Oswaldo Paredes / Diego Melo / Adolfo Ricardo Guamán /
Mario García / Fabricio Guamán-Guevara

Which Innovative Solutions of Non-Technological and Technological Nature are Needed to Improve Tourism Services? A Case of Tungurahua Province in Ecuador

Abstract

The present empirical study aims to provide a new conceptual framework for the regional tourism industry of the Province of Tungurahua-Ecuador that emerged from a combined application of stakeholder engagement and research-practice approaches. These preliminary outcomes from in-depth focus group assessments and surveys applied to tourism experts, industry practitioners, government's representatives, and tourists revealed that a synergic/collaborative work across tourism stakeholders have the potentials to create innovative touristic products and services, thus solving progressively the existing issues observed in the regional tourism, travel and hospitality sectors. Resulting tailor-made tourism products, mainly based on advanced technology, may represent the first steps of improvements to be taken into consideration prior to evolving to the development and implementation of smart cities and smart tourism concepts in this region where tourism activities are one of the most important revenue for the national and regional tourism industry.

Keywords: stakeholder engagement, research-practice approach, e-tourism, Tungurahua, Ecuador

1. Introduction

Organizations across sectors and industries are constantly developing new ways to adapt their goals, roles, and responsibilities to respond efficiently to challenges driven by global, regional, and national economic, political, legal, social-cultural, climate change, environmental, and technological innovation factors (Fagerberg, 2009; Rajapathirana & Hui, 2018). Thus, emerging technologies, particularly digital technologies, have improved the quality of the decision-making process, maximizing tangible and intangible benefits, particularly in industries of developed economies (Niebel, 2018; Palvia et al., 2018). However, a broad range of economic sectors and enterprises, mainly Small and Medium-sized Enterprises (SMEs) from developing countries, are still coping with the access and implementation of such technologies (Abou-Shouk et al., 2013; Economic Commission for Latin America and the Caribbean [ECLAC], 2019; Organisation for Economic Co-operation and Development [OECD], 2019; United Nations Conference on Trade and Development [UNCTAD],

Oswaldo Paredes, Associate professor, School of Systems, Electronics and Industry, Universidad Técnica de Ambato, Ambato, Ecuador;
ORCID: https://orcid.org/0000-0003-0985-9738; e-mail: oswaldoeparedes@uta.edu.ec

Diego Melo, MA, Associate professor, School of Human and Education Sciences, Universidad Técnica de Ambato, Ecuador;
ORCID: https://orcid.org/0000-0003-3426-5659; e-mail: diegofmelof@uta.edu.ec

Adolfo Ricardo Guamán, PhD candidate, Corresponding author, Associate professor, The International Doctoral School, Universidad Rey Juan Carlos, Madrid, Spain; School of Agricultural Sciences and Natural Resources, Universidad Técnica de Cotopaxi, Latacunga, Ecuador;
ORCID: https://orcid.org/0000-0002-8816-7379; e-mail: ar.guaman.2018@alumnos.urjc.es

Mario García, Associate professor, School of Systems, Electronics and Industry, Universidad Técnica de Ambato, Ambato, Ecuador;
ORCID: https://orcid.org/0000-0001-8378-7475; e-mail: marioggarcia@uta.edu.ec

Fabricio Guamán-Guevara, PhD, School of Geography and Sustainable Development, University of St. Andrews, United Kingdom;
ORCID: https://orcid.org/0000-0002-1008-1452; e-mail: fabricio.guaman.guevara@gmail.com

559

2014). Therefore, the impacts of emerging technologies on the economic development of developing nations are still pending issues to be addressed, specifically in the tourism industry. This is the case for Ecuador, a nation embracing an immense natural wealth constituting the major tourism attraction, and where the tourism industry and associated activities have to date remained largely neglected over the last decades by academics, government, policymakers, and practitioners, especially in the Province of Tungurahua. Here, SMEs linked to the tourism industry have traditionally played a pivotal role within the regional and local economy due to their potentials to create tourism-related jobs, boost consumption, and alleviate poverty. Despite these benefits, little is known about how these new technologies could help provide value-added tourism activities to avoid stagnation and decline of the regional tourism industry.

Previous studies on tourism activities and use of technology in the province of Tungurahua are scarce, and most existing literature available focuses on a specific city or town promoting its tourist attractions as a single/isolated destination (Guamán-Guevara et al., 2017; Paredes-Ochoa et al., 2017; Paredes et al., 2018). In this context, the present study attempts to provide a conceptual framework where synergic/collaborative work among tourism stakeholders leads to innovative touristic products with the potential to contribute to improving the tourism value chain of the Province of Tungurahua. More specifically, the current empirical research aims: (1) to determine current issues, needs, and priorities observed within the regional tourism industry; (2) to develop an innovative tourism business organizational model derived from stakeholder engagement and research-practice approaches; (3) to generate concrete actions, activities, products, and measurable outcomes/targets. It is hypothesized that outputs based on technology solutions would be the best candidates to help the Province of Tungurahua to achieve greater competitiveness levels within the national and international tourism industry.

This present article is structured in five sections; the first reviews selected literature related to the information and communication technologies (ICTs) in the tourism industry, e-tourism, and knowledge-based on a research-practice-approach. This is followed by the methodology adopted to conduct the present research. The subsequent sections present the most relevant outcomes, discussions and research limitations, and future work. Conclusions and implications of the study are presented in the last section.

2. Literature review

2.1. ICTs in the tourism industry

Advances in ICTs, associated infrastructures, wider application of broadband internet, and enhanced mobile connectivity have accelerated the participation of non-profit and for-profit organizations in diverse technology-mediated activities such as e-governance, e-commerce, e-business, mobile commerce, and social commerce (Jung et al., 2013; Múgica & Berné, 2019; Wirtz et al., 2010). This advanced technology not only has affected significantly how governments and industries operate but also have influenced and replaced some traditional means of both human communication/interactions and consumption of products and services (i.e., government services, education, healthcare, entertainment, and leisure) (Hays et al., 2012; OECD, 2019; Ruiz et al., 2018; Sunkel & Trucco, 2011; UNCTAD, 2014). For instance, in the travel and tourism sectors, the ICTs have considerably contributed to improving organizational structures and developing more effective marketing strategies to successfully promote tourist attractions and services (Kim-S et al., 2017; Kim-Y et al., 2009; Souto, 2015; Wagaw & Mulugeta, 2018). However, the resulting impacts of ICTs implementation on economic development, innovation, productivity, competitiveness, and market participation is unequal across countries, tourism types (i.e., rural vs. urban destinations), tourism companies (i.e., SEMs), and tourism sectors, especially in accommodation, recreational centers, travel insurance and culinary tourism sectors, where the usage of ICTs showed positive impacts in comparison with other travel sectors (Aramendia-Muneta & Ollo-López, 2013; Jung et al., 2013; Najafipour et al., 2019; Sedmak et al., 2016).

