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Evaluating the strategies and solutions to improve cultural and national tourism services

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ABSTRACT

The global tourism industry demands fresh ideas and complementary initiatives for sustained growth and resilience, particularly in the wake of recent COVID-19-related restrictions and lockdowns that have disproportionately impacted travel, tourism, and hospitality worldwide. These necessary innovations can encompass non-technological elements such as organizational or business models, as well as technological components including digital technologies, e-tourism, travel apps, and more. This research seeks to introduce a novel theoretical framework aimed at revitalizing the regional tourism sector in the prominent travel destination of Tungurahua province in Ecuador. The goal is to provide enhanced tourism experiences that deliver added value and prevent further stagnation and decline within both the local and regional tourism industries. Through a combination of comprehensive face-to-face meetings and surveys, this study engaged industry professionals, tourism experts, tourists, government representatives, and key stakeholders associated with enhancing tourism in Tungurahua. Our findings indicate that a fresh, synergistic, and collaborative approach among tourism stakeholders holds the potential to generate innovative tourist services and solutions. This collective effort seeks to address the ongoing challenges confronted by the global tourism, hospitality, and travel sectors. The proposed tailored tourism offerings, products, innovations, and promotional strategies primarily draw upon advanced technology. Ultimately, these innovations and adaptive strategies, guided by dynamic mindsets, forecasts, and technological advancements, have the potential to foster long-term growth in tourism for Tungurahua.

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1. Introduction

The rapidly evolving digital technologies have helped improve the decision-making processes within several industries worldwide (Stonehouse & Konina, 2020; Palvia et al., 2018) and have brought about tangible and intangible benefits to all sectors of the economy, especially the small and medium-sized enterprises (SMEs) sector. Advances in information and communication technologies (ICTs), associated infrastructures, widespread use of broadband internet, and permanent uninterrupted net connectivity can accelerate the participation of all organizations and stakeholders in the value-chain through diverse technology-mediated activities such as electronic business, electronic commerce, electronic governance of travel-related activities, e-tourism, and other digitized innovative-tourism. These ICTs have significantly improved the functioning of governments and industries (Chen & Sivakumar, 2021; Hays et al., 2013; Organization for Economic Cooperation and Development [OECD], 2019); United Nations Conference on Trade and Development [UNCTAD], 2014). Moreover, the application of ICT in the travel and tourism sectors has helped strengthen the structure of organizations and develop highly efficient marketing strategies so that tourist attractions as well as services can be promoted and fully exploited (Kim et al., 2017; Souto, 2015; Wagaw, & Mulugeta, 2018), especially in the destinations of cultural and natural tourism with maximum growth potential. For instance, with e-tourism, most organizations have saved operational costs, streamlined their operations more efficiently, earned higher revenues, experienced and successfully overcome greater competitiveness, and offered greater consumer satisfaction levels (Gratzer et al., 2004; Benyon et al., 2014).

Besides technology-based innovations, non-technological initiatives can also induce remarkable changes in the business models of different industries, companies, and businesses (Souto, 2015; Yoon & Kwon, 2022), especially in the sectors where traditional industrial structures were only concerned with generating revenues via direct production and on-time customer delivery of goods and services. These transformations in organizational models have enabled more active and greater participation of the key stakeholders to provide both high-quality products and services (OECD, 2019; UNCTAD, 2014; OECD, 2010) and practical information to be used for further surveys. Today, as the companies linked with the tourism industry do not generate relevant knowledge per se themselves, it is essential to create new models that allow many actors with different sources of knowledge and the capability of modifying the obsolete current economic development model to work in unison to improve travel business in Tungurahua. These new models may help industries transition from an economic productivity perspective to one that incorporates productive, sustainable, and inclusive economic development (Snabe & Weinelt, 2016; Martin & Leurent, 2017). The application of the stakeholder engagement approach in the development of models has proven to be a useful tool for promoting more interaction and cooperation between private and public organizations in diverse sectors. It allows an in-depth involvement of academic scholars and practitioners as providers of experience as well as knowledge based on research (Worum et al., 2019; Lewis & Perry, 2017).

Transferring knowledge based on research into practical solutions, primarily through the successful execution of ICTs in the production system, has been most prominently observed in developed economies rather than in developing and emerging ones (OECD, 2019; UNCTAD, 2014; Economic Commission for Latin America and the Caribbean [ECLAC], 2019). Consequently, the influence of emerging technologies on developing nations' economic progression is not to the desired extent, particularly in the tourism industry of South America. Ecuador has immense natural wealth, and its provinces can play a pivotal role by generating innumerable tourism-related jobs, boosting the optimal consumption of available local resources, and alleviating poverty by strategizing their policies and implementing plans in earnest. There are fewer studies on the application of the latest technological tools to promote tourism in Tungurahua. Furthermore, there are fewer studies about technological solutions for tourism activities in this neglected, unexplored, and untapped province due to the use of traditional models; this highlight that much of the existent literature centers on a particular town or city and promotes its tourism sites as a single place without considering thoroughly all dimensions associated with tourism service quality (Paredes et al., 2018; Castillo et al., 2021; Del Pilar Hurtado-Yugcha et al., 2022).

