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RIAT

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Research paper

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The cellulose industry and its impact on the population: From the social to the biochemical

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Interamerican journal of Environment and Tourism

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Incidence of Covid-19 in the behaviour of tourists of the Coquimbo region

Incidencia del Covid-19 en el comportamiento del turista de la región de Coquimbo

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ABSTRACT

The objective of this paper was to analyze the incidence of Covid-19 in the behaviour of tourists in the Coquimbo region. The methodology had a quantitative approach, non-experimental design, descriptive type and cross section. The data were collected through a survey applied to 979 participants, whose statistical analysis included the application of the binary logistic regression. The results reveal changes in the tourist's travel behavior manifested in a greater concern for hygiene and safety. Tourists, post Covid-19, show a greater intention to find out about the destination, preference for visiting nearby places and less crowded (with a focus on nature, sun and beach tourism), and less intention to have contact with local residents. The multivariate analysis confirms the inverse and significant relationship between risk perception and the tourist's travel intention. It is concluded that post-Covid-19 tourism establishes a new profile of the tourist, more demanding, who demands strict hygiene and safety standards. Therefore, the challenge for tourism organizations is to work to restore confidence to visitors within the framework of a new travel culture.

Keywords: Covid-19, Tourism, Tourist behaviour, Journey Plan, Region de Coquimbo (Chile)

RESUMEN

El trabajo, de enfoque cuantitativo, diseño no experimental, tipo descriptivo y corte transversal, planteó por objetivo analizar la incidencia del Covid-19 en el comportamiento del turista de la región de Coquimbo. Los datos fueron recolectados mediante una encuesta aplicada a 979 personas, cuyo análisis estadístico incluyó la aplicación de la regresión logística binaria. Los resultados revelan cambios en el comportamiento de viaje del turista manifestados en una mayor preocupación por la higiene y la seguridad. Los turistas, post Covid-19, muestran una mayor intención por informarse sobre el destino, la preferencia por visitar lugares más cercanos (con foco en el turismo de naturaleza, sol y playa), el favoritismo por visitar áreas sin mucha afluencia de público y una menor intención de tener contacto con los residentes del lugar. El examen multivariante confirma la relación inversa y significativa entre la percepción de riesgo y la intención de viaje del turista. Se concluye que el turismo post Covid-19 establece un nuevo perfil del turista, más exigente, que demanda estrictas normas de higiene y seguridad. Por lo tanto, el desafío para las organizaciones turísticas consiste en trabajar para regresar la confianza a los visitantes en el marco de una nueva cultura del viaje.

Palabras clave: Covid-19, Turismo, Comportamiento del turista, Planificación de viaje, Región de Coquimbo (Chile).

INTRODUCTION

The sudden and extensive outbreak of the coronavirus (Covid-19) once again demonstrated the fragility and vulnerability of living in a globalized world. The virus that appeared at the end of 2019, in the city of Wuhan of the province of Hubei China, spread rapidly around the world, which led to the World Health Organization (WHO) declaring it a pandemic on 11 March 2020 (Félix & García, 2020). From that moment on, the countries adopted various health self-care strategies, such as the use of masks, hand washing, physical distancing, ventilation of spaces, and even confinement measures such as the establishment of quarantines and the closure of borders.

Chile, in line with the above, adopted the advices recommended by the WHO (Organización Mundial de la Salud, 2020), and the Ministry of Health established the Plan Paso a Paso (Step-by-Step Plan), a strategy that defines the mobility of people in the country, depending on the particular health situation of each area (commune) of the territory (Ministerio de Salud, 2020). These restrictions, as was predictable, seriously affected the tourism sector, and caused a gradual decrease in the flow of tourist arrivals to Chile. For example, Rivas et al. (2021) reported that between the months of July 2017 and July 2020, the arrival of tourists decreased from 500,000 to less than 2,000, that is, a fall of 99.6%.

Furthermore, it should be noted that different authors have analyzed and exposed the impact generated by crises, such as the current pandemic situation, on tourism (Zenker & Kock, 2020), the effects produced on the behavior of tourists (Hajibaba et al., 2015; March & Woodside, 2005; Paraskevas et al., 2013; Wen et al., 2005) and the relevance of providing safety to the visitor (Luders, Castillo & Gândara, 2016). In this way, the perceived risk can be understood as an important predictor of the tourist's behavior on their travel decision (Matiza, 2020) so it can modify a tourist's evaluation of a destination and their intention to travel (Carballo et al., 2017). It should be noted that within the field of tourism, the perceived risk is associated with a tourist's perception of uncertainty and the possible adverse results resulting from the consumption of travel and tourism offers (Adam, 2015; Liu et al., 2016). In this context, this research aimed to analyze the incidence of Covid-19 in the behavior of tourists in the Coquimbo region, one of the most important tourist destinations in Chile. The results are expected to provide useful information to support decision-making by companies and gover-

ment authorities, at a time of global health crisis, in which proximity tourism emerges as a viable alternative for the displacement of the travelers. And, in a scenario, where it is urgent to formulate effective strategies for the reactivation of the tourism sector, so heavily affected by the pandemic (Félix & García, 2020; Lucero & Gómez, 2021).

STUDY AREA

The Región de Coquimbo is located in the north of Chile, approximately between 29° 20' and 32° 15' south latitude. It has an area of 40,579.9 square kilometers, equivalent to 5.37% of the national territory. According to the 2017 Census, the population reached 757,586 inhabitants and a density of 46.23 inhabitants per square kilometer. The Region has three provinces and 15 communes, and the regional capital is the city of La Serena (see Table 1).

Table 1: Political-administrative division of the Región de Coquimbo

Province	Capital	Commune
Choapa	Illapel	Canela
		Illapel
		Los Vilos
		Salamanca
		Andacollo
Elqui	La Serena	Coquimbo
		La Higuera
		La Serena
		Paihuano
		Vicuña
Limarí	Ovalle	Combarbalá
		Monte Patria
		Ovalle
		Punitaqui
		Río Hurtado

The Región de Coquimbo has a set of attributes that make it especially suitable for tourist activity and that have positioned it as one of the most important tourist destinations in the country (González & Morales, 2011). In general, the region has different attractions that differentiate it in the national context, exhibiting comparative advantages in the coastal sector as it has an extensive coastline with various beaches suitable for bathing, fishing, resting, and water sports. It also

offers a unique geographic set with its transversal valleys, in which its scenic and cultural attractions and climatic conditions stand out (Subsecretaría de Turismo Chile, 2017).

Some of the featured tourist places and attractions in the Coquimbo region are: Avenida Costanera, Barrio Inglés, Biblioteca Regional Gabriela Mistral, Casa de Gabriela Mistral, Casino de Juegos, Caleta de Hornos, Centro Cultural Islámico Mezquita Mohhamed VI, Cruz del Tercer Milenio, Domo museo de sitio Cultura Las Ánimas, Estadio Bicentenario Francisco Sánchez Rumoroso, Faro de La Serena,

Fuerte de Coquimbo, Hacienda el Tangué, Iglesia San Pedro, Iglesia San Francisco, Iglesia Santo Domingo, Isla Damas, Jardín Japonés, Mirador de Los Navegantes, Museo Arqueológico de La Serena, Observatorio astronómico La Silla, Parque Nacional Fray Jorge, Parque Pedro de Valdivia, Reserva Nacional del Pingüino de Humboldt, la Ruta de las Estrellas (observatorios turísticos) y el Valle del Elqui. Also, the region stands out for the beaches of Peñuelas, La Herradura, Totoralillo, Las Tacas, Morrillos, Las Mostazas, Guanaqueros, Playa Blanca and Tongoy (National Tourism Service, 2018). See Figure 1.

Figure 1. Tourist places of Región de Coquimbo (Chile)



Playa de La Serena



Observatorio Cerro Mayu



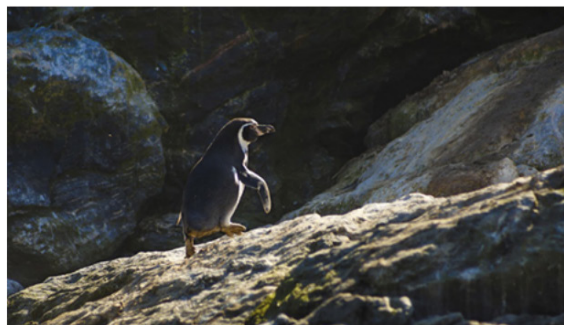
Iglesia de Nuestra Señora del Rosario de Pisco Elqui



Museo Histórico Gabriel González Videla



Valle del Elqui



Reserva Nacional del Pingüino de Humboldt

Source: Servicio Nacional de Turismo (2018), Subsecretaría de Turismo Chile (2017)

METHODOLOGY

The study had a quantitative approach, non-experimental design, descriptive type and transectional scope. It collected the data through an online survey applied to 979 people over the 18 years old residing in the Coquimbo Region (Chile) between December 15, 2020 and January 10, 2021.

The questionnaire was compound of 42 questions, organized into three sections. The first section was intended to characterize the sample in terms of sex, age, education, occupation, income, and place of residence. The second part grouped questions related the perception of the pandemic (confidence and expectations). And, the third item referred to the fundamental aspects of the study, since it made inquiries related to travel issues, risk perception and tourism safety. The second and third section of questionnaire were based on the works developed by Nazneen et al. (2020) and Dryhurst et al. (2020), respectively.

In particular, in the second section of the questionnaire, the respondent indicated on a scale of 1 to 5 how likely they believed that the question asked would occur in each question asked (5 = extremely likely, 1 = not likely). While, in the third section, the person indicated on a scale from 1 to 5 their degree of agreement with each statement made (5 = totally agree and 1 = totally disagree).

The reliability of the instrument was measured through Cronbach's alpha coefficient, which demonstrated the suitability of the scale used, both globally (alpha = .92) and for each dimension evaluated: perception of the pandemic (alpha = .71) and predictors of tourist travel, risk and safety (alpha = .92).

Data were analyzed using descriptive statistics and hypothesis tests (association tests). In addition, two binary logistic regression models were used, which allowed us to examine, given the pandemic context, the variables with the highest incidence on the tourist's intention to travel and the intention to reduce the duration of travel

and tourism. The explicative variables of the model included characteristics of the tourist profile (sex, place of residence, age, education, work and income), perception regarding Covid-19 (severity of the virus and the probability of contracting coronavirus), opinion on the measures and people and institutions linked to the pandemic (trust in health personnel, satisfaction with government measures, and assessment of self-care actions), and expectations of the country's recovery and travel safety.

Binary logistic regression allows the evaluation of multiple independent variables (metric and non-metric) on a non-metric dichotomous (binary) dependent variable (Hair et al., 2014). The general equation used was the following:

$$P = \frac{1}{1 + e^{-(\beta_0 + \sum_{i=1}^n \beta_i X_i)}} \tag{1}$$

In the equation, the dependent variable (P) represents the probability (intention) to travel in the next twelve months (or the possibility of reducing the duration of travel and tourism), while the explicative variables (Xi) are compound of aspects sociodemographic and by elements of travel, risk and safety of the tourist, which were dichotomized (0 = absence of the variable, and 1 = presence of the variable of interest).

The fit and predictive power of the model were measured using the Hosmeer and Lemeshow test, Nagelkerke's R-square, Cox and Snell's R-square, and McFadden's pseudo R-square. Finally, it should be noted that all the analyzes were obtained through the IBM SPSS Statistics version 24 software for Windows.

RESULTS

Sample Profile

The profile of the study sample is summarized in Table 2.

Table 2: Sample profile (n = 979)

Criteria	Segment	Percentage
Sex	Woman	55.5
	Man	44.5
Age	Between 18 and 25 years old	33.8
	Between 26 and 35 years old	24.1
	Between 36 and 45 years old	16.8
	Between 46 and 55 years old	16.5
	Over 55 years old	8.8
Education	Primary	3.5
	High school	39.2
	Undergraduate (Institute)	26.9
	Undergraduate (University)	27.8
Month Income (CLP)	Postgraduate	2.6
	None	20.7
	Less than 300.001	21.3
	Between 300 001 and 700 000	31.4
	Between 700 001 and 1 200 000	17
	Between 1 200 001 and 2 500 000	8
Occupation	Over 2 500 000	1.6
	Housework	7.3
	Retired	2.5
	Does not work or study	0.8
	Businessman/businesswoman	5.3
	Unemployed	5.7
	Public official	8.9
	Dependent worker	30.2
	Independent worker	10.6
	Student	28.7
Residence commune	La Serena	37.5
	Coquimbo	31.3
	Vicuña	8.4
	Ovalle	8.3
	Other	14.5

Table 2 shows that the respondents were, for the most part, women (56%), aged between 18 and 35 years (58%), with an income lower than CLP \$ 700,001 (53%), active in employment (55%), with higher level studies (55%) and residents of the La Serena - Coquimbo conurbation (69%). Perception of the COVID-19

The purpose of the examination of the tourist's perception of the pandemic was to answer three main questions: how likely it is to be affected by the virus (directly or indirectly), trust in relation to different stakeholders and relevant sectors, and their opinion in relation to effectiveness of the measures applied to face the pandemic (personal and external). See Table 3.

The results, summarized in Table 3, reveal that the largest proportion of respondents think that, over the next six months, Covid-19 is likely to affect them (67%) or affect their friends and family (73%), and that the country's situation will worsen with the pandemic (93%). In addition, two out of every three tourists consider that it would be serious or very serious for them to get sick from the coronavirus (66%).

The respondents, as to the trust placed in the authorities and responsible for the control of the pandemic, indicated having a high level of trust with doctors and nurses (71%), and scientists (50%). But they said they have a high degree of distrust with the country's politicians (87%).

Finally, most tourists consider that the self actions they are taking make a difference in controlling the pandemic (54%) and that it is important to do things for the benefit of other people (59%). But, the evaluation of the effectiveness of the government's response to face the pandemic was very low (11%). It should be noted that respondents were also asked whether their income had decreased due to the health crisis, and only one in five indicated that their income was not affected (21%). However, when relating this response to the level of income, it was noted that it is the segment with the lowest income who were most affected (28% indicated that it affected them a lot), while people with average income (CLP 700 000 and CLP 1 200 000) the least affected (12% indicated that it affected them a lot). See Figure 2.

Figure 2. Percentage decrease in income by monthly income level (n = 979)

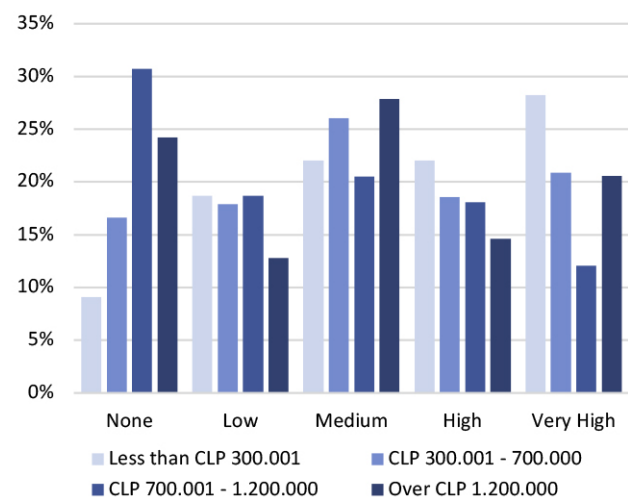


Table 3. Perception of the COVID-19 (n=979)

Question	Low	Medium	High
How likely do you think Covid-19 will affect you or affect you again during the next 6 months?	32.8	29.7	37.5
How likely do you think it is that your friends and family will be directly affected by Covid-19 in the next 6 months?	27.0	33.1	39.9
How likely do you think the country's situation will be worsened by Covid-19 in the next 6 months?	6.8	18.7	74.5
How serious would it be for you to get sick with the coronavirus?	15.6	18.7	65.7
How much do you trust the country's politicians?	86.9	8.3	4.8
How much do you trust scientists?	16.3	33.6	50.1
How much do you trust doctors and nurses?	9.6	19.9	70.5
To what extent do you feel that the personal actions you are taking to try to limit the spread of coronavirus make a difference?	17.1	28.6	54.3
How effective do you think the official government response has been in dealing with the pandemic?	60.7	28.1	11.2
To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?	13.6	27.7	58.7

Note: Low=Not at all likely or Not so likely, Medium=Somewhat likely, High=Very likely or Extremely likely

The bivariate analysis between the perception of the severity of becoming ill with coronavirus and the characteristics of the tourist profile revealed significant associations with sex [$\chi^2(4, N = 979) = 18.937, p < .001$], age [$\chi^2(20, N = 979) = 78.227, p < .001$] and occupation [$\chi^2(32, N = 979) = 64.026, p < .001$]. In particular, those who believe that getting sick from coronavirus is the most serious are women, the oldest age groups, retirees and those who carry out housework or work independently.

A similar response was registered when people were asked about how likely they think they will be affected by Covid-19 during the next six months, since a significant and direct association was found between this question and the age of the respondent [$\chi^2(20, N = 979) = 41.258, p = .003$] and the income level [$\chi^2(20, N = 979) = 32.644, p = .037$].

Regarding the level of trust with politicians, a significant association was evidenced with age [$\chi^2(20, N = 979) = 35.38, p = .018$] and income [$\chi^2(20, N = 979) = 37.839, p = .009$]. The findings show that trust is lower among the youngest and those with the lowest income. These results were consistent with the responses obtained to the question, how effective do you think the official government response has been in facing the pandemic? which also showed a relevant and direct association with the respondent's age [$\chi^2(20, N = 979) = 35.742, p = .016$] and income [$\chi^2(20, N = 979) = 49.984, p < .001$].

Furthermore, educational level showed a significant association with trust in health personnel (doctors and nurses) [$\chi^2(16, N = 979) = 40.782, p < .001$] and scientists [$\chi^2(16, N = 979) = 35.148, p = .004$]. In addition, regarding this last aspect (trust

in scientists), a significant and direct association with visitor income was also revealed. [$\chi^2(20, N = 979) = 55.023, p < .001$].

Otherwise, regarding the perception of the effectiveness of the personal actions taken to face the pandemic, significant associations with age were identified [$\chi^2(20, N = 979) = 42.118, p = .003$], the occupation [$\chi^2(32, N = 979) = 47.502, p = .038$] and the income [$\chi^2(20, N = 979) = 41.473, p = .003$]. The above indicates that it is the older people, inactive workers (retirees, owners and those who do not work or study) and those who have higher incomes who perceive that their actions make a difference and limit the spread of the coronavirus.

Finally, regarding expectations about the future of Chile in the face of the pandemic, no significant associations were observed according to the profile of the tourist, which shows a general pessimistic perception (shared vision among participants).

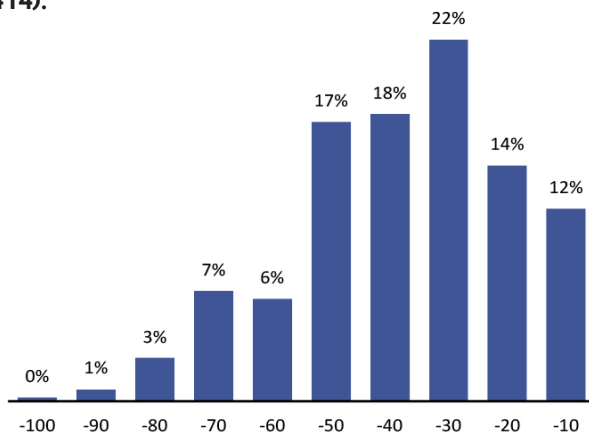
Travel preferences, perception risk and predictors of travel intention

Travel preferences.

Most respondents indicated that before COVID-19 they were scheduled to visit national destinations (77%), and that they do not consider that their plans will be affected by the pandemic (51%). As for the reason for their visit, tourists reported that their next trip will be mainly oriented to enjoy nature tourism (39%), sun and beach (34%), adventure (9%) and cultural (9%). In addition, they indica-

ted that they will travel mostly accompanying of family and friends (85%) and that they plan to spend the same (41%) or less (48%) than before the pandemic.

Figure 3. Travel expense decrease percentage (n = 414).



It's interesting to note that, although there is an inverse and significant relationship between the level of estimated spending and the level of decrease in income, this association was very low ($r = -.11$ and $p < .001$). Therefore, it could be expected that the negative impact of the evolution of personal income, as a result of the pandemic, will not have a strong impact on traveler expenses.

Tourist risk perception.

Table 4 shows that due to Covid-19 (66%) there is a high perception of insafety in the traveler and this will lead them to make changes in their travel plans for the next year, such as: minimize travel plans (76 %); avoid traveling to cities with a large influx of people (65%); completely avoid leisure travel (51%); reduce the length of travel and tourism (69%); travel only as a family (69%), and following the self-care measures against Covid-19, such as the use of masks and disinfectants (92%).