TOURISM An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

560

Widespread implementation of ICTs such as smartphones and the internet has positively affected the global tourism industry, enabling travelers to access real-time information sources, consequently facilitating travel decision-making and trip planning (Benyon et al., 2014; Bock, 2015; Kumar & Kumar, 2019). For instance, ICTs have improved tourism consumers' experiences throughout all stages of travel (i.e., before, during, and after) by providing them the possibility of acquiring primary information about destination such as accommodation facilities, catering, peripheral services, local activities, transportation, routes, geographic position, culinary festivals, arts, and musical events, and prices/costs of potential tourist destinations (Benyon et al., 2014; Buhalis, 2020).

2.2. E-tourism

Over the last decades, businesses linked to the travel and tourism sectors have strived to implement ICTs to provide detailed information about products and services through automated customer services and networking platforms, thus increasing levels of competitiveness, business transactions, and revenues. With e-commerce for tourism, also known as e-tourism, most enterprises have experienced cost savings, improved tourism services operations, obtained greater levels of travelers' satisfaction, and influenced consumers' experiences (Benyon et al., 2014; Gratzer et al., 2004; Mhlanga & Tichaawa, 2017; Najafipour et al., 2019). This virtual communication and interactivity have increased the demand for more sophisticated e-tourism platforms such as websites, social media, and travel applications where features such as functionality, information quality, system quality, privacy, versatility, memorability, customization, and security are advocated by more customers (Alizadeh & Isa, 2015; Benevolo & Spinelli, 2018; Chen & Lin, 2015; Fodor & Werthner, 2005; Kazandzhieva & Santana, 2019; Keller, 2009; Kim-S. et al., 2017; Vila et al., 2020). In this context, tailor-made business websites and Apps have been designed and implemented in different businesses related to the tourism industry, mainly food and beverages, accommodations, concerts, transportation, street food festivals, other types of outdoor events, sports, and tourism information centers. The innovation of websites and Apps is practically a response to meet specific interests and demands of a wide range of customers, markets, and non-profit and for-profit organizations which expect to provide and receive touristic products and services that guarantee the best travel experiences (Praničevic & Mandić, 2020).

2.3. Stakeholder engagement and research-practice-based approach

Innovations of a non-technological and technological nature can induce changes in industries/companies' business models (Schiavi & Behr, 2018; Souto, 2015), especially in those with traditional industrial structures focused only on production and delivery of goods and services to customers, ultimately generating revenues. For instance, to fulfill tourism development at destinations, the industry has been progressively implementing a long-term sustainable vision via the application of transformative models as strategies to achieve more engagement/commitment among government, industry, destination communities, and other stakeholders, including Academia, to generate knowledge applicable into tourism activities, ultimately providing high-quality products (Ali et al., 2017; OECD, 2010; OECD, 2019; UNCTAD, 2014). As the knowledge *per se* is not generated by companies associated with the tourism industry (Souto, 2015); it is imperative to develop new models where multiple actors with diverse sources of knowledge can modify the current economic development model, from having a perspective of productivity purely economic towards another model incorporating productive, sustainable and inclusive economic development (Edwards-Schachter, 2018; Razović & Tomljenović, 2015; World Economic Forum [WEF], 2016, 2017).

An approach of stakeholder engagement has proved to be an effective tool to promote more interaction and cooperation among public-private organizations across various industries and sectors, also attaining a deeper involvement of practitioners and academia researchers as sources of experiences and research-based knowledge, respectively (Lewis & Perry, 2017; Worum et al., 2019). This type of collaborative participation

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

561

of multi-stakeholders along with investment and support generally help increase knowledge production (i.e., research, evidence, and practice-based), science-based technology development, and innovation, ultimately achieving sustainability goals (UNCTAD, 2014) and providing opportunities for tourism development and recovery during unpredictable circumstances (Čorak et al., 2021).

Although several studies have investigated and highlighted the benefits of using research-practice based knowledge approaches across different sectors and industries (Duxbury et al., 2019; Fuchs et al., 2013; Lewis & Perry, 2017; Worum et al., 2019), more studies incorporating similar integrated approaches are needed: (1) to address the current challenges encountered in industries; (2) to harness the capabilities of stakeholders (e.g., resources, skills, expertise, collaboration, and networks); (3) to transfer research-based knowledge into practical solutions mainly through effective implementation of ICTs in the productivity system of developing and emerging countries.

3. Materials and methods

3.1. Study area

The province of Tungurahua is located in the center of the Andean region of Ecuador (country of north-western South America). It embraces nine cities: Ambato, Baños, Cevallos, Mocha, Pelileo, Pillaro, Tisaleo, Quero, and Patate. The latter, due to natural landscapes and ancestral culture and traditions, has been recognized by the Ministry of Tourism as Magical Town. These nine cities are situated at different elevations ranging from 1,800 to 3,400 meters above sea level (1°14'56.7'' S 78°37'0.3'' W) and experience average low and high temperatures between 10°C and 24°C, respectively (Honorable Gobierno Provincial de Tungurahua, 2015). The province population of approximately 600.000 people is spread across a total land area of about 5,753.25 square kilometers.

The province of Tungurahua is a land surrounded by multiple volcanos and features mainly a warm-summer Mediterranean climate (Climate-data, 2020) except for Baños that also experiences an Amazon forest climate. The annual rainfall recorded is approximately 504 mm (Climate-data, 2020; Weatherspark, 2020). Despite the presence of dry and wet seasons, climatic stability all-year-round favors diverse economic activities such as agriculture, tourism (e.g., culinary, agro-tourism, adventure, and cultural tourism), textiles, and leather production handicrafts, and wooden furniture manufacturing. These economic activities have become the cornerstone of regional employment and socio-economic development over the last decades. All of nine cities forming part of this province are strongly connected through well-developed road system.