A considerable knowledge gap between non-technological and technology-based initiatives could offer value-added tourism activities and thus reduce the stagnancy of the local and regional tourism sector. To date, there are few studies on tourism development in Tungurahua Province. Therefore, this

study attempts to plug this knowledge gap by providing a conceptual framework that involves synergy and collaboration among tourism stakeholders from both public and private sectors and helps develop innovative touristic solutions in Tungurahua. The present study's main objectives are as under:

1. Analyze current challenges, requirements, and priorities recognized in the regional tourism sector and establish the dimensions associated with tourism service quality;
2. Create an innovative tourism business model based on extensive stakeholder engagement and research-practice approaches
3. Suggest concrete action plans, novel activities, better products, and measurable outcomes/targets supporting the new tourism business organizational model.

It is hypothesized that the combination of non-technological and technological solutions might be the optimum candidate to attain greater competitiveness and efficiency levels in the national as well as the international tourism industry.

2. Literature Review

The literature review is the section where the analysis and references of previous study is explained. A literature review is a piece of theoretical writing that contextualises and establishes knowledge of the theoretical literature. It is considered a literature review rather than a literature report because it also involves a critical assessment of the sources.

Rajamohamed et al. (2016) proposed research to study the importance and the role of ICT (Information and Communication Technology) and also to identify its influences on Thailand Tourism Industry. As a suggestion they have conveyed that in future other researchers can be carried out for sustainable development of tourism by Information and Communication Technology concerned with business models. That study was a descriptive study with 90 numbers of estimated sample sizes. The research was carried out by ICT oriented business models and found that it is understandable that Information and Communication Technology have an effect on the tourism industry. However, some variables like social media have negative influence due to improved competitiveness and capturing market share for separate channel associates in their commercials. Meanwhile, David-Negre et al. (2018) focused on identifying important network participants in the e-tourism ecosystem, such as social media and online travel agencies. Analyses how visitors from around Europe utilize the major e-tourism sites. Their study concluded stating that four platforms show a predominant role in the e-tourism ecosystem: Booking, Google, TripAdvisor, and Facebook, these ego-networks are graphically illustrated for well recognition in the e-tourism network. The findings also indicate that, in accordance with the use of e-tourism platforms, various networks are developed per nation. There are more and more studies conducted related to tourism and ICT.

De Lucia et al. (2021) investigated how ICT influences locals view tourism as a factor in regional development and how digital technologies have affected these opinions using stochastic analysis, ordered logistic regression model and Brant test and found that the usage of tourism, non-job factors, digital technology, and education goods as well as cuisine, wine, and landscape, in addition to events, have an influence on positive perspective. Relatively, Lee et al. (2021) also examined whether Information and Communication Technology had an impact on the development of tourism. They implemented a descriptive statistics and unconditional correlation to conquer their objective; they also explained the possible non linear and asymmetric relationship between numerous variables (Dependent variables, Control variables, explanatory variables). The results proved that the fixed broadband, secured internet servers and cellular mobile subscription are increasing with time with advantages in the tourism field. Wagaw et al. (2018) conducted a survey to study the features and the factors influencing the collaboration of tourism and Information and Communication Technology.

An empirical study was accomplished which used a quantitative approach all along the interpretation, data collection and data analysis phases. Their findings proved that the competitive advantage, social influence, cost effectiveness, perceived usefulness, perceived ease of use, and simplifying conditions like Information and Communication Technology resources, experience and skill meaningfully influence behavioral purpose to implement Information and Communication Technology in Ethiopia Tourism sector. There is another study conducted by Adeola et al. (2020) using the same empirical analysis at Africa to understand the connection among the tourism and Information and Communication Technology as well as to point out the differing factors among

tourism development and infrastructure. The study postulated that substitute evidence-based decision-making among the tourism and Information and Communication Technology. Zhou et al. (2021) researched on the impact of Information and Communication Technology concentrating the interconnection between the tourism and culture on industrial convergence.

