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**Design Engineering** (Toronto) ISSN:

**Vol 2021: Issue 06**

**Role of surface structure and morphology of Zinc and Magnesium codoped Vanadium Pentoxide Thin Films for Gas Sensor Applications**

Sandesh Kumar Rai, Rajesh Rai, Jayarama A, Chinmaya K.C

8325-8337



**Entrepreneurial Traits Vs Entrepreneurship Skills: Lessons from Women Agropreneurs**

V.Darling Selvi, Dr.P. Jegan

8338-8348



**Performance Evaluation of Sustainable Porous Concrete Pavement for Low Traffic Volume Roads and Heavy Rainfall Region**

Anil Kumar Suman, Dr Tanveer Ahmed, Dr Pradeep Kumar Ghosh

8349-8362



---

**Analysis Of The Effective Rate Of Temporal Bone Acoustic Window And Measurement Of Cerebral Blood Flow According To Sex And Age In Transcranial Color Coded Doppler**

Myeong-Hoon Ji, Youl-Hun Seoung

8363-8373



**Identification Of Hazards Based On Pbs (Product Based Structure) For Each Operation Scenario Of Small Uavs**

Hye-Gi Park, Je-Hong Park Won-Hyuk Choi

8374-8393



**INDUSTRY 4.0: PHU QUOC ISLAND SUSTAINABLE TOURISM DEVELOPMENT**

Hao Ngo Xuan, Ai Tran Huu

8394-8410



**THE DEVELOPMENT OF EXTERNAL IMAGE OF THE THAI PROCESSED FOOD INDUSTRY**

Wiranpat Chatwiriyant, Pornkul Suksod, Duangkarnon Chantararatmanee

8411-8423



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# INDUSTRY 4.0: PHU QUOC ISLAND SUSTAINABLE TOURISM DEVELOPMENT

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## ABSTRACT

The Fourth Industrial Revolution is changing all aspects of human activity. Impact on Tourism such as an increase in customer expectations, improvement of product quality, innovation of cooperation and organizational form. Customers are at the heart of the economy, improving the way customers are served. Products and services are enhanced with digital capabilities. New technology makes travel services fast and flexible, information and data are updated continuously and widely. Customer experience, data-driven services through analytics demand new forms of collaboration, at a fast pace. This article presents the impacts of Industry 4.0 on world tourism as well as Vietnam tourism and proposes implications for tourism development in Phu Quoc in this revolutionary era.

Keywords: Tourism 4.0, smart tourism, sustainable tourism Phu Quoc, Vietnam.

## 1. INTRODUCTION

The 4th Industrial Revolution is not only about intelligent machines and systems, but also waves of breakthroughs in different fields, the fusion of technologies, and their interaction in different fields area. Emerging technologies and widespread innovation are rapidly diffusing and transforming the global economy and society. Tourism is therefore also affected in many ways.

Sustainable tourism is tourism that takes into account the full range of current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities (Anuar A. and Sood N., 2017). Tourism can involve primary transportation to a common destination, local transportation, accommodation, play, recreation, nursing, and shopping (APEC., 2000). There is now a broad consensus that tourism development must be sustainable responsibility. Global tourism accounts for 8% of global greenhouse gas emissions (mostly from aviation), as well as other significant environmental and social impacts

that are not always beneficial to local communities and their economy (ASEAN Secretariat., 2016).

Economies welcome the facilitation of travel within APEC. Emphasizing the important role of tourism in stimulating economic growth, promoting economic integration and connectivity in the region. At the same time, it was agreed that the Asia-Pacific region is at an important stage of transformation in the context that the world is changing drastically with the digital era and the Industrial Revolution 4.0 Highlight the importance of sustainable tourism as an important driver of regional economic integration and inclusive, innovative and sustainable growth. Digitization reflects the adoption of digital technologies in business and society as well as changes related to the connectivity of individuals, organizations, and objects (Gartner, 2017; Gimpel et al. 2018).

The connection of tourism with the concept of sustainable development, popularized over the past three decades, has led to the emergence and popularity of the concept of "sustainable tourism". The definition cited by Mapjabil et al (2021), pays attention to three important elements of sustainable tourism: environmental, social, and economic. On the basis of common understanding, economies strongly agree to strongly support principles and actions to promote sustainable tourism, including: Consider sustainable tourism development as a continuous process that requires monitor and evaluate impacts on a regular basis; promote domestic and regional tourism development policies to support the implementation of the United Nations' sustainable development goals; encourage viable, long-term economic contributions that benefit all stakeholders; respect the socio-cultural originality of the local community; optimal use of natural environmental resources; encourage consumer demand for sustainable tourism products and activities; promote public-private partnership as the main measure to develop sustainable tourism infrastructure and services; creating a competitive environment, supporting all tourism-related businesses, especially micro, small and medium enterprises; conduct more research so that APEC economies can adapt and take advantage of the changes brought about by advanced new technologies.

