

Critical Success Factors Associated to Tourism e-Commerce: Study of Peruvian Tourism Operators

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Abstract—The incorporation of information and communication technologies (ICT) has generated new opportunities and innovation in business models, such as electronic commerce (EC). Despite the benefits that the EC offers PYMEs, its adoption is low. Several authors have argued that many factors condition the adoption of EC in developing countries. This study proposes a model of factors associated with the adoption of EC by tourism operators based on factors categorized into organizational, individual, environmental, and technological factors. In this study, a structural equation modeling and confirmatory factor analysis tools were used to analyze the data. The data collected from 116 participants (69% males and 31% females, managers of tourism operators). The results reveal that 11 factors influence the adoption of EC. Also, the operators currently using EC consider that the most influential factor are related with organizational factors operators that have not implement EC value factors involving skills, knowledge and experience in technology. This study can be used to establish policies on ICT adoption in tourism PYMEs.

Keywords—Adoption; e-commerce; tourism operators; PYMEs; critical factors; TOE

I. INTRODUCTION

The tourism sector is an emerging sector that has recently experienced diversification. Tourism is key to countries' economies, contributing to job creation [1], and is one of the premier export industries in developing countries [2]. The tourism sector plays the role of a catalyst for innovation and entrepreneurship and contributes to improving the lives of millions of people and transforming entire communities [3].

Information and communication technologies (ICTs) and the expansion of the internet have generated new opportunities and innovation in business models, changing the business structure and creating new ways of doing things. Likewise, the benefits of ICT in improving efficiency, reducing costs, and increasing productivity in organizations have been recognized. One of the sectors affected by ICT is the tourism sector, which has adopted new technologies with a growing trend in the future. This sector has remained at the forefront of the digital transformation due to the changes in how the sector operates and people travel [4]. Tourism in Peru is the third-largest industry behind fishing and mining.

A technology that has been used and is becoming more critical is electronic commerce (EC) [5], which is used in several sectors, such as the tourism sector. PYMEs in the tourism sector are not oblivious to these changes and are recognized as providers of job opportunities [6]. Despite the

benefits of ICTs, such as reduced costs per transaction, increased speed, and operational efficiency, not all PYMEs have incorporated EC. Although the global turnover of EC continued to grow steadily by about 11% in 2019, in the case of Latin America, it constitutes only 2% [7]. Moreover, EC has grown almost 15 times in revenue since 2009 [8].

In the tourism sector, EC is conducted in tourism-related activities using ICT tools by tourism organizations [9]. In developing countries, EC adoption in PYMEs is below that of large enterprises [10, 11]. One aspect that hinders adoption is that most PYMEs do not know how information technology (IT) can benefit their businesses and support them in achieving their goals; therefore, they do not invest in EC [12]. Some countries lag in adopting ICT due to poor economies, lack of infrastructure, and an unskilled workforce [9].

The process of ICT adoption has been studied by several authors [6, 13]. Some factors have been mentioned as enablers of EC in tourism PYMEs: pressure from external agents, perceived usefulness, perceived ease of use, technological readiness, ICT skills of employees, organizational readiness, management capacity, and government support, among others. Tourism is an activity that energizes the Peruvian economy, so it is essential to study how tourism PYMEs adopt EC.

The main contribution of this paper is determining the critical success factors positively associated with the EC adoption according to the perception of tour operations managers. With the recent events of the coronavirus disease 2019 (COVID-19) pandemic, an opportunity has been created for tour operators to reassess the business model. The general challenges for the tourism sector are innovating and digitizing as many activities as possible (i.e., organizations must invest in digital transformation to improve the management and planning of tourism destinations) [1].

Once the critical enabling factors of EC are known, an adoption model adapted from the technology and organizational environment (TOE) framework is proposed.

The managers of PYMEs, researchers and tourism institutions can benefit from the findings of this research.

The article is structured into five sections, including the introduction. Section II presents a comprehensive background and research hypotheses. Section III presents the material and methods. Section IV describes the results. Section V presents the discussion of the results and suggests future studies. Finally, in Section VI, the conclusions are presented.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This study aims to determine which factors, based on the literature review, are positively associated with the adoption of EC from the tour operator manager’s viewpoint and to increase understanding of the topic. Tourism is a sector that energizes the economy through creating jobs, for which ICT can be a strategic ally, especially for PYMEs dedicated to tourism. With the COVID-19 pandemic, new challenges have arisen for these companies, such as reassessing the business model and innovating and digitizing activities, which many PYMEs have not considered.

A. Technology, Organizational and Environment

The Technology Acceptance Model (TAM) and Technology Organization Environment (TOE) framework can be used to measure the adoption of a technology in organizations. The TOE framework was developed by Tornatzky and Fleischer [14]. This framework describes the influence of contextual factors in adopting an innovation. Three aspects of the context of an enterprise influence the adoption of technological innovations: technological context, organizational context, and environmental context [10].