A study's framework recommended synthesizing encompassing three hypotheses and three econometric models. The studies version became then empirically examined and proven via quantitative studies the use of provincial panel facts of China from the year of 2004 to 2018. The study's conclusions imply a high-quality influence Information and Communication Technology and market-oriented reforms within side the tradition and industries of tourism convergence. Furthermore, a high-quality labor-convergence became even as the poor government–convergence variables. Castillo et al. (2021) stated a study on the smart tourism tools worldwide importance to increase material for the process of decision making in the industry of tourism at Riobamba Canton. Using a questionnaire correspondence analysis, they brought up a theoretical explanation that Ecuadorian tourists claim that the smart tools have less usefulness as associated with the global tourists. Using the study of variables measured from a questionnaire, Del Pilar Hurtado-Yugcha et al. (2022) discovered that in the modern market, there is an important connection amongst tourist routes and the connections amongst cultural and economic development, in the proportions of travel costs and tourist route preferences.

3. Methods

3.1 Area of study

Tungurahua Province is situated in the middle of Ecuador's Andean region in northwestern South America (1°14'56.7" S 78°37'0.3" W). It consists of nine cities: Baños, Ambato, Pelileo, Mocha, Cevallos, Quero, Píllaro, Tisaleo, and Patate. Tungurahua is one of Ecuador's 24 provinces, and its capital is Ambato. Tungurahua Province derives its name from the Tungurahua Volcano located within the province's borders. The National Institute of Statistics and Census (INEC) in 2010 showed officially that 504,583 people lived in Tungurahua Province; 259,800 females (51.49%) and 244,783 males (48.51%), which corresponds to 3.48% of the total national population, making it the eighth-most populous province after Esmeraldas. Approximately 70% of the populations are mixed-race heritage people, 10% of the populations are indigenous peoples, and 20% of the populations are of African, Asian, and European ancestry. In the total population of Tungurahua province, 59.26% of people live in rural areas, and the other 40.73% in urban areas, which has varied due to migration and progressive urban development in recent years, particularly in the city of Ambato.

Tungurahua is the second smallest province in the country, with 3,335 square kilometers of surface. The area associated with natural areas is about 167,161 hectares, which is equivalent to 49.32% of the total land area of the province. Tungurahua province had rivers such as the Huapante, Talatag, Quillopaccha, el Golpe, Puca-chuayco, the Cutuchi, the Ambato River, and the Pachanlika. In the province, there were ponds such as Pisayambo, Tambo, Patojapina, Rodo-Cocha, and Yanacocha. Tungurahua province had hot springs such as Cunuc-Yacu, Aguajan, Pishilata, Quillán, and Vertientes del Salado and La Virgen. It is noteworthy that the Ministry of Tourism has recognized Patate in Tungurahua as a "Magical Town" due to its beautiful natural landscapes, rich ancestral heritage, culture, and traditions. This city is situated at an elevation ranging between 1800 and 3400 meters above sea level.

The climate in the Tungurahua province is dry and moderate. The region, like all mountainous areas, is subject to the phenomena known as microclimates, in which isolated areas of the province experience radically different weather conditions from the rest as a result of winds and localized pressure. During the day, Tungurahua temperatures range from 14 to 170 C, and nights are cooler. At higher altitudes, conditions are much cooler. Although the region is close to the equator, mountains such as Carihuirazo and Chimborazo are covered in snow throughout the year. The Tungurahua province is very mountainous, bordered by the Tungurahua volcano near Baños and the Carihuairazo and Chimborazo volcanoes to the south. Baños attracts a large number of tourists. The Patate River is an important river in the Tungurahua province and it flows east towards the Amazon Region (Honorable Gobierno Provincial de Tungurahua, 2015).

Tungurahua is more rural than urban, but is a highly industrialized province, particularly in manual work, textiles, and leather production. Although the dry and wet seasons, climate stability throughout the year favors various economic activities such as tourism (cultural and agro-tourism), agriculture, textiles, leather as well as furniture manufacturing. Over the past decades, these economic activities have played an important role in regional employment and socio-economic development in Tungurahua Province. In Tungurahua Province, 80% of the country's leather production is processed. All nine cities that are part of this province are well linked by a properly advanced road system.

3.2 Study Design

This study was conducted from September 2017 to December 2018. More than 300 regional as well as local authorities, practitioners, academics, tourism industry representatives from different tourism sectors, and tourists were the participants in this study. All the participants, except the tourists, were invited through e-mails and phone calls to participate voluntarily in an online survey and subsequent rounds of work meetings. The participants had to offer potential solutions to the regional tourism industry's current issues. The present survey was developed using focus group discussion (FGD) assessments, where face-to-face meetings with stakeholders enabled the researchers to elaborate on participants' online answers and provide more detailed opinions. This additional information, obtained through the exchange of experiences and views between attendees who have expertise in various fields, was also recorded for further analysis.