Industry 4.0 is a new revolution related to the development of engineering. Moreover, the new trend is called the fourth industrial revolution. It deals with network-physical systems, the internet of things, cloud computing, and cognition. As technology evolves almost daily, new inventions are produced every day. As more and more people book their rides online, companies have to adapt to this new booking method. Otherwise, the hotel will not meet its goals in terms of the number of services sold such as rooms or food.

However, different target groups prefer different ways to book their rides. For today's consumers, there are many different ways of booking while before digitization there was only one option: a travel agency. Mobile phones expand options, especially when considering developments related to data roaming in the European Community. For example, online travel guides offer several advantages: simple updates, links to specific information, search

functionality, bookmarks, or other travelers' feedback and reviews. While the older generation prefers to book a vacation at a travel agency, the younger generation prefers online booking portals. Based on this fact, more and more hotels focus on online promotion. As opposed to larger hotels or large hotel chains, smaller hotels have to expand their online selling features, e.g. book directly through their official website or invest in online travel agents, i.e. booking.com. Otherwise, the hotel will be negatively impacted and affected by the new development known as "industry 4.0".

## 2. LITERATURE REVIEW

According to the UNWTO, "Tourism is a cultural, social and economic phenomenon that entails the movement of people to countries or other places outside their usual area of habitation. These people are referred to as tourists (which can be tourists or leisure travelers, residents or non-residents), and tourism has performed those activities for them, some of which are related to tourism expenditures. ". Overall, international tourist arrivals globally have shown almost uninterrupted growth: from 25 million in 1950, with 277 million in 1980, to 435 million in 1990, with 675 million in 2000, in 2011 it was 945 million. According to the World Tourism Organization (UNWTO-2019), the number of international tourists globally in 2018 exceeded 1.4 billion arrivals, an increase of 74 million arrivals compared to 2017, reaching a growth rate of nearly 6%. This is the second-highest growth rate in the period from 2010 to now (only after the impressive growth rate of about 7% in 2017). In 2018, Asia-Pacific welcomed 342.6 million international visitors, an increase of 6.1% compared to 2017, accounting for nearly a quarter of the total number of global international visitors, of which, Southeast Asia is the region leading terms of growth in international arrivals with 7.4%. It is forecasted that by 2030, the number of international tourists worldwide will reach 1.8 billion. Southeast Asia will become the 4th largest international tourist destination in the world.

Now, the Fourth Industrial Revolution is emerging from the third, which brings together the technologies, blurring the lines between physical, digital and biological". Industry 4.0 will take place in 3 main areas including Biotechnology, Digital, and Physics. The core elements of Digital in Industry 4.0 will be Artificial Intelligence (AI), Internet of Things (IoT), and big data (Big Data).

According to Klaus Schwab (2018), the breakthrough speed of Industry 4.0 is currently "without historical precedent". When compared to previous industrial revolutions, 4.0 is progressing at an exponential rather than a linear rate. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of the entire production, management, and governance systems. Currently, Industry 4.0 is taking place in developed countries such as the US, Europe, and part of Asia. Besides new opportunities, the industrial revolution 4.0 also poses many challenges to humanity.

## 3. IMPACT OF INDUSTRY 4.0 ON TOURISM DEVELOPMENT:

Impact on Tourism such as an increase in customer expectations, improvement of product quality, innovation cooperation and organizational form. Customers are at the heart of the economy, improving the way customers are served. Products and services are enhanced with digital capabilities. New technology makes travel services fast and flexible, information and data are updated continuously and widely. Customer experience, data-driven services through analytics, demand new forms of collaboration, at a fast speed.

### 3.1. Tourism promotion and marketing

- **Expanding space, time, and tourism market:** The development of the Internet of Things, erases space and time, creating a flat world. People all over the world, just need an internet connection, can access and learn all the monuments. Historical, famous tourist attractions around the world. This is an important push to create travel demand in all people, a golden opportunity to expand the tourism market. Potential space tourism market Earth tourism is a trillion-dollar industry. These surveys confirm a widespread personal interest in space tourism (60 to 80%, depending on the country) and a willingness to spend up to a month's salary just to go into space once. Obviously, this is not a “far-fetched” plan without a connection to earthly reality — space, tourism expand an already thriving industry into a new and potentially very lucrative field.
- **Reduce advertising and marketing costs:** If in the past, to promote and develop a destination, people had to spend a lot of time and have to pay a large amount of money for advertising on television, newspapers, radio, distributing leaflets, brochures, maps, tour introduction and price per tour now through the application of smart websites (such as Web30s, Smart Live Chart, Smart Marketing Tool) and virtual switchboards (all these software are run on cloud computing environment) cost of advertising, marketing and time spent on it has been greatly reduced. This is a huge advantage brought by Industry 4.0 Furthermore, if the design of a product requires consumers to trade both time and money, then the actual price includes more than just its price" (Wells and Prenskey, 1996: 92).
- **Digitizing tourism database:** The digitization of tourism databases such as the introduction of natural and human tourism resources, maps of tourist attractions, systems of restaurants, hotels, transportation systems... of each locality, each country is being widely deployed, bringing convenience to managers, tourism businesses, and tourists around the world. Smart products are products that are capable of computing, storing data, and communicating and interacting with their environment (Miche et al., 2009; Mühlhäuser et al., 2008). Industry 4.0 implies a massive increase in the variety, volume, and speed of data generation (Lee et al., 2014), and information availability.
- **Virtual reality travel:** The desire to travel and escape from everyday life remains pervasive, with new features powered by information and communication technology (ICT). Virtual reality (VR) allows users to travel virtual using computer-generated images or