Table 4. Tourist risk perception (n=979)

No	Affirmation	Low	Medium	High
1	Travelling is unsafe because of Covid-19	16.4	17.9	65.7
2	Covid-19 greatly reduced my travel plans for the next 12 months	12.4	12.1	75.6
3	After Covid-19, I prefer avoid travelling to crowded big cities in the next 12 months	16.9	17.8	65.4
4	After Covid-19, I prefer completely avoid travelling for leisure in the next 12 months	25.1	23.7	51.2
5	After Covid-19, I prefer take masks and sanitizers	4.3	4.2	91.5
6	After Covid-19, I prefer to reduce the length of travel and tourism in the next 12 months	10.0	21.0	68.9
7	Covid-19 reduced possibility of travelling with groups	7.5	13.4	79.2
8	After Covid-19, I only prefer to travel with family	13.5	17.4	69.2
9	After Covid-19, I prefer to stay in high quality hotels	24.5	31.5	44.0
10	After Covid-19, I prefer to eat food in high quality restaurants	24.7	31.4	43.9
11	After Covid-19, my need for hygiene while travelling is changed	6.4	7.2	86.4
12	After Covid-19, I care more about hygiene and safety of the public transportation	5.6	9.5	84.9
13	After Covid-19, I care more about hygiene and safety of the public recreation sites	5.6	8.4	86.0
14	After Covid-19, I care more about hygiene and safety of the hotels	6.4	13.4	80.2
15	For my next trips I will look for more detailed information about the destination	7.9	10.6	81.5
16	In my next trips I will take out travel insurance	31.5	30.9	37.6
17	In my next trips I will visit nearby destinations (within the country)	12.5	22.6	65.0
18	In my next trips I will request advice from travel agencies	41.6	30.0	28.4
19	Due to the pandemic, my concern regarding the security measures of the destination has increased	7.3	11.4	81.3
20	Due to the pandemic, my concern about knowing the diseases at the destination has increased	13.3	18.1	68.6
21	Due to the pandemic, my interest in learning about the health system of the destination has increased	8.8	12.9	78.3
22	Despite the pandemic, I will continue to try the local gastronomy as before	29.2	23.5	47.3
23	Due to the pandemic, I will prefer to eat at well-known food chains	26.9	30.2	42.9
24	I will continue to hire the same types of accommodation that I used before the pandemic	23.3	26.8	49.9
25	Due to the pandemic, I will have less contact with the residents of the place visited	9.8	18.3	71.9
26	Today I intend to travel less than I did before COVID-19	17.0	21.1	61.9

Note: Low=strongly disagree or disagree, Medium=neutral, High=agree or strongly agree

In addition, travelers indicated that hygiene requirements changed (86%), and that today they care more about the hygiene and safety of public transport (85%), public recreation sites (86%) and hotels who visit (80%). Also 44% of tourists indicated that given the pandemic today they prefer to stay in high quality hotels and restaurants.

Another important effect that was detected in the behavior of the tourist was a greater concern for seeking more detailed information about the destination (82%), which means a greater concern for knowing the safety measures (81%), the health system (78 %) and local diseases (69%).

Also, due to the pandemic, a lower intention to travel was found in tourists (62%), a greater preference for visiting nearby destinations (65%) and a lower predisposition to have contact with the residents of the place visited (72%). Further, on the issue of the accommodation and food, only half of those respondents indicated that they will continue to use the same types of accommodation that they used before the pandemic (50%), and that, despite the crisis, they will continue to trying the local gastronomy as before (47%). In addition, a significant percentage of tourists indicated a high preference for eating in well-known food chains (43%).

Predictors of travel intention.

Two regression analyzes were applicated in order to identify which variables operate as predictors of the tourist's intention to travel and the intention to reduce the duration of travel and tourism. The summary of the results obtained is illustrated in Table 5.

The findings of the first model executed reveal that the

probability of traveling increases when the tourist is male, young (under 36 years old), without higher education and high income. It also contributes to increasing the intention to travel when the person perceives that traveling is safe, when they feel that the personal actions they are taking to try to limit the spread of the coronavirus do not make a difference, and when they consider that there is little probability of getting sick from Covid-19. In particular, the predictor variables with the greatest impact, in decreasing order, are: Perception of security (3.7), educational level (1.7), income (1.7), age (1.5), contribution of self-care (1.5), sex (1.4) and the probability of infection (1.3).

Examining the results of the second regression model reveals that the probability that a tourist does not decide to reduce the duration of travel and tourism would occur when the person is male, with a high income level, when the person perceives that traveling is safety, when you consider that the personal actions you are taking to try to limit the spread of the coronavirus do not make a difference, and when the country's recovery expectations are positive. The contribution of each predictor variable, from highest to lowest, is as follows: perception of travel safety (6.1), contribution of self-care (1.7), age (1.6), expectations of the country (1.5) and income level (1.4).

The contrast of both statistical models allowed the identification of four variables that are important both to explain both the tourist's intention to travel and the preference to maintain or increase the duration of travel and tourism. These factors make it possible to define the profile of said tourist as that of a young person (under 36 years old), with a high monthly income level (greater than CLP 700,000),

Table 5. Binary logistic regression models (n = 979)

Variable	Model 1 (y = travel intention)			Model 2 (y = reduce travel)		
	OR	Sig.	IC (95%)	OR	Sig.	IC (95%)
Sex (man)	1.36	.034*	[1.02, 1.80]			
Age (less than 36 years old)	1.48	.009**	[1.11, 1.99]	1.58	.005**	[1.15, 2.19]
Superior level education (not)	1.68	.001**	[1.25, 2.27]			
Income (> CLP 700.000)	1.66	.004**	[1.18, 2.34]	1.42	.048*	[1.00, 2.02]
Contribution of self-care (low)	1.46	.009**	[1.10, 1.94]	1.72	.001**	[1.26, 2.35]
Traveling safe perception (yes)	3.68	.000***	[2.76, 4.90]	6.05	.000***	[4.45, 8.21]
Probability of getting infected (low)	1.30	.087+	[0.96, 1.74]			
Country expectations (positive)				1.53	.015*	[1.08, 2.15]
Constant	-2.05	.000***		0.10	.000***	
Hosmer and Lemeshow test	$\chi^2=4.22$	Sig.= .837		$\chi^2=15.25$	Sig.= .054	
R2 de Cox y Snell	.133			.188		
R2 Nagelkerke	.181			.264		

OR = Odds ratio; +p < .10; *p < .05; **p < .01; ***p < .001

who considers that traveling is safe and who perceives that the personal actions that are taking to try to limit the spread of the virus are not significant. Otherwise, it could be established that the people who will be most affected by their travel intention and preferences are adults over 35 years of age, with low incomes, who consider that traveling is not safe and who feel that their self-care actions (such as social distancing, use of masks, etc.) are essential to combat the pandemic.

DISCUSSION AND CONCLUSION

Firstly, regarding the tourist's perception of the pandemic, it is revealed that there is pessimism regarding the overcoming of the health crisis and the lower probability of contagion of COVID-19. In this area, those who believe that getting sick from coronavirus is the most serious are women, the oldest age groups, retirees and those who do housework or work independently. These findings assume that people who work as salaried employees (public and private sector) or who are students perceive a lower risk of becoming seriously ill given the security protocols present in their organizations.

On the other hand, there is a positive assessment of the work carried out by health personnel and scientists to face the crisis, but not by politicians and the effectiveness of their measures. Also, most tourists value the personal effort they are making to control the pandemic and consider it important to do things for the benefit of others (prosociality).

Second, the results confirm that the pandemic negatively affected people's income, with the lowest-income segment being the most affected. This evidences the need to establish and promote social aid programs that allow the most vulnerable sectors to enjoy tourism.

Thirdly, in terms of travel preferences, proximity tourism stands out with a focus on nature, sun and beach tourism. Which makes sense, when understanding the situation of confinement to which the population has been exposed. For the rest, tourists indicated that they will travel mostly accompanied by family and friends, that they plan to spend the same or less than they did before the pandemic (between 20 and 50% less), and that they will continue to respect self-care measures (such as the use of masks and disinfectants).

From the analysis of the determinant factors in travel planning, the study highlighted the intention of the tourist to learn more about the destination and to visit nearby destinations (within the country). However, the acquisition and advice of services in travel agencies does not arouse the same interest in this post-pandemic scenario, nor does the contracting of travel insurance.

Fourth, there is a high perception of insafety of travel due to Covid-19. This is manifested in the reduction of the duration of the trips, the favoritism for visiting places without much influx of tourists and a lesser intention to have contact with the residents of the place visited.

Along the same lines, new concerns are evident, with emphasis on the destination's safety measures, concern about knowing the endemic diseases of the place increases and interest in learning about the destination's health system increases. This is also expressed in a greater concern for the hygiene and safety of tourist services, such as accommodation, gastronomy, recreation sites and public transport. Indeed, a large part of tourists indicated that given the pandemic today they prefer to stay in high-quality or recognized hotels and restaurants.

Fifthly, even when four determining variables were identified in the tourist's intention to travel and their preference to maintain or increase the duration of visits and tourism, the perception of risk is the predictor with the highest incidence. Thus, to the extent that people perceive that the risk of traveling is low, the intention to travel will increase (inverse relationship).

Regarding the other significant variables (age, income and perception of the contribution of self-care measures), it is revealed that there is a greater probability and intention to travel in young people, with higher income and who do not consider that their self-care actions (such as confinement, social distancing, use of masks, etc.) are essential to combat the pandemic.

This situation denotes that to the extent that people perceive that the risk of traveling is low, the intention to travel will increase (Hajibaba et al., 2015). Therefore, even when there are incident sociodemographic variables, the role of perceived risk is the determining variable for the traveler, as has recently been exposed by other authors (Karl & Schmude, 2017; Kim et al., 2021).

In this way, it is concluded that the new post-Covid-19 tourism establishes a new profile of the tourist, more demanding, which will demand strict hygiene and sanitation standards of spaces. Therefore, the challenge for tourism organizations is to adopt these recommendations and work together in order to restore confidence to visitors within the framework of a new travel culture.

Finally, for future studies it is suggested to replicate the research in order to corroborate the findings obtained and measure its evolution over time (longitudinal study). It would also be relevant to examine the incidence of other independent variables on the intention to travel, especially of psychographic factors. It is also recommended to analyze the tourist's perception of risk, a determining variable of the study, from a multidimensional perspective, using multivariate techniques (such as the structural equation model). Moreover, it would be interesting to develop this study in other tourist regions of Chile, to evaluate similarities and differences, both in the tourist profile and in the variables determining their behavior and intention to travel.

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Monocultures in the Vinces river basin (Ecuador) and their relationship between the supply of water for irrigation

Monocultivos en la cuenca del río Vinces (Ecuador) y su relación con la oferta de agua para riego

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ABSTRACT

The need to satisfy the food requirements of the Ecuadorian population added to the public policy of increasing the income of foreign exchange to maintain the economic model of the country through the export of agricultural products has increased the establishment of several monocultures in large areas of land, significantly increasing the use of water for irrigation of these crops. The present work aims to analyze the change in time and space of the use of agricultural land, the expansion of its border and the pressure on the water resource exerted by irrigation in the Vinces River basin in accordance with the water concessions granted by the governmental authority with competence in the basin. This research involved the collection of digital geoinformation, its subsequent processing in Geographic Information Systems, tabulation of official statistical information and verification in the field. The conceptual integration of Integrated Water Resources Management allows us to advance in the understanding of the complexity and difficulties to achieve a balance between the natural and social processes that affect us. The main agricultural coverage of the Vinces river basin represented by banana, cocoa and oil palm monocultures showed a remarkable and progressive temporo-spatial change (expansion of the cultivated area) and increase of the water pressure of the basin for irrigation in the long dry period. The historical concessions of water for irrigation extended in the Vinces river basin by the environmental authority do not reflect the true volume used by the agricultural sector in the summer stage, which is demonstrated by relating the volumes of water concessioned, the hectare areas of crops planted and the real water requirements for the aforementioned crops. to achieve maximum productivity.

Keywords: Agricultural products, Use of water, GIS, Irrigation, Vinces river basin

RESUMEN

La necesidad de satisfacer los requerimientos alimentarios de la población ecuatoriana sumada a la política pública de incrementar el ingreso de divisas para mantener el modelo económico del país a través de la exportación de productos agrícolas ha incrementado el establecimiento de varios monocultivos en grandes extensiones de terreno, aumentando significativamente el uso de agua para el riego de estos cultivos. El presente trabajo tiene como objetivo analizar el cambio en el tiempo y espacio del uso de suelo agrícola, la ampliación de su borde y la presión sobre el recurso hídrico que ejerce el riego en la cuenca del río Vinces de acuerdo con las concesiones de agua otorgadas por la autoridad gubernamental con competencia en la cuenca. Esta investigación implicó la recolección de geoinformación digital, su posterior procesamiento en Sistemas de Información Geográfica, tabulación de información estadística oficial y verificación en campo. La integración conceptual de la Gestión Integrada de los Recursos Hídricos nos permite avanzar en la comprensión de la complejidad y dificultades para lograr un equilibrio entre los procesos naturales y sociales que nos afectan. La principal cobertura agrícola de la cuenca del río Vinces representada por los monocultivos de banano, cacao y palma aceitera mostró un notable y progresivo cambio temporo-espacial (expansión del área cultivada) y aumento de la presión hídrica de la cuenca para riego en el largo período seco. Las históricas concesiones de agua para riego otorgadas en la cuenca del río Vinces por parte de la autoridad ambiental no reflejan el verdadero volumen utilizado por el sector agropecuario en la etapa estival, lo cual se demuestra al relacionar los volúmenes de agua concesionados, las hectáreas de cultivos sembrados y el real requerimientos de agua para los cultivos antes mencionados. para lograr la máxima productividad.

Palabras clave: Productos agrícolas, Uso del agua, SIG, Irrigación, Cuenca del río Vinces

INTRODUCTION

Rapid population growth and growing international demand for tropical products have led to the conversion of large areas of land for intensive agricultural production of various monocultures in Ecuador. For Gudynas (2013) the expansion of monocultures in regions of the world implies an exploitation of natural resources in large volumes or high intensity, essentially oriented to the export of raw materials without processing or with limited processing. The expansion of monoculture for export in Latin American countries is an example of the "extractive activities" or "extractivism" that neoliberalism promoted from the nineties (Gudynas, 2013; Seoane, 2013). In this way, transnational corporations received multiple incentives from the State on the assumption that they constitute the fastest route to economic progress (Svampa, 2009). In practice, the commodification and private appropriation of natural assets in territories with deficit environmental legislation was given way (Silvetti, Soto, Cáceres and Cabrol, 2013).

In Ecuador, agricultural production in the 1920s and 1930s was dominated by cocoa and from the 1950s to the present, bananas have been the most important agricultural export product. The area devoted to these export crops has been increasing, so that between 1980 and 2000 the harvest area has increased, reaching 165,000 hectares in bananas and 433,000 hectares for cocoa (MAGAP, 2012). In Argentina in the periods between 1990/1991 and 2011/2012, of the 14.4 million hectares that were incorporated into production nationwide, 95% were dedicated to soybean cultivation (Zeolla, 2013). Soybean production went from an implanted area of 5.9 million hectares to an implanted area of 19.7 million hectares. In Costa Rica, the cultivated area of pineapple went from 12,500 hectares in 2000 to 42,000 hectares in 2012 (SEPSA, 2001; 2013). Although the calculations of several environmental organizations show that the hectares dedicated to pineapple are much higher than the official figures and the expansion continues without adequate planning by the State (Chacón, 2012).

The Guayas River basin is the largest hydrographic basin of the Pacific coast of South America, it is divided into seven sub-basins, of which the sub-basin of the Vinces river stands out for its wide altitudinal gradient and high agricul-

tural productivity, which make it up in the north part of the provinces of Santo Domingo de los Tsáchilas and Cotopaxi of the Sierra region and part of the province of Los Ríos in the coastal region. The basin of the Guayas River is formed by the confluence of its main rivers, the Daule and Babahoyo and their respective tributaries, draining a total area of 34,000 km² distributed among various ecosystems that include mangrove areas, dry and humid forests, Andean paramo and territory used for agricultural activities.

The influence of the basin on Ecuadorian territory is very important: in 2010 the Guayas River basin covered 380,840 hectares of irrigated land, being 57% of the irrigated agricultural area of Ecuador (CISPDR, 2014; CISPDR, 2015). The basin is under a humid tropical system comprising a rainy season from December to May and a wet one for the remaining months. There are variations in precipitation from the north (2,900 to 3,100 mm) to the south (300 to 700 mm) (CISPDR, 2015), the Guayas basin within the national agricultural production includes the most important crops of the region such as rice (96%), bananas (68%), sugar cane (97%), corn (55%), café (33%) and palm oil (19%) (MAGAP, 2015). Agricultural land covers 49% of the Guayas River basin, followed by forests (29%) and pastures (13%) (Frappart et al., 2017). The Guayas river presents an annual discharge of 30 billion m³ of water, which would make available 8,847 m³/hb/year, higher than the world average of 6,783 m³/hb/year (INOCAR, 2010).

The population in Ecuador has grown from 4.5 million inhabitants in 1960 to 14.9 million inhabitants in 2010 (World Bank, 2018), as a consequence anthropogenic activity such as urban construction, industry, agriculture, aquaculture and deforestation have intensified (Damanik-Ambarita et al., 2018). Intensive and continuous grazing, a common practice in the Guayas river basin has shown negative impacts on water quality, reducing riparian vegetation, modifying channels and streams, increasing runoff and erosion as well as sedimentingumping (Raymond and Vondracek, 2011).

The objective of this research is to analyze the tempo-spatial change of the use of agricultural land and the expansion of its border in the Vinces River basin during

the period 1990-2014 due to the presence of the main agricultural monocultures in the area and the demand for water for irrigation by the same agricultural crops according to the water concessions granted by the governmental authority with competence in the basin.

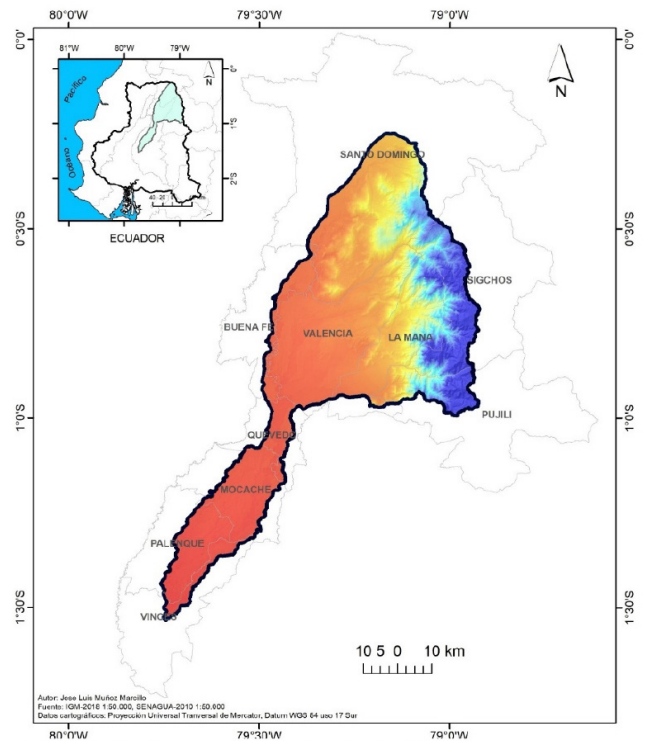
MATERIALS AND METHODS

Study area

The Vinces river basin is a sub-basin of the Guayas river basin that extends between the parallels $00^{\circ} 14' S$, $02^{\circ} 27' S$ and the meridians $78^{\circ} 36' W$, $80^{\circ} 36' W$, covering the partial or total territories of eight of the twenty-four Ecuadorian provinces: Guayas, Los Ríos, Manabí, Santo Domingo de los Tsachilas, Cotopaxi, Bolívar, Chimborazo, Cañar. In turn, the provinces of Guayas and Los Ríos together represent 48% of the area of the basin and 72% of its population. The total area covers approximately 32,219 km² (Fig. 1). In addition to the Vinces river basin, the Guayas river basin is composed of 6 other sub-basins (SENAGUA, 2009), which are from north to south the sub-basins of the Daule, Macul, Babahoyo, Juján and Yaguachi rivers (Fig. 1).