For the tourist survey, twenty trained personnel randomly intercepted 267 tourists in the province just before they checked out hotels, food courts, restaurants, hostels, central parks, travel agencies, bus terminals, and other public and tourist spots across the province. The survey sought participation in a 10-minute online survey by filling out a self-reported questionnaire presented on a computer tablet. This method allowed collecting information on the following parameters:

1. Tourists' profile and behavior,
2. The primary purpose of travel,
3. Attributes and perceptions about the places already visited or proposed to be visited by tourists,
4. Tourists' needs and any other suggestions for solutions to make Tungurahua a leading international tourist destination

Some questions focused on the potential product offerings that might help visitors achieve better satisfaction levels while staying in any of the nine cities or towns in the Tungurahua Province that have been visited.

All participants were informed about the ongoing tourism projects conducted by the Technical University of Ambato, the study's purpose, and the multidisciplinary and multidimensional approaches needed to strengthen the tourism industry. The study was carried out using quantitative and qualitative approaches through online self-reported semi-structured questionnaires. The created questionnaires are written in both English and Spanish. This battery of questionnaires was electronically designed using the Google Survey app. In general, these questionnaires helped collate useful personal and sensitive information about tourism-related factors. Researchers fully undertook to maintain the confidentiality of private data and maintain secrecy about participants or organizations involved. Therefore, only common data is given in this study (Table 1).

Table 1. Descriptive properties, breakup, and information of the study participants.

Stakeholders in tourism destination	Number of participants	Representatives of natural persons
Government	12	Regional Tourism officers
	1	Local Tourism Officer
Academia	20	Regional public and private universities
Industry	39	Practitioners Accommodation
	67	Practitioners Food and beverages
	11	Practitioners Public transportation
	27	Travel Agencies
	21	Food producer and provider
Tourists/end consumers	267	Visitors across Tungurahua province

The data collected was quantitatively analyzed using statistical software, SPSS version 25.0. Exploratory factor analysis on question datasets with IBM SPSS Statistics Base allowed defining the most relevant dimensions of tourism service quality. Finally, the outcomes were employed to develop a new conceptual model to enhance the regional tourism industry's current service quality. This proposed model is based on research-practice-based knowledge and stakeholder engagement approaches as suggested across other sectors and industries (Worum, et al. 2019; Lewis & Perry, 2017).

4. Results

The results were evaluated carefully by the researchers. Key findings of the study are presented here:

Table 2 shows the tourist profile. The majority of the respondents are males. The majority of people are between the ages of 26 and 35 (38.20%) and 36-45 (26.21%). The majority of tourists' education level is a bachelor's degree or more (55.43%). The tourist profile shows that the majority of the respondents are international travelers (61.79%) and national travelers (25.46%). The tourist travel preferences for Self-organized trips (63.67%), group travel (19.10%), backpacking (10.11%), and all-inclusive Charter (7.11%).

Table 2. Tourist's profile

Variables	options	Number	Percentage (%)
Gender	Male	151	56.55
	Female	116	43.45
Age	18-25	51	19.10
	26-35	102	38.20
	36-45	70	26.21
	Above 45	44	16.47
Level of education	primary	5	1.87
	secondary	29	10.86
	High school	85	31.83
	Bachelor's degree or more	148	55.43
Provenance	Regional	34	12.73
	National	68	25.46
	International	165	61.79
Monthly income	USD ≤ 400	89	33.33
	USD 401–1000	106	39.7
	USD 1001–2000	50	18.72
	USD 2001–3200	4	1.49
	USD 3201–4300	6	2.24
	USD> 4300	12	4.49
Travel preferences	All-inclusive Charter	19	7.11
	Backpacking	27	10.11
	Group travel	51	19.10
	Self-organized trip	170	63.67

Exploratory analysis of datasets enabled the identification of four underlying factor structures or dimensions that significantly contribute to tourism service quality, namely reliability, tangibility, accessibility, and knowledge. These four dimensions accounted for approximately 73% of the overall variance. Factor loadings displayed scores above 0.4.

The KMO value of 0.879 exceeded the acceptable minimum value of 0.6. Barlett's test of sphericity ($p < 0.001$); Cronbach's alpha (0.913).

This information was combined with integrated approaches to provide a new conceptual model with immediate application to the tourism industry sectors to (1) address the present challenges that industries are facing, such as the undefined role of the stakeholders, the prevalence of some barriers to adoption of ICTs, and the poor and dispersed quality of tourism-related information; and (2) utilize the stakeholders' abilities (e.g., skills, resources, expertise, networks, and collaboration). The proposed conceptual model is highly flexible, allowing all stakeholders, particularly practitioners from host communities and tourists, to undertake public initiatives, projects, and related activities (results-oriented actions) and products to address some of the issues facing the declining tourism industry in the province (Figure 1).