videos, simulating real-life experiences and providing a travel alternative Guttentag DA (2010); Loureiro et al., (2020). The concept of virtual reality is applied in various fields such as video games, entertainment, military applications, healthcare, education, tourism, architecture, and sales marketing. In industry, virtual environments are used at all times such as production planning, design, production, service, maintenance, testing, and quality control (Bayraktar and Kaleli 2007). However, there are few studies that address the question of whether virtual reality has the potential to replace physical travel (Sussmann et al., 2000; Tussyadiah et al., 2016). Therefore, the use of images, 3D and 4D movies to reconstruct events, historical, cultural, and natural heritage sites and put them on the internet or show them at tourist attractions will help everyone around the world (including tourists) to easily discover, understand, love more and enjoy learning about tourism resources of each locality, each country. This is also one of the effective methods of stimulating tourism demand.

### 3.2. About the business of tourism services

- **Online sales and online payment:** E-commerce, online business, including tourism business, is currently the trend of the times. Industry 4.0 helps tourism businesses deploy and sell travel services to all types of people in need around the world with the least cost, the most time savings, and the highest revenue.
- **Reduce labor force, time, cost tourist services:** The application of modern technology has significantly reduced human resources, shortened working time, sharply reduced costs, leading to a reduction in the cost of tourism services. It is thanks to buying and selling goods online that tourism businesses can link, cooperate, share difficulties and profits, sell to a large number of customers, with little cost and time, so they can be stable pricing, discounts, even shocking discounts on travel services. Chinese-American tourism businessmen in the US, in some countries in Southeast Asia (Thailand, Malaysia, Singapore), and tourism businesses in Eastern Europe are very good people in the field. In the US, their tour prices are very flexible, even some lucky tourists in the low season have a huge promotion (buy 2 get 2 free), only pay about 250 USD for a 7-day 6-night tour. East Coast, about 400 USD for a 10-day 9-night tour in the US West Coast (price only includes travel expenses and overnight in 3-5star hotels). Cheaper prices like this in Vietnam can only be seen in a dream.
- **Development of new tourism products:** Industry 4.0 creates more and more new, richer, and more attractive tourism products. Industry 4.0, especially virtual technology, allows recreating historical events, ancient cultural spaces, majestic natural landscapes ... so that visitors can experience and immerse themselves in it, creating the sensations of reality at tourist destinations. Visitors who have the opportunity to visit the Hollywood movie capital can see all the virtual technology effects, the irresistible attraction of this famous tourist destination. The hardest product development strategy and the highest risk strategy is to develop new products for new and/or existing customers. The Canadian Tourism

Commission's book *Passages to Innovation* provides a strategic support tool that includes the development of new and truly innovative products.

- **Improve quality serving:** When applying industry 4.0, with its outstanding technological advantages, it allows visitors to feel with all their senses (hearing, taste, smell, touch, perception), the sensation Visitors' reception and satisfaction will greatly increase. Therefore, Industry 4.0 not only reduces costs but also increases the quality of tourism services. Quality assurance depends on the excellence of two important points in business: the design of goods and services and quality control during service delivery that is often supported by a number of factors. forms of measurement and inspection activities (Evans & Lindsay, 2010).
- **Globalization of tourism in a flat world:** Industry 4.0 is opening up many opportunities, especially for developing countries to improve productivity and shorten the gap. The connection between people, every organization no longer has the distance, the time to take place at the same time (Veselica V., 2007). Development cooperation will contribute to the diversification of tourism products. The increase in domestic tourist traffic is largely related to the increasing exchange between developed parts of the world. The globalization of tourism clearly shows that traditional tourist areas are losing market share to rapidly growing competitors (WTO, 2017). It is a clear, dynamic, and heterogeneous process that will change the world into a global village (Ostrowska B., 2011). Requirements to develop tourism according to global standards: service, rooms, food, respect for common values, attitude to culture, and ecological environment. Establishing common values and standards goes hand in hand with affirming and defending specific values of a culture. Global thinking about respecting, preserving, and protecting particular values... (Deszczynski P., 2009).
- **The shift from scenic tourism to traditional culture:** Tourism demand changes, towards new values on the basis of traditional culture with uniqueness, originality, natural value, pristine, wild, creative value, and modern high technology, convenience suspect. Sustainable, green, responsible tourism, community-oriented towards the origin, towards nature, are outstanding trends. Tourism is a phenomenon of contemporary globalization, appearing and developing at a certain stage of human society's development. Its influence combines economic, ecological, social factors, religious relations, culture, and other scientific categories in the field of human activity (Smeral E., 1996: 395).
- **Progress on Technology use in Tourism:** Industry 4.0 creates rich products at low prices, bringing great benefits. Digital technology impacts the travel industry. Travel and tour companies need to take advantage of the revolution and transform their business models (Liang et al., 2017). It is necessary to invest in and apply advanced tourism, technology, especially information technology and telecommunications in the online tourism business, to participate in the global reservation system to serve the marketing and promotion activities