Technological context is related to technologies in the organization (internal) and those available for adoption that are not used by the organization (external). In the adoption process the technology existing in the organization is important because is related to technological change. One of the factors that affect the use of technology is usability.

Organizational context refers to the nature and resources of the organization, specifically its size, decentralization, formalization, management-structure complexity, and human resources. Environmental context refers to the aspects surrounding the organization, such as competitors and suppliers and the relationship with government entities.

This framework was adapted considering the factors identified in the literature, such as perceived utility, ease of use, and managerial skills, among others, and a new context called individual was added. Individual context refers to aspects related to people, skills, knowledge, and experience. Thus, it is possible to understand how these determinants can influence the adoption of ICT from the context of the adapted TOE framework. The following section reviews studies related to technology adoption factors.

B. Critical Factors in the Adoption of EC

ICT play a vital role in developing the tourism sector and positive contribution to sustainable development [15]. Despite the rapid growth in the number of travelers using technology, challenges to adopting technology exist in all tourism segments. Several factors condition the adoption of EC. In a previous study [16], the systematic review method was used to determine the critical success factors for EC adoption.

The summary of the identified, prioritized, and categorized factors in this study is presented in Table I. The first column of Table I presents the categories, and the second column presents the factors that correspond to each of the identified categories. The factors in the Table I were presented with a frequency greater than two. Among the factors are the expansion of the

internet in society, positioning, distributed product types, perceived risks, subjective norms, perceived needs, socio-cultural practices of sharing information among PYMEs, and the e-readiness of government and socio-cultural practices.

TABLE I. CATEGORIES AND CRITICAL FACTORS

Category	Critical Factors
Technology (FT)	EC is perceived as useful in the business (FT1), perceived cost of e-commerce implementation (FT2), perceived ease of use (FT3), and perceived security and reliability of payment methods (FT4)
Organizational (FO)	Organizational readiness (FO1), technological readiness (FO2), and management capability (FO3)
Environmental (FA)	Customer pressure (FA1), stakeholders demand for EC (FA2), government support (FA3), access to quality information technology services and infrastructure (FA4), and expansion of the internet in society (FA5)
Individual (FI)	Employee information technology skills, knowledge, and experience (FI1), employee attitudes toward using information technology (FI2), manager information technology skills, knowledge, and experience (FI3), and manager’s attitude toward using information technology (FI4)

Factors mentioned by previous authors include whether the company staff have previously used ICT, the national policies that support EC, the size of the business, the maturity level in implementing ICT in organizations, technological resources for the EC implementation process, the external pressure or the possibility of external assistance (advice and support) to implement EC platforms [17].

According to Dahbi and Benmoussa [18], the categories that group the factors are organizational, technological, cultural, financial, and external (called environmental in other studies). Among the organizational factors, management support and the perceived need for EC are mentioned.

The mentioned technological factors are employee ICT knowledge, client confidence in technology, client confidence in transactions, and client knowledge of technology. Among the cultural factors, some authors have mentioned the attitude toward changes in conducting business, the need for human contact, and the need to feel/touch the product. Financial factors include implementation costs, logistics costs, financial resources, and price transparency. External factors include government support, customs regulations, and pressure from competitors, customers, and suppliers.

The technological factors most mentioned in the literature review were perceived utility, perceived ease of use, perceived cost of EC implementation, perceived ease of use, and perceived security and reliability of payment methods. The organizational factors were perceived organizational readiness, perceived technological readiness of the enterprise, and perceived management capability of the enterprise.

The environmental factors were customer perception for successful adoption of EC, perception of pressure from business partners, suppliers, and competitors for EC implementation, perception of government support for EC implementation, perception of access to quality ICT services and infrastructure, and perception of the expansion of the internet in society. The individual factors are the perception of

the employee and manager's ICT skills, knowledge, experience, and attitudes toward ICT use and the manager's education level.

C. Technological Factors

Due to challenges related to ICT infrastructure and services, the percentage of ICT use is not equally distributed in large cities and the country's interior. In addition, ICT is fundamental to the expansion of EC. In this regard, Carvalho and Mamede [19] found that the infrastructure cost factor contributes positively to adopting ICT, which is in line with their findings [18]. As new technologies emerge, an essential aspect for EC is the confidence that online transactions and payments are secure.

Iddris [20] mentioned that EC security and the initial cost of EC negatively influence the adoption of EC by PYMEs. In contrast, AlGhamdi et al. [21] noted that the reliability and security of online payment options positively influence the adoption of EC. The perceived cost of implementation is considered a contributing factor to EC adoption. From the researcher's viewpoint, the security of a transaction is a barrier in the case of security problems. Taylor and Eshun [22] indicated that, although EC is perceived to have benefits, as identified by Shaharudin et al. [23], online payment processes and pricing structures influence the adoption of EC by PYMEs.