The Vinces River basin is located from the north-eastern sector to the center of the Guayas River basin, extending for 426,800 hectares and runs 267.96 km away in its main water axis following a north-south direction becoming an important part of the Guayas river basin. About 57% of the surface of the province of Los Ríos, territory of the Ecuadorian coast eminently agricultural with presence of tropical and subtropical export crops such as abaca, rice, bananas, coffee, cocoa, corn, oil palm among others. The basin of the River Vinces takes its name from the River Vinces which crosses it in a north-south direction. Río that takes different names along its route, in such a way that in the northern part between the cantons Santo Domingo de Los Tsachilas and San Jacinto de Buena Fe is called Baba River and from there to the south of the basin takes the name of the canton through which it crosses, so we have what is called, Quevedo River, Mocache River and Vinces River. The Quevedo River is formed from the convergence of three rivers, these being the Baba, Lulo and San Pablo rivers (Fig. 1).

Figure 1. Study area: Vinces river basin (Ecuador).



The determination of the change in the agricultural cover of the Vinces River basin was made from the compilation of land use cover studies generated by the Ministry of Agriculture and Livestock (MAG) and the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP) for the years 1980, 2002 and 2014. The 1980 land use and land cover map required a process of digitization and reprojection to be integrated with the land use covers of 2002 and 2014, all carried out in a Geographic Information Systems (GIS) environment using ArcGIS 10.4.1 software.

The determination of the demand for water for irrigation in the Vinces River basin was carried out based on the analysis of the concessions granted to the users of the basin by the Secretariat of Water (SENAGUA) in recent decades. Data were also taken from the Regional Hydraulic Plan of the Guayas Hydrographic Demarcation (CISPDR, 2016) regarding water supply and demand for agricultural irrigation. These data were analyzed in conjunction with

the area of intensive agricultural monocultures existing in the Vinces River basin (MAGAP, 2014) considering the irrigation requirements per ha/year in the summer season of intensive monocultures such as bananas, oil palm and cocoa, the latter requiring extensive field verification.

RESULTS

Land use

The analysis of the agricultural cover of the Vinces river-basin for the years 1990, 2002 and 2014 shows an increase in agricultural coverage as a result of the expansion of the agricultural frontier from the establishment of several monocultures such as bananas, cocoa and palm and intensive short-cycle crops such as maize, rice, etc. (Fig. 2 and Table 1).

Figure 2. Agricultural overture in the Vinces river basin for 1990, 2002 and 2014.

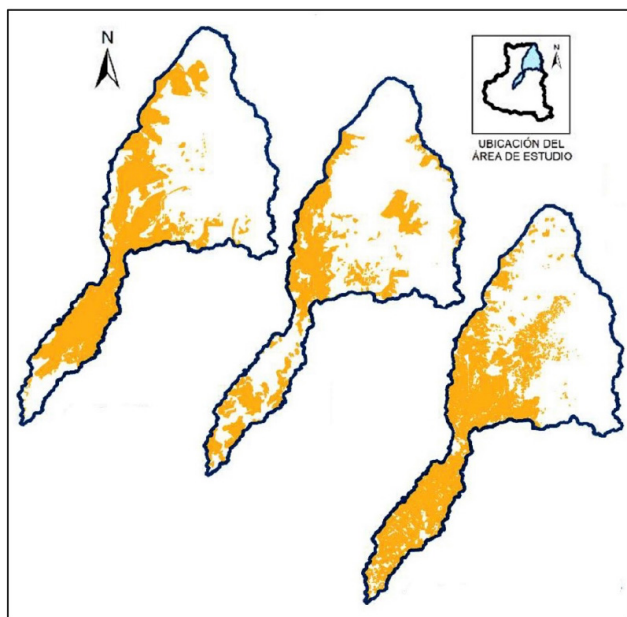


Table 1. Agricultural use in 1990, 2002 and 2014 in the Vinces River basin (Ecuador).

Land cover	year 1990 MAG Area (ha)	year 2002 MAGAP Area (ha)	year 2014 MAGAP Area (ha)
Tropical Arboriculture			
Short Cycle Crops		56586.61	
Banana Crops	11280.55	24843.77	23932.09
African Palm Crops	21399.05	15166.85	20543.46
Corn Crops	11401.8	3687.91	40484.22
Coffee Crops	35141.7	3413.40	
Rice Crops	5.760	1448.62	3444.17
Sugarcane Crops	2219.96	1002.33	27.82
Cocoa Crops	10983.950	841.89	36129.02
Coffee-Cocoa	49332.790		
Cultivation			
Abacá			595.67
Chia			58.13
Palm			762.61
Tobacco			1368.51
Total	141.765,560	106.991,37	127.345,70

Source: Own elaboration.

Of the agricultural coverage of the Vinces river basin, the permanent and intensive monocultures of bananas, cocoa and oil palm stand out because they require continuous and abundant irrigation during the eight months that the summer stage lasts in this region, added to the fact that it is precisely in the dry season where these exotic crops present the highest productive yields. The average irrigation need for banana production in banana farms in the province of El Oro is 27,500 m3 of water for irrigation per ha/year of cultivation (Erika Zarate & Derk Kuiper, 2013). On the other hand, cocoa and oil palm crops that have a woody plant structure, according to what was stated in oral communication by key informants of the sector, would demand approximately half of the water consumed by a banana sector in production. The spatial distribution of bananas, cocoa and African palm in the Vinces river basin are presented in Figure 3. In the case of bananas, one of the main export crops of Ecuador, in the period presented it shows an expansion of 112%. In the case of cocoa monoculture, it shows an expansion of 800%. On the

other hand, the monoculture of oil palm or African palm presents a slight decrease of 0.04%.

Banana cultivation in 1990 occupied mostly the central part of the Vinces river basin while by 2002 it was extended to the southeast of the basin precisely next to the margin of the main course of the river or finally in 2014 it expanded significantly to the northern area of the basin where most of the river tributaries are located and also the altitude of the ground reaches the level 1000 msnm. This location presents good soil quality: very deep, porous and rich in organic matter.

In relation to the fine national aroma cocoa, in 1990 the Vinces river basin had important covered areas whose plantations were mostly south of the sub-basin and in a small area in the northern sector of the basin. During the 2000s the plantations of finely aromad national cocoa ceased to be productive and were practically abandoned to later be replaced by the CCN51 cocoa clone which is

the one that has now spread from the south, center and north of the Vinces river basin thanks to its productive precocity and production intensity especially in summer.

The oil palm also known as African palm, for the year 1990 had a modest presence in the northwestern area of the basin in lands with a height that reached 600 meters above sea level, hence for the year 2014 it suffered an expansion from the south, center and north of the basin in lands with distances close to smaller surface courses of water without reaching the expansion that has had the crops of banana and cocoa.

Demand for water for irrigation

In relation to the volume of water for irrigation of agricultural crops, for the Vinces river basin according to (CISPDR, 2016) corresponds to 573.06 hm³ (Fig. 3), this volume was distributed according to the agricultural crops existing in the river Vinces (Fig. 4).

Figure 3. Dallocation of 573.06 Hm3 water for the rego of agricultural crops in the Vinces river basin.

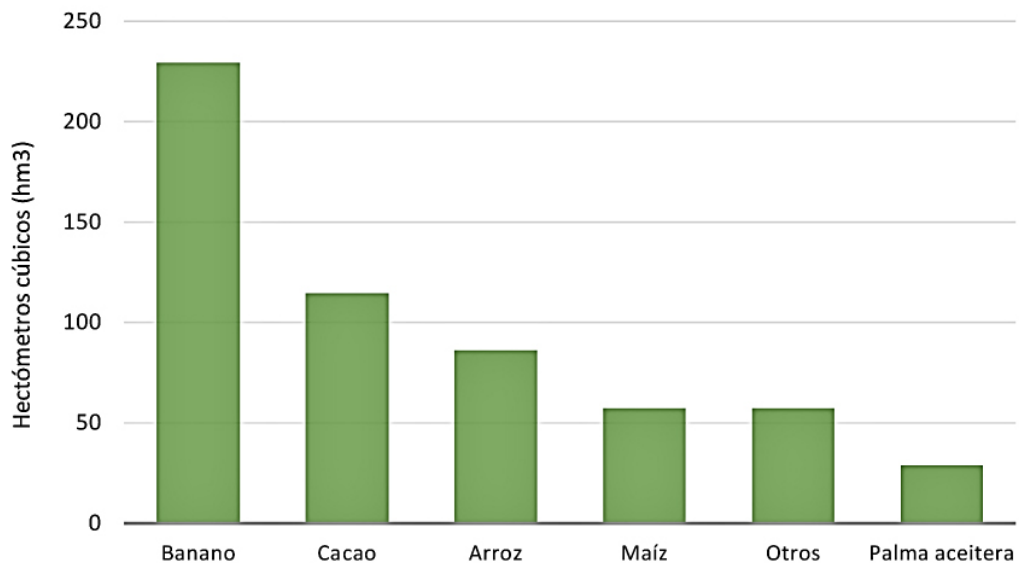
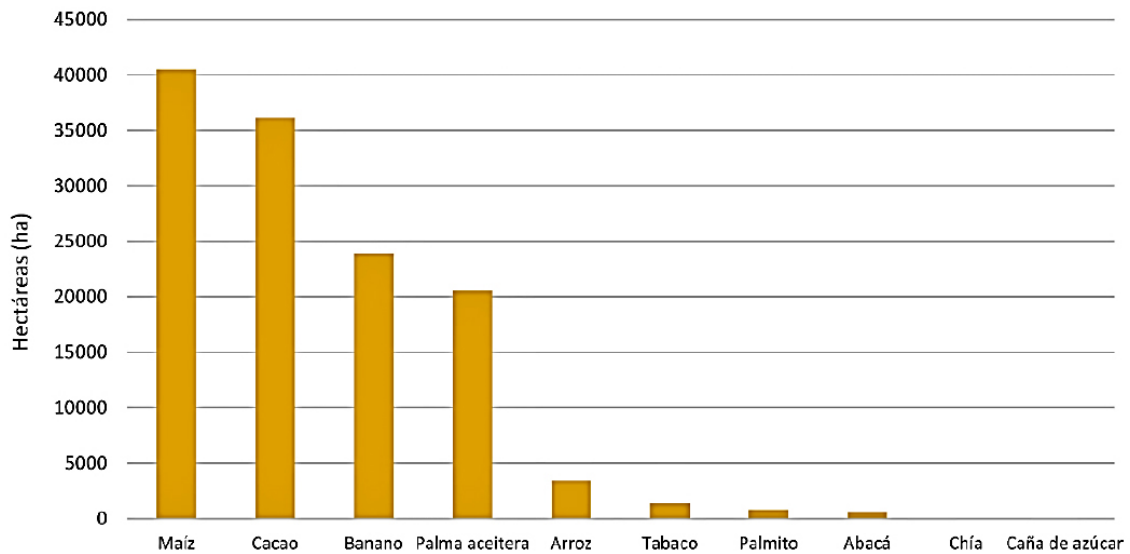


Figure 4. Distribution of agricultural crops in 127,345.70 ha in the Vinces River basin (MAGAP-2014).



The Secretariat of Water (SENAGUA) has granted water concessions for irrigation in the period between 1980 – 2018 for the Vinces River basin as indicated in Figure 5.

Figure 5. Water concessions (l/sg) for irrigation of agricultural crops in the Vinces river basin, for 1980 - 2018.

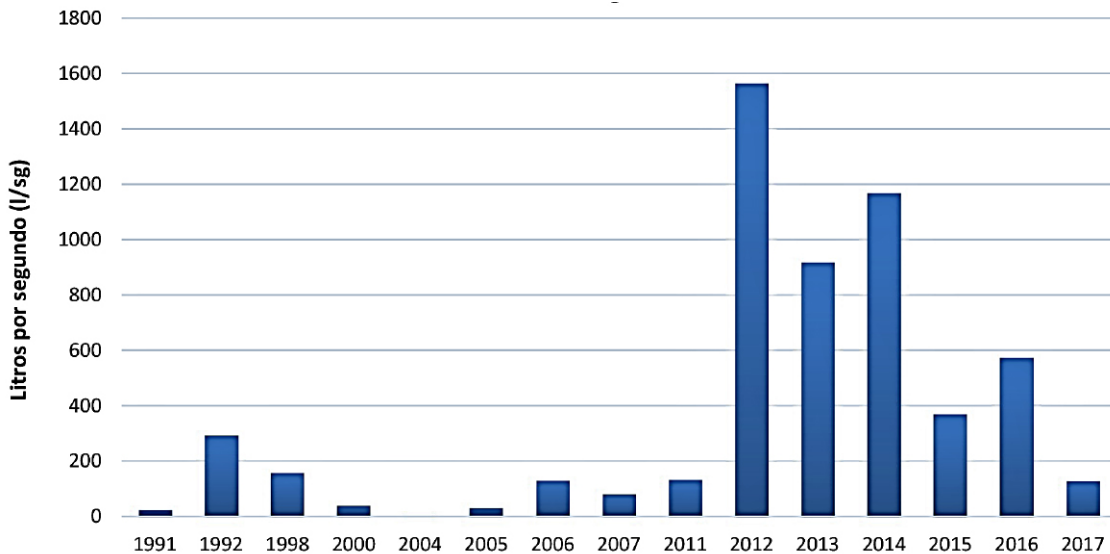


Figure 5 shows a significant year-on-year variation in water concessions by the Water Secretariat due to the lack of control for the period between 1991 and 2011 due to the difficulty of this work for the control bodies of a centralized nature, propitiating that in a clandestine way the water resource was abused for agricultural irrigation. Since 2008, when executive decree 1088 created the National Water Secretariat (SENAGUA), this situation changed thanks to the implementation of decentralized offices for citizen service, as is the case of the Quevedo customer service office, which began with a process of issuance and control of water concessions for irrigation in an equitable manner. In the Vinces river basin according to the extension of land area of agricultural producers (SENAGUA, 2011).

Ecuador's hydrographic systems are abundant. The volume of water provided by all the hydrographic systems in the national territory reaches 432,000 hm³ in the rainy season while in the dry season it reaches only 146,000 hm³ of which 115,000 hm³ correspond to the Pacific slope and 317,000 hm³ to the Amazon. However, the availability generated for the country is only 34% or 146,000 hm³, this fluctuation in availability is due to the irregular spatial and temporal distribution of rainfall given that in the eight months of summer the precipitation is reduced in relation to winter by 90% (Galárraga, 2000 cited by MAGAP Ecuador, 2013).

Rainfall in the country is distributed in the winter and summer periods, according to data collected over 35 years in the PICHILINGUE meteorological period of the National Autonomous Institute of Agricultural Research (INIAP PICHILINGUE) located in the central part of the Vinces river basin, the monthly average rainfall in the winter period from January to April is 423.78 mm, while in the summer season, from May to December the average is 67.70 mm so it is imperative to irrigate agricultural crops in the basin in the long summer period (Caicedo et al., 2016).

According to communications from key informants engaged in banana production, a banana crop in production requires to be watered by subfoliating spray three times a week for two hours on each occasion. The subfoliation sprinklers reach a flow rate of 680.21 L/hour, their spacing

between them being 12 m x 14 m, with application efficiency of 90% (Caicedo et al., 2015).

The production of bananas for export in the Vinces river basin is associated with an unsuitable use of the water resource for irrigation. The cultivation of bananas requires large amounts of water, the study carried out in the center of the Vinces river basin determined that a plant consumes approximately 30 liters of water daily on sunny days, 24 liters on semi-cloudy days and 12.5 liters on cloudy days, this may be necessary especially in dry season being applied by gravity, sprinkling, flooding or dripping and it is precisely in this last part that the lack of technical studies of the site result in the choice of an irrigation method that generates high rates of water waste (Rodríguez 2009).

The production of bananas for export in the Vinces river basin is associated with a non-optimized use of the water resource for irrigation. Banana cultivation requires large amounts of water, the study carried out in the center of the Vinces river basin determined that a plant consumes approximately 30 liters of water daily on sunny days, 24 liters on semi-cloudy days and 12.5 liters on cloudy days, this may be necessary especially in the dry season, being applied by gravity, sprinkling, flooding or dripping and it is precisely in this last part that the lack of technical studies of the site leads to the choice of an irrigation method that generates high levels of water waste (Rodríguez 2009).

Oil palm plantations in the Vinces River basin do not have an irrigation system for the most part because they are developed in moderately humid soils, however there is an important discussion around the fact that intensive oil palm plantations significantly reduce the levels of the surrounding aquifers and slopes. The cultivation of oil palm presents its optimal performance in regions with a rainfall of less than 2,000 mm per year with a good distribution, the average monthly values in relation to good yields are above 150 mm. However, oil palm naturally has a great capacity to survive prolonged periods of drought thanks to morphological and physiological characteristics in addition to the ability to abort the inflorescences, the seasonal variation in the peaks of cluster production and the mobilization of reserves

that allow it to compensate for the lower rate of photosynthesis due to the closure of stomata (Nouy et al., 1999). In a study conducted on three hybrids variety of oil palm had, a positive effect of irrigation on the behavior of each of the hybrids under study was reported for the variables plant height, sex ratio and Production

(Reinoso, 2008).

In figures 6a, 6b and 6c we can see the current land use of the Vinces river basin according to the cantons Valencia, Quevedo and Mocache that represent three realities of the upper, middle and lower part of the basin.

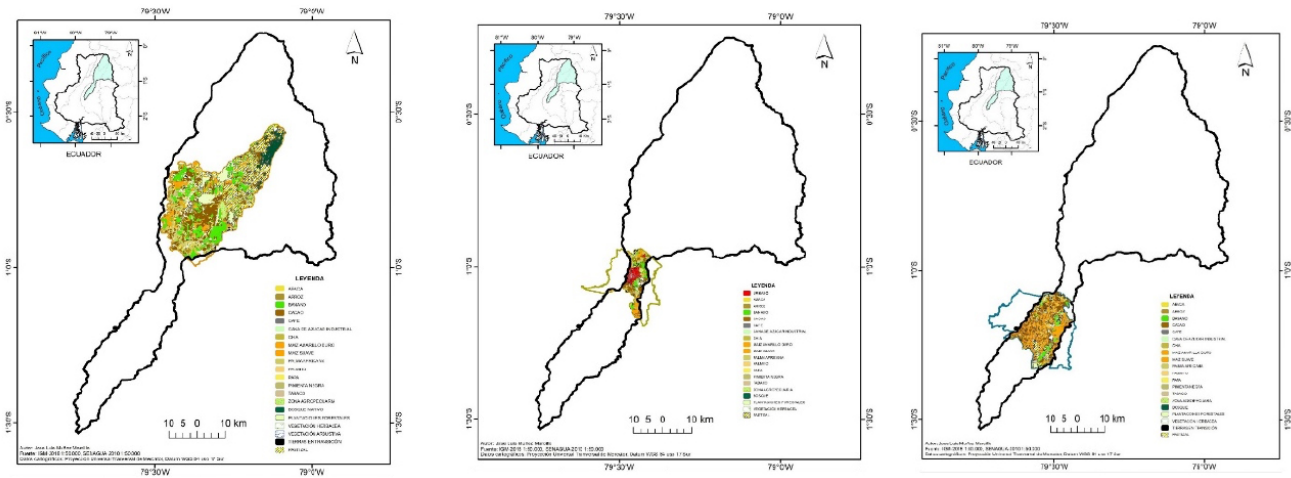


Figure 6a, 6b and 6c. Current land use of the Vinces river basin in its upper, middle and lower part.

The demand and pressure of water for irrigation of agricultural crops in the Vinces river basin is important considering that it is precisely in the dry months where to maintain high production rates permanent irrigation is

necessary. In figures 7a, 7b and 7c you can see according to the cantons of the upper, middle and lower part the presence of the main monocultures existing in the sub-basin of the Vinces River.

CULTIVO	ÁREA (HA)	%
ABACA	6,86	0,01
ARROZ	1.643,62	3,19
BANANO	15.559,71	30,16
CACAO	19.306,07	37,42
CHIA	58,13	0,11
MAIZ AMARILLO DURO	6.635,28	12,86
PALMA ACEITERA	7.423,08	14,39
TABACO	960,72	1,86
TOTAL	51.593,48	100

CULTIVO	ÁREA (HA)	%
ARROZ	368,38	4,56
BANANO	1.419,52	17,56
CACAO	2.846,89	35,22
MAIZ	1.427,63	17,66
PALMA	2.021,67	25,01
ACEITERA	8.084,09	100,00

CULTIVO	ÁREA (HA)	%
ARROZ	490,94	1,84
BANANO	1.810,71	6,80
CACAO	8.874,28	33,34
MAIZ AMARILLO DURO	12.490,79	46,93
PALMA	2.881,81	10,83
ACEITERA	69,5	0,26
TABACO	69,5	0,26
TOTAL	26.618,03	100,00

Figure 7a, 7b, and 7c. Distribution of monocultures in the Basin of the Vinces River in its upper, middle and lower part.