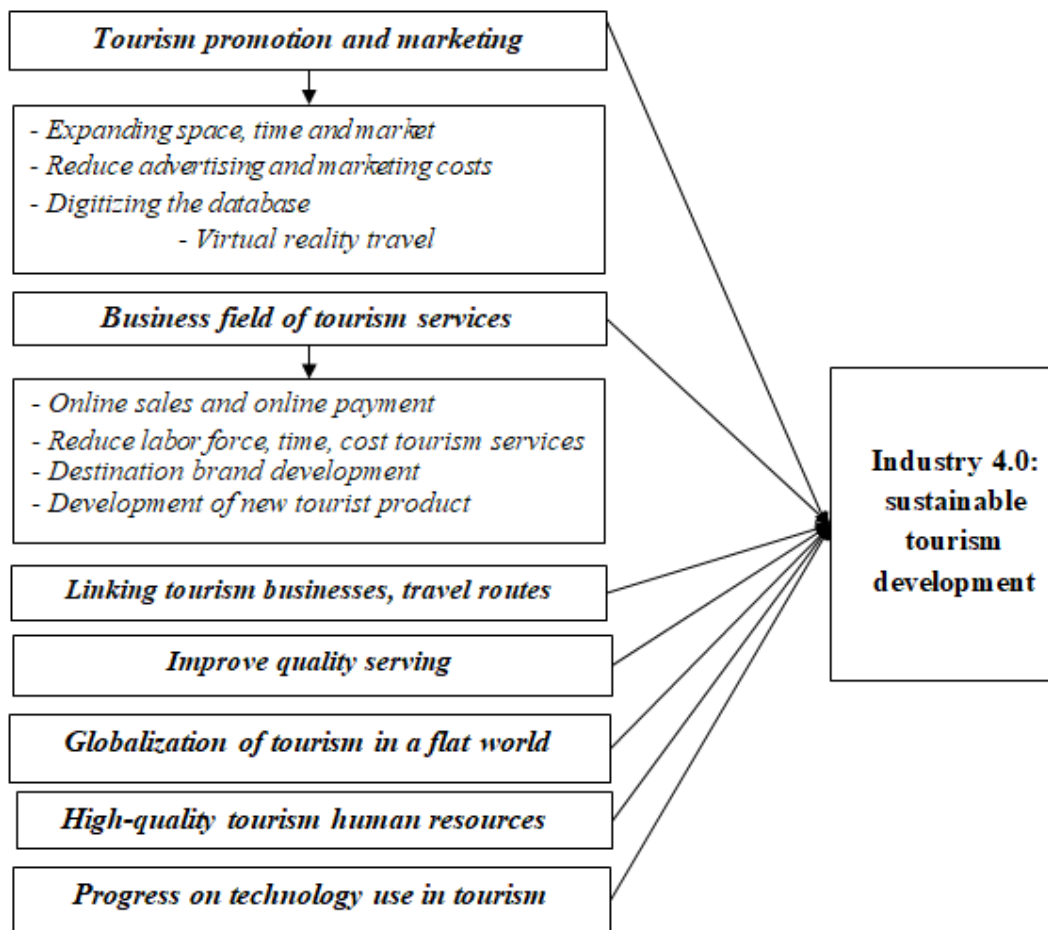


products and strongly participate in the global value chain (Baskerville and Myers, 2002). It is necessary to strengthen cooperation to learn from development experiences in the integration process too soon improve the traffic infrastructure system, ensure safety and security. Focusing on proper investment promotion and destination marketing so that Vietnam tourism really has a good image and brand... Interested in developing and applying scientific and technological advances to the management as well as activities and services for the tourism industry (state management/business administration, travel, accommodation, tourist transport, etc.) sales, catering and other services); especially “online tourism promotion and business” in line with the trends and habits of tourists around the world (Navío-Marco et al., 2018)