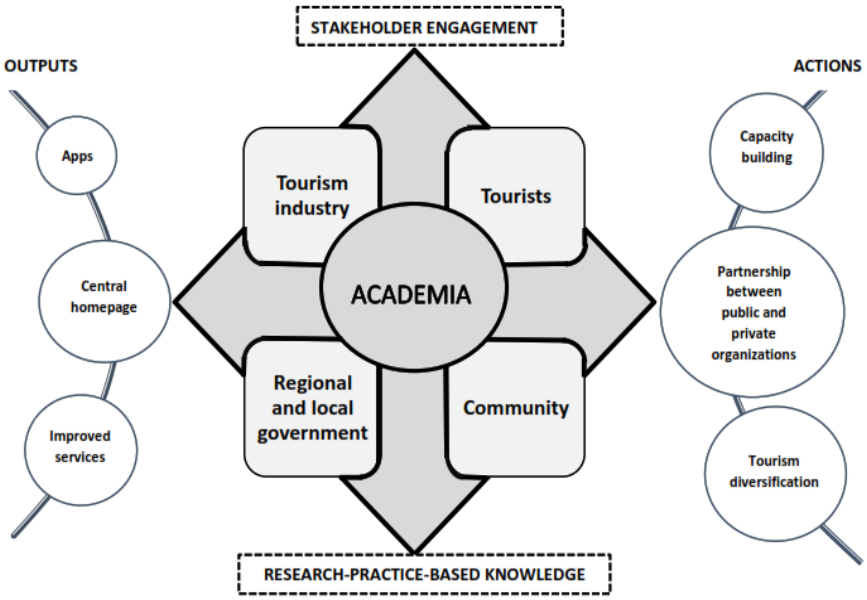

Figure 1. The collaborative model is based on research-practice and stakeholder engagement approaches.

Stakeholders, priority measures to be taken, main outputs, and feedback are also shown.

The percentages indicated below show the proportion of participants who agreed with any particular activity or solution. Thus, analysis of responses indicated that 95% of the participants agreed with the idea of changing radically the traditional business organizational model for a new model with non-technological and technological components to help form better marketing strategies in the regional tourism services sector. In terms of practical solutions, academia appeared to be the leading taker of initiatives through research projects for increasing scientific knowledge (97%), whereas regional and local governments were found critical in identifying the best methods for sustainable tourism development (98%). For instance, the provincial government should follow the duties suggested by different stakeholders, such as creating and maintaining modern tourism infrastructure; providing beneficial regulatory policies (e.g., reducing red-tapism, regulations, taxes, and fees); implementing effective campaigns for promoting domestic tourism; and creating short- and long-term public and private partnerships. These alliances should be forged primarily with the telecommunications, hospitality sector, and tourism certification firms to prioritize customized training programs. For instance, under these beneficial scenarios, tourism-related businesses might acquire high-tech as well as low-cost products for improving internet accessibility and connectivity across the province. According to 98% of participants, certified capacity-building programs will enable people to obtain free education, learn new skills, alter their attitudes toward ICTs, and low costs associated with running their businesses.

Table 3. Suggestions to improve the image and publicity of Tungurahua Province

Suggestions	Mean	Standard Deviation
Enhance regional connectivity.	4.13	0.900
Facilitate internet access.	3.96	1.236
Manage one official centralized website for the entire Tungurahua Province.	4.75	0.541
The audiovisual content that is submitted to websites or social media platforms should be of higher quality.	4.38	0.748
During the off-peak season, maximize activities and events	3.21	1.255
Boost the number of businesses that are accredited and certified in tourism.	3.85	1.272

Table 3 shows the mean and standard deviation for tourists' recommendations for improving the image and publicity of Tungurahua Province. Manage one official centralized website for the entire Tungurahua Province. (mean > 4.75) and the audiovisual content that is submitted to websites or social media platforms should be of higher quality (mean> 4.38) are the important suggestions pointed out by tourists for improving the image and publicity of Tungurahua Province's tourism destination.

Improving the Province of Tungurahua's image and promotion may influence tourist decision-making and encourage future visit intentions to Tungurahua. The survey points out that the tourists are all willing to do adventure and recreational activities in the province of Tungurahua. In the Province of Tungurahua, the nine cities offer various adventures such as cycling down-hill on breath-taking trails, bungee jumping, river rafting and tubing, kayaking and canoeing, paragliding and paragliding, mountain trekking and biking, rock climbing, and also offer various recreational activities such as birding, fishing, hiking, camping, cycling tours, and horseback riding. Improving information and communication technology encourages tourists to visit the Tungurahua province. Most of the respondents strongly agreed that the official centralized website is important for getting reliable information about the destinations.

Table 1 shows that a maximum of 67 participants out of 267 were from the food and beverage industries. Through the online apps, potential travelers may be given more choice in the selection of their specific food requirements instead of serving them mainly the regionally available foods. Based on dataset analysis, customized business websites and travel apps to be designed as well as implemented in diverse businesses and sectors related to the regional tourism sector were the most preferred technology-based solutions. Thus, tourists and residents can access primary information about food as well as beverages, accommodations, concerts, weather, transportation, cultural and educational activities, tourist attractions, directions for driving, traffic, road systems, banks, hospitals, and other outdoor events, sports, and the location of centers for tourism information across the nine cities of the Province of Tungurahua.