DISCUSSION

The temporal-spatial analysis of the agricultural coverage of the Vinces river basin in the last three decades has made it possible to visualize the sustained growth of agricultural production through the development of intensive export monocultures whose expansion has spread to high altitude areas and important gradient of the land and with an impact on the demand for surface water for irrigation in the summer months. In this regard, Flórez-Yepes et al., 2017 state that the application of multitemporal analysis allows determining the most significant environmental changes and impacts over time, allowing to know the interrelationships between the elements that compose it and anthropic activities.

The intensive monoculture of banana has been expanded mainly by economic groups with power whose plots exceed 100 hectares, generating a very high pressure from the water resource of the basin for irrigation. Frequently it can be observed that they do not respect the flows granted by the environmental authority and in many cases, they have been financially sanctioned but pay their fines and continue to clandestinely use the water for irrigation of the Vinces River. This reality lived in the basin is not very different from what happens in the rural area of Bogotá, where the expansion of the agricultural frontier has led to the almost total disappearance of the buffer areas of the páramo, this is related to the forms of economic use of the land, due to several large estates that have been leased to third parties, precipitating the ecosystem and water deterioration of the basin (Hernández, Rojas, Sánchez, 2013).

The presence of exotic monocultures in the Vinces River basin has significantly changed the landscape of one of the richest areas in natural resources of Ecuador, to date there are very few remnants of forest patches in the middle and lower part of the basin resulting in unsuccessful controls exercised by the competent environmental authority. In this problem agree (Lambin et al. 2001) those who point out that human intervention is what has caused the greatest transformations on the earth's surface despite the fact that environmental modifications can occur naturally or can be of the anthropogenic type being the general results changes in coverage plant and land use that bring with them effects that diminish the biological and cultural potential.

The results of the temporary-spatial study of the agricultural cover of the Vinces river basin during the period 1990-2014 has made it possible to identify trends in land occupation patterns. (Morales et al., 2016) indicates that the spatial-quantitative analysis of changes in vegetation

cover and land use between 1979 - 2013 in the Banderas Bay region, Mexico generated valuable information for the monitoring of natural resources with implications for the hydrological cycle, biodiversity, soil erosion and local climate, among other relevant aspects.

In practice, banana producers in Ecuador do not know the volumes of water they use through sprinkler irrigation since it is assumed that it is always irrigated until the soil is saturated (Erika Zarate & Derk Kuiper, 2013) although the ideal would be 27,500 m³ of water for irrigation per ha / year. Ecuadorian producers also point out that in the basins where bananas are produced there is competition for water resources, noting the decrease in the availability of water in dry season especially, this has caused changes in the hydrology of rivers due to factors such as deforestation and inappropriate land use. According to Erika Zarate & Derk Kuiper (2013) the situation in Peru is no less different since an annual ha of bananas in production requires 28,500 m³ of water for irrigation and before the minimum rainfall there is a forecast of increase in water stress in the coming years since at present the minimum environmental flows are not respected, with serious repercussions for the ecosystems.

CONCLUSIONS

Of the main agricultural monocultures existing in the Vinces River basin such as bananas, cocoa and oil palm, banana cultivation stands out as the one that exerts the most pressure on the water resource given the high volume of irrigation it requires to maintain its productivity levels.

The application of irrigation water is an imperative need to obtain high and stable yields in the cultivation of bananas in the Vinces river basin, the main source of water being surface water courses. It is important to note that the field trips show many clandestine connections to the main water axis of the basin as well as to that of its tributaries, this as a cause of the lack of economic and human resources to control the wide area of the basin.

The regulation of the expansion of the planting of banana cultivation in the Vinces river basin has a single economic objective and that is to stop the overproduction of the fruit to maintain its price, there is no context of environmental protection, so the outlook for the Vinces River in the medium term in the summer season is almost total drought.

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Determination of the environmental sustainability of tourism in the Pastaza Province, Ecuador

Determinación de la sustentabilidad ambiental del turismo en la Provincia de Pastaza, Ecuador

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ABSTRACT

Tourism causes impacts in the receiving communities and in the ecosystems. To minimize these impacts, the World Tourism Organization and the United Nations have called on governments to consider sustainability as a global objective. Developing policies for a common practical strategy that allows measuring the sustainability of tourism is the current challenge. However, it will not be easy to achieve its implementation in a specific way, if the interests of the stakeholders involved in the tourism sector are taken into account. The objective of this research is to analyze the current state of sustainability of tourism in the province of Pastaza (Ecuador). A mixed methodology is used, which starts from the documentary analysis to determine the variables affected by tourist activity and their quantification through indicators. Based on 19 specific indicators selected for the environmental dimension, a synthetic index of sustainable environmental development of tourism is proposed, as a criterion of the environmental sustainability of tourism. Which contributes to implement decisions to improve the efficiency and sustainability of tourism management.

Keywords: biodiversity, tourism, sustainability index, Pastaza, Ecuador

RESUMEN

El turismo genera impactos en las comunidades receptoras y en los ecosistemas. Para minimizar estos impactos, la Organización Mundial del Turismo y las Naciones Unidas han pedido a los gobiernos que consideren la sostenibilidad como un objetivo global. Desarrollar políticas para una estrategia práctica común que permita medir la sostenibilidad del turismo es el desafío actual. Sin embargo, no será fácil lograr su implementación de una manera específica, si se tienen en cuenta los intereses de los actores involucrados en el sector turístico. El objetivo de esta investigación es analizar el estado actual de la sostenibilidad del turismo en la provincia de Pastaza (Ecuador). Se utiliza una metodología mixta, que parte del análisis documental para determinar las variables afectadas por la actividad turística y su cuantificación a través de indicadores. A partir de 19 indicadores específicos seleccionados para la dimensión ambiental, se propone un índice sintético de desarrollo ambiental sostenible del turismo, como criterio de sostenibilidad ambiental del turismo. Lo cual contribuye a implementar decisiones para mejorar la eficiencia y sostenibilidad de la gestión turística.

Palabras clave: biodiversidad, turismo, índice de sostenibilidad, Pastaza, Ecuador.

INTRODUCTION

Tourism is an important sector in the progress of the international economy, the recovery from the economic crisis and the reduction of poverty. In Ecuador, it is the third source of non-oil income, after bananas and shrimp, which shows the relevance of the sector for the Ecuadorian economy. The National Tourism Plan 2030 identifies sustainable tourism as one of the strategies for the economic and social development of Ecuador.

One of the most important challenges facing policy makers and tourism managers is determining whether tourism management meets the principles of sustainability. Tourist destinations that use their natural resources for tourism development must agree, among local stakeholders, the policies and practices necessary to manage, in a sustainable way, the development of tourism activities in their fragile natural environments. The research defines a so-called index of environmental sustainability of tourism (ISAT).

Sustainable development concept

The concept of sustainable development was defined, in the Brundtland Report, as "the type of development that meets the needs of present generations without compromising the ability of future generations to meet their own needs." (UN, 1987). Since the origin of the concept of development, the contradiction between the finite nature of the planet's resources and the exponential growth of the economy has prevailed.

The solution of this dilemma gave rise to the concept of sustainability that supposes a balance between economic growth and the protection of the environment. From the Brundtland Report (UN, 1987) it can be considered that there are several approaches to the concept of sustainable development:

- The ecological approach limits the concept to ecological sustainability, where the indispensable conditions to maintain human life today and in the future prevail. The socio-economic aspect is relegated to overcome poverty.
- The economic approach, exposes a concept of sustainable development from the economic processes. Where economic development is perceived as a condition to protect nature.
- The approach to sustainability as management refers to the fact that on a global level the natural herita-

ge should be used in a rational way. However, the environmental impacts of economic growth are not considered and there is optimism about the future availability of resources.

- The scope of the concept, when trying to bring together economic and social criteria, aims to protect the heritage of humanity, agreeing on the satisfaction of needs and the recognition of the limits of the use of the environment. Since the origin of the concept of development, the contradiction between the finite nature of the planet's resources and exponential growth has prevailed. (Rutherford, 2008; Bramwell, 2017; Higgins-Desbiolles, et al., 2019). As a solution to this dilemma, the concept of sustainability arises, which involves a balance between economic growth and environmental protection.

Sustainable tourism concept

The clearest definition of sustainable tourism was formulated by the International Union for Conservation of Nature (IUCN): "The process that allows development to take place without deteriorating or depleting resources so that they can be renewed at the same rate as they are being used, or from the use of a resource that is generated slowly to another that does so faster. In this way, the resources will be able to continue supporting future generations". (IUCN, 1991).

According to the World Tourism Organization (UNWTO), it is proposed to consider sustainable tourism as:

"Development that meets the needs of today's tourists and host regions while protecting and fostering opportunities for the future. It is conceived as a pathway to managing all resources so that economic, social and aesthetic needs can be met, while respecting cultural integrity, essential ecological processes, biological diversity, and life-sustaining systems." (UNWTO 1999, p 22)

Tourism has impacts on the environment of the destinations, on the receiving communities and on the conservation of the ecosystems of regions and countries. To minimize the unwanted impacts that tourism has on receiving communities and on the conservation of ecosystems in regions and countries, the UNWTO and the United Nations (UN) have called on governments to consider sustainability as an overall goal. At the United Nations General Assembly, an important agreement was endorsed to agree on

the positions of the countries with the purpose of approaching a common practical strategy called Measuring the Sustainability of Tourism (MST) (UNWTO / UN, 2019).

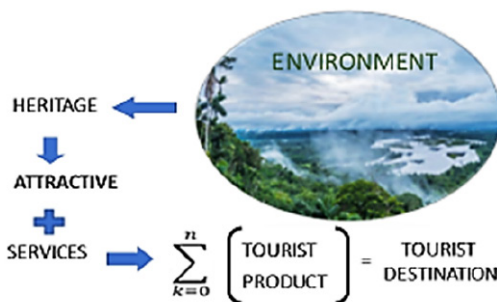
Developing policies for a common practical strategy to measure the sustainability of tourism is the current challenge. However, it will not be easy, the problem will be to achieve its implementation in a specific way, if the interests of the parties involved in the tourism sector are taken into account. According to Sharpley (2020), after more than three decades of international acceptance of the fundamental principles of the concept of sustainable development, real advances in achieving a more sustainable tourism sector have been few.

Interactions between tourism and the environment

Since the sixties, environmental issues have acquired notoriety in society. Despite this, human activities and the economic system have caused the loss of resources that leads, more and more rapidly, to the degradation of ecological systems. The analysis of the relationships between tourism and the environment is essential to achieve the sustainable development of tourism; in a way that contributes to the satisfaction of the needs of the different actors involved.

Actually, the environment and its conservation constitute the fixed capital of any tourism initiative with a sustainability approach. Thus, a difficult relationship is established between the protection of natural resources and the increase in economic profitability. When resources are structured for tourist use and enjoyment, they become products. The tourism products offered in a given geographic region complement and compete with each other. (Figure 1)

Figure 1. Relationship between environment and tourism in the framework of sustainability.



Source: self made. Photo of the Provincial GAD of Pastaza

The attractive resources related to the typologies of the environment, of the region in which the tourist development takes place, are the fundamental source of tourist activities. These resources are the key to the design of the tourism product and its planning in each particular destination.

The growth of demand and the diversification of the offer have originated the contradictions between the environment and the growth of the tourist offer. These divergences constitute a threat to the essential resources that are offered as tourist attractions and suppose a danger to development and continuity of local tourism.

The role of tourism in environmental protection as a support for sustainable development must be present in strategic planning, zoning, observation of impacts and approaches to tourism (Sharpley & Pearce, 2007; Job et al., 2017).

Indicators to measure the sustainability of tourism

The UNWTO defines indicators as “the set of measures that provide the necessary information for better understanding of the links and impacts of tourism with respect to the natural and cultural environment in which the activity takes place and on which it is widely dependent” (UNWTO, 2004).

Based on the UNWTO mandates, numerous works have been developed that propose systems of indicators to assess the tourist sustainability of destinations. (Kristjánsdóttir et al., 2018). However, most of them formulate the system theoretically without fully quantifying it, which makes it difficult to use in practice (Kates & 2005; Blancas et al., 2007; Tanguay et al., 2013).

The term sustainable tourism has been widely studied, as well as the proposals for indicators and the index to evaluate the sustainability of a tourist destination (Buckley, 2012; Torres-Delgado et al., 2017; Rasoolimanesh et al., 2020). But, studies on tourism sustainability indices applied specifically to protected natural areas (ANP) are scarce. (Li, 2004; Erdogan et al., 2009; Ashok et al., 2017) Environmental sustainability measurement models

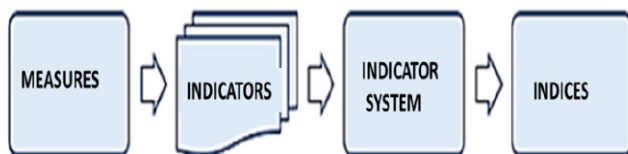
The design of measurement models, especially in the environmental dimension, allows establishing a chain of values and factors that bring transcendence to a fundamental dimension of the concept of sustainable develop-

ment. Indicator systems are a selection of indicators that generate a new context in which it is possible to study a phenomenon. (Figure 2)

According to OMT, (2018) the main characteristics that the indicators must meet to be included in the systems can be summarized in the following.

- Integrators capable of providing summary information
- Easy to measure, to control and supported by available information.
- Appropriate to the aggregation level of the system analysis
- Applicable in a wide range of conditions
- Be based on reliable information
- Easy to understand (not just by experts)
- Focus on the practicalities and be clear
- Temporality allows the detection of trends
- Prediction, provides early warning detection
- Really express the property to be evaluated

Figure 2. Indicator system



Source: Castro, 2004

A system of indicators is more than a sum of statistical figures; since it responds to a specific and joint interest that makes the information greater and incomparable with that offered by each of its parts (Castro, 2004).

The creation and application of indexes implies a scientific design, supported by a prior social assessment. The development of an information system for the development of sustainable tourism is essential to use natural and social resources in favor of the economy (Hinkel, 2011; Cabello et al., 2013; Pulido & Pulido, 2015). Currently, the information available to help local destinations make decisions to improve tourism is limited.

The construction of the indicator system is generally made difficult by a number of problems. The design of an indicator system for the Pastaza province, these problems can be summarized as follows:

- Lack of strategic vision on sustainability as an alternative that promotes new territorial and tourist information systems.
- Limitations of local statistical information, from the quantitative and qualitative approach.
- Little coordination of the different municipal areas involved in the development of tourism.
- Little use of the possibilities of information technologies to organize data with statistical value.

Essentially, three models have been defined to undertake the process of construction of environmental indicators, which have been applied to obtain sustainable tourism indicators:

- Model PSR (Pressure-State-Response), is based on the impact that human activities have on the environment and modify the original characteristics of natural resources, which facilitate the evaluation of the impact of tourism on the environment.
- DPSIR (driving forces-pressure-state-impact-response) model, was designed by the European Environment Agency (1998). It incorporates the causes of pressure and impacts produced as a result of changes in environmental conditions.
- CMAP Model (World Commission on Protected Areas) (2019), formulated to assess the status of protected natural areas and evaluate their management, proposes the following categories of indicators: context, planning and legislation, means, processes, activities and services, and results. (Hockings et al, 2000)

MATERIALS AND METHODS

Investigation methodology

A mixed methodology is used that, from the quantitative and qualitative approaches, starts from the documentary analysis to determine the variables that can affect the sustainability of the tourist activity and that will require its quantification through indicators. A design is used that involves three processes: establishing the sample box, determining the variables, collecting and examining the data.

The research begins with the bibliographic review around the concepts of development and sustainability and the analysis of the most used tools for their measurement. The analysis of the documentation takes into account conceptual aspects and practical experiences of previous studies in tourist destinations characterized by their natural heritage; those that provide elements to decide which

instruments will be used (Ruiz, et al., 2011; León & Leyva, 2017).

The current state of tourism in the Pastaza province was verified, from the participatory strategic diagnosis, through the use of two traditional analysis methods, SWOT and Delphi (Miller, 2001; Choi & Sirakaya, 2005). Subsequently, the appropriate indicators were chosen to measure the sustainability of tourism through a Relative Operational Index (IOR); constructed from expert criteria on the relevance, specificity and feasibility of each indicator (Grandzol & Gershon, 1994; Tague, 2004).

The calculation of tourism sustainability is carried out from indicators that are selected according to the relevance, specificity and feasibility of each one. The sustainability index for each dimension was established according to the adequacy of the methodology developed by Torres-Delgado (2018). The evaluation criterion was adopted from the methodology to measure sustainability in tourist areas characterized by their high biodiversity, which is recommended by the IUCN (2001). To guarantee the objectivity, reliability, efficacy and applicability of the results, a methodological triangulation was used (Forni, 2020).

Importance of research and delimitation of the study area
The dependence between tourism and the environment requires the establishment of measures to plan and manage the use of these areas, in order to improve their services, offer a variety of alternatives to visitors and contribute to their sustainability, in their biophysical dimensions, social, ecological and economic (Buckley, 2012; Acosta, 2017; Reyes-Vargas, 2019).

The potential for tourism development in the Pastaza province is based on its natural resources; which are affected by the unplanned expansion of the agricultural and livestock frontier, and the increase in urban areas. However, the province lacks instruments to evaluate the environmental sustainability of tourism; lack that limits the possibilities of defining correct policies, strategies and decisions to achieve a rational use of its natural and cultural heritage. In this context, the research proposes three objectives:

1. Analyze tourism performance from an approach that contemplates the perspective of environmental sustainability.
2. Delineate a tool to measure, conceptualize and quantify the performance of the environmental sustainability

of tourism in the Pastaza province; by synthesizing the information into indicator values that are easy to interpret and apply.

3. Apply the tool to the Pastaza province in a way that provides tourism managers with a judgment on the environmental sustainability of tourism management.

General characteristics of the Pastaza province

The Pastaza province is located in the center of the Ecuadorian Amazon Region. It is part of one of the hot spots of biodiversity on the planet, due to its exceptional concentration of species and high levels of endemism. It is located entirely in the Ecuadorian Amazon between 500 and 1500 meters above sea level (Aguirre, 2017).

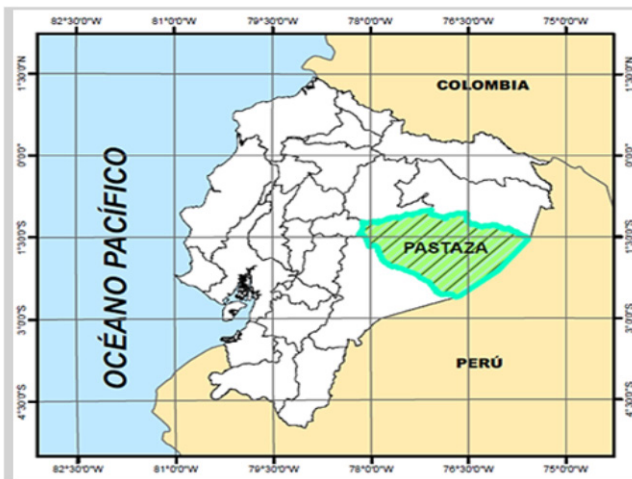
Pastaza is located between the geographic coordinates of 1 ° 10' south latitude and 78 ° 10' west longitude; and 2 ° 35 'of south latitude and 76 ° 40' of west longitude. The province is located in the central zone of the Ecuadorian Amazon; Its cantonal head, the city of El Puyo, is one of the most important accesses to the Ecuadorian East and is part of a road axis that connects with the central area of the country.

It is the largest province in Ecuador with 29 643.33 km²; but the second least populated, after Galapagos. Its estimated population, year 2019, is 111,270 inhabitants, which represents a population density of 3.75 inhabitants / km²; the lowest in Ecuador (INEC, 2020). For decades the province was the object of displacement, but today it has become a consolidated province, with poles of economic development and urban growth such as Puyo and Shell,

Pastaza has a high percentage of NBI (poverty due to unsatisfied basic needs); In 14 of 21 parishes in their territory, poverty exceeded 70% (INEC, 2019). Health, education, housing, water and sanitation are priorities of the strategy prioritized decentralized autonomous governments (GAD) Cantonal Pastaza will prioritize the updating of the Development Plans and Land Planning.

Pastaza is also characterized by conserving a large part of the country's biodiversity and cultural wealth. More than 94% of this territory is tropical humid forests, inhabited by seven of the 11 indigenous nationalities of the Ecuadorian Amazon: Kichwa, Shuar, Waorani, Achuar, Sapara, Andoa and Shiwiar.