Perceived useful in the business has been mentioned in several studies as a factor related to EC adoption [24, 25]. Several authors have mentioned perceived usability as a contributing factor in EC adoption [23, 24, 25, 26].

For Ochola [27], the characteristic factors of innovation complexity and relative advantages have a significantly positive effect on adopting EC by PYMEs. Other factors, such as innovation and perceived benefits, have been mentioned in the studies. Le et al. [28] found that innovation compatibility, innovation complexity, and perceived risks influence the adoption of EC by PYMEs in Vietnam. Shaharudin et al. [23], Rahayu and Day [10], and Syah et al. [26] found a positive relationship between the perceived benefits and EC adoption by PYMEs. Al-Alawi and Al-Ali [12] indicated that the perceived benefit factor is positively related to the adoption of EC by PYMEs. Based on the identified constructs, the following hypothesis was proposed.

Hypothesis 1 (H1): Technology factors (FT) are positively associated with EC adoption.

D. Organizational Factors

Abbasi et al. [24] found that the company's innovative character has a significantly positive effect on EC adoption. One factor is organizational readiness, which positively correlates with EC adoption [19, 25, 26, 29]. Walker, Saffu, and Mazurek [30] found that organizational readiness and decision-making were important in discerning EC adoption. Kenneth et al. [31] noted that infrastructure and competition significantly influence the adoption of EC by Kenyan tourism PYMEs.

Villa et al. [17] identified factors related to the adoption of the EC, such as ICT and the level of maturity and the resources for the EC implementation process. Rahayu and Day [10]

found that the technological readiness factor is a determinant for adopting ICT in PYMEs in Indonesia. Ochola [27] noted that the company's seniority factor has a significant positive effect on the adoption of EC by PYMEs in Kenya. Lama, Pradhan, and Shrestha [9] concluded that barriers to adopting EC include a lack of adequate infrastructure and resources. Frasquet et al. [32] argued that the organization's size is a critical factor, and Villa et al. [17] related the size of the business to the adoption of EC.

Kenneth et al. [31] found that the factors with a significant influence on the adoption of EC by PYMEs in the Kenyan tourism sector are leadership style and positioning. Iddris [20] proposed that factors with a negative influence on the adoption of EC by PYMEs in Ghana include management culture and interest. Al-Alawi and Al-Ali [12] argued that the support factor of senior management is positively related to the adoption of EC by PYMEs in Kuwait. Chee et al. [33] stated that the senior management support factor is significantly related to adopting EC by PYMEs. Lama, Pradhan, and Shrestha [34] concluded that the key drivers include awareness, value proposition, and the role of the owner or senior management.

Dahbi and Benmoussa [18] agreed with the previous authors and mentioned logistics and financial resources as critical factors for adoption, as did Kenneth et al. [31], who supported that resources [28] influence adopting EC. Taylor and Eshun [22] indicated that company resources influence the adoption of EC. Based on the identified constructs, the following hypothesis was formed.

Hypothesis 2 (H2): Organizational factors (FO) are positively associated with EC adoption.

A. Environmental Factors

Saffu et al. [25] indicated that the external pressure factor (competitors, buyers, business partners, and suppliers) is related to the adoption of EC by PYMEs in Slovakia, whereas Shaharudin et al. [23] found that the factor influencing EC adoption by PYMEs is external pressure from customers. Chee et al. [33] noted that pressure factors from competitors influence SME adoption of EC, whereas Shaharudin et al. [23] suggested it is pressure from competitors, business partners, and suppliers.

Lama, Pradhan, and Shrestha [34] concluded that market strength is among the key motivators. For Carvalho and Mamede [19], the business partner factor contributes positively to adopting EC. Matsinhe and Kabanda [6] argued that such aspects as international market strength condition the adoption of EC. Syah et al. [26] found a positive relationship between external pressure (partners, competitors, customers and suppliers) and the adoption of EC by PYMEs. Frasquet et al. [32] supported that EC adoption by retailers in Spain, the UK, and France is influenced by such factors as the competitive environment. Le et al. [28] found that the intensity of competition, industry support, supplier behavior, buyer behavior, and government support influence EC adoption by PYMEs in Vietnam. Walker, Saffu and Mazurek [30] noted that operational support and external pressure were vital in discerning EC adoption.

Dahbi and Benmoussa [18] mentioned external factors, such as government support, customs regulations, and pressure from competitors, customers, and suppliers. Al-Alawi and Al-Ali [12] proposed the factor of government regulations. Villa et al. [17] identified factors related to the adoption of EC, including national policies that support EC, external pressure to be part of this commerce type, and the possibility of external assistance (advice and support) to implement EC platforms.