3.2. Overall survey

Regional and local authorities, academics, practitioners, and tourism industry representatives from different sectors of the regional tourism industry took part in this study from September 2017 to December 2018. They were contacted by project members through e-mail correspondence and phone calls, being briefly informed about the purpose and the procedure of this project, and finally asked for their availability and willingness to participate voluntarily in several rounds of work meetings to provide a full picture of current issues detected in the regional tourism industry, and how they can be explored from a multidisciplinary and multidimensional approach. After their consent, all stakeholders were also requested to fill out an online structured questionnaire. Because of different reasons, only 153 stakeholders were available on the dates and at times proposed by researchers for face-to-face meetings. For those stakeholders attending meetings, researchers asked them to expand their online answers by providing detailed opinions. The exchange of experiences and views from different fields of expertise and subsequent debates among attendees were recorded.

Concerning to tourist survey, field data collection was carried out on different days and geographical points within the nine cities and surroundings. The survey was conducted by twenty trained assistants and researchers

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

562

who intercepted randomly 267 tourists before leaving restaurants, food courts, hotels, hostels, travel agencies, central parks, and bus terminals. Tourists were asked to participate in an 8-min survey, and after obtaining their consent, a self-completion questionnaire was provided on a computer tablet to start with the online survey. This approach was selected to collect information mainly focused on tourist's profile, tourists' behavior including primary travel purpose, attributes, and perception of places visited or to visit, tourist's needs, and potential products that may have helped visitors to have better levels of satisfaction during their stay in any of the nine visited cities/towns of the Province of Tungurahua.

The study was conducted in qualitative and quantitative approaches using different online self-completion and semi-structured questionnaires written in Spanish and English. These instruments were designed electronically through the Google survey platform and were applied to participants to collect sensitive information about both tourism-related problems unsolved for decades in this region and how associated solutions linked to non-technological and technological nature could help provide value-added tourism activities to avoid stagnation and decline of the regional tourism industry, especially during adversities and crises periods.

Confidentiality of private data identifying either participants or organizations involved was fully guaranteed by researchers. Thus, only general information is presented in this study, as detailed in Table 1.

Table 1
Descriptive characteristics of surveys participants

Stakeholder	Number of participants	Persons or institution	Position	Field of expertise
Academia	8	Public and private higher education institution	Academic	Tourism
	5			Technology
	7			Hospitality
Industry	39	Practitioner - hotel	Representative	Accommodation
	67	Practitioner – restaurant, bars, coffee shops		Food and beverages
	11	Practitioner - public transportation		Transportation
	27	Travel agency		Tour packages
	21	Food producer and provider		Culinary tourism
Government	12	Regional tourism officer		Tourism
	1	Local tourism office		Tourism
Tourists/ customers	267	Visitors in different cities	N/A	N/A

Source: Elaborated by the authors.

4. Results

The main findings are summarised in the next three sections:

4.1. Issues of the regional tourism industry

Here, stakeholders found the three most common difficulties in developing effective destination marketing strategies to strengthen the regional tourism sector.

4.1.1. Unclear role of stakeholders

Notably, data indicated that each stakeholder's role and responsibilities to contribute towards enhancing the current touristic destination image were not clear. Besides, 82 % of participants showed a decreasing interest in collaborative work among stakeholders who had opted to define their own marketing and positioning strategies which in some cases lack global standards for sustainable travel and tourism. The majority of

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

563

attendees (91%) expressed that government policies have not fully helped achieve a long-term sustainable tourism development plan. Even worse, innovation and competitiveness have not been considered crucial drivers of growth in terms of supporting employment and social participation. To solve this, it was suggested by stakeholders (95%) a radical change of the current business organizational model to identify priorities and develop better marketing strategies for the regional tourist industry.

4.1.2. Limited use of ICTs

In meetings, over 90% of representatives and practitioners alleged the existence of gaps in ICTs in regional tourism, travel, and hospitality activities. This information was corroborated at analyzing questions about key indicators of digitization processes implemented over the last decade. Subsequent evaluation visitations to some tourism businesses confirmed the deficient or inexistent technology infrastructure. For instance, SMEs, accounting for 100 % of surveyed tourism businesses, showed they have not fully implemented and integrated ICTs yet as solutions for enhanced customer services. They did acknowledge the potential benefits that may bring the integration of technology into the tourism enterprises; however, they mentioned that there are still some barriers to ICTs adoption among SMEs, such as the extra cost of having recourse to ICT specialists and investment in network infrastructure.

Notably, although most SMEs have implemented a website (83%) and social media (32%) as low-cost marketing tools, in most cases, they are not regularly updated, and sophisticated functions for e-business are not fully installed yet. Owners and managers of businesses with a well-developed network infrastructure clearly expressed that web selling of products and services made directly between businesses and individual consumers (B2C) accounted for up to 6 % of total web sales. Results revealed no electronic transactions taken place between businesses (B2B).

4.1.3. Quality of tourism-related information

96 % of stakeholders strongly agreed that most online information about tourism in the province is highly dispersed in many private and public websites and social media sites, whose touristic information lacks value-creation and innovation processes for customers, products and services, and stakeholders. Consequently, stakeholders believed that a technology-based solution would help use information more effectively to benefit tourists and tourism-related sectors. Hence, it is suggested to create both an official centralized website and travel applications to exclusively provide primary tourism information of the province of Tungurahua, which should be updated instantly while displaying high-value products and services.

Results also indicated that over 90% of stakeholders considered that the reliability, accuracy, and completeness of online tourism information provided by regional businesses must be the key brand differentiators of potential tourism websites and travel applications. The majority of travelers (93%) agreed with this idea because it would help them make a more effective travel decision, save time and money, and ultimately obtain higher satisfaction levels.

4.2. Recommended proactive actions

Most stakeholders and tourists suggested putting into action a few immediate activities to improve both the image and promotion of the Province of Tungurahua, and they are mentioned as follows:

4.2.1. Workshops and hands-on training

Most of the attendees at meetings (95%) considered that owners, managers, and employees of the SMEs are currently not well-trained in the usage of ICTs; hence, as a potential solution, it was suggested the development and implementation of a series of hands-on training workshops conducted by specialists selected by the Higher Education institutions associated to this current study. They considered that capacity-building

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

564

programs would enable people to access free education; acquire value-added knowledge; change people's attitudes towards ICTs and reduce operational costs. Additionally, stakeholders believed that a progressive familiarisation with ICTs will allow people to develop practical skills and gain competencies to participate actively in global activities related to tourism, such as e-commerce which has not been fully exploited by companies that in most cases are still operating with traditional marketing tools (i.e., newspapers, radio, and leaflets) to offer tourism services and products.

