K., Karoulis, A., White, M. (2010), “Exploring the relationship between presence and enjoyment in a virtual museum”, *Int. J. Human-Computer Studies* 68 (2010) 243–253, PP.243-253.

Tsokota, T., (2019), “The reticent effect of ICT on tourism: A case study of Zimbabwe”, *African Journal of Hospitality, Tourism and Leisure*, Volume 8 (3) - (2019) ISSN: 2223-814X.

Tussyadiah, I, Wang, D., Jung, T., Dieck, M. (2018), “Virtual Reality, Presence, and Attitude Change: Empirical Evidence from Tourism”, *Tourism Management*, PP. 4-7.

2nd International Conference on Advanced Research in MANAGEMENT, ECONOMICS AND ACCOUNTING



18-20 February 2022
Milan, Italy

Tyan, M. Yangüe, A. Guevara-Plaza. Blockchain Adoption in Tourism: *Grounded Theory-Based Conceptual Model*, vol10(1), PP. 68-89, ISSN:2014-4458.

United Nations, (2021), “Digital Technologies for New Future”, *ECLAC*, 2022, P.7.

UNEP and UNWTO, Making Tourism More Sustainable - A Guide for Policy Makers, 2005, p.11-12

UNWTO Website, 2022, <https://www.unwto.org/sustainable-development>

Visa, (2017), “VISA Annual Report”, P.11

Yallop, A., & Seraphin, H. (2020), “Big data and analytics in tourism and hospitality: opportunities and risks”, *JOURNAL OF TOURISM FUTURES*, *Emerald Publishing Limited*, ISSN 2055-5911

Ying, M., (2017), “Analysis of the impact of tourism e-commerce on the development of China's tourism industry”, *Advances in Economics, Business and Management Research*, volume 48, PP.239-243

Yli-Huumo J, Ko D, Choi S, Park S, Smolander K (2016). Where Is current research on blockchain technology?—A systematic review. *PLoS ONE* 11(10): e0163477. doi:10.1371/journal.pone.0163477

Zarzuela, M., Pernas, F., Calzón, S., Ortega, D., Rodríguez, M. (2013), “Educational Tourism Through a Virtual Reality Platform”, 2013 *International Conference on Virtual and Augmented Reality in Education*, PP. 383-385.

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