Taylor and Eshun [22] indicated that IT service providers, online banking service availability, energy service reliability, and industry competition influence the adoption of EC by Ghanaian PYMEs. Ardjouman [35] identified that infrastructure and maintenance factors, such as limited internet access and limited and unreliable power sources, negatively affect adopting EC by PYMEs in Côte d'Ivoire. For AlGhamdi et al. [21], the factors include government support and assistance in EC and developing a strong ICT infrastructure. AlGhamdi et al. [21] also found that developing a strong ICT infrastructure is an enabler for the adoption of EC. Al-Alawi and Al-Ali [12] proposed that the government regulatory factor is positively related to the adoption of EC by PYMEs in Kuwait. Based on the identified constructs, the following hypothesis was formed.

Hypothesis 3 (H3): Environmental factors (FA) are positively associated with EC adoption.

E. Individual Factors

Abbasi et al. [24] proposed that the subjective standards variable significantly affects EC adoption by PYMEs in Iran. Le et al. [28] found that the factors of employee knowledge of EC and the manager's attitude toward innovation influence the adoption of EC by PYMEs. Iddris [20] noted that the factors that negatively influence the adoption of EC by PYMEs are the lack of technical skills of employees and the resistance of people. Hajli et al. [29] suggested that the EC awareness factor positively correlates with EC adoption by PYMEs in Iran. Taylor and Eshun [22] indicated that such factors as skilled personnel in EC solutions and company resources influence the adoption of EC by Ghanaian PYMEs.

Carvalho and Mamede [19] noted that managers' perception of the return on investment contributes positively to EC adoption. Ardjouman [35] identified that employee technical skills are related to the adoption of EC. Ochola [27] noted that employee IT skills and education level significantly positively affect adopting EC by PYMEs in Kenya. Villa et al. [17] identified the previous use of ICTs by company staff as a factor related to adopting EC. Carvalho and Mamede [19] found that human resources contribute positively to EC adoption.

Rahayu and Day [10] argued that the innovation, IT capacity, and IT experience of the owner/manager are determinants for adopting EC in PYMEs in Indonesia. Matsinhe and Kabanda [6] determined that the characteristics of the manager, previous experience in EC, and sharing of experiences condition the adoption of EC. Based on the identified constructs, the following hypothesis was formed. Table II presents the proposed hypotheses.

Hypothesis 4 (H4): Individual factors (FI) are positively associated with EC adoption.

TABLE II. PROPOSED HYPOTHESIS

Hypothesis	Factors	Association*
H1	Technological factors are positively associated with EC adoption	(H1: FT → IMP)
H2	Organizational factors are positively associated with EC adoption	(H2: FO → IMP)
H3	Environmental factors are positively associated with EC adoption	(H3: FA → IMP)
H4	Individual factors are positively associated with EC adoption	(H4: FI → IMP)

Based on the research conducted in the literature review and the proposed hypotheses, the association between critical success factors and EC adoption for tourism operators is represented in Fig. 1.

III. MATERIALS AND METHODS

The details regarding the research method, data collection, the instrument used, the pilot study, the study sample and demographic data are presented in this section.

A. Research Method

In this research, factors associated with EC adoption are analyzed using the quantitative research method to measure the variables. The research is transversal because the data were collected at a single moment. The study population comprises 2,692 managers of tourism operations located in various regions in Peru. A nonprobabilistic sample was applied. In total, 116 managers of tourism operations (31% male and 69% female) from different cities in Peru were asked to complete a questionnaire.

B. Data Collection

A questionnaire was designed as a data collection instrument. The questionnaire had two sections: sociodemographics and questions on each factor. Moreover, 10 and 16 items were evaluated to measure the qualifying factors for adopting the EC in tourism PYMEs. All items for this study were rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The instrument was subjected to a validity check using a pilot test with four operator managers from outside the selected sample to check the validity and reliability of the instrument. A total of 116 questionnaires were distributed to the managers of tourism operations who completed and returned them. Table III lists the items on the questionnaire.

C. Data Analysis

The proposed model and hypotheses were tested using SEM (Structural Equation Modeling). The IBM SPSS Amos 22 tools were applied to analyze the data. Concerning SEM this study confirmed the prerequisites for item parceling. Cronbach's alpha was used to determine the internal consistency.

D. Structural Model

Based on the research conducted in the literature review and the proposed hypotheses, the association between critical success factors and EC adoption for tourism operators is represented in Fig. 1 as a causal diagram. Fig. 1 illustrates the causal diagram of the assessment of qualifying factors for adopting EC in tourism PYMEs. The variables are technological factors (FT), organizational factors (FO),

environmental factors (FA), and individual factors (FI). One variable adoption is EC (IMP).

The conceptual model presents 16 critical success factors organized in four categories (Table I). Cronbach’s alpha was used to assess the internal consistency of the factors. A Cronbach’s alpha value greater than 0.70 is recommended for confirmatory research [36]. Table IV lists the statistics of all elements of the model.