In addition to this, analysis of field data collected across the nine cities pointed out that other tourism sectors as gastronomy required more initiatives for community engagement. For instance, the creation of customized training programs is advocated. Stakeholders expect that participants who successfully demonstrated their knowledge of food tourism practices and standards may be awarded a Certificate in Culinary tourism core skills, which the tourism industry and regional government may recognize. The ten most voted workshops were: ICTs knowledge and e-commerce, customer services, food tourism enterprises, Hospitality marketing and business development, social media of food advertising, food freelance entrepreneurship and event Management, introductory courses of photography for digital technologies, good practices of accessible tourism, institutional housekeeping, food handler, English specialized in tourism, clean and safe techniques.

4.2.2. Alliances between public and private organizations

In terms of the practical solutions, all surveyed stakeholders agreed that those detected tourism issues could be solved progressively by improving accessibility and internet connectivity and the immediate acquisition of high-tech and low-cost products applicable to sustainable tourism activities. As suggested by participants, this can be attained via long-term alliances between public and private organizations, particularly with the telecommunications sector, to gain greater online visibility and digital competitiveness for SMEs, consequently encouraging people to visit the Province of Tungurahua and increasing B2C and B2B, ultimately obtaining in return greater levels of consumers' satisfaction, revenues, and revisit intention.

Furthermore, as 95% of SMEs representatives indicated that enterprises had not adopted any accreditation or certification for their ongoing tourism activities due to the high cost involved, again, alliances between the tourism industry and certification firms may help solve this issue.

4.3. Outputs

Information obtained from debates among stakeholders pointed out that a certain convergence in the regional tourism industry and sectors urgently require innovations of a non-technological and technological nature (91%). Because these options were the most ranked solutions, they are detailed as follows:

### 4.3.1. Development of a collaborative work framework

As a result of the preliminary evaluation mentioned above and participants' suggestions, roles and responsibilities among stakeholders were restructured, enabling them to recommend actions/activities and technology-based products to be developed and implemented as early as possible, as shown in Figure 1.

The model incorporates main integrated components depicting the interoperability among stakeholders to boost proactive actions and outputs in the tourism industry.

The collaborative model shows multidirectional interactions to maximize benefits; however, Academia would be the key producer of initiatives through research projects that will lead to an increase in scientific knowledge, which among other features, must be comprehensible and applicable to the regional tourism industry. While regional and local governments remain as the key players in finding the best ways for effective, sustainable tourism development; thus, for example (most voted): creating and maintaining modern tourism infrastructure, implementing effective campaigns to promote domestic tourism, creating alliances between

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

565

public and private sectors, providing beneficial regulatory policies (e.g., reducing bureaucracy, fees, taxes, and regulations) and developing programs of economic incentives for existing businesses and potential start-ups associated with any tourism sector.

Figure 1
Outline of the proposed collaborative model based on a research-practice approach
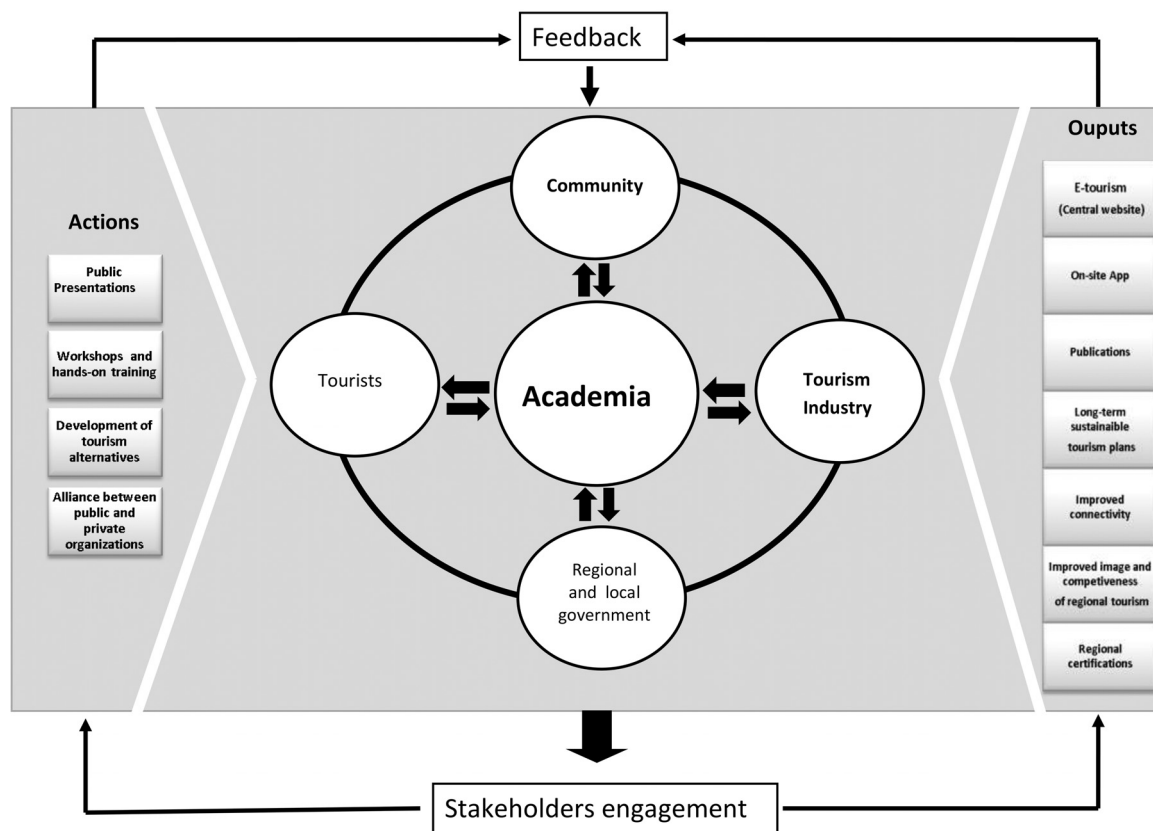
Source: Elaborated by the authors.
Note: Main components, overall relationships among stakeholders, priority actions to take, main outputs and feedback are shown.