Figure 3. Geographic location of the Pastaza province



Source: GADPPz provincial de Pastaza

Approximately 20% of the natural forests that the country has are in the province of Pastaza. The region belongs to the humid tropical zone of the continent, with an average temperature range between 18 and 24 °C and an average rainfall of 3,570 mm per year.

The majority of tourist attractions in the province are natural environments related to its aquatic resources such as spas and waterfalls, and others related to the rich landscape such as viewpoints, nature trails, caverns, etc. (Figure 3). In addition, it has multiple attractions associated with its cultural wealth.

Figure 3. Panoramic view of the Pastaza river in the jungle area



Photo: GADPPz provincial de Pastaza

Its capital, the city of Puyo, is one of the most important steps towards the Ecuadorian east, which connects to the central area of the country. In this context, water is an essential element of biodiversity and ancestral cultures, it represents the central argument of tourism and its contribution to local development (Torres, 2017).

Main productive activities that take place in the Pastaza province

The oil industry continues to be the most important economic activity for the country and this resource is extracted mainly from the Ecuadorian Amazon region. In Pastaza there are several oil wells in production that are located in the northern part. However, and with the exception of the protected areas of the province, practically the entire territory is segmented into oil blocks, most of them still without a concession for exploration or exploitation. Of particular importance for the environment is the oil exploitation in the upper area of the province, since in this territory are the sources of water for human consumption of most of the population of Pastaza.

Among the main non-oil productive activities that take place in the province are:

- The manufacture of clothing, except leather.
- The manufacture of metal products for structural use.
- The retail sale of food, beverages and tobacco.
- The retail sale of food in specialized stores.
- Restaurants and mobile food services.
- Telecommunications, construction and transportation.

Prospects of the Pastaza province for the development of tourism

The extension of the Amazon rainforest, with its extraordinary biodiversity, offers very good prospects for the development of activities such as scientific tourism and tourism associated with natural heritage. Life and customs of the Zápara, Shiwiar and Andoa, in danger of extinction, are reason for trips and tourist excursions.

Despite the interest aroused by the attractions of the Ecuadorian Amazon, there are few comprehensive technical studies that induce the enhancement of the extraordinary tourist potential of the region and the economic benefits that this activity could provide and above all the way to access a market as competitive as tourism.

However, there are some successful experiences with positive effects in which the potential of scientific tourism is presented as well as the existence of research projects that respond to themes in the lines of Ecosystems, Biodiversity and Species Conservation, Environmental Management and Conservation, (Reyes & Ortega, 2013; Bravo, et al., 2017). According to the inventory of natural and cultural attractions of the GADPPz, (2019), in the province of Pastaza there are a total of 64 tourist attractions.

RESULTS AND DISCUSSION

Participation of tourism in the economy of the Pastaza province

The activity with the highest share of gross value added (GVA) in the province of Pastaza corresponds to the exploitation of mines and quarries with 51.2%, followed by public administration with 5.7% and transportation and storage with 5.6%. Tourist activities, accommodation and restaurant services only represent 2.2%. (Central Bank of Ecuador, 2019).

In the Pastaza province, income from tourist activities, in the period 2012-2019, registered an annual growth rate of -2.4%. In the same period, Ecuador achieved a compound annual growth rate (CAGR) of 9.9% in income from tourism. (Table 1).

In 2019, tourism in Ecuador directly contributed 2.2% of the national GDP and favored the creation of 408,774 jobs in the sector. The country's tourism activity stands out for being the third source of non-oil income, which shows its relevance for the Ecuadorian economy (INEC, 2020).

Table 1 Income from international tourism (GVA, US \$ million): Ecuador and Pastaza province

Year	Ecuador		Pastaza	
	Sightseeing	Total	Sightseeing	Total
2010	1.031	56.481	18,8	759,7
2011	1.092	60.925	15,1	1.135
2012	1.136	64.362	19,6	1.042
2013	1.191	67.546	18,5	1.033
2014	1.218	70.105	17,1	981,7
2015	1.173	70.174	16,1	613,0
2016	1.166	69.314	17,8	546,7
2017	1.234	70.955	13,7	634,6
2018	1.871	108.398	17,2	713,8
2019	2.422	100.871	16,1	730,9

Source: Own elaboration from <https://www.entaciónrencifras.gob.ec/cuentas-economicas/>

The impact that the tourism sector has on the economic growth of Ecuador and the Pastaza province was determined from the dependency relationship between the variables economic growth of the country and the economic activity of the tourism sector by means of the Pearson correlation of the VAB. (Table 2)

Table 2: Correlations: contribution of tourist activities to the economy of Ecuador and the Pastaza Province (2010-2019) (thousands of US dollars)

Pastaza	Average	Deviation Standard	Pearson's correlation
VAB- tourism	17,197	1,702	0.273
GVA-Total	745,325	198,326	0.273
Ecuador	Average	Deviation Standard	Pearson's correlation
VAT- tourism	1,768,681	389,444	0.909
GVA-Total	88,493,325	1,096,230	0.909

The correlation is significant at the 0.01 level (bilateral)
Source: Own elaboration with, SPSS Statics 25

Selection of indicators to measure the environmental sustainability of tourism in the Pastaza province

Based on the SWOT strategic diagnosis, the Delphi technique and the relative operability index, the indicators were chosen to measure the sustainability of tourism. For which the criteria on the relevance, specificity and feasibility of each indicator were considered. The proposal was based on the territorial development approach that is based on two strategies: local economic development and tourism development.

To evaluate the protection and conservation of the environment, 19 indicators related to water, energy, the preservation and recovery of natural resources, and the environment. To eliminate the heterogeneity of the measurement units, it was necessary to normalize each of the indicators on a common scale. Regardless of the unit of measurement in which an indicator is expressed, a value can be obtained for each of them that is relative to the total number of indicators. These values range from 0 to 1; and its meaning varies according to the type of relationship, positive or negative (Table 3)

Table 3: Selected indicators to measure the environmental sustainability of tourism in Pastaza

No	Indicators	Zscore *
1	There are training initiatives for local resident officials.	0.476
2	There are local resident officials with tourism training.	0.593
3	The amount of water consumed by tourists does not affect local consumption.	0.652
4	There are programs to reduce the consumption and reuse of water.	0.471
5	There is monitoring of water quality.	0.462
6	The amount of solid waste generated by tourism is high.	0.486
7	There are programs to reduce the amount of solid waste.	0.491
8	There is selective collection of solid waste and a recycling process.	0.488
9	The energy consumed by a tourist in a period does not affect local consumption.	0.590
10	There are programs to reduce energy consumption.	0.465
eleven	There is a wastewater treatment process.	0.501
12	There are areas preserved, recovered or in the process of recovery.	0.468
13	There are programs or facilities to improve air quality.	0.439
14	There is a program oriented to environmental education.	0.572
fifteen	There are associations of environmental groups in the town.	0.598
16	There is an environmental or tourism certification process.	0.547
17	There is a good amount of typical local products (crafts, souvenirs, etc.).	0.505
18	There are acts of vandalism practiced by tourists to the heritage	-0.441
19	There is satisfaction of the local population with tourism .	0.415

* Zscore (normalized indicator)

Consultation with third parties on the proposal of indicators

The proposal of indicators in the Delphi study was consulted with a third group of experts who had no information on the previous ratings. The experts who would participate in these analyzes were chosen for their professional experience at the regional and national levels:

- University professors linked to research and tourism planning of natural spaces, or the relationships between tourism, territory and the environment;
- Qualified professionals from the Ecuadorian, tourism and environmental public administrations;
- Members of institutions and / or organizations, public and private, related to the planning and management of natural spaces;
- Professionals from private companies with experience in tourism planning and management of natural spaces.

In any case, the existence of a close link between the professional, institutional and / or research activity of the experts invited to collaborate and the subjects under study was established as a requirement. The average experience of the experts was 25 years, 36% are doctors in different areas of science and 50% work as professionals, managers and entrepreneurs in the tourism sector

The interpretation of the results was carried out by means of the statistical analysis of Measures of Central Tendency or of Position and Measure of Dispersion to obtain a qualitative evaluation on the answers of the experts. Wang (2016) The validation of Sustainability Indicators for areas with tourist use in the Pastaza Province, consulting third parties presented a Cronbach's Alpha 0.877.

By consensus, selection was considered a very useful instrument to measure the sustainability of natural areas with tourist use in the region. (Table 4).

Table 4: Consultation with third parties on the proposal of indicators to measure sustainability.

No	Query about indicators	Dev. typical	% agree
1	It is conceptual and coherent	0.422	96
2	They are of practical use	0.789	84
3	There is no duplication	0.316	98
4	All are relevant	0.483	74
5	Are enough	0.483	94

Basic and strategic dimension of the indicators

The indicators are classified, according to Coll-Serrano (2012), in two levels according to their relevance, specificity and feasibility of application (Table 5)

- Basic level: made up of operational indicators that allow knowing, based on planning, all the actions of the different strategic lines. This dimension is made up of short-term indicators of resources, processes and products.
- Strategic level: formed by the indicators linked to the strategy and the results to be achieved in medium and long term; relating to the effects and impacts.

Table 5: Dimension of the system of indicators to measure environmental sustainability in the province of Pastaza.

System level	Indicator number *
Basic	1,2,3,5,6,8,9,11,12,13,15,16,17,18,
Strategic	4,7,10,14,19

* (Identify in Table 3)

Strategic indicators should guide actions and the application of policies aimed at the conservation, restoration, preservation and revaluation of heritage assets. The triangulation of the information provided by all the actors who participated in the selection process and guarantees the objectivity of each of the indicators.

Evaluation of the tourism environmental sustainability index

The ISAT was calculated according to the Methodological Guide recommended by the Economic Commission for Latin America and the Caribbean (Quiroga 2009). As a criterion for evaluating sustainability, the methodology to measure sustainability in tourist areas characterized by their high biodiversity recommended by the IUCN was adopted; according to which, to establish the level of sustainability, the following criteria must be included:

- 0 to 0.2 = collapse
- Any number greater than 0.2 to 0.4 = critical
- Any number greater than 0.4 to 0.6 = unstable
- Any number greater than 0.6 to 0.8 = stable
- Any number greater than 0.8 to 1.0 = optimal

Formula of the environmental tourism sustainability index (IST)

$$ZSi = \text{value of indicator "j"} \text{ normalized in the field}$$

$$p = \text{number of simple indicators used}$$

The application of the proposal of sustainability indicators was able to reveal the current problem of tourism management in the Pastaza province regarding environmental sustainability, presenting an index of 0.485; which qualifies biodiversity as an unstable system.

Among the causes that determined the sustainability index in the environmental dimension are:

- Most of the province's territory is covered with natural forest, but only 38% of these areas are under some mechanism of conservation or legal protection. (Zambrano et al., 2019)
- Inadequate solid waste management is exacerbated in Pastaza. These wastes are emitters of gases, fumes and dust that promote pollution.

The Autonomous Decentralized Government of the province has proposed the strengthening of the provincial environmental unit. As well as the execution of projects focused on solving environmental management problems and compliance with regulations that affect the sustainability index of areas with tourist use.

CONCLUSIONS

The integration of various techniques and methodologies used in the framework of natural spaces of great biodiver-

sity, allowed to identify the behavior of the environmental sustainability of tourism in the Pastaza province. The analysis allowed the system to be classified as unstable by registering an index of environmental sustainability of tourism of 0.485.

The main contribution of the research is the establishment of a useful tool for determining the environmental sustainability of tourism in the Pastaza province. Which can serve as a reference for other Amazon regions and tourist destinations recognized for their biodiversity.

THANKS

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Research paper

Preferences of the Orense population regarding the provision of food services during the covid-19 pandemic

Preferencias de la población Orense frente a la prestación de servicios de alimentación durante la pandemia del covid-19

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ABSTRACT

The global pandemic due to covid-19 has generated changes in the different social, cultural and also economic spheres. However, the tourism sector has also been affected, producing a negative impact on the provision of its services. The present research aims to identify the positive and negative aspects that may be conditioning the reactivation of the sector, taking into account consumer satisfaction to generate a correct reactivation of the same. The methodology used was descriptive with a mixed approach, in which qualitative and quantitative results were obtained, applying a questionnaire of eleven questions, the same one that allowed obtaining efficient results. In this way, it was evidenced that the surveyed population has chosen to make their purchases online, in which they have been satisfied and motivated to continue demanding the services of the different food and beverage establishments.

Keywords: Online sales, Covid-19, Biosafety measures, Food and beverages.

RESUMEN

La pandemia global debido al Covid-19 ha generado cambios en los diferentes ámbitos tanto sociales como culturales y así mismo económicos. Sin embargo, el sector turístico también se ha visto afectado produciendo un impacto negativo en la prestación de sus servicios. La presente investigación tiene como objetivo identificar los aspectos positivos como negativos que pueden estar condicionado la reactivación del sector, teniendo en cuenta la satisfacción del consumidor para generar una correcta reactivación del mismo. La metodología que se empleo fue de tipo descriptiva con enfoque mixto, en el cual se obtuvo resultados cualitativos y cuantitativos, aplicando un cuestionario de once preguntas, la misma que permitió obtener resultados eficientes. De esta manera, se evidenció que la población encuestada ha optado por realizar sus compras de manera online, en las cuales han resultado satisfechos y motivados a seguir demandando los servicios de los diferentes establecimientos de alimentos y bebidas.

Palabras claves: Ventas Online, Covid-19, Medidas de bioseguridad, Alimentos y bebidas.

INTRODUCCIÓN

La pandemia del COVID-19 ha afectado desde muchos enfoques, lo que ha generado cambios sociales, culturales, sanitarios, económicos, entre otros. Ecuador no ha sido la excepción, lo que ha ocasionado que se hayan adoptado medidas para llevar o reactivar sectores productivos del país.

En el contexto del sector económico se generaron una serie de restricciones, tales como: limitaciones de movilidad, el distanciamiento social, cierre de actividades comerciales, como también implementación medidas de prevención y de bioseguridad, todo ello ha condicionado una baja en la productividad provocando a su vez pérdidas monetarias que brindan gran inestabilidad a economías locales.

El sector terciario, específicamente el turismo, no fue la excepción frente a la crisis que actualmente está atravesando el mundo. Las empresas de prestación de servicios de alimentos y bebidas también están sufriendo los impactos negativos generados a partir de esta pandemia.

En la provincia de El Oro se generó un sin número de restricciones y se dispuso a través de gestión de la gobernanza que la población debe realizar un confinamiento aproximadamente con duración de diez meses aproximadamente durante la pandemia. No obstante, durante este tiempo la prestación de servicios de tipo alimentos y bebidas, fue una de las principales actividades que estaban permitidas, y esto generó asimismo un temor por parte de la población local debido a la posibilidad de contagio al momento de adquirir alimentos. Es por ello, que algunos pobladores consideraron la compra en línea. Sin duda alguna, se generaron cambios en la producción, comercialización y el consumo de la población Orense. Con los antecedentes expuestos surgen las siguientes preguntas:

- ¿La población económicamente activa de la provincia de El Oro realizó compras en línea de alimentos y bebidas?
- Si los residentes Orense realizaron las compras en línea en los establecimientos de alimentos y bebidas, ¿se recibió una adecuada prestación de servicios?
- Si la Población Orense no realizó compras en línea en los establecimientos de alimentos y bebidas ¿cuáles fueron sus razones para no realizarlas?

La importancia de realizar la presente investigación está en identificar los aspectos positivos como negativos que pueden estar condicionado la reactivación del sector, considerando que la satisfacción del cliente es imprescindible para generar una óptima reactivación del sector y lograr la fidelización de los mismos.

BASES TEÓRICAS

Pandemia del covid-19 y el sector turístico

En la actualidad, la pandemia del Covid-19 ha repercutido en las economías mundiales, especialmente de América Latina, produciendo pérdidas socioeconómicas.

Esta realidad también se ha visto reflejada en el turismo, en función a ello, la pandemia de Covid-19 ha afectado fuertemente al sector turístico, el mismo que depende de la captación de los turistas o visitantes. En efecto, la planta turística por la falta de llegada de turistas ha tenido pérdidas económicas e incluso ha generado inestabilidad en el sector y en algunos casos ha llevado al cierre comercial de las empresas turísticas. Sin embargo, a pesar de todos los factores negativos que conlleva estos momentos de crisis, ha sido posible reactivar la economía y actividad comercial de algunas de las empresas turísticas; todo ello ha dependido de la gestión y estrategias que se han establecido los empresas con el fin de innovar en la prestación de servicios de alimentos y bebidas garantizando que se cumplan cada día las normas de bioseguridad y a su vez creando nuevos métodos para la comercialización de los servicios de alimentos ofrecidos por los establecimientos o empresas (RODRÍGUEZ-TOUBES MUÑIZ & ÁLVAREZ DE LA TORRE, 2017).

Prestación de servicios de los establecimientos de alimentos y bebidas en la provincia de El Oro durante la pandemia del covid-19.

La provincia de El Oro cuenta con una diversidad de planta turística necesaria para recibir a la población en general o a los turistas que se dirigen a los distintos cantones de la provincia, siendo los establecimientos de alimentos y bebidas esenciales para el desarrollo turístico de cada destino. No obstante durante la pandemia del Covid-19, dichos establecimientos tuvieron la necesidad de implementar o innovar los métodos de venta y comercialización de sus

servicios empleando diferentes plataformas online, los cuales pudieran garantizar la bioseguridad de las personas. Es por ello que, en la actualidad las ventas online son un factor clave para que la población obtenga los alimentos o bebidas de manera rápida y eficaz. Estas estrategias de venta benefician tanto a los prestadores de servicios de alimentos y bebidas como también a la población en general (CHERREZ, 2018).

Importancia del uso de la tecnología en el servicio al cliente durante la pandemia del covid-19

La inserción de los sistemas tecnológicos en el campo turístico ha sido esencial para el desarrollo productivo del sector, aunque hoy en día todo el sector turístico ha tenido grandes impactos negativos a causa del virus Covid-19. Los aspectos positivos de estas herramientas se dan a la hora de gestionar y analizar datos que interactúan entre sí para generar la información, es importante a la hora de promocionar los establecimientos de alimentos y bebidas mediante la difusión de sus servicios. El crecimiento en función al uso de estas plataformas tecnológicas se ha convertido en un elemento clave para consolidar los beneficios de la industria turística, puesto que fomenta el dinamismo dentro del mercado global poniendo a disposición de la población toda la información actualizada, accesible, interactiva y segura (JOVANOVIC V. & NJEGUS, 2016).

Medidas de bioseguridad en los establecimientos de alimentos y bebidas

El Ministerio de Turismo (2020) a través de su página oficial, ha emitido un documento en donde constan las diferentes medidas de bioseguridad que los establecimientos de alojamiento y bebidas deben tomar en cuenta para ofertar sus servicios. Entre las que resaltan:

- Recomendaciones del personal antes de salir de sus hogares;
- Desinfección de las instalaciones;
- Limpieza de los instrumentos como las vajillas, utensilios y mantelería;
- Recomendaciones para el manejo de proveedores;
- Recomendaciones para servicio a domicilio; y
- Recomendaciones para el cliente.

El objetivo de aquellas medidas de bioseguridad es prevenir la propagación del virus en la prestación de sus servicios, ya sea para usuarios tanto internos como externos de los establecimientos.

En base al tema general del presente documento, se destaca las recomendaciones o requisitos para la oferta de los servicios y productos que los establecimientos de alimentos y bebidas deben ejecutar, entre ellas están:

- La elaboración de los alimentos deben ser elaborados cumpliendo las normas de seguridad alimentaria en vigencia.
- El personal encargado de repartir los alimentos a domicilio deberá mantener la debida distancia de dos metros.
- También se recomienda evitar la aglomeración durante la entrega a domicilio.

De la misma manera para prevenir o contrarrestar la propagación del virus de cliente a repartir o viceversa, hay que tomar en cuenta lo siguiente:

- Realizar limpieza constante del transporte en uso para las entregas a domicilio, asimismo como la sanitización de las mochilas, cajas u otros instrumentos en donde se colocan los recipientes.
- Los recipientes en los que se ofertan el producto deben estar debidamente sellados, para evitar adulteración del mismo durante la transportación.
- El personal de entrega de productos a domicilio deberá prestar sus servicios utilizando los equipos necesarios de protección, entre los prioritarios están, las mascarillas y alcohol.
- Los pagos deberán, preferiblemente, realizarse mediante en línea o tarjetas de crédito. Sin embargo, cuando ello no sea posible se procederá a la firma de vouchers para evitar contagios.
- El personal deberá manifestar si presenta síntomas relacionados con el COVID-19.