TABLE III. VARIABLES OF THE INSTRUMENT

Module	Items
Sociodemographics	Age, gender, and location
Technological factors	EC is useful, implementation cost and maintenance are affordable, EC is easy to use, payment method is secure and trustworthy
Organizational factors	Functions and processes are understood, information management is automated, company management capacity
Environmental factors	Customer demand the implementation of EC, stakeholders demand the implementation of EC, government support, services, and infrastructure are accessible, internet access.
Individual factors	Employees have knowledge, skills, abilities, and employees have a positive attitude,
E-commerce	EC implementation

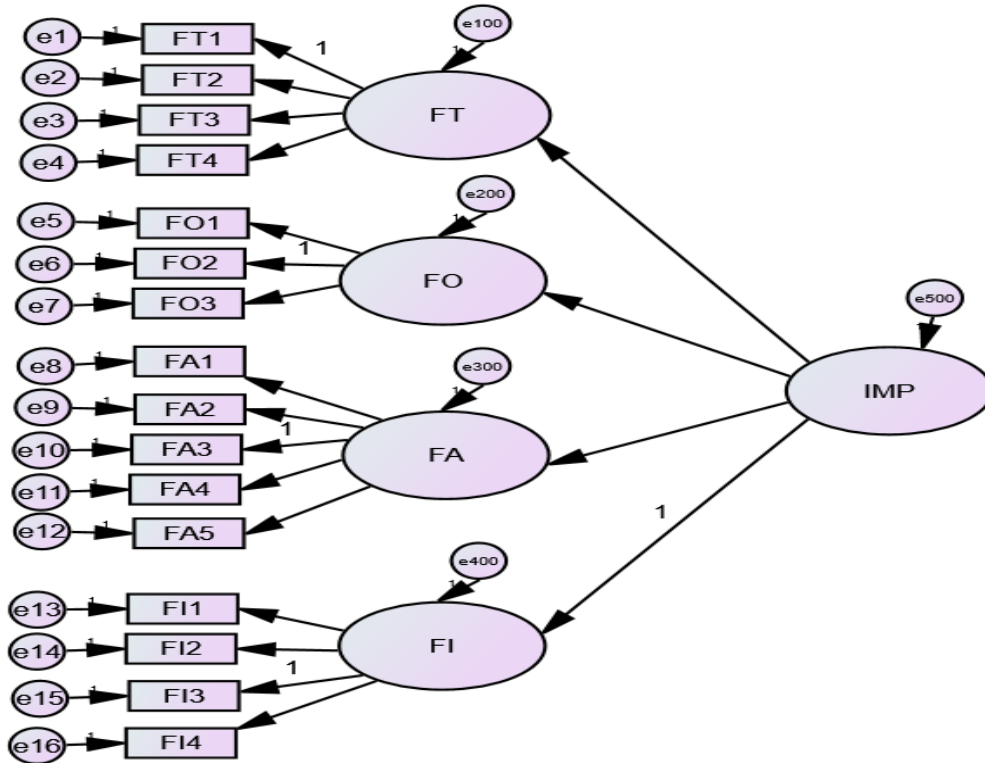


Fig. 1. Causal Diagram.

TABLE IV. STATISTICS OF ALL ELEMENTS

Factor	Scale average if the element is deleted	Scale variation if the element is deleted	Total correlation of elements corrected	Multiple square correlation	Cronbach's Alpha if the element is deleted
FT Technological Factors					
FT1	10.90	6.67	0.57	0.34	0.78
FT2	11.68	6.74	0.61	0.39	0.76
FT3	11.44	6.44	0.69	0.48	0.72
FT4	11.55	7.15	0.61	0.38	0.76
FO Organizational Factors					
FO1	8.31	4.22	0.78	0.61	0.84
FO2	8.10	3.78	0.77	0.59	0.85
FO3	8.05	4.07	0.80	0.64	0.82
FA Environmental Factors					
FA1	13.42	5.69	0.49	0.49	0.41
FA2	13.46	6.02	0.60	0.52	0.37
FA3	14.66	8.19	0.03	0.12	0.69
FA4	13.53	7.21	0.43	0.29	0.48
FA5	12.83	7.36	0.23	0.32	0.57
FI Individual Factors					
FI1	13.01	6.36	0.81	0.77	0.90
FI2	13.01	6.43	0.82	0.78	0.89
FI3	12.94	6.14	0.78	0.72	0.91
FI4	12.84	5.96	0.85	0.78	0.88

IV. RESULTS

A. Participants Demographics

Table V provides the demographics of the sample, including education and the use of EC. Regarding the characteristics of the respondents, 31% of the respondents were male, and 69% of the respondents were female. The majority of the managers (63.7%) were over 37 years old, and 21.6% were in the age group of 33 to 37 years old. In addition, 27.6% of the respondents have considered implementing EC at some point, 25% have decided to implement EC, and 41.4% are currently using EC.