Furthermore, the proposed conceptual model is highly flexible to incorporate ideas, suggestions, and actions from host communities, practitioners, and tourists, which in some cases have been largely neglected from collaborative projects. Thus, each tourism sector or stakeholder can publicly present initiatives, projects, and related activities to address some problems facing the province's tourism industry.

4.3.2. E-tourism through virtual environments

A central website was one of the most voted options by stakeholders and tourists to be used as an initial destination marketing tool for the Province of Tungurahua. The development of this virtual environment was already carried out by researchers from the Technical University of Ambato to improve the acquisition and management of existing touristic information. The design of website contents was initially based on analysis of surveyed tourists' profiles which showed mostly international travelers (71%) aged between 25 and 40 years old and with travel preferences for self-organized trips (65.83%), followed by group travel (15.89%), backpackers (9.97%) and all-inclusive tour packages (8.31%). With the majority of highly educated women (57%), these three groups pointed out the need to organise their own itineraries throughout all travel stages by using technological tools to access primary tourism-related information sources. For instance, tourists

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

566

mentioned that one attractive website, instead of several websites, displaying inspirational videos, photos, and messages about regional destinations may positively influence tourists' decision-making process and future visit intentions to the Province of Tungurahua. Furthermore, a friendly virtual environment has to make it easier for tourists to navigate and find real-time information about each city such as service and products providers (e.g., tourism-related businesses), transportation schedules, accommodation, weather, cultural and educational activities (i.e., festivals, workshops, seminars, etc.), touristic attractions (e.g., natural, historical and religious sites), driving directions, traffic, routes and road systems, hospitals, banks, etc.

Surprisingly, 93% of stakeholders and tourists required that the central website be characterized among other features by being strictly used as an information platform or source; thus, direct commercial transactions and promotions (i.e., prices) should not be supported directly. The central website would be initially managed by the university's researchers, who will allocate a specific space for each organization that freely decides to join this initiative. This central website will enable visitors to search for useful information of their own interest, and subsequently, use the activated links to visit individually the websites of tourism businesses listed. As suggested, business and organizations will keep their own website/homepage and will be in charge of uploading updated and high-quality information about their services and products. This system would facilitate and encourage direct communication between businesses and consumers and also across businesses linked to tourism.

Stakeholders, particularly regional food producers and providers, considered that this proposed website could be the best way to promote unique culinary tourism by offering online specific and regular culinary workshops, festivals, and food tasting. These activities combined with short tours towards rural settings will allow people to participate in the seasonal harvest, buy products, and be directly immersed in activities related to Agriculture tourism. This type of activity (i.e., tour packages) will enable visitors and residents to obtain memorable gastronomic experiences while discovering and connecting with the region's authentic identity.

As this technological initiative will incorporate a map with geolocation and georeferencing functions, stakeholders agreed that these options would help travelers to visit more traditional and non-traditional destinations/locations distributed across the province. This will favor the creation and promotion of more high-value touristic attractions and events throughout the year in each of the nine host cities, mainly during off-peak season. Natural attractions located in wilderness areas of these nine cities and surroundings also offer multiple opportunities for regional businesses to host adventure activities such as sports events linked to cycling down-hill on breath-taking trails, bungee jumping, both river rafting, and kayaking, mountain trekking and biking, and recreational activities including birding, phishing, trail hiking, camping, cycling tours, and horseback riding. All surveyed tourists indicated that they indeed would do any of the adventure activities mentioned above when implemented.

More technical details about the development and construction of this centralized website can be found in Paredes et al. (2018).

4.3.3. Development of an on-site travel App

Results from the present research also led to the development of a particular "on the go" application for mobiles and tablets. This priority technological innovation will benefit mainly end-consumers (e.g., tourists, visitors, and residents). As requested, this promising travel App would aim to exclusively satisfy immediate on-site travel tourists' needs, particularly those linked to sectors of accommodation, food and beverages, adventures, and transportation services. As visitors move around the cities, they will be able to visualize information about new audiovisual material, news latest offers (i.e., highlighting low prices, menus of the day, seats and rooms, etc.), and other tourism services available instantly. Real-time information provided on mobiles and tablets screens will be the same information as that already uploaded by associated businesses or organizations via respective spaces allocated in the centralized website which was discussed above. Furthermore, new

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

567

features incorporated on this free on-site travel App will be a voice and offline visual navigation, live traffic information, 3D maps, and automatic recognition of businesses regionally accredited, including those for accessible tourism.

5. Discussion

It is believed that this is the first study to focus exclusively on understanding the current tourism issues and roles of each stakeholder within the regional tourism industry prior to the development and implementation of marketing strategies based on collaborative approaches and technological solutions. As presented in the previous sections, the most important findings pointed out the need to create immediately a new conceptual model with more realistic and balanced roles among stakeholders to achieve successfully common strategic objectives through short- and long-term effective business planning. The proposed model depicts such radical change of the traditional hierarchical top-down governance system towards a more decentralized approach that would allow a higher integration among stakeholders (Ali et al., 2017).

Definitively, innovative destination models implying synergy among stakeholders would become a great asset to reinforce the regional productivity, socio-economic growth, and diversification of high-value tourism services; ultimately, enhancing the touristic and commercial image of the Province of Tungurahua or elsewhere, especially during adversities and crises periods (Mekawy, 2019). Similar models based on stakeholder engagement and research-practice based approaches have been successfully implemented in diverse services sectors (Duxbury et al., 2019; Worum et al., 2019); therefore, it is also expected that the proposed model not only will close existing gaps of responsibilities and collaboration among stakeholders but also will help reduce differences between research-based knowledge and practice in the regional tourism industry.

Regarding the outputs derived from the proposed collaborative model, a centralized website and on-site travel applications were the most voted technology-based solutions (over 90 %) for immediate implementation in the regional tourism industry. The former will solve the problem of acquisition and management of existing touristic information, which has been dispersed and neglected over the last two decades despite continuous technological advances. This communication choice may confirm previous study stating that a website can be a tool for destination marketing organizations (DMOs) when it is used efficiently to increase awareness and visits to destinations by a wide international audience, consequently decreasing the costs for marketing considerably, optimizing results, and partially replacing traditional methods of advertising used by tourists and tourism-related companies (Benevolo & Spinelli, 2018; Kim-Y. et al., 2009).