5. Discussion

A conceptual model for the tourism industry was developed based on the above methodology, interactions, the analysis of online and face-to-face responses of most of the stakeholders and tourists, and other datasets. This new business model was linked to the urgent need to implement a few result-oriented activities to improve both the image of the province on global platforms and to promote the Province of Tungurahua in social, economic, and cultural terms. For this, gradual acclimatization and familiarization with ICTs might allow the practitioners to develop practical skills and gain much-needed competencies and relevant skill sets to actively participate in global tourism activities through online apps, e-commerce, and tourist-centric information solutions. This study shows that e-commerce is being exploited by companies with traditional marketing tools to provide tourism products and services. As a result, all the tangible benefits of implementing the new model and associated activities may facilitate SMEs to gain more online visibility as well as digital competitiveness (Dredge et al., 2019). As a result, people are encouraged to visit Tungurahua Province, thereby increasing electronic transactions directly between companies and individual consumers (B2C) and business-to-business (B2B).

The innovation towards informative centralized websites and apps suggested in this study will respond to the dynamic need of meeting new and specific interests as well as requirements of a variety of end consumers, markets, and non-profit as well as for-profit firms that expect to provide or receive tourism-related products as well as services that ensure the finest traveling experiences. This will also lighten the burden due to ongoing COVID-19-related restrictions.

This study may be the unique study to focus exclusively on considering non-technological and technological solutions to lay the foundation for the upcoming development as well as the implementation of alternative marketing strategies for the regional tourism industry in the immensely rich Tungurahua province. In promoting tourism, advances in information and communication technologies, associated infrastructures, extensive use of broadband internet, and permanent uninterrupted net connectivity can accelerate the involvement of all organizations and stakeholders in the value-chain through diverse technology-mediated activities like electronic business, electronic commerce, electronic governance, e-tourism, and other digitized innovative mechanisms (Ugurlu, 2022)

It is suggested that a combination of non-technological and technological solutions might give optimum results to attain greater competitiveness and efficiency levels within the national as well as international tourism industry and help revive the tourism sector in the state (Labanauskaite et al., 2020).

This study also highlighted cultural and gastronomic traditions in the entire province. Data gathered through an online survey can be helpful by including the Food Heritage Atlas of Ecuador.

The results showed that the tourists in Tungurahua mostly agreed to use digital tourism, e-commerce, and travel apps, which can make a significant contribution to the development and recovery of the tourism industry in the province. Besides Tourism 3.0, ICT apps can also help service providers, hoteliers, and planners modify and develop policies as per the changing tourist tastes, preferences, and predilections in an increasingly digitized world.

Findings from this study can be adapted and applied in other communities, sectors, and provinces to also boost the Ecuadorian economy. Furthermore, in a virtual-based industry, customized offerings will go a long way in solving the problem of declining tourism in Tungurahua. This is because, now that tourists are tech-savvy, they use apps and gather information in advance before zeroing in on their tourist destinations (Vij & Rizwan, 2022). Websites should be updated with the latest information on a real-time basis in all urban areas of Tungurahua.

The statistics from Google Analytics, a free system developed by Google that enables users to view information about the users and the number of times they have visited the internet site, could be very useful for all people and stakeholders.

5.1 Limitations

This study was conducted with a focus on a small province in a small country. Its findings may not apply to large-sized economies such as the USA and India.

It mainly used the questionnaire method from visitors, but including more people through randomized online surveys and studies from a larger international population may have provided better outcomes to generalize.

Implications

This study has highlighted the role of digitalized tools, apps, and customized product offerings to the customers and helped generate awareness about Tungurahua across the globe. That may help propel the sagging state economy and may provide much-needed succor. It is suggested that all the stakeholders: planners, government and non-government agencies, hospitality sector people, tourists, information technology professionals, app developers, and travel-related promotional agencies in Ecuador must work in unison and make concerted, result-oriented, up-to-date, tourist-friendly policies to fully exploit the potential and highlight the scenic beauty of the mountainous and culturally important province. In this manner, Tungurahua can become the leading tourist destination in South America and help boost the economy and earn much-needed foreign exchange for the resource-strapped province, thus tidying over the current COVID-19-related slowdown and providing more jobs, revenues, security, and branding opportunities for the sector at an international level.

6. Conclusions

An inventive model for the tourism sector has been devised through a blend of diverse research methodologies and inclusive stakeholder engagement approaches. This collaborative model proposes the establishment of fresh roles, responsibilities, and outcome-focused endeavors for each stakeholder. The aim is to furnish technology-driven and non-technological resolutions with immediate applicability within tourism service activities. The creation of a customized centralized webpage and on-site travel applications, paired with capacity-building initiatives, garners extensive support among participants, emerging as the most favored products/solutions.