B. Structural Model and Hypothesis Testing

When observing the reliability analysis results, environmental factors are qualified as questionable; therefore, were analyzed the answers collected on those factors through a frequency analysis. More than one-third of the interviewees answered "neither agree nor disagree" on the frequency analysis, which affects the overall analysis. In this sense, these factors should be excluded from the analysis.

Validation steps were followed before validating the proposed theoretical model using the SEM technique of the AMOS SPSS software and analyzing the measurement estimates of the observed variables. As a first step, the confirmatory factor analysis validates the factor composition (constructs) to identify which indicators (observed variables) load to establish the number of factors and their intercorrelations. The second step was to convergent validity.

- The validation of the convergence of items and constructs refers to the fact that a variable measure what

it is supposed to measure. The erroneous assignment of latent variables to certain observed variables produces validity problems. Two conditions exist for the validity of an observed variable. First, the observed and latent variables must have a direct relationship with each other. Second, the latent factors excluded from the model must not directly affect the observed variable. The indices of convergent validity are greater than 0.70, and the average of the extracted variance (AVE) is greater than or equal to 0.50 (see Table VI).

- The validation of the hypotheses through a causality analysis determines whether the structural model is correct and approximates the actual phenomenon. The goodness-of-fit statistics, which refer to the accuracy of the assumptions of the specified model were analysed. Considerations for the evaluation of the SEM of the research include the following: (1) due to the small sample (116 surveys), the procedure for estimating the model was the maximum likelihood and (2) the multivariate distribution of the statistics used in the model is assumed to be normal. Table VI presents the results of the model estimation.

From the results in Table VI, causal Model 2 is observed, where the factor loads of the items are greater than or equal to 0.70 (factor loading or standardized regression weights ≥ 0.70), and the mean variances extracted (AVE) are greater than or equal to the recommended value of 0.50. Thus, the conformation of factors fulfills the criteria of convergent validity. The indices of adjustment of causal Model 2 are acceptable. Table VII lists the model fit indices.

TABLE V. FREQUENCY ANALYSIS

Characteristics		N	Percent
Gender	Female	80	69.0%
	Male	36	31.0%
Age	Over 37	74	63.8%
	33–37	25	21.6%
	28–32	9	7.8%
	23–27	7	6.0%
	< 23	1	0.9%
Manager education	University superior	83	71.6%
	Technical superior	30	25.9%
	High school	3	2.6%
Use EC	Don't know EC	3	2.6%
	Implementing EC has not been considered	4	3.4%
	Implementing EC has been considered at some time	32	27.6%
	Implementing EC has been decided	29	25.0%
	Currently using EC	48	41.4%

Source: Research data; N: Number; EC: e-commerce

TABLE VI. MODEL ESTIMATION

Factors	Variables	Causal Model 1			Causal Model 2		
		Factor Loading *	Loading Squared	AVE	Factor Loading *	Loading Squared	AVE
Technological Factors (FT)	FT1	0.75	0.57	0.51	0.76	0.58	0.51
	FT2	0.65	0.42				
	FT3	0.77	0.60		0.74	0.55	
	FT4	0.67	0.44		0.64	0.41	
Organizational Factors (FO)	FO1	0.83	0.69	0.73	0.82	0.68	0.72
	FO2	0.83	0.69		0.83	0.68	
	FO3	0.90	0.80		0.90	0.81	
Environmental Factors (FA)	FA1	0.88	0.77	0.70	0.89	0.79	0.70
	FA2	0.79	0.63		0.78	0.61	
	FA3						
	FA4						
	FA5						
Individual Factors (FI)	FI1	0.87	0.75	0.7	0.91	0.84	0.8
	FI2	0.88	0.77		0.94	0.88	
	FI3	0.82	0.68				
	FI4	0.88	0.78		0.80	0.63	

* Standardized regression weights

TABLE VII. MODEL FIT INDICES

Fit Indices	Acceptable Fit	Causal Model 1		Causal Model 2	
		Indices	Fit situations	Indices	Fit situations
Chi-square	>1 and < 5	2.52	Acceptable	1.73	Acceptable
Goodness-of-fit index	≥ 0.8	0.82	Acceptable	0.90	Acceptable
Comparative fit index	≥ 0.9	0.91	Acceptable	0.96	Acceptable
Root mean square error of approximation	≤ 0.08	0.12	Not Acceptable	0.08	Acceptable