Although the adoption of a specific technology solution generally reduces operational costs and conversely increase competitiveness (WEF, 2017); it is pivotal to carry out complementary actions and investments in intangible (i.e., capacity building) and tangible (i.e., data infrastructure) resources to ensure the successful development of industries and sectors (Oliner et al., 2008). For instance, in the case of the regional tourism industry, strategic alliances via agreements and collaboration between public and private companies linked to telecommunications sectors may help achieve higher digital competitiveness by improving the quality of affordable mobile broadband internet services, consequently attaining ubiquitous connectivity within and across the nine cities and ensuring the operative functionality of the designed central website and on-site app proposed in this study. Undoubtedly, improvements in connectivity will ensure effective access to primary destination information through both public and private communication sources, consequently influencing travelers' decision-making process (Ab Karim & Chi, 2010).

Throughout the year, a more effective tourism promotion highlighting the regional pleasant spring-like weather and all adopted environmental sustainability practices (e.g., Ecolabel certification as discussed in Bučar et al. (2019)). This proactive action may encourage people to visit more frequently the Province of Tungurahua. Thus, these promotion initiatives via the proposed central website will allow all businesses associated with adventure, culture, culinary, and tourism to remain open throughout the year, gain greater visibility, attract

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

568

more end-customers and attain more benefits for each city, ultimately reducing pressure on the natural environments directly linked to the overtourism observed in Baños and Ambato during peak seasons (November through February). Although tourism and over-capacities problems are noticeably observed in developed cities of Global North (Fletcher et al., 2019; Lee et al., 2020), this detrimental impact on sustainable development of these two popular cities has been more commonly observed over the last decades.

Any new collaborative framework is successful only if it is efficiently and quickly implemented to avoid short-term restrictions and adaptation challenges (Kazandzhieva & Santana, 2019). Therefore, in this context, the proposed and similar research–practice-based models should be immediately applied to prevent the total collapse of the tourism industry due to the current negative impact of the COVID-19 pandemic (Čorak et al., 2021). Complementary to these actions, the regional tourism industry should find alternative ways of incorporating effective information sources to communicate constantly about the latest achievements, commitments, and progress made in biosecurity conditions to provide value-added products and services in touristic places extremely safe for travelers who may be eager to explore new places after the end of global and regional lockdowns. Particularly, as also observed in this study, the millennials group is more likely to explore other demographic regions (WEF, 2017); therefore, a special focus on this market segment should be implemented but without neglecting the needs of other tourist groups.

Finally, from a practical approach, the development of a research-practice-based model, technology-based solutions, and internet connectivity are still the key activities to be enhanced in this region, where tourism activities are among the most important revenue within the national tourism industry. In this context, these activities should be urgently implemented before evolving to develop and implement smart cities and smart tourism concepts (Boes et al., 2016).

6. Limitations and further work

Despite the findings from this study provided comprehensive insights into key problems observed and potential solutions for the regional tourism industry, it is imperative to know how SMEs would respond to new challenges and opportunities imposed by: (1) ongoing implementation of the proposed collaborative work approach and technology-based solutions. Here, SMEs are so essential for the local economy as for the economic growth of other developing countries, mainly through jobs generation (Afriyie et al., 2019; Burns, 2016); (2) resulting tourism growth versus genuine economic development (Pulido-Fernández et al., 2014); and (3) current global circumstances associated with COVID-19 outbreak.

Although the proposed approach incorporated ideas and suggestions from most of the tourism stakeholders, field data of host communities are still missing and will be unavailable until COVID-19 related lockdowns finish, and researchers can resume this specific part of the survey. Perceptions, viewpoints, attitudes of communities' residents, and resulting relationships between residents and tourists are fundamental to develop long-term sustainable tourism plans (Kim-G et al., 2020; Okazaki, 2008) and enhance both community residents' quality of life and visitors' quality of experiences (Chand, 2013; Jani, 2018); ultimately avoiding detrimental socio-economic, cultural and environmental impacts in destinations such as the Province of Tungurahua.

Finally, as interactivity between consumers and the use of tourism websites services can be measured to determine the effectiveness of a marketing strategy in visitors' destination choice and travel behavior (Kim-Y et al., 2009); further research could be conducted on the economic impact of the proposed central website on local tourism businesses, particularly on culinary tourism and accommodation sectors whose innovation, productivity, competitiveness, and market participation are affected continuously by ICTs (Aramendia-Muneta & Ollo-López, 2013; Jung et al., 2013).

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

569

7. Conclusions

The present empirical research helped develop a new organizational model for the tourism industry based on a research-practice collaboration approach, establishing new roles and responsibilities and activities/actions to be carried out by each stakeholder, and prioritizing the development of technology-based solutions (e.g., tailor-made central webpage and on-site travel App) with immediate application into tourism activities. The proposed collaborative work model is focused on Academia and industry practitioners as sources of research-based and experience-based knowledge, respectively. In contrast, regional and local governments would play a key role in supplying an attractive environment for national and international investment, appropriate tourist-related infrastructure, beneficial regulatory policies, promotion of domestic tourism, and creating alliances between public and private sectors, particularly with telecommunications sectors.

This study paves the way for long-term tourism programs, helps boost the number of visitors, and enhances the tourists' experience, consequently raising awareness and competitiveness of Tungurahua Province within the tourism market. These realities will contribute to positioning the Province of Tungurahua as a leading sustainable tourism destination and promoting the conservation and preservation of tangible and intangible regional heritage, ultimately leading to sustainable social, cultural, and economic opportunities for resident communities and other stakeholders.

Finally, the present study's relevant findings may help the social and economic reactivation of the regional tourism industry strongly affected by the ongoing health crisis (COVID-19) pandemic.