The pivotal discoveries arising from this investigation bear paramount significance for the advancement of enduring tourism programs, capacity enhancement efforts, and research undertakings. The formulation of appropriate travel applications, websites, and offerings tailored to customer preferences, encompassing areas such as food, transportation, and amenities, stands to amplify the influx of visitors, revenues, and revisitation intentions. This, in turn, elevates tourists' overall experiences and fosters heightened awareness and competitiveness for the Province of Tungurahua across expansive national and international tourism markets. These contributing factors serve to position Tungurahua as a premier sustainable tourism destination, concurrently bolstering the drive for conservation and preservation of both regional tangible and intangible heritage.

On the whole, the collaborative framework proposed in this study, encompassing technological and non-technological solutions, holds the potential to rejuvenate the regional tourism sector, which has

grappled with the adverse impacts of the COVID-19 pandemic. This approach extends toward fostering social and economic vitality. Moreover, it promises to bolster the income levels of the province's populace and facilitate integration between the province and other regions, along with prominent global hotspots.

Data Availability
All relevant data are within the paper and its Supplementary Materials files.

Conflicts of Interest
The authors declare that there is no conflict of interest regarding the publication of this paper.

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References

Adeola, O., and Evans, O. (2020). ICT, infrastructure, and tourism development in Africa. *Tourism Economics*, *26*(1), 97-114. https://doi.org/10.1177/1354816619827712

Benyon, D., Quigley, A., O'keefe, B. & Riva, G., 2014. Presence and digital tourism. *AI & society*, *29*(4), 521-529. https://doi.org/10.1007/s00146-013-0493-8

Castillo Vizuete, D.D., Gavilanes Montoya, A.V., Muñoz Jácome, E.A., ChávezVelásquez, C.R. & Borz, S.A. (2021). An evaluation of the importance of smart tourism tools in the Riobamba Canton, Ecuador. *Sustainability*, *13*(16), p.9436. https://doi.org/10.3390/su13169436

Castillo-Vizuete, D., Gavilanes-Montoya, A., Chávez-Velásquez, C., Benalcázar-Vergara, P. and Mestanza-Ramón, C. (2021). Design of nature tourism route in chimborazo wildlife reserve, ecuador. *International Journal of Environmental Research and Public Health*, *18*(10), p.5293. https://doi.org/10.3390/ijerph18105293

Chen, Y. & Sivakumar, V. (2021). Investigation of finance industry on risk awareness model and digital economic growth. *Annals of Operations Research*, pp.1-22. https://doi.org/10.1007/s10479-021-04287-7.

David-Negre, T., Almedida-Santana, A., Hernández, J.M. & Moreno-Gil, S. (2018). Understanding European tourists' use of e-tourism platforms. Analysis of networks. *Information Technology & Tourism*, *20*(1), 131-152. https://doi.org/10.1007/s40558-018-0113-z

De Lucia, C., Pazienza, P. & Balena, P. (2021). How does ICT influence residents' attitudes towards tourism as a driver of development? A generalised ordered logistic regression analysis: ICT for tourism as driver of development in lagging behind regions. *International Journal of Tourism Research*, *23*(6), 1126-1150. https://doi.org/10.1002/jtr.2473

del Pilar Hurtado-Yugcha, J., Quisimalin-Santamaría, H.M., Mancheno-Saá, M.J., Gamboa-Salinas, J.M., & Castro-Analuiza, J.C. (2022). Tourist routes, a link between economic and cultural development in the modern marketplace. *Journal of Positive School Psychology*, pp.1562-1572.

Dredge, D., Phi, G.T.L., Mahadevan, R., Meehan, E. and Popescu, E., (2019). Digitalisation in Tourism: In-depth analysis of challenges and opportunities.

ECLAC. (2019). Caribbean technology partnerships for the SDGS. Available from: https://www.cepal.org/en/publications/45206-caribbean-technology-partnerships-sdgs#:~:text=Director's%20Desk%3A%20Caribbean%20technology%20partnerships,speed%20connections%20in%20the%20Caribbean.