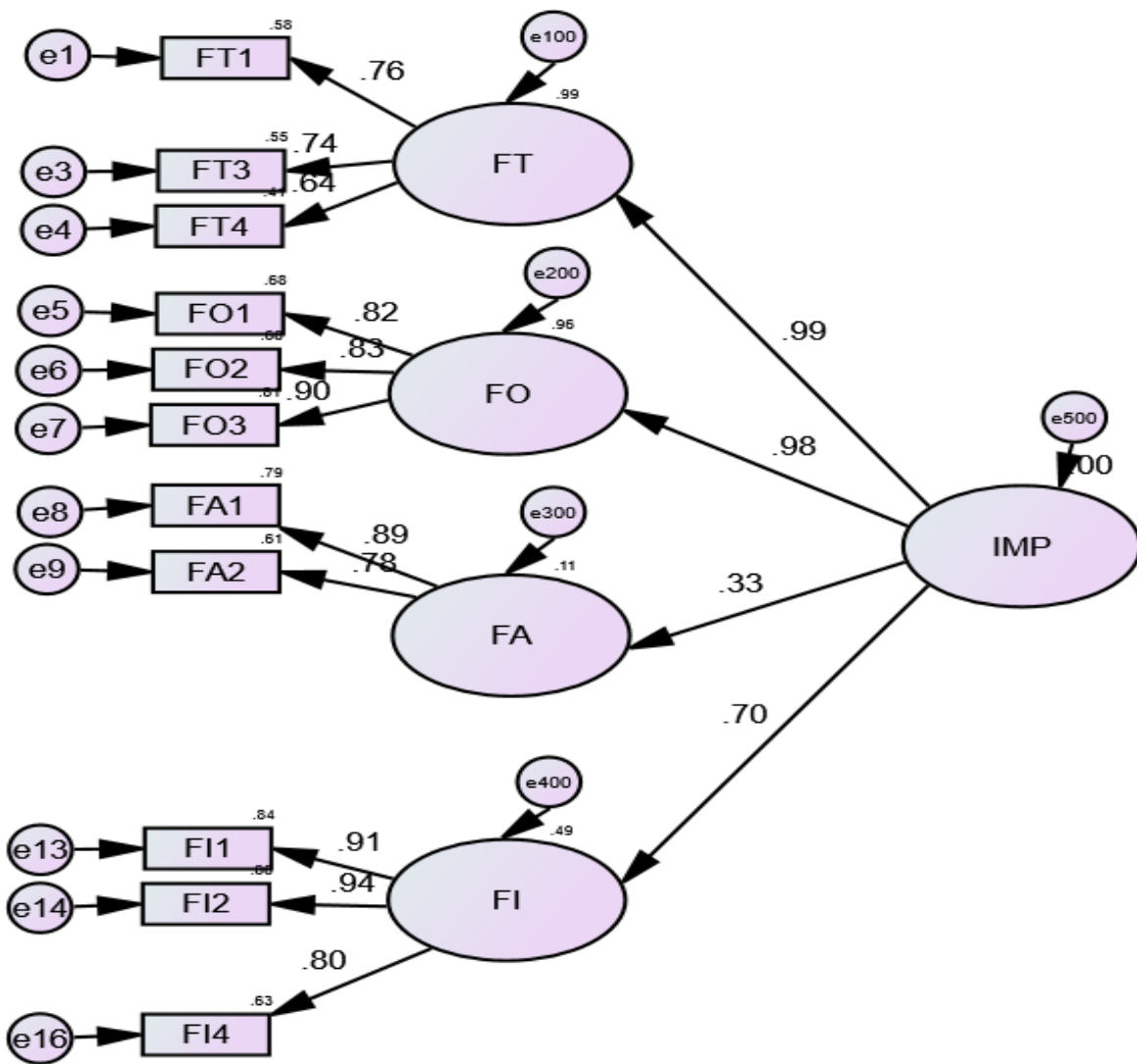


Fig. 2. Assessment of Qualifying Factors for e-commerce Adoption.

TABLE VIII. RESULTS OF HYPOTHESIS TESTING

Hypotheses	Factors	Association
H1	Technological factors are positively associated with EC adoption	33.0%
H2	Organizational factors are positively associated with EC adoption	32.7%
H3	Environmental factors are positively associated with EC adoption	11.1%
H4	Individual factors are positively associated with EC adoption	23.2%

Notes: EC: e-commerce.

According to the general modeling in structural equations regarding the qualifying factors for adopting EC in tourism operators, the most influential factors are the technological and organizational factors. Fig. 2 presents the final causal model on the evaluation of the qualifying factors for adopting EC.

Table VIII presents the results of the hypotheses.

The following observations were made when analyzing groups according to the company situation where the interviewees work concerning adopting EC:

- Group 1: Tourism operators currently using EC consider that the most influential factor is the organizational factor, mainly information management in the company.
- Group 2: Tourism operators that have not yet implemented EC equally value factors involving skills, knowledge, and experience in technology and the technological and organizational factors of the company.

V. DISCUSSION AND FUTURE STUDIES

In a context of pandemic COVID-19 the adoption of ICT, in special EC has been recognized a key factor to give continuity with business activities due to social isolation, distancing and border closures. Also, the research on adopting ICTs has a great interest, especially business. EC is a very potent strategy to beat competitors and generate profits. Despite the benefits of the adoption of EC, the adoption of EC by SEM is low. The reasons, factors or determinants have been amply documented in the literature and several explanations such as organizational factors, environmental factors, technological factors and individual factors are mentioned. The studies corresponding to different countries and not evidences have been founded about impact of factors in the EC in Peruvian tourism operators. In this study, a total of four hypotheses were tested.