- **High-quality tourism human resources:** Industry 4.0 requires highly qualified human resources. Low-skilled human resources are gradually being replaced by machines and automation. Developing an organized and high-quality labor market has become an urgent requirement and an effective tool to support and develop human resources in the tourism industry. When automation replaces people in the entire economy, workers will be redundant and highly fragmented. Automation affects the back-office, sales, customer service, and support industries. Automation, automated reporting, and virtual assistants will become ubiquitous. The “consultation robot” in travel is a phone, a tablet, etc. As companies begin to realize the wide range of quality, the concept of total quality (TQ) has emerged. Total Quality is a person-centered management system that aims to continuously improve customer satisfaction at a continuously lower actual cost. A successful property employs leaders-managers who create an engaging work environment in which guests and employees become integral parts of the mission by engaging on goals and goal setting (Walker, 2010).

#### 4. RESEARCH MODEL AND HYPOTHESIS

- **Research models:** From theory, interviews with experts, empirical research on factors affecting sustainable tourism development by previous researchers, and potential features of sustainable tourism development in Phu Quoc. Country. Compared with other localities in the country, the authors propose a proposed research model with the following factors: (1) Tourism promotion and marketing (TPM), (2) Business field of tourism services (BFTS), (3) Linking tourism businesses, tourist routes (LTB), (4) Improving service quality (ITS), (5) Globalizing tourism in a flat world (GTFW), (6) High-Quality Tourism Human Resources (HQHS) and (7) Progress on technology use in tourism (PTUT). The dependent variable is Industry 4.0: sustainable tourism development (ISTD)



**Figure 1. Research models**

*(Source: Author's compilation)*

- **Research hypothesis.**

**H1:** *Tourism promotion and marketing has a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

**H2:** *Business field of tourism services has a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

**H3:** *Linking tourism businesses, travel routes have a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

**H4:** *Improve quality serving has a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

**H5:** *Globalization of tourism in a flat world has a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

*H6: High-quality tourism human resources has a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

*H7: Progress on technology use in tourism has a positive impact on sustainable tourism development in Phu Quoc island from Industry 4.0*

Therefore, we have a total of 7 research hypotheses in the research model that directly affects sustainable tourism development in Phu Quoc island from Industry 4.0 In which the first 2 hypotheses have components related to parts that are indirectly affected by sustainable tourism development in Phu Quoc island from Industry 4.0

## 5. RESEARCH METHODS

A set of methods used in this study are as follows:

- **Survey method by questionnaire and data analysis:** The survey method by questionnaire is used to collect information related to demographic characteristics, tourist behavior, perception of sustainable tourism development, and recommendations of visitors. Accordingly, 405 tourists visiting Phu Quoc were interviewed from August 15, 2020, to September 4, 2020. After collecting the questionnaires and re-checking, we decided to remove 46 questionnaires with a lot of information that was missing information or were answered mainly at one rating level. As a result, 359 satisfactory questionnaires were used for the research.

**Table 1. General information about the study sample**

Variable	Interpretation	Percentage	Variable	Interpretation	Percentage
<i>Sex</i>	Male	58,1	<b>Level</b>	High School	43,1
	Female	41,9	<b>Education</b>	College	8,2
<i>Ages</i>	18-28	48,1	<b>Specialize</b>	University	41,2
			Other	7,5	
			<b>Type of Residence</b>	City	66,9
	29-39	33,8	Countryside	33,1	
	40-68	18,1			

*(Source: Author's compilation)*

Data from the questionnaire were analyzed using SPSS 23.0 software with descriptive statistical analysis techniques, scale, reliability, exploratory factors, and multivariable linear regression.

- **Field observation method:** Tourism research in general and sustainable tourism development in Phu Quoc, in particular, is an indispensable destination without field observations. Using this method, helps us to have an overview of tourism activities in the study area. In the process of interviewing tourists (August 15, 2020 - September 4, 2020),

we combine with visiting the tourist route system and learn some issues related to tourism development sustainable tourism in Phu Quoc.

- **Methods of collecting and processing documents:** For this study, literature or secondary data play an important role. Using the literature, we get the theory of the problem to be implemented and the basis for developing the research model. In addition, to have a local understanding, it is indispensable to consult the literature. The types of materials we use for research include books, scientific articles, and statistics. To obtain information from documents, we use analytic and synthesis techniques. Scale: The scales used in this topic are synthesized from the measurement scales that many foreign authors have used in many countries in the tourism industry. However, these scales have also been adjusted through qualitative research (group discussion) in HCMC. In order to find the most suitable scales for the Vietnamese tourism market.

- Evaluation of the scale: First, the scales will be preliminarily evaluated through two methods: Cronbach's Alpha reliability coefficient and exploratory factor analysis (EFA). Next, the scales were tested by confirmatory factor analysis (CFA).

- Theoretical model testing: Along with confirmatory factor analysis (CFA), model testing is done through linear structural analysis (SEM) software.