Las compras online

El servicio de entrega a domicilio de diferentes servicios gastronómicos se ha convertido en una herramienta de marketing de mayor uso por parte de los usuarios. En función a la oferta de los restaurantes, Gomes Teixeira, Gomes de Souza, & De Azevedo Barbosa (2013) citando a (Rieunier, 2004, Bellos & Kavadias, 2011) manifiestan que el consumidor a través de los tiempos busca nuevas experiencias, no solo la adquisición de servicios o productos. Lo cual ha impulsado a que los establecimientos opten por establecer nuevas formas de atraer o mantener al consumidor. Sin embargo, lo que anteriormente se definía como una estrategia de marketing, hoy en día se ha convertido en un factor indispensable debido a la situación por la que atraviesa la comunidad global.

El COVID-19 ha generado un gran impacto en la sociedad, cambiando la rutina diaria, por nuevas formas de combatir el virus. De esta manera, el confinamiento, debido a la pandemia mundial, ha ocasionado tanto pérdidas sociales como económicas. Desde este punto, las diferentes empresas se han visto afectadas, las cuales han llevado por optar por las medidas necesarias para combatir y contrarrestar la situación, como asimismo adquirir nuevas estrategias, ya que otro de los impactos que ha causado la pandemia ha sido el comportamiento del consumidor hacia la adquisición de productos. De esta manera, las diferentes plataformas digitales cumplen un rol importante, ya que a través de ellas se logrará mantener la vida comercial de los establecimientos (ORTEGA-VIVANCO, MAYRA, 2020).

METODOLOGÍA

Esta investigación es de tipo descriptiva en la cual se encuentra los análisis de los datos levantados mediante el trabajo de campo realizado teniendo como resultado un estudio observacional. Además se aborda como objeto de estudio a las características y preferencias de la población oreense sobre el proceso de compra de servicios de alimentos y bebidas a través de plataformas en línea.

El presente estudio tiene enfoque mixto con métodos cualitativos y cuantitativos obtenidos a través de aplicación de instrumentos metodológicos de tipo encuesta, siendo esta la técnica utilizada para generar el diseño de investigación descriptivo.

Objeto de estudio: Preferencias de compras en los servicios gastronómicos por los Oreenses durante la crisis sanitaria del Covid-19.

Población de estudio: Población económicamente activa perteneciente a la provincia de El Oro

Muestra: La población estimada es de 715.751 según el censo del INEC de la provincia de El Oro (INEC, 2010) mediante el cual se determinará la muestra a través de la siguiente fórmula:

Valores:

- N= 715.751 población
- n= tamaño de la muestra
- Z= nivel de confianza 95%
- e= error de estimación 5% 9/100=0.05
- p= probabilidad a favor 50% 50*100=0.5
- q= probabilidad en contra 50% 50*100=0.5

$$n = \frac{N * z^2 * p * q}{e^2(N - 1) + z^2 * p * q}$$

$$n = \frac{715.751 * 1.96^2 * 0.05 * 0.05}{[0.09^2(715.751 - 1)] + [1.96^2 * 0.5 * 0.5]}$$

$$n = \frac{715.751 * 3.84 * 0.5 * 0.5}{[0.0025 * 715.750] + [3.84 * 0.5 * 0.5]}$$

$$n = \frac{687.120}{1.789+0.96}$$

$$n = \frac{687.120}{1.789.96} = 384 \longrightarrow$$

Tamaño de la muestra de la población de El Oro

Instrumento de recolección de información:

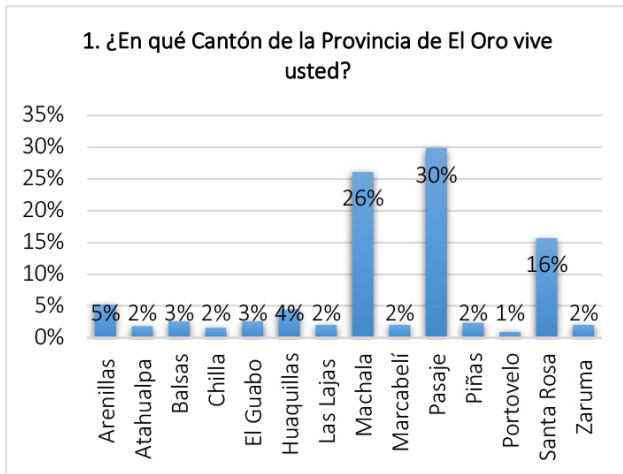
Encuesta

Se elaboró un formulario con 11 preguntas objetivas con opción múltiple, el cual tiene como objetivo recolectar información acerca del grado de satisfacción de la población oreense al momento de realizar comprar vía online y sus preferencias para emplear este tipo de servicio que ofrecen los distintos establecimientos de alimentos y bebidas. Dicho formulario se elaboró mediante la plataforma de google forms y fue compartido con la población oreense en general.

RESULTADOS

Mediante el trabajo de campo realizado se obtuvieron los siguientes resultados de acuerdo al grado de satisfacción de la población oreense con respecto a la prestación de los servicios de alimentación durante la pandemia del Covid-19.

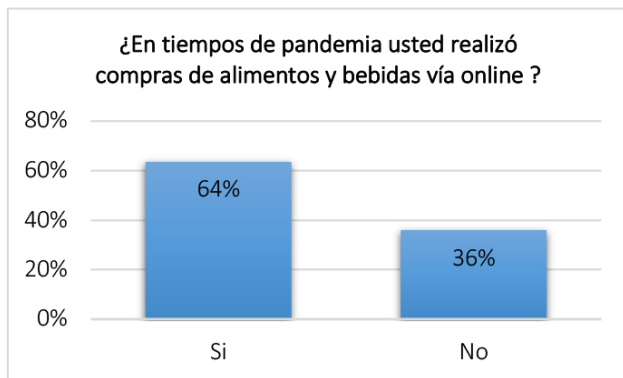
Ilustración 1: ¿En qué Cantón de la Provincia de El Oro vive usted?



Fuente: Trabajo de campo 2021

Actualmente la pandemia del Covid-19 ha generado grandes cambios negativos en los diferentes sectores económicos, tanto a nivel nacional como internacional, es por ello que, la actividad turística es una de las más afectadas durante este tiempo debido a que se ha ocasionado una baja afluencia de clientes en la distintas empresas de la planta turística, entre ellos en los establecimientos de alimentación provocando una disminución en su demanda. En este contexto, se analizaron las diversas opiniones de la población oreense en donde el 30% perteneció al cantón Pasaje, el 26% al cantón Machala, el 16% al cantón Santa Rosa y dentro del rango del 1% al 10% se encuentra los otros 11 cantones encuestados pertenecientes a la provincia de El Oro.

Ilustración 2: ¿En tiempos de pandemia usted realizó compras de alimentos y bebidas vía online?

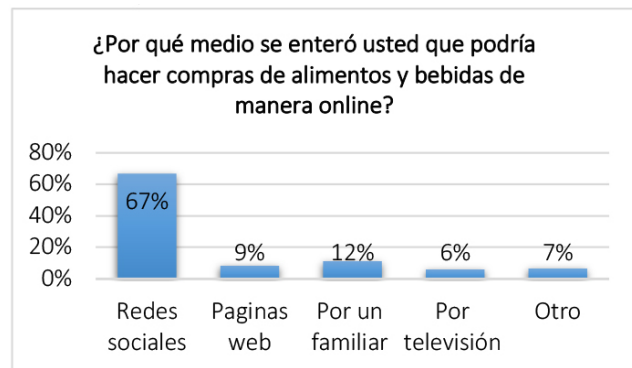


Fuente: Trabajo de campo 2021

Durante el tiempo de pandemia el 64% de los encuestados manifestaron que sí realizaron compras de alimentos y bebidas vía online, debido a que este medio facilitaba la adquisición de los productos alimenticios evitando tener algún riesgo de un posible contagio, mientras que el 36% manifestó que no realizaron compras por este medio debido a distintas razones entre ellas, la falta de fiabilidad para adquirir los alimentos como también el cierto grado de desconfianza al utilizar medios tecnológicos para la compra.

En este sentido, la población Oreense mayoritariamente está haciendo uso de estos medios para la adquisición de diferentes productos y servicios, lo cual beneficia a las empresas prestadoras de servicios de alimentos y bebidas, identificando que en la actualidad las empresas deben ofrecer este servicio con el fin de brindar mejores procesos de comercialización. En función a ello, Casco (2020) expresa que las compras de alimentos mediante plataformas digitales cada día va tomando más importancia entre los usuarios gracias a los beneficios que se obtienen por la adquisición de los productos que se deseen, debido a que además de generar menos aglomeración entre las personas, el usuario también se ahorra tiempo y evita exponerse al virus del Covid-19 garantizando su seguridad y salud.

Ilustración 3: ¿Por qué medio se enteró usted que podría hacer compras de alimentos y bebidas de manera online?



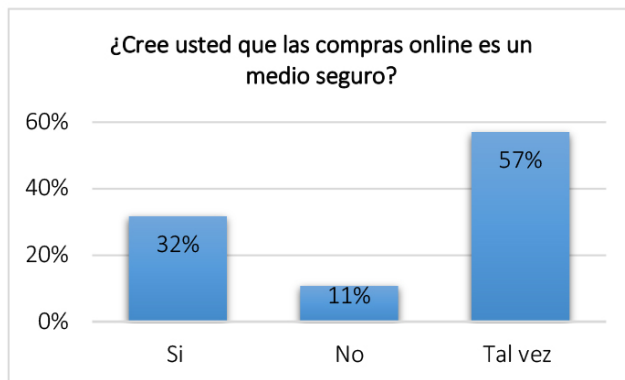
Fuente: Trabajo de campo 2021

La población Oreense si realizan compras de alimentos y bebidas vía online manifestando el 67% de los encuestados que por medio de las redes sociales se enteraron de este servicio para realizar las compras, debido a que las redes son las que más utilizan en su vida diaria, mientras que el 12% conoció de este servicio por medio de la información brindada por un familiar en donde se garantiza las

medidas de seguridad al momento de adquirir los alimentos, el 9% se enteró por medio de páginas web, el 6% por medio de la televisión a través de comerciales publicitarios y el 7% por medio de otros.

En este sentido, es de suma importancia el uso adecuado de las redes sociales ya que esto facilita adquirir una compra efectiva y segura. Según Tello (2020) Las redes sociales son plataformas digitales que a nivel mundial las diversas empresas ya sean grandes o pequeñas utilizan frecuentemente para promocionar los distintos productos o servicios de tal manera que el futuro cliente se sienta motivado a adquirirlos. Es por esto que, unos de los principales medios para impulsar de manera más efectiva los productos o servicios son a través de las redes sociales gracias a su gran alcance dentro de la población.

Ilustración 4: ¿Cree usted que las compras online son un medio seguro?



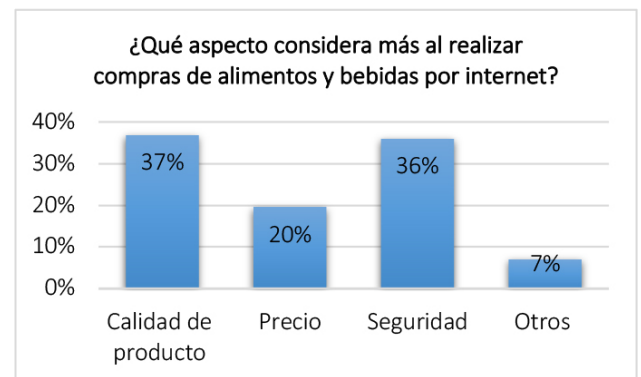
Fuente: Trabajo de campo 2021

El 57% de la población encuestada manifestó que las compras de alimentos y bebidas vía online no es un medio muy factible o seguro debido a que se pueden presentar diversas desventajas al momento de adquirir los productos y esto genera un grado de inseguridad en la población Orense a la hora de realizar compras en Online; mientras que el 32% si lo considera un medio muy seguro por la situación de la pandemia provocada por el virus Covid-19 que se vive actualmente, mientras que el 11% no considera nada seguro las compras de alimentos y bebidas vía online.

Ante esta realidad de la inseguridad que posee la población orense sobre las compras en línea es importante generar mejores estrategias de compra por parte de las em-

presas de alimentos y bebidas; a fin de generar seguridad en los clientes. Para ello, Rodríguez, Ortiz, Quiroz & Parralles (2020) manifiestan que las compras de los productos de alimentos y bebidas vía online son seguras siempre y cuando se verifique totalmente la información de las empresas que brinden este tipo de servicio para poder evitar caer en cualquier engaño, es por ello que, se recomienda que los posibles compradores deben de tener muy cuenta toda la información y recomendación de la empresa o negocio para que la compra sea eficaz y segura.

Ilustración 5: ¿Qué aspecto considera más importante al realizar compras de alimentos y bebidas por internet?



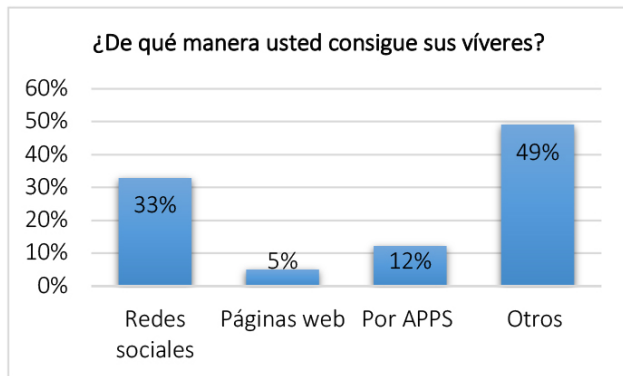
Fuente: Trabajo de campo 2021

El 37% de la población encuestada considera que la calidad del producto al momento de realizar una compra vía online es un aspecto sumamente importante ya que eso garantiza que el producto sea recomendado y reconocido por las personas, como también a la empresa que lo comercialice, el 36% manifiesta que la seguridad tanto de los clientes como de los productos es esencial cuando se hace este tipo de compras, mientras que el 20% expresa que el precio es un factor muy importante para hacer uso del servicio online. Por último el 7% considera otros aspectos que se deben de tener en cuenta cuando se hace compras de alimentos y bebidas por este medio.

Cabe resaltar que la calidad del servicio o de los productos que una empresa ofrece es esencial al momento que un futuro comprador desee realizar la compra, ya que esto permite la fidelización y a su vez la recomendación del producto o servicio hacia las demás personas, garantizando la seguridad en la entrega y así poder lograr la satisfacción total del potencial cliente. Para Palomino (2020) el factor más importante que se debe de tener en cuen-

ta para adquirir ya sean productos o servicios por medio de plataformas digitales es la seguridad que brinda un establecimiento o una empresa al momento de ofrecer su servicio, es así que, se debe garantizar que la imagen o información brindada del producto sea totalmente real y verificable para que los usuarios se sientan seguros de realizar la compra y su grado de satisfacción sea adecuada conforme a lo recibido.

Ilustración 6: ¿De qué manera usted consigue sus víveres?



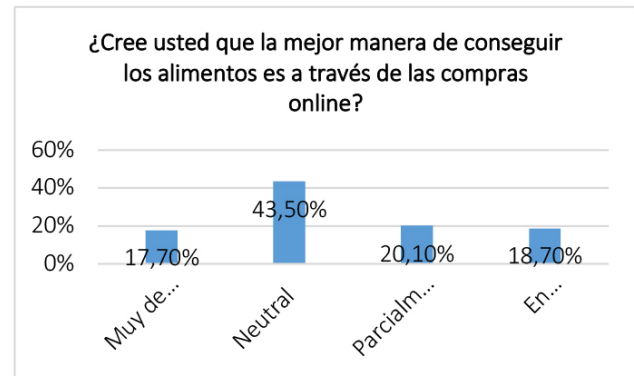
Fuente: Trabajo de campo 2021

Durante la pandemia del Covid-19 el 33% de la población encuestada adquirió los víveres por medio de redes sociales debido a que la mayoría de los establecimientos de tipo alimentos y bebidas hacen uso de este medio para promocionar sus productos, mientras que el 12% hace uso de las aplicaciones disponibles que existen en el mercado por las facilidades que brinda para la adquisición de los víveres, el 5% expresó que utilizaron las páginas web y el 49% de los encuestados manifestaron que adquieren sus víveres mediante otros medios.

En la actualidad las preferencias de los clientes son cada vez más exigentes por lo que esto conlleva a que las empresas día a día creen nuevas estrategias de publicidad y a su vez facilite los métodos de compras garantizando la seguridad y la salud de las personas teniendo en cuenta la emergencia sanitaria por la cual se está atravesando. De acuerdo con Alvarado (2020) la adquisición de los productos alimenticios durante la pandemia ocasionada por el virus Covid-19, ha dado un giro total debido a que las personas cada vez optan por hacer uso de diferentes medios que les facilite realizar las comprar sin salir de casa ya que las medidas de bioseguridad son un factor muy importante para garantizar la salud de las personas y en función a

ello el uso de estas plataformas digitales disminuye los posibles contagios debido a la reducción de las aglomeraciones entre las personas en los distintos establecimientos de alimentos y bebidas.

Ilustración 7: ¿Cree usted que la mejor manera de conseguir alimentos es a través de las compras online?



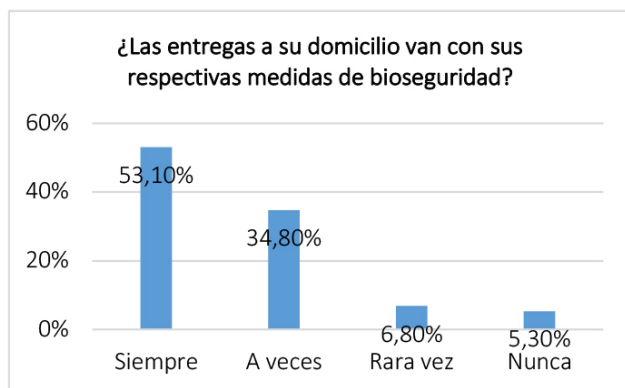
Fuente: Trabajo de campo 2021

Según los encuestados, la mayor parte de ellos representado en un 43,50%, manifestó que neutralmente la mejor manera de conseguir alimentos es online. Mientras que el 18,70% indicó desacuerdo ante las compras de alimentos online.

Ante ello, es evidente que un gran porcentaje de la población encuestada opta por realizar sus compras de alimentos a través de las diferentes plataformas online, medios por los que actualmente los servicios de alimentos ofertan sus productos. Cabe recalcar que debido a la situación de la pandemia, es necesario prevenir contacto masivo.

Además, en la actualidad las redes sociales han cambiado de manera extraordinaria las formas de interrelación de las personas con la cotidianidad. Falcão Durão, André ; Dos Santos, Arthur Jacinto; Avelino, Maria Raquel ; Da Mota Silveira, Carla Borba (2017) manifiestan que según un estudio de investigación realizado en el 2016 por la agencia global de marketing digital, de los siete billones de personas que habitan en el planeta Tierra, tres billones y medio usan internet, y de éstos, unos 2 billones se encuentran activos en las redes sociales. En base a este contexto es aceptable que la mayoría de los encuestados opten por realizar sus compras online y de esta manera evitar la propagación del virus.

Ilustración 8: ¿Las entregas a su domicilio van con sus respectivas medidas de bioseguridad?

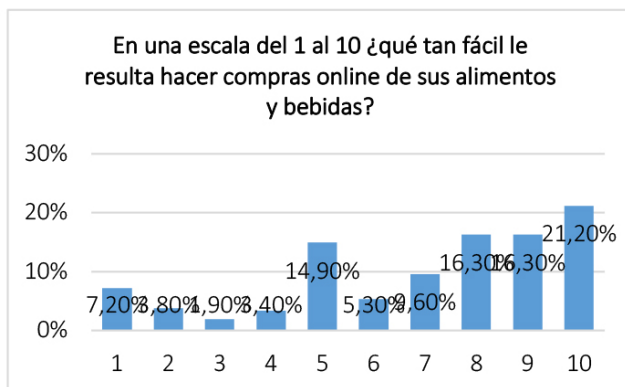


Fuente: Trabajo de campo 2021

De acuerdo a las respuestas obtenidas, se evidenció que el mayor porcentaje de la población encuestada, exactamente el 53,10% de ellos ha recibido sus compras con las respectivas medidas de bioseguridad, todo esto contra un 5,30% el cual expresaron que nunca reciben sus productos con las respectivas medidas. En base a estos datos, es importante recalcar que ante la situación por la que atraviesa la población mundial es necesario que se tomen las medidas respectivas ante la oferta de un producto y mucho más cuando este pasa por un proceso de elaboración muy delicado.