Accordingly, the results the technological factors were positively associated with EC adoption. EC is perceived useful in the business, and perceived ease of use. Are two constructs of ICT models adoption. An Information System that presents difficulties in their use discourages its use. Perceived usefulness is related to use of technology enhance the job performance and Perceived ease of use is related effort necessary to use of technology. Then individuals will be more willing to adopt EC if it is easy of use. Perceived ease of use is consistent with the studies by Ochola [27] and Syah et al. [26]. The perceived security and reliability factor, related to secure and reliable payment methods, was also consistent with the research by Ochola [27]. Today, the development of technologies and components for the EC encourages tourism operation managers to trust it and naturally adopt ICT. Specifically, if the managers of tourism operators believe that the method of payment used and the transactions are secure then they are more likely to support the adoption of EC. Technological factors were founded as influencing factors for EC.

Organizational factors are positively associated with the adoption of EC. Organizational factors include organizational readiness with clearly understood functions and processes, technological readiness due to automated information management, and management capability that enables change. Organizational readiness is related to EC adoption, which is consistent with the research by Syah et al. [26]. Only organizational readiness is associated with EC adoption. Tour operation managers may consider EC adoption the necessary next step for their businesses to grow and evolve.

Environmental factors are positively associated with EC adoption. In this case, only two out of five factors were considered: customer and stakeholders demand for EC. In the pandemic, these two environmental factors have a more significant influence, considering the immobilization in some cases and the distance and sanitary measures required by regulatory organizations. In this regard, customer pressure is a factor highlighted in the research by Syah et al. [26], Saffu et al. [25], Le et al. [28] and Sánchez-Torres et al. [37]. The fact that pressure from customers and external agents is correlated with EC adoption indicates that tour operator customers, suppliers, competitors, and business partners are increasingly

using electronic media in buying and selling transactions. This situation may increase the motivation of tour operation managers to adopt this technology to meet the need for immediacy in transactions with customers, suppliers, competitors, and business partners.

External pressure of stakeholders was related to EC adoption, which is consistent with the research by Syah et al. [26] and Saffu et al. [25]. The government support was not empirically validated which is consistent with other studies. Regulatory policies that are not clear and not significative for EC adoption could be a reason. Also, this result can be explained for the highest rates of entrepreneurship. The expansion of the internet in society is not related to the adoption of EC. This result can be explained due to internet is part of our lives and has been incorporated in the organizations.

Individual factors are positively associated with e-business adoption, such as employee ICT skills, knowledge, experience, and attitudes toward ICT use, and managers' attitudes toward ICT use. Furthermore, these factors could guarantee, to some extent, the success of the implementation of this technology and the design and execution of the processes. In PYMEs, the primary decision maker is the owner of the business [38] and top management support is statistically significant determinant of e-commerce adoption.

When comparing the manager group of tour operators that already has EC, the most influential factor is the organizational factor, mainly the information management of the company. In contrast, in groups that have not yet implemented EC, they equally value the skills, knowledge, and experience in technology and the technological and organizational factors.

This study provides an understanding of the factors considered by tour operators for adopting EC. A sample of 116 tour operators was used to conduct this study, which presents the limitation of the generalizability of the results. Although most departments were represented in the sample, further research is needed to assess factors faced during the COVID-19 pandemic. The study represents the characteristics of tour operators in Peru, so it is crucial to conduct empirical studies in other developing countries to generalize the findings. With the COVID-19 pandemic measures, such as closed airport and flight bans to prevent widespread infection, many tour operators were forced to suspend operations. Future work would include assessing the effect of COVID-19 on tour operators and adopting ICT to address new regulations.

VI. CONCLUSION

For all kinds of organizations in different sectors, ICT has become a strategic ally. The tourism sector is considered a driving force in the economy. Despite the benefits offered by ICT, the incorporation into the tourism sector has been very slow. Several authors have argued that a set of factors influence adopting EC in tourism companies. The purpose of this research was to develop and propose a model for adopting ICT by tourism operators. The first task was to determine critical factors from the literature review and establish the identified and selected factors. The research was quantitative, with a sample of 116 tour operators surveyed using Google Forms. Confirmatory factor analysis was used to determine the

factors influencing ICT adoption. Technological, organizational, environmental, and individual factors are positively associated with the adoption of EC. Disseminating the results to tourism operators facilitates their understanding and the need to consider these factors to reinvent themselves. As future work, a plan to review the critical factors and their behavior concerning the changes due to COVID-19 through a longitudinal study to determine whether significant differences exist in the process of adopting ICT.

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