In the multiple regression model, we have the additional hypothesis that the independent variables are not completely correlated with each other. Therefore, when estimating multiple regression models, we have to test this hypothesis by testing the phenomenon of multicollinearity. To check for multicollinearity, we use the VIF index, called the Variance Inflation Factor. Usually, if the VIF of a certain variable is  $> 2$ , then this variable has almost no explanatory value for the variable Y in the model (Hair & ctg, 2006). If the VIF of any variable  $< 2$ , it is assumed that multicollinearity does not occur. In fact, if  $VIF > 2$ , we need to be careful in interpreting the regression weights (Nguyen Dinh Tho, 2011, p 497).

## 6. RESULT

The average Cronbach's Alpha reliability analysis results of the scales are  $0.872 > 0.7$ . At the same time, all 8 observed variables have a total correlation  $> 0.4$ .

**Table 4.8: Cronbach's Alpha test results before EFA analysis**

No.	Scale	Number of observed variables	Cronbach's Alpha	Corrected Item-Total Correlation
1	Tourism promotion and marketing (TPM)	4	0.871	0.649
2	Business field of tourism services (BFTS)	5	0.921	0.721
3	Linking tourism businesses, travel routes (LTB)	5	0.901	0.665

4	Improve quality serving (ITS)	5	0.856	0.610
5	Globalization of tourism in a flat world (GTFW)	5	0.911	0.732
6	High-quality tourism human resources (HQHS)	5	0.873	0.596
7	Progress on technology use in tourism (PTUT)	5	0.843	0.554
8	Industry 4.0: sustainable tourism development (ISTD)	4	0.805	0.549
	Total	38		

(Source: Author's compilation)

The EFA analysis showed that 34 observed variables in 7 factors influencing sustainable tourism development in Phu Quoc island dependent Industry 4.0, remained the same 7 factors with 34 observed variables. EFA analysis results of 7 factors of sustainable tourism development in Phu Quoc island dependent Industry 4.0 With KMO coefficient = 0.744, EFA fits the data and Bartlett Chi-square test 107446.817, significance level  $p = 0.000$ . Thus, the observed variables are correlated with each other on the overall scale. The extracted variance 73.129 shows that the factors derive from 73.129% of the explanatory variance of the data, the eigenvalues in the system are equal to 1.383.

- Analysis CFA:** Regarding the overall quality of the fit, the linear structural analysis shows that this model has a statistical chi-square value of 321.333 with 163 degrees of freedom and  $p = 0.000$ . The relative square chi in degrees of liberty  $CMIN/df$  is 1.971 ( $< 2$ ). Other indicators include  $GFI = 0.92$  ( $> 0.9$ ),  $TLI = 0.944$  ( $> 0.9$ ),  $CFI = 0.956$  ( $> 0.9$ ), and  $RMSEA = 0.052$  ( $< 0.08$ ). Therefore, it is appropriate for market data. This also allows us to draw conclusions on the unidirectional character of the observed variables. As far as the convergent value is concerned, the standardized weights of the scales are all  $> 0.5$  and have a statistical significance of  $p < 0.5$ , so that the scales reach a convergent value. Therefore, the components: (1) Tourism promotion and marketing (TPM), (2) Business field of tourism services (BFTS), (3) Linking tourism businesses, tourist routes (LTB), (4) Improving service quality (ITS), (5) Globalizing tourism in a flat world (GTFW), (6) High-Quality Tourism Human Resources (HQHS) and (7) Progress on technology use in tourism (PTUT).

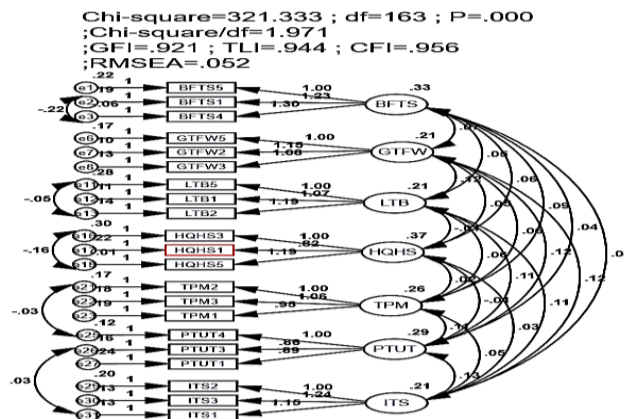


Figure 2 - The model CFA

(Source: authors' own calculations in SPSS Amos 23.0)

**Table 2 - Results of estimating the causal relationship between the factors of sustainable tourism development in Phu Quoc island dependent Industry 4.0 (Source: authors' own calculations)**