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Appendix A

Questionnaire: **Conducted to visitors**

SECTION 1. Sociodemographic visitor's profile

1. Age group
[ ] 18-24   [ ] 25-40   [ ] Over 40

2. Gender
[ ] Male   [ ] Female

3. Disability
[ ] Yes   Which one? [_____]
[ ] No

4. Residence area
[ ] Regional   [ ] Nacional   [ ] International

5. Travel mode
[ ] Own motorized vehicle (mainly cars and motorcycles)
[ ] Public transport (e.g. bus, taxis)
[ ] Eco-friendly options (e.g. bikes)

6. Main journey purpose
[ ] Cultural historic visit (Religious, and historic events, festival celebrations, parades, etc.)
[ ] Gastronomic visit (street food festivals, traditional restaurants)
[ ] Natural attractions
[ ] Friend visit
[ ] Family visit

7. Monthly income
[ ] >1000 USD   [ ] 400-1000 USD   [ ] <400 USD

8. Education level
[ ] Higher education   [ ] Less than higher education

9. Visitor's behaviour
Had previously visited the Province of Tungurahua
[ ] Yes   [ ] No
Number of previous visits to the Province of Tungurahua [_____]
Number of persons currently travelling with interviewed visitor [_____]
Length of stay (in nights) [_____]
City belonging to the Province of Tungurahua where you stayed longer [_____]
Number of cultural attractions including historic, religious, art, festivals, parades, sports and social events attended during the visit [_____]
Number of gastronomic attractions including street food festivals and traditional restaurants attended during the visit [_____]

10. Amount of money expected to be spent on leisure activities
[ ] >50 USD   [ ] 20-50 USD   [ ] <20 USD

11. Travel Frequencies (per year)
[ ] 1   [ ] 2   [ ] ≥ 3

12. Travel Preferences
[ ] Backpacker
[ ] Group travel
[ ] Self- organized trip
[ ] All-inclusive charter

TOURISM An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

570

SECTION 2. Tourism information

13. How did you find out about events taken place in the Province of Tungurahua? By:
(Select one or more options)

[_] Friends
[_] Relatives
[_] Social media (Facebook, Instagram, Twitter, blogs, etc.)
[_] Travel magazines
[_] Documentary
[_] Touristic Virtual Environment (including websites and Apps)

14. How easy was to find tourism information about the Province of Tungurahua?
Likert scale: 1[very difficult] to 5[extremely easy])

15. What was the main drawback when searching for primary information about the Province of Tungurahua?
(Select one or more options)

[_] Too many websites showing the same basic information
[_] Only a few websites showing the same basic information
[_] Lack of information at all

16. At what stage of your trip plan do you use most the following ITCs options?

Website.   [_] before [_] during [_] after
App.   [_] before [_] during [_] after

17. What type of virtual environment would you use most to improve your experience in the Province of Tungurahua?
(Select one or more options)

[_] Website providing real-time primary tourism information
[_] Website offering tourism products and services (i.e. online booking and transactions)
[_] App providing real-time primary tourism information
[_] App offering tourism products and services (i.e. online booking and transactions)

18. What are the most appreciated features by tourists when searching for tourism information about destinations?
(Select one or more options)

[_] Relevance
[_] Reliability
[_] Currency
[_] Accuracy
[_] Completeness

19. What type of information may it be important for tourists' decision-making process and their future visit intentions to the Province of Tungurahua?
(Select one or more options)

[_] Service and products providers (e.g. tourism-related businesses)
[_] Transportation schedules
[_] Accommodation
[_] Weather
[_] Cultural and educational activities (i.e. festivals, workshops, seminars, etc.)
[_] Touristic attractions (e.g. natural, historical and religious sites)
[_] Map of destination and surrounding areas (i.e. driving directions and road systems)
[_] Traffic
[_] Hospitals
[_] Banks

[_] Shopping area
[_] Restaurants
[_] Markets (i.e. traditional markets, artisans markets and supermarkets)
[_] Businesses certified by Accredited firms, mainly international organisations
[_] Travellers reviews and opinions

20. Would you be willing to do adventure activities (i.e. cycling down-hill on breath-taking trails, bungee jumping, both river rafting, and kayaking, mountain trekking and biking) or recreational activities (i.e. birding, phishing, trail hiking, camping, cycling tours, and horseback riding) if they were available during your trip to the Province of Tungurahua.

[_] Yes   [_] No

21. Which actions would you recommend to improve both the image and promotion of the Province of Tungurahua?
(Select one or more options)

[_] Improve regional connectivity
[_] Facilitate internet access
[_] Manage one official centralised website for the entire Province of Tungurahua rather than several homepages for each city
[_] Improve the quality of the audiovisual material uploaded to websites or social media sites
[_] Increase the activities and events during off-peak season
[_] Increase the number of businesses with tourism accreditation and certification

22. Did you have a positive tourism experience?

[_] Yes   [_] No

23. Would you encourage other people to visit the Province of Tungurahua?

[_] Yes   [_] No

23. Would you be willing to visit again the Province of Tungurahua?

[_] Yes   [_] No

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

TOURISM
An International Interdisciplinary Journal

571

Appendix B

Questionnaire: **Conducted to practitioners**

SECTION 1. General Information

1. Job Position
[_] General Manager   [_] HH.MM Manager
[_] Owner   [_] Attendant

2. Type of business
[_] Hospitality   [_] Food & Beverages
[_] Attraction park   [_] transportation
[_] Travel agency   [_] Resorts
[_] Museum, Galleries / exhibition center

3. Is your tourism business part of SMEs?
[_] Yes   [_] No

4. Operating time [_____] years

5. City / Town
[_] Ambato   [_] Baños   [_] Cevallos
[_] Mocha   [_] Patate   [_] Pillaro
[_] Pelileo   [_] Quero   [_] Tisaleo

SECTION 2. ICTs Infrastructure

6. From your experience, which are the main issues currently facing the regional tourism industry? (Select one or more options)
[_] Lack of efficient business organisational model
[_] Lack of clear roles and responsibilities for each tourism stakeholder
[_] Lack of tourism infrastructure (i.e. hotels, road systems, etc.)
[_] Deficient or inexistent technology infrastructure
[_] Lack of connectivity infrastructure deficient or inexistent technology infrastructure
[_] Too many requisites to start up with tourism activities
[_] Too many fees applied to tourism activities
[_] Lack of economic incentives to start up with new tourism activities
[_] Lack of projects where innovation and competeveness are the main drivers to improve the regional tourism industry
[_] Lack of capacity building programmes for practitioners and community to improve quality of tourism products and services currently offered
[_] Too many responsibilities rest with regional government

7. Does your business have a website?
[_] Yes   [_] NO

8. Do you promote your business through social media?
[_] Yes   [_] NO

9. Do you acknowledge that the use of technology has potential benefits for your tourist business?
[_] Strongly Agree   [_] Agree   [_] Undecided
[_] Disagree   [_] Strongly Disagree