Gratzer, M., Werthner, H. &Winiwarter, W. (2004). Electronic business in tourism. *International Journal of Electronic Business*, 2(5), 450-459. https://doi.org/10.1504/IJEB.2004.005878

Hays, S., Page, S.J. &Buhalis, D. (2013). Social media as a destination marketing tool: its use by national tourism organisations. *Current issues in Tourism*, *16*(3), pp.211-239. doi.org/10.1080/13683500.2012.662215

Honorable Gobierno Provincial de Tungurahua. (2015). https://www.tungurahua.gob.ec/

Kim, S.E., Lee, K.Y., Shin, S.I. & Yang, S.B. (2017). Effects of tourism information quality in social media on destination image formation: The case of Sina Weibo. *Information & management*, *54*(6),687-702. https://doi.org/10.1016/j.im.2017.02.009

Labanauskaitė, D., Fiore, M. and Stašys, R. (2020). Use of E-marketing tools as communication management in the tourism industry. *Tourism Management Perspectives*, *34*, p.100652. https://doi.org/10.1016/j.tmp.2020.100652

Lee, C.C., Chen, M.P., Wu, W. and Xing, W. (2021). The impacts of ICTs on tourism development: International evidence based on a panel quantile approach. *Information Technology & Tourism*, *23*(4), 509-547. https://doi.org/10.1007/s40558-021-00215-4

Lewis, C. & Perry, R. (2017). Lesson study to scale up research-based knowledge: A randomized, controlled trial of fractions learning. *Journal for research in mathematics education*, *48*(3), pp.261-299. https://doi.org/10.5951/jresematheduc.48.3.0261

Martin, C., & Leurent, H. (2017). Technology and innovation for the future of production: Accelerating value creation. In *World Economic Forum, Geneva Switzerland.*

OECD. (2010). OECD tourism trends and policies 2010. Available from: https://www.oecd-ilibrary.org/industry-and-services/oecd-tourism-trends-and-policies-2010_tour-2010-en

OECD. (2019). Latin American economic outlook 2019: Development in transition. Available from: https://doi.org/10.1787/20725140

Palvia, P., Baqir, N. and Nemati, H. (2018). ICT for socio-economic development: A citizens' perspective. *Information & Management*, *55*(2), 160-176. http://dx.doi.org/10.1016/j.im.2017.05.003

Paredes, O.E., Melo Fiallos, D.F., Guaman, A.R., García, M.G. and Armas, N. (2018). Touristic Virtual Environment of Tunguragua Province. *The Academic Research Community publication*, *2*(2), p.9. http://dx.doi.org/10.21625/archive.v2i2.244

Rajamohamed, H.R.K. (2016). Analyzing the importance of ICT in tourism industry with reference to Thailand. Available at SSRN 2739491. https://dx.doi.org/10.2139/ssrn.2739491

Snabe Hagemann, J. & Weinelt, B. (2016). Digital transformation of industries: Demystifying digital and securing $100 trillion for society and industry by 2025. In *World Economic Forum*,(January).

Souto, J.E. (2015). Business model innovation and business concept innovation as the context of incremental innovation and radical innovation. *Tourism management*, *51*, pp.142-155. https://doi.org/10.1016/j.tourman.2015.05.017

Stonehouse, G.H. & Konina, N.Y. (2020). Management challenges in the age of digital disruption. In *1st International Conference on Emerging Trends and Challenges in the Management Theory and Practice* (ETCMTP 2019) (pp. 1-6). Atlantis Press. https://dx.doi.org/10.2991/aebmr.k.200201.001

Ugurlu, K. (2022). Technology in Tourism Marketing. *Handbook of Technology Application in Tourism in Asia*, p.69. https://doi.org/10.1007/978-981-16-2210-6_4

UNCTAD. (2014). Transfer of technology and knowledge sharing for development science, technology and innovation issues for developing countries. Available from: https://digitallibrary.un.org/record/784430?ln=en

Vij, M. & Rizwan, S.A. (2022). Emerging Technologies in Tourism for a Better Experience: The Case of Dubai. *Technology Application in Tourism in Asia*, pp.97-107. https://doi.org/10.1007/978-981-16-5461-9_6

Wagaw, M. and Mulugeta, F. (2018) Integration of ICT and tourism for improved promotion of tourist attractions in Ethiopia. *In Applied Informatics*, *5*(1), 1-12). SpringerOpen. https://doi.org/10.1186/s40535-018-0053-x

Worum, H., Lillekroken, D., Ahlsen, B., Roaldsen, K.S. and Bergland, A. (2019). Bridging the gap between research-based knowledge and clinical practice: a qualitative examination of patients and physiotherapists' views on the Otago exercise Programme. *BMC geriatrics*, *19*(1), 1-18. https://doi.org/10.1186/s12877-019-1309-6.

Yoon, W. and Kwon, S. (2022). The Impact of Technological and Non-technological Innovative Activities on Technological Competitiveness. *Journal of the Knowledge Economy*, pp.1-19. https://doi.org/10.1007/s13132-021-00868-w

Zhou, C. and Sotiriadis, M. (2021). Exploring and evaluating the impact of ICTs on culture and tourism industries' convergence: Evidence from China. *Sustainability*, *13*(21), p.11769. https://doi.org/10.3390/su132111769