Correlations			Estimate	S.E.	C.R.	P
BSTF	<-->	GTFW	.066	.016	4.056	***
BSTF	<-->	LTP	.054	.015	3.534	***
BSTF	<-->	HQHS	.057	.017	3.282	.001
BSTF	<-->	TPM	.095	.020	4.622	***
BSTF	<-->	PTUT	.036	.016	2.243	.025
BSTF	<-->	ITS	.045	.015	3.079	.002
GTFW	<-->	LTP	.120	.018	6.813	***
GTFW	<-->	HQHS	.049	.016	3.067	.002
GTFW	<-->	TPM	.065	.016	4.098	***
GTFW	<-->	PTUT	.118	.018	6.496	***
GTFW	<-->	ITS	.120	.017	7.092	***
LTP	<-->	TPM	.062	.016	3.915	***
LTP	<-->	PTUT	.108	.018	5.844	***
LTP	<-->	ITS	.112	.017	6.472	***
HQHS	<-->	ITS	.034	.016	2.154	.031
TPM	<-->	PTUT	.113	.019	5.778	***
TPM	<-->	ITS	.050	.016	3.231	.001
PTUT	<-->	ITS	.134	.019	7.047	***

(Source: Author's compilation)

- Structural Equation Model Results:** The research model includes 7 concepts, after SEM testing there are 6 satisfactory concepts, including (1) Tourism promotion and marketing (TPM), (2) Business field of tourism services (BFTS), (3) Linking tourism businesses, tourist routes (LTB), (4) Improving service quality (ITS), (5) High-Quality Tourism Human Resources (HQHS) and (6) Progress on technology use in tourism (PTUT). The results show that this model has a chi-squared value of 353.719 with 163 degrees of freedom ( $p = 0.000$ ). The relative squared value of degrees of freedom  $CMIN/def$  is 2.170 ( $< 3$ ). Other indicators include:  $GTI = 0.917$  ( $> 0.9$ ),  $TLI = 0.935$  ( $> 0.9$ ),  $CFI = 0.949$  ( $> 0.9$ ), and  $RMSEA = 0.057$  ( $< 0.08$ ). Therefore, this model achieves compatibility with the collected information. Factors include (1) Tourism promotion and marketing (TPM), ( $ES = 0.261$ ,  $P = 0.000$ ); (2) Business field of tourism services (BFTS), ( $ES = 0.327$ ,  $P = 0.000$ ); (3) Linking tourism

businesses, tourist routes (LTB), (ES = 0.206, P = 0.000); (4) Improving service quality (ITS), (ES = 0.213, P = 0.000); (5) High-Quality Tourism Human Resources (HQHS), (ES = 0.374, P = 0.000); Progress on technology use in tourism (PTUT), (ES = 0.293, P = 0.000).

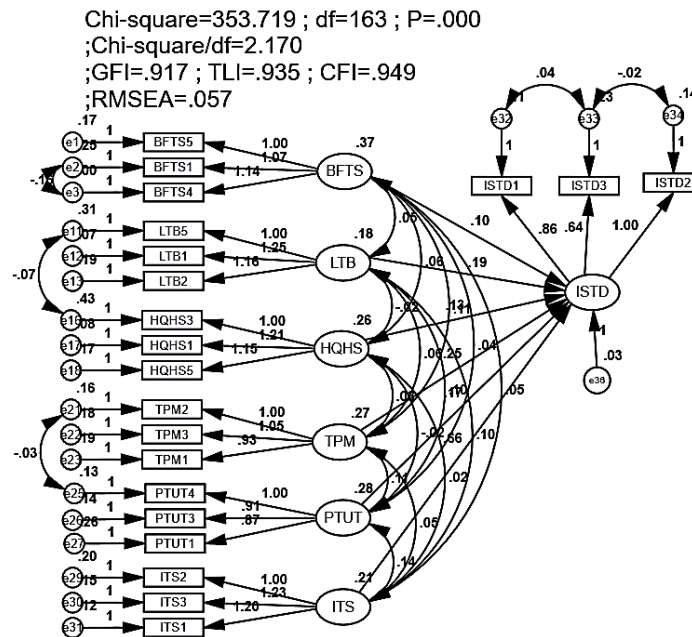


Figure 6 - The model structure after final calibration in SEM

(Source: authors' own calculations in SPSS Amos 23.0)

Table 3 - Results of estimating the causal relationship between the factors of sustainable tourism development in Phu Quoc island dependent Industry 4.0 (Source: authors' own calculations)

Relationship	Estimate	S.E.	C.R.	P	Label
ISTD <--- BSTF	.101	.031	3.209	.001	Yes
ISTD <--- LTP	.186	.061	3.054	.002	Yes
ISTD <--- HQHS	.127	.041	3.068	.002	Yes
ISTD <--- TPM	.250	.050	4.973	***	Yes
ISTD <--- PTUT	.175	.056	3.098	.002	Yes
ISTD <--- ITS	.659	.075	8.801	***	Yes

(Source: Author's compilation)

The bootstrap method is usually used to test the model estimates, with the pattern repeatedly being  $N = 1000$ . The estimation results for 1000 samples averaged together with the deviations are presented in Tab. 4. CR has a very small absolute value, thus, it can be stated that the deviation is very low, while also being not statistically significant at the 95% confidence level. Thus, we can conclude that the model estimates can be trusted.