10. Do you agree with the following statements?
[_] I am not prepared for ICTs adoption into my tourism business
[_] I need more technical education on ICTs before adopting this technology into my tourism business
[_] ICTs adoption among SMEs just creates an extra cost of having recourse to ICT specialists
[_] ICTs adoption among SMEs will require more investment in network infrastructure
[_] ICTs adoption may improve visibility and competeveness of SMEs related to the regional

11. Do you consider government policies have helped achieve sustainable tourism development plan in Tungurahua?
[_] Strongly Agree   [_] Agree   [_] Undecided
[_] Disagree   [_] Strongly Disagree

12. Do you consider there is a collaborative work among stakeholders to define marketing and positioning strategies?
[_] Strongly Agree   [_] Agree   [_] Undecided
[_] Disagree   [_] Strongly Disagree

13. Are you agree, the creation of an official centralized website and travel applications will be useful to provide tourism information about Tungurahua province?
[_] Strongly Agree   [_] Agree   [_] Undecided
[_] Disagree   [_] Strongly Disagree

14. Does your company have any accreditation or certification for tourism activities due to the high-cost involved?
[_] Yes   [_] NO
If, No, specific why?_____

15. Would you make any changes in the current business organisational model of the regional tourism industry?
[_] Yes   [_] No
If yes, specify the changes: _____

16. Would you incorporate the Academia within a new regional tourism industry model?
Likert scale: 1[strongly disagree] to 5[strongly agree])
[_] Yes   [_] No
Which stakeholder should it play the leading role in fostering the regional tourism industry?
[_] Government   [_] Practitioners   [_] Academia

17. What kind of solution would it help improve tourism industry in the Province of Tungurahua? (Select one or more options)
[_] Non-technology solution (i.e. changes of organisational model)
[_] Technology-based solution (i.e. use of ITCs and connectivity infrastructure)

18. How often do you update the information showed on the virtual platform implemented into your tourism business?
[_] Daily   [_] Weekly   [_] Monthly

19. Do the virtual platforms implemented into your tourism business have sophisticated functions for e-business?
[_] Yes   [_] No

20. Through your virtual platforms implemented, what type of businesses can you do?
[_] B2C, between businesses and individual consumers
[_] B2B, between businesses

21. Through your virtual platforms implemented, indicate the percentage of the total web sales?
[_____]

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

572

Appendix C

Questionnaire: **Conducted to Government**

SECTION 1. General Information

1. **Name:**_____

2. **Job position? :**
   [_] Director
   [_] Subdirector
   [_] Tourism Technician

3. **Who do you work for? :**
   [_] Local Government GAD (Gobierno Autónomo Descentralizado)
   [_] Provincial Government
   [_] Central Government

4. **Do you hold an academic degree related to the job you perform?**
   [_] Yes   [_] NO
   [_] Others _____

5. **City / Town**
   [_] Ambato   [_] Baños   [_] Cevallos
   [_] Mocha   [_] Patate   [_] Pillaro
   [_] Pelileo   [_] Quero   [_] Tisaleo

SECTION 2. Tourism issues

6. **From your experience, which are the main issues currently facing the regional tourism industry? (Select one or more options)**
   [_] Lack of efficient business organizational model
   [_] Lack of clear roles and responsibilities for each tourism stakeholder
   [_] Lack of tourism infrastructure (i.e. hotels, road systems, etc.)
   [_] Deficient or inexistent technology infrastructure
   [_] Lack of connectivity infrastructure deficient or inexistent technology infrastructure
   [_] Too many requisites to start up with tourism activities
   [_] Too many fees applied to tourism activities
   [_] Lack of economic incentives to start up with new tourism activities
   [_] Lack of projects where innovation and competiveness are the main drivers to improve the regional tourism industry
   [_] Lack of capacity building programmes for practitioners and community to improve quality of tourism products and services currently offered
   [_] Too many responsibilities rest with regional government, and evident lack of interest by other stakeholders

7. **Do you consider government policies have helped achieve sustainable tourism development plan in Tungurahua?**
   [_] Strongly Agree
   [_] Agree
   [_] Undecided
   [_] Disagree
   [_] Strongly Disagree

8. **Would you incorporate the Academia within a new regional tourism industry model?**
   Likert scale: 1[strongly disagree] to 5[strongly agree])
   [_] Yes   [_] No

9. **Which stakeholder should it play the leading role in fostering the regional tourism industry?**
   [_] Government
   [_] Practitioners
   [_] Academia

10. **Do you consider there is a collaborative work among stakeholders to define marketing and positioning strategies?**
    [_] Strongly Agree
    [_] Agree
    [_] Undecided
    [_] Disagree
    [_] Strongly Disagree

11. **Which of the following alternatives do you consider the most important to support employment and social participation?**
    [_] Innovation
    [_] Competitiveness
    [_] technology
    [_] labor laws

12. **Do you consider a radical change of the current business organizational model in order to develop better marketing strategies for regional tourist industry?**
    [_] Strongly Agree
    [_] Agree
    [_] Undecided
    [_] Disagree
    [_] Strongly Disagree

13. **Do you consider there is a gap in ICTs in the regional tourism, travel, and hospitality activities in Tungurahua?**
    [_] Strongly Agree
    [_] Agree
    [_] Undecided
    [_] Disagree
    [_] Strongly Disagree

14. **How do you consider the technology infrastructure in the Tungurahua province?**
    [_] Excellent
    [_] Very good
    [_] Good
    [_] Bad
    [_] Very Bad

15. **Is there any long-term sustainable development plan designed by government to foster the regional tourism industry?**
    [_] Yes   [_] No

16. **Do you think that Government has accomplished all goals to strengthen the regional tourism industry?**
    [_] Yes   [_] No

17. **Do you think that the current laws and regulations applied by Government has accomplished all goals to strengthen the regional tourism industry?**
    [_] Yes   [_] No

TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

573

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TOURISM
An International Interdisciplinary Journal

Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara
Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

574

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Oswaldo Paredes, Diego Melo, Adolfo Ricardo Guamán, Mario García, Fabricio Guamán-Guevara Innovative Solutions of Non-Technological and Technological Nature Needed to Improve Tourism Services, Tungurahua Province, Ecuador Vol. 69/ No. 4/ 2021/ 559 - 577

575

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Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

576

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TOURISM
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Innovative Solutions of Non-Technological and Technological Nature Needed
to Improve Tourism Services, Tungurahua Province, Ecuador
Vol. 69/ No. 4/ 2021/ 559 - 577

577