De esta manera, Salas Medina, Navas Alcívar, & Paredes Núñez (2021) manifiestan que para la reactivación de la actividad turística a nivel nacional, los establecimientos deben cumplir con los protocolos elaborados por el Ministerio de Turismo del Ecuador, entre los lineamientos principales están: la limpieza, desinfección y protección personal. En función a ello, permitirán garantizar una adecuada distribución de su servicio y por consiguiente el bienestar de sus clientes.

Ilustración 9: En una escala del 1 al 10 ¿qué tan fácil le resulta hacer compras online de sus alimentos y bebidas?



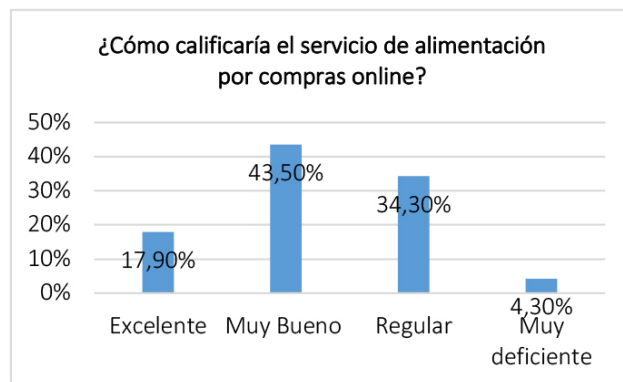
Fuente: Trabajo de campo 2021

La población orense encuestada ha manifestado en su mayoría que les resulta fácil realizar sus compras de alimentos y bebidas online, entre las opciones con mayor porcentaje de elección ha sido de 8,9 y 10 dentro de la escala.

Según los resultados, se evidenció que debido a la situación sanitaria a nivel mundial, la población ha optado por realizar las debidas compras por medios digitales. A pesar de que algunos establecimientos de alimentos y bebidas siempre han ofertado sus productos a través de los diferentes medios digitales, en la actualidad, debido a la crisis de la pandemia se ha extendido la implementación de las ventas online. De esta manera se ha reflejado que a la mayoría de la comunidad orense le resulta fácil realizar compras de alimentos y bebidas online.

Según Larios-Gómez, Fisher de la Vega, & Augusto Monteiro (2021), en la actualidad los consumidores han desarrollado ciertas modalidades de consumir productos o servicios debido al avance tecnológico. De esta manera, en función a la nueva normalidad que vive el mundo, la comunidad se ha visto en la obligación de expandir sus formas de consumir, todo ello gracias a la tecnología.

Ilustración 10: ¿Cómo calificaría el servicio de alimentación por compras online?



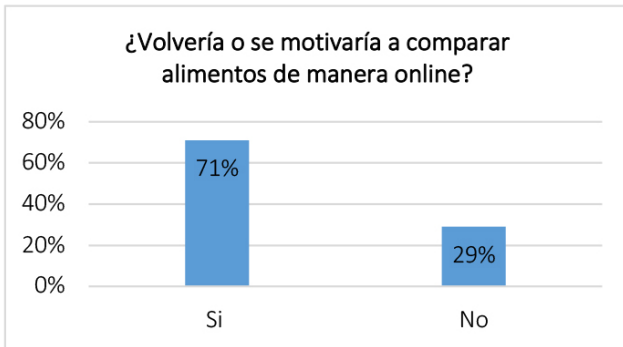
Fuente: Trabajo de campo 2021

En función a la calificación sobre el servicio online que ofrecen los diferentes establecimientos de alimentos y bebidas, los encuestados han manifestado en un 43,50% que es muy bueno, seguido de regular con un 34,30%.

Es importante recalcar que presencialmente el servicio de un establecimiento es importante para que la demanda vuelva a requerir de sus servicios. De la misma manera sucede a través de la oferta online, en la cual suele ser de mucho más exigencia por el consumidor.

De acuerdo al resultado obtenido, se evidenció que los establecimientos de Alimentos y bebidas han cumplido con los requerimientos que el Ministerio de Turismo (2020) ha establecido, para salvaguardar la salud y bienestar de la comunidad ecuatoriana.

Ilustración 11: ¿Volvería o se motivaría a comprar alimentos de manera online?



Fuente: Trabajo de campo 2021

De acuerdo a los datos obtenidos, la comunidad oreense encuestada ha manifestado en un 71% que si volverían a realizar compras de alimentos de manera online, mientras que el 29% no se encuentra motivada a volver a realizar compras a través de este medio.

Todo ello refleja que en su mayoría la población oreense se encuentra satisfecha por el servicio que ofertan los diferentes establecimientos de alimentos y bebidas, lo cual se evidencia en la motivación que tienen de volver a comprar y consumir sus productos.

Además, la pandemia ha obligado a que los consumidores demanden sus productos de manera online, los cuales llegan a la puerta de su casa. De esta manera, los establecimientos de alimentos y bebidas han desarrollado estrategias, las cuales tienen como objetivo principal captar la afluencia de compra y motivar al consumidor a adquirir sus productos (Mamani Coaquira & Cañazaca Quispe, 2020).

CONCLUSIÓN

Mediante la investigación realizada se considera que la prestación de los servicios de alimentos y bebidas du-

rante la pandemia del Covid-19 ha tomado un gran giro en referencia a las estrategias o técnicas para ofertar los productos alimenticios, debido a la importancia de las medidas de bioseguridad que se deben salvaguardar para garantizar la salud de las personas. Por lo tanto, las ventas online actualmente son esenciales para la oferta de los productos o servicios dentro de la planta turística y principalmente para lograr un desarrollo turístico sostenible en el país.

En función a ello, se pudo identificar que el grado de satisfacción de la población oreense es altamente aceptable debido a que las preferencias de los clientes en cuanto a los servicios o productos que se ofrecen son atendidos de la manera más adecuada, con el fin de brindar mejores procesos de comercialización aceptados por dicha demanda. Además, en función al grado de satisfacción por parte de los consumidores se evidenció que los establecimientos han acatado los requerimientos que las entidades en competencia a sus actividades han establecido, permitiendo que la comunidad goce de una nueva experiencia salvaguardando su bienestar y salud.

De esta manera, se observó que la población oreense encuestada se está adaptando a esta nueva modalidad que ha surgido debido a la pandemia mundial, adoptando nuevos métodos de consumir; y de la misma forma han adquirido nuevas experiencias, lo cual los ha motivado a seguir requiriendo de los servicios de los establecimientos de alimentos y bebidas de manera online.

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Research paper

Analysis of the ecotourism potential of the Piñas canton, Ecuador

Análisis sobre la potencialidad ecoturística del cantón Piñas, Ecuador

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ABSTRACT

The Piñas canton enjoys a diversity of resources of both cultural and natural character in its territory, it is for this reason that has been determined as the main objective of this research work the analysis of the ecotourism potential of the Piñas canton belonging to the province of El Oro. Allowing the increase of the economy and the development of new ecotourism projects, taking advantage of the resources contained in the territory in a sustainable way. For the effective development of this research, an analysis of the tourism system was carried out with direction to the internal elements that conform it, which allow identifying the current state of the attractions that exist in the canton, for this reason a methodology based on the deductive method was implemented using the hierarchy of attractions and generation of tourist spaces tool designed by the Ministry of Tourism, along with a direct observation approach. Consequently, the results obtained through the research show that the Piñas canton has as a strength a high state of conservation of its natural attractions, however, it lacks the implementation of plans for the dissemination of its ecotourism attractions, which would allow for an increase in visitors and tourists.

Keywords: tourism, diversity, cultural, ecological, potential.

RESUMEN

El cantón Piñas goza de una diversidad de recursos tanto de carácter cultural y natural en su territorio, es por este motivo que se ha determinado como objetivo principal de este trabajo investigativo el análisis de la potencialidad ecoturística del cantón Piñas perteneciente a la provincia de El Oro. Permitiendo el incremento de la economía y el desarrollo de nuevos proyectos ecoturísticos, aprovechando de manera sostenible los recursos que contiene el territorio. Para el desarrollo efectivo de esta investigación se llevó a cabo un análisis del sistema turístico con dirección a los elementos internos que lo conforman, los cuales permiten identificar el estado actual de los atractivos que existen en el cantón, por esta razón se implementó una metodología en base al método deductivo utilizando la herramienta ficha de jerarquización de atractivos y generación de espacios turísticos diseñada por el Ministerio de Turismo, junto con un enfoque de observación directa. En consecuencia, los resultados obtenidos mediante la investigación evidencian que el cantón Piñas posee como fortaleza un alto estado de conservación de sus atractivos naturales, sin embargo, carece de ejecución de planes de difusión de sus atractivos ecoturísticos, lo cual permitiría llevar a cabo un incremento de visitantes y turistas.

Palabras clave: turismo, diversidad, cultural, ecológico, potencialidad.

INTRODUCTION

Ecotourism is a tourism activity that includes travel mainly in natural areas, since it is an appropriate and responsible type of tourism to achieve sustainable development. The purpose of ecotourism is to promote the activity through practices of sustainability, conservation, and participation with the local community; thus being considered as a typology of alternative tourism. (Blanco Portillo, et al., 2016).

According to Medina (2018), ecotourism activity in Ecuador has generated great benefits for the ancestral groups and communities that reside in many natural areas of the country. It allows the active participation of this population in the field of ecotourism taking into account that it is a process of assimilation on the natural and cultural wealth that the territory has. In addition, Cruz (2017) states that the local population is a significant factor and emphasizes the responsible use of the resources offered by that particular territory; these aspects must go together with the planning and efficient control of the ecotourism activity.

The emergence of COVID-19 has created a new learning scenario for the tourism sector worldwide. That is why, due to the current pandemic situation, it is necessary to change the way of doing tourism (Castello, V. 2020). The reactivation seeks new forms of tourism, so the territories that have natural and tourist areas aim to strengthen the development of the productive sector. For example, the Piñas canton belongs to the coastal province of El Oro, which has mountains, a humid temperate climate, and a great variety of natural and cultural attractions such as rivers, flora, and fauna. These characteristics provide a unique scenic beauty for tourists who visit this place to carry out activities in natural environments.

However, there is limited ecotourism development in this canton. For this reason, we propose to analyze the tourism system of Piñas based on its internal elements such as superstructure, supply, demand, infrastructure, and the guiding community. In addition, it is proposed to determine the tourism potential through the valuation of natural tourism attractions by using the methodology for the hierarchization of attractions and the generation of tourism spaces in Ecuador.

This research aims to determine the potential and tourism diagnosis to carry out sustainable local development and achieve an effective flow in the economy, society, and tou-

ism. Moreover, it is intended to convey a sense of identity to the people residing in this canton through the identification of natural resources available in the territory. Finally, this study identifies the strengths and weaknesses of the natural attractions of the Piñas canton according to the criteria of valuation of tourist attractions. Taking into account as a strength the state of conservation of natural attractions.

METHODOLOGY

The deductive method was used to establish logical conclusions based on an analysis that goes from the general to the particular about the object of the so-called study area. In addition, the research approach was mixed, i.e., qualitative and quantitative, since these two methods were collected, detailed and associated in the same research.

The study area is the Pina’s canton and the following as the object of this study:

1. Internal elements of the tourism system. In this study, the information was collected through direct observation, the methodology of the hierarchy of attractions and generation of tourism spaces in Ecuador, bibliographic research and the application of methodological instruments such as the use of surveys, which allowed obtaining effective information and verifiable data on each of the elements of the tourism services system.

It is important to emphasize that for the analysis of the internal elements of demand, supply and host community, surveys were applied to the established sample, which was obtained through the census conducted in 2010 (INEC, 2010). Therefore, the population of the El Oro province was selected as the study sector by using the formula presented in Table 1.

Sample size:

$$N = \frac{600659}{(0.05)^2 (600659 - 1) + 1}$$

Table 1: Sample formula

VARIABLES	
Sample size (N)	600.659
Constant (1)	1
Maximum admissible error (E)	0.05
SAMPLE SIZE (n)	399,73
Total	400

By: Authors.

In addition, an interview was conducted with representatives of the governance structure, which is responsible for tourism development in the canton. As a result, information related to the internal elements of the tourism system, mainly superstructure and infrastructure, was obtained.

2 For the analysis of the ecotourism potential, a hierarchical method was used to rank the attractions and production of Ecuador's tourist areas and to evaluate the tourist attractions, in which nine evaluation criteria were established. This method according to MINTUR (2017), consists of two stages: Stage I; allows the collection, inspection, hierarchization and location of the different tourist attractions. Stage II; description of attractions, geographical detail and typification of tourist spaces. In addition, the nine evaluation criteria are linked to the particularities including the attraction's offer, which determines a hierarchy. They are also based on tourism competency indicators provided by the World Tourism Organization (UNWTO).

The Ministry of Tourism of Ecuador establishes the following criteria related to the tourism competitiveness index and supply.

Criteria weighting

For Pineda, Sojos, and Calle, who have conducted a scientific article of the tourism system analysis, "the criteria presented in the tourist attraction hierarchy card define the current state of the attraction and its evaluation based on a hierarchy." (2019, p.164).

The following are the criteria for the evaluation of tourist attractions as proposed by MINTUR (2004), which are shown in Table 2.

Table 2: Weighting of criteria for Ecuador's tourist attractions

	Evaluation criteria	Description	Weighting
A	Accessibility and Connectivity connectivity to the attraction	Access roads to the site and	18
B	Tourist plant/ Services by the attraction	Equipment and services provided	18
C	State of conservation and integration / Environment	Integrity of properties, attractions and their surroundings	14
D	Tourism Hygiene and Safety basic services of the attraction	This aspect considers all the	14
E	Policies and Regulations cantonal tourist planning	The attraction is presented in the	10
F	Activities practiced at the attraction attractiveness	Activities that give relevance to	9
G	Diffusion of attractiveness	Acknowledgments and declarations	7
H	Visitor registration and inflow	This aspect considers the demand	5
I	Human Resources	Staff capacity and educational degree	5
	TOTAL		100

By: Authors.

Source: Methodology for the Inventory of Tourist Attractions, MINTUR 2004; Report of the UNWTO Tourism Competitiveness Index 2015.

For the valuation of the tourist attractions, an on-site visit was made by taking into account the fixed weighting values of the criteria. It means that the hierarchical method to rank the attractions and production of tourist areas has a permanent weighting value. Therefore, Sánchez and Calle state that "the criteria under the jurisdiction of the State will have a higher value; while the criteria corresponding to the national tourism authority will obtain a lower weighting, since it has direct incidence within its competences". (2020, p.284-285).

Theoretical basis

Tourism

Tourism refers to the movement of individuals from their current residence to a different location for recreational activities, rest, and fun at the destination (Ledhesma, 2016). Tourism is also defined as a phenomenon that includes social, economic, environmental, historical, and educational aspects. These aspects are also involved in business, state, or non-governmental sectors and are directly linked to the population of the tourist destination.

According to Castro and Galán (2020), tourism includes those activities that individuals carry out in order to take a break and whose trip does not exceed one year in duration. For these authors, tourism incorporates several factors that make it complex.

Alternative tourism

The main purpose of this type of tourism is to travel and participate continuously in recreational activities such as cultural expressions of indigenous, rural, and urban communities and contact with nature by taking into account the cultural, natural, and historical heritage of the area visited. According to Narváez (2014), one of the main characteristics of alternative tourism is working together with people from local communities to practice sustainable development and provide all the necessary guarantees to tourists who carry out tourism activities in a specific place.

Thus, both nature and culture are fundamental elements that provide an alternative tourism experience; natural resources constitute a wide range of activities to be carried out. This type of tourism includes experiences and activities different from those offered by the usual tourist attractions and destinations; as it allows people to enjoy

nature and the unique landscapes that tourist attractions offer. (Vázquez & Lara, 2018).

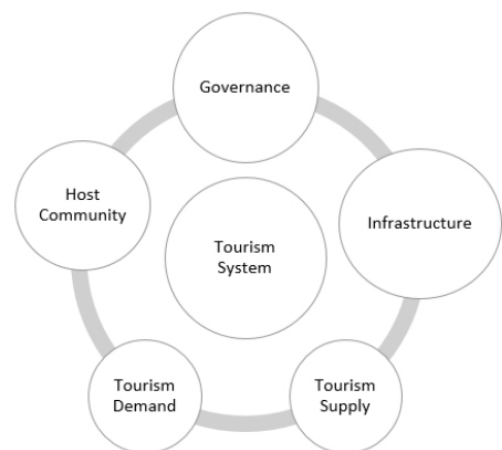
Ecotourism

Orgaz (2014) states that all ecotourism activities should be planned and properly managed, by taking into account the ecosystem and local communities, which prevent the negative impacts on the environment, such as the destruction of the resources that make up the tourist attraction. Moreover, it is important to define the local development that is based on social participation by emphasizing its characteristics and working on the concept's clarifications. Ecotourism promotes different tourist activities carried out in a purely natural environment, which captures the interest of individuals due to the culture and nature it possesses.

Tourism System

Once the ecotourism modalities have been contextualized, it is necessary to identify how tourism development is structured in a specific territory. An analysis of the tourism system must be carried out in order to understand the impact of a tourism activity in an area and to identify the barriers or limitations that condition tourism potential. For this purpose, the model proposed by Boullón (2006), shown in Figure 1, has been used as a basis.

Figure 1: Internal elements of the tourism system



Source: By authors. (Boullón 2006)

Within the tourism system there are external elements, which include economic, social, environmental and cultural aspects, and internal elements such as superstructure, supply, demand, infrastructure, and the host community, which are interrelated and maintain a basis for local development.

Governance: Governance includes public and private entities, which have specific objectives such as promoting tourism in a particular territory, optimizing resources, facilitating production, and promoting the sale of tourism services by considering each of the components that are immersed in the tourism system (Díaz, 2013). The importance of the superstructure of a territory is to manage and plan the promotion of tourism, through the articulation of both public and private sectors. Therefore, the Royal Spanish Academy (2014) mentions that governance aims at a lasting economic, social and institutional development, which achieves a balance between society, the State and the economy of the area.

Infrastructure: It represents the works and services that achieve the development of economic activities, so it is of common use and is part of the tourism field. It is also the basis for the development of a tourist destination and establishes a connection between service providers and the final consumer (Varisco, 2013). The infrastructure includes transportation services, road network, additional services, recreation areas, as well as tourist facilities such as restoration services, lodging, and tourist information.

Tourism supply: All services and goods are marketed on-site, so that tourists can use or consume them at their destination or tourist attraction. According to Boullón (2006), the tourist offer is composed of the services provided by the tourist plant and non-tourist goods, which mainly benefit the visitor. For this reason,

when planning or developing a tourism package, it is essential to establish the real needs of the tourist.

Tourism demand: Comprises the number of individuals who travel away from their residence or place of work to enjoy the tourism services and facilities that a place offers. It is represented by tourists, either collectively or individually, who seek tourist facilities to satisfy their needs. Flores (2012), states that there are two types of demand: Internal demand, which is related to the movement of tourists within their national territory or region; and External demand, which refers to tourists who travel to different or external countries.

Host community: Also known as the local community, it is integrated by the people who share a variety of cultural elements in a specific geographic area. The local population provides all its indispensable supply to meet the needs demanded by tourists, which implies direct participation in the development of ecotourism activities (Varisco, 2013).

Tourism potential

Through their research, Rodríguez, Vargas, Andrade, and Bedolla (2016), refer to the ecotourism potential within communities that have a series of natural resources, which are transformed into tourism products and satisfy visitor demand. It also occurs with the ecotourism potential of a specific area that can be transformed into a tourism product and which is included in the economic offer of this place.

In order to evaluate and identify the strengths and weaknesses of the tourism potential, it is necessary to carry out a ranking process of each tourist attraction in the area. Thus, Sanchez, Parra and Calle (2020), detail that there are several methodologies that allow the evaluation and determination process, which are presented below in Table 3.

Table 3: Contrast of methodologies for categorization, evaluation and ranking of tourism attractions.

According to Sánchez, Parra and Calle (2020) there are many methodologies applied by different organizations and researchers involved in tourism, which contain approaches that represent different phases to achieve proper management. Some of these methodologies are presented in Table 3.