**Table 4 - Results estimated by means of bootstrap, N = 1000**

**(Source: authors' own calculations)**

Parameter	SE	SE-SE	Mean	Bias	SE-Bias	CR
ISTD <--- BSTF	0.046	0.001	0.099	-0.001	0.001	-1
ISTD <--- LTP	0.081	0.002	0.192	0.005	0.003	0.6
ISTD <--- HQHS	0.058	0.001	0.121	-0.006	0.002	-0.33
ISTD <--- TPM	0.076	0.002	0.25	0.002	0.002	1
ISTD <--- PTUT	0.086	0.002	0.17	-0.005	0.003	-0.6
ISTD <--- ITS	0.136	0.003	0.663	0.005	0.004	0.8
ISTD <--- BSTF	0.046	0.001	0.099	-0.001	0.001	-1

*(Source: Author's compilation)*

- **T-test and Anova:** According to the results of T-test and ANOVA analysis, some demographic variables are statistically significant in this study: age group, education level and resident city or rural. This means that there is a difference in the impact of sustainable tourism development in Phu Quoc island dependent Industry 4.0, by age group, education level and resident city or rural (Ai Huu Tran, 2020).

**7. Conclusion** Successfully attracting visitors is only half of the success, the important thing is that after attracting visitors to Phu Quoc Island, it must increase the length of visitors' stay, making visitors spend more of their money on the island. Phu Quoc and then how visitors will return to Phu Quoc island for the second and third time... To achieve the above goal, the research team proposes to consolidate, expand and effectively exploit key customer source markets suitable to the specific conditions of Phu Quoc island: on the basis of building products unique tourism with unique nuances of Phu Quoc capable of competing in the domestic and international markets, with special emphasis on marine, cultural-historical and ecological tourism products; at the same time, diversify tourism products with thematic products suitable for the city to satisfy the diverse and increasing needs of visitors, and improve the efficiency of tourism activities.



- Protection of habitat and rest is an integral part of an integral ecological policy. It should be understood that the protection of natural tourism resources means the protection of the habitat for tourism activities, not the protection of tourism. One of the major issues of conservation and development of tourism resources that need attention is the conservation of biodiversity.
- Establishing an information management network, building a scientific data bank on biodiversity. The results on biodiversity must be made statistics on species composition, distribution, reserves, habitats, living relationships... Applying and developing tourism information technology, building a database system, tourism, resource management system, environmental management, and waste treatment effectively.
- The biodiversity training includes the training of management staff and propaganda and education of the community on biodiversity knowledge in order to raise the local people's understanding and awareness of biodiversity protection as well as visitors.
- Building a legal system, strict sanctions for tourism and travel business units in two protected areas; strictly observe and implement the principles of biodiversity conservation, minimize the impact on the ecological environment of the area when constructing construction as well as doing business in services... Sustainable tourism development requires the management, conservation, embellishment, and development of all types of resources to meet the current economic, social, environmental, and aesthetic needs without compromising the needs of future generations. Develop strict sanctions to enhance the responsibility of tourism resource protection for tourism businesses.
- Develop a strategy to develop tourism products in order to develop tourism in a sustainable and reasonable manner. At the same time, there should be policies to encourage and support green and environmentally friendly tourism such as ecotourism; tourism combined with conservation, scientific research; cultural-historical tourism; village tourism. These are not only attractive and unique types of tourism that Phu Quoc has a lot of potentials, but also as a special and indirect tool to protect the environment, preserve ecology, and actively contribute to ensuring the safety of the environment ensure sustainable tourism development.
- Develop environmentally meaningful green consumption policies, manage energy well, save water and manage waste. The use of new energy sources such as wind, sunlight, and biogas will reduce costs for tourist sites, while also reducing fuelwood consumption and greenhouse gas emissions.
- Develop a program on raising the awareness of the local community in preserving and embellishing natural and human tourism resources because tourism resources are basically non-renewable resources.

- **Limitations of the topic:** Although some specific results have been obtained as described above, the research cannot avoid certain limitations that need to be further researched, supplemented, and improved.

- The new study identified only 7 influencing factors and only explained 73,2% of the model in sustainable tourism development in Phu Quoc island dependent Industry 4.0 of the tourist, and 26.8% of the model sustainable tourism development in Phu Quoc island dependent Industry 4.0, are explained by other undefined factors. However, due to the limited access to data as well as the capacity of the research team, the study will still have shortcomings and the research team would like to receive the sincere contributions of experts, researchers and experts. science to complete this research problem.

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