Category analysis	OEA/CICATUR 1978	Leno Cerro 1993	López Olivares 2005	SECTUR México 2005	MINCETUR Perú 2018	MINTUR Ecuador 2017
Classification of resources	Natural areas	Natural areas	Natural or scenic attraction or resource	Natural resources	Natural areas	Natural attractions
	Museums or cultural and historical events	Museums or cultural and historical events	Monumental, technical, ethnological and artistic historical resources	Natural resources	Cultural events	Cultural events
	Folclore	Folclore	Craft and gastronomic resources	Tourist equipment	Folclore	
	Technical, scientific, artistic and contemporary achievements	Technical, scientific, artistic and contemporary achievements	Folklore, festivals and events	Tourist facilities	Technical, scientific, artistic and contemporary achievements	
	Scheduled events	Scheduled events		Market infrastructure	Scheduled events	
	Natural resources	Natural resources	Natural resources	Natural resources	Natural resources	Natural and cultural resources
Aspects to evaluate	Tourist resources	Tourist resources	Tourist resources	Tourist resources	Tourist resources	Tourist resources
				Tourist plant	Particularities	Tourist plant
				Infrastructure	Publications	Infrastructure
				Superstructure	Recognition	Superstructure
					State of conservation	State of conservation
					Tourist flow	Hygiene and safety
					Facilities	Dissemination and promotion
	Territorial representation	Visitor registration				
	Inclusion in tourist tours	Human Resources				
Hierarchization	Hierarchy 1: Attractive without sufficient merit	Hierarchy 1: Complementary resource	Hierarchy 1: Complementary resource	A. Red classification = 0. Means the absence of resources	Hierarchy 1: Attractiveness without sufficient or complementary merit	Resources (0-10): It does not have support infrastructure
	Hierarchy 2: Attractive with a striking feature	Hierarchy 2: Local interest	Hierarchy 2: Local interest	B. Yellow = 1. Implies severe deterioration, neglect, loss or contamination	Hierarchy 2: Resources with striking features	Hierarchy 1 (11-35): Presents minimum conditions to generate products
	Hierarchy 3: Exceptional attractions in a country	Hierarchy 3: Provincial interest	Hierarchy 3: Provincial interest	C. Green = 2. Reflects that the classification of resources is in good condition	Hierarchy 3: Resources with exceptional features	Hierarchy 2 (36-60): Basic conditions for generating interest
	Hierarchy 4: Attractions with very exceptional features of great significance to the international tourism market.	Hierarchy 4: Nacional interest Hierarchy 5: International interest	Hierarchy 4: Nacional interest Hierarchy 5: International interest		Hierarchy 4: Exceptional resources with great significance to the international tourism market.	Hierarchy 3 (60-85): Attractive with exceptional features Hierarchy 4 (86-100): Highly significant attraction for the tourism market.

Source: Tourism analysis based on intrinsic strengths and weaknesses of the territory: Case of Zaruma, Ecuador. (Sánchez, Parra and Calle, 2020).

As it is evident in Table 3, there are different theoretical models for the hierarchical ranking of tourist attractions. Each one of them has similarities in terms of evaluation criteria and hierarchical levels, understanding that the hierarchical level will allow knowing the level of development that the attraction has and could have. Furthermore, in some countries the tourism authority establishes management and quality procedures to strengthen tourism development. In Ecuador, a methodological guide has been established for the ranking of attractions and generation of tourist spaces. It is based on the competitiveness indexes issued by the UNWTO, to establish the criteria and weighted values for the ranking process.

Hierarchization

The inventory of tourist attractions includes all the areas that have cultural and natural characteristics, which are considered part of the territorial patrimony. It is an instrument responsible for providing specific data, maintaining proper management, organization, execution and territorial diagnosis. It also achieves a better selection of strategies for the tourism development of the territory. (MINTUR, 2017).

Once the information on the attraction has been collected, a numerical value is generated, which is equivalent to the score obtained out of 100. It should be classified in the hierarchical level established by the Tourism Ministry of Ecuador, as detailed in Table 4.

Table 4: Hierarchy of tourist attractions

Ranks	Hierarchy	Description
76 – 100	HIERARCHY IV	Attraction that has the optimal conditions for the development of tourism products.
51 – 75	HIERARCHY III	Attraction that has adequate conditions to develop tourism products.
26 – 50	HIERARCHY II	Attractive with some peculiar characteristics, it motivates the visit of national tourists, because it has basic requirements to develop tourism products
11 – 25	HIERARCHY I	Tourist attraction that has the minimum conditions to develop tourism products.
0 - 10	Resource	Cultural or natural element that drives displacement.

By: Authors.

Source: Methodology for the Inventory of Tourist Attractions, (MINTUR 2017).

RESULTS

Analysis of the Tourism System

The tourism system allows for an analysis of the object of study by evaluating the territory based on five internal elements such as superstructure, supply, demand, infrastructure, and host community. These elements are analyzed from a territorial approach and with a transversal sense that takes into account the axes of sustainability to identify the strengths or barriers that the internal elements of the tourism system have.

Through field work and by using the direct observational method and the methodological guide for ranking tourist attractions and spaces, the strengths or barriers that condition the canton's tourism development were identified. In addition, for the present analysis, those criteria that reach a percentage of 70% to 100% will be considered as strengths, while percentages ranging from 69% to 1% will be identified as limitations to tourism development:

1. Superstructure

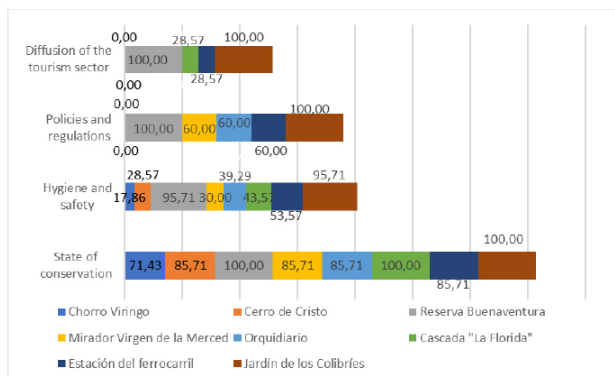
The superstructure is one of the elements of the tourism system that is composed by public and private organizations. This competence represents the companies that develop and provide services within the tourism field, reaching an optimal fulfillment of the needs of those who integrate it (Pineda, Sojos and Calle 2019). In this manner, tourism activities are developed on a regular basis. In the Piñas canton, the governance structure consists mainly of the Decentralized Autonomous Government, which is experiencing a problem with its natural attractions that reflect poor management.

Superstructure		
	Positive aspects	Negative aspects
Economic	The governance proposes projects to take advantage of the spaces and offer alternatives to tourists who travel to the canton.	Many service providers are not linked to governance.
Social	Strategies are being implemented to improve tourism promotion.	Dissemination of tourist attractions is a poor indicator at the time of implementation.
Environmental	Awareness-raising projects for local residents and tourists for the conservation of natural and cultural attractions.	Some strategies are not applied within the tourist areas, which represents a lack of control.

By: Authors
Source: Fieldwork 2021.

Based on the management of the superstructure of the canton's tourism potential, the tourist attractions were analyzed based on four evaluation criteria taken from the methodological guide for ranking tourist attractions, which are directly related to the competence of the governance of the Piñas canton, as shown in Figure 2.

Figure 2: Governance management in tourist attractions.



This analysis allows establishing the conservation status criteria as the main strengths, because the natural attractions represented by the "Buenaventura Reserve" obtained a weighting that is higher than the estimated value. That is why, it is considered a conserved attraction. In addition, it represents a positive impact because it can produce long-term benefits. As Lapo, Quituisaca, and Calle state, "it is essential to sustain all the needs of future generations by protecting tourist areas that promote ecotourism in the territory. It will benefit the local population within the economic sphere due to the arrival of tourists." (2019, p.173).

Regarding the dissemination of the attractions, the results represent a weakness because only two natural areas have a weighted value higher than 70%, the rest have a percentage lower than 30%, which reflects a limited ecotourism promotion by the delegated entities. According to Mendes, Augusto Biz, and Gándara (2013), the dissemination of tourist attractions is considered useful for the commercialization of tourism by local organizations that offer services involved in economic mobilization and local development, through the implementation of tourism activities.

The criterion of policies and regulations corresponds to the natural space placed in the local tourism development plans. The results reflected a percentage between 60% and 100% except for three that have a weighting of 0, which is worrisome, since this criterion refers to actions carried out by public administrations and institutions.

Regarding hygiene and safety, the Buenaventura reserve stands out with 95.71% and the Jardín de los colibríes with 95.71%, both of which represent a potential for the Pina's canton. In contrast to the other attractions, this criterion represents a weakness. For the Tourism Ministry (2017), tourism safety is the reflection of respect and protection towards a tourist attraction. It is associated with the comfort of tourists when traveling since safety guarantees the physical and psychological protection of the visitor, service providers, and the local population. In terms of hygiene, the areas must have people in charge of collecting and depositing waste in order to preserve and conserve the state of the tourist areas.

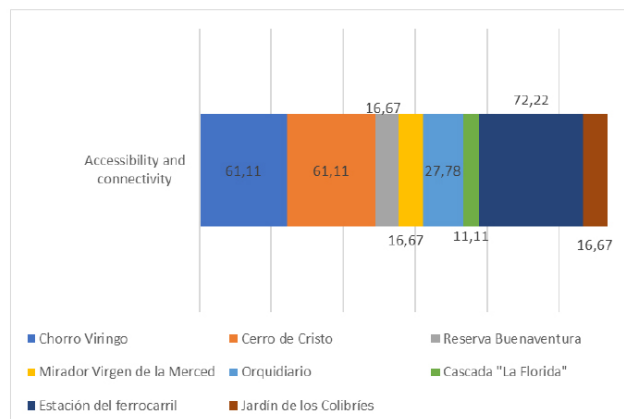
2. Infrastructure

The infrastructure criterion is composed of all the aspects that allow the development of complementary areas that are part of the natural attractions of the Pina's canton. Figure 3 shows the results obtained by evaluating the accessibility and connectivity criteria.

Infrastructure		
	Positive aspects	Negative aspects
Economic	97.40% of people consider that tourism activities can be developed in the Pina's canton.	Poor tourism impact outside the national territory..
Social	The Pina's canton has 76% potable water services, 98% electricity and health services, and 55% sewerage services throughout the area.	There is a lack of signage to find the tourist attractions in the area.
Environmental	Waste collection coverage (78%) in the territory..	Access roads to tourist attractions are not in good condition.

By: Authors
Source: Territorial development plan and fieldwork 2021.

Figure 3: Infrastructure of tourist attractions



The results of the accessibility and connectivity criteria reflect a weakness of the canton's tourist attractions since they were rated below average, except for the Estación del Ferrocarril, which scored 72.22% for this criterion.

The accessibility and connectivity section represents a benefit for the sector, due to it generates a good performance within the social, economic, and tourism aspects. According to Carrillo and Boujrouf (2018), tourist accessibility is the reflection of the service quality, since people have free access to enjoy the tourist attractions. On the other hand, signage and conditioning represent a disadvantage for the canton since people can't find the tourist attractions.

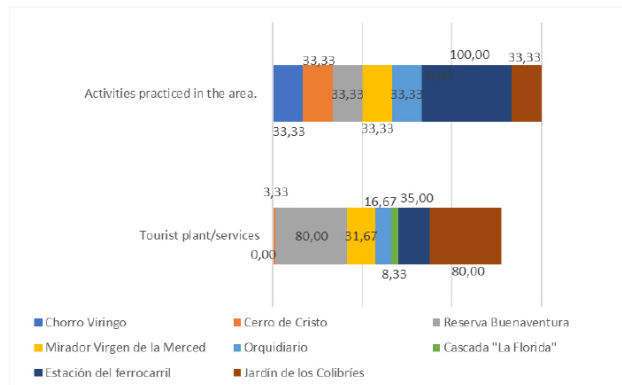
3. Offer

The tourism supply is constituted by the tourism plant, the goods and services, and complementary elements that are part of the tourist destinations in the Piñas canton. From a theoretical point of view, tourism supply refers to the goods of the areas and spaces where tourism activities are carried out, which meet all the expectations of individuals (Ayaviri, Quishpe, and Sanchez, 2017).

Offer		
	Positive aspects	Negative aspects
Economic	The Pina's canton has a tourism plant made up of 4 lodging establishments, 7 A&B establishments, 4 recreational establishments and 2 transportation establishments.	No tourism promotion plans have been developed by the GAD.
Social	38.3% of the respondents stated that they practice tourism activities very frequently.	The service providers do not have trained personnel.
Environmental	Piñas has 18 attractions; 10 natural attractions and 8 cultural attractions.	Waste collection at the attractions is done each week.

By: Authors
Source: Territorial development plan and fieldwork 2021.

Figure 4: Offer in tourist attractions



For the criterion of activities practiced within the attraction, the Estación del Ferrocarril has an above-average value in comparison to the other attractions which obtained lower scores. This criterion is important because the activities practiced in the area benefit the community economically. The attractions of the Pina's canton promote ecotourism because people take advantage of the spaces that are part of their surroundings.

4. Demand

This parameter integrates both tourists and their consumption needs. It takes into account all tourists who purchase goods and services such as lodging, restaurants, transportation, information, and recreation. According to Rosado, Carbajal and Oliver. (2017) the influx of visitors represents a valued amount of people who visit a tourist area to relax, distract and enjoy. Based on the demand that the Pina's canton had, the following aspects are identified.

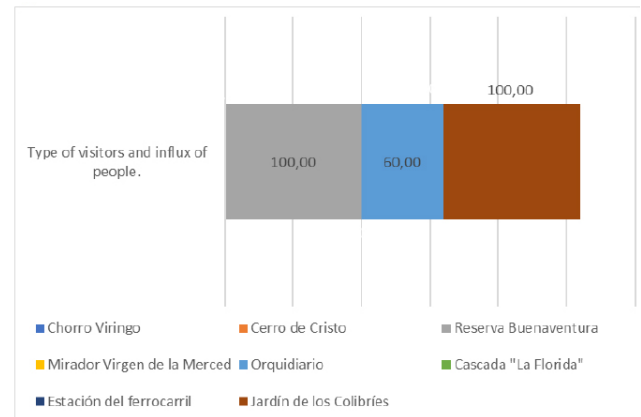
	Demand	
	Positive aspects	Negative aspects
Economic	86.50% of tourists consider that the Pina's canton offers quality tourism services.	National tourists visiting the Piñas canton do not spend a considerable amount of money on tourism.
Social	77.80% of tourists have visited the Pina's canton.	22.22% of the respondents do not know and have not visited the canton..

Environmental	97.40% of the tourists surveyed mentioned that ecotourism activities can be carried out in the canton. It means that this canton has a variety of landscapes and natural areas	There is no environmental management plan for Piñas' tourist attractions.
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By: Authors
Source: Fieldwork 2021.

Based on the demand for the canton's tourist attractions, the following has been determined, Figure 5.

Figure 5: Demand of tourist attractions.



In the evaluation criterion "Type of visitors and influx", the main attractions are: the Reserva Buenaventura with a 100% weighting, the Orquidiario Municipal de Piñas with 60%, which also has a physical record without information analysis, and the Jardín de colibríes with 100%. On the other hand, some attractions do not have a digital or physical tool to obtain statistical data on visitor arrivals. It is necessary to take into account this information in order to determine the demand for the attraction.

4. Host community

For the tourism development of the host community, it is important to include all residents, as they play an active role in the tourism performance of the place. They increa-

se the productivity of tourist destinations composed of leaders of local associations, organizations, and communities of a specific area (Velasco, 2020). Aspects of the Piñas canton community are detailed below.

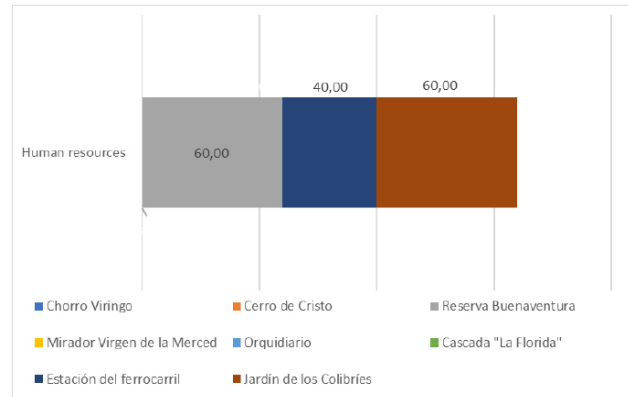
Comunidad receptora		
	Positive aspects	Negative aspects
Economic	62% of the population between 15 and 65 years of age is considered a productive population. It means that they can work and make a living.	Lack of tourism ventures and businesses.
Social	In the Piñas canton, 40% of the population has received primary education, 21.7% attends secondary, while only 10.1% attends higher education, and 0.4% attends graduate school.	In the Piñas canton, the school dropout rate in rural areas is 3.8%, and in urban areas, it is 5.3%.
Environmental	The presence of forests and herbaceous vegetation in the canton is 20% of the territory, the presence of humid and dry forest is 5%.	58.84% of the canton's land is overexploited. This zone is considered a protected area, but it is currently used for pasture and agricultural purposes, so there is significant deterioration.

By: Authors

Source: Territorial development plan for the Piñas canton.

Mendoza, Fernández, and Salas (2016) state that natural resources are the main elements within ecotourism because they develop better tourism management in cooperation with the continuous participation of individuals who have specific needs in terms of tourism services. For this reason, Figure 6 shows the percentage of human resources that the tourist attractions of Piñas canton have.

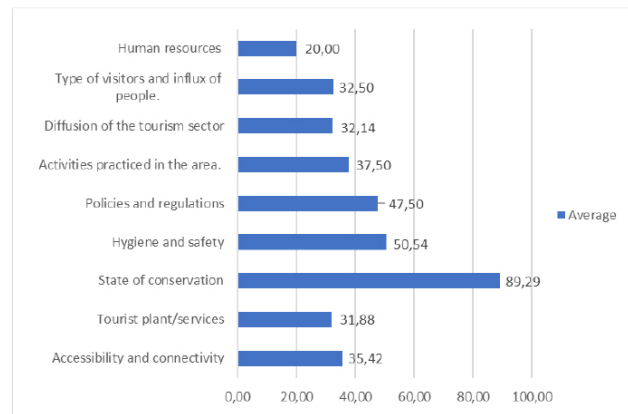
Figure 6: Host community working in tourist attractions.



For the "Human Resources" criterion, the Reserva de Buenaventura y the Jardín de colibríes have 60%, the Estación del ferrocarril has 40% in comparison to other attractions, which have 0% weighting. Due to this situation, it is extremely important to implement strategic planning for human resources in each of the canton's attractions.

Analysis of the ecotourism potential of the Piñas canton. Rodriguez and Martinez define tourism potential as the compendium of opportunities to develop tourism activities in the environment by making appropriate use of resources, which increase tourism potential in the locality (2016, p.178).

Therefore, the ecotourism potential of a specific area is recognized through the valuation of its resources and comprises two principal cycles: the recording of the potential of the area's resources and the evaluation of all inventoried resources (Cartuche, Romero and Romero, 2018).



The tourist potential is the set of characteristics that the natural environment gives to the tourist attraction. The activation of this environment allows reaching the maximum potential of the area since the tourist attractions include its customs, traditions, activities, and tangible and intangible characteristics that attract visitors' attention. (González, Párraga, Calle, 2020).

Thus, the potential of the Piñas canton is favorable for ecotourism activity, since in the criterion of the conservation status of tourist attractions a percentage of 89.29% was obtained, which is considered the only strength. However, there are barriers that condition ecotourism potential, such as hygiene and safety with 50.54%, policies and regulations with 47.57%, attraction activities with 37.50%, accessibility and connectivity with 35.42%, type of visitors and affluence with 32.50%, attraction dissemination with 32.14%, tourist plant/services with 31.88%, and finally human resources with 20%. These criteria need to be improved to strengthen tourism in the canton. The Piñas canton has a series of natural attractions that are evaluated through a tourism diagnosis, which analyzes their strengths and weaknesses. It also allows establishing a table of potentialities, through which the authorities are responsible for developing policies to raise the quality of tourism in the indicators identified as weaknesses.

CONCLUSIONS

Based on the results obtained from the analysis of the Piñas canton's tourism system, it is evident that the State of Conservation criterion is the only strength under the jurisdiction of the Governance which regulates, coordinates, and promotes tourism activities in the territory represented by the Decentralized Autonomous Government of the canton. On the other hand, its weaknesses include the state of hygiene and safety, the notable absence of tourist signs to facilitate access to the attractions of the canton, and the indicator of policies and regulations, in which the decentralized autonomous government does not have a development project with approaches to tourism implementation. In addition, in the criterion of the activities that are practiced, they are considered self-guided. Similarly, the results show a lack of tourist facilities/services in the area, such as lodging establishments, food and beverage services, guides, and tour operators. In addition, the canton's tourist attractions have limited infrastructure, i.e. the signage is not in optimal condition because it does not have adequate lighting. Therefore, the arrival of tourists

and human resources to provide information to visitors is reduced, except for the Reserva Buenaventura and the Jardín de Colibríes.

On the other hand, it is concluded that the Piñas canton has low tourism potential, not only because of the lack of elements that favor the natural environment of the place but also because of the lack of tourism planning by the governance in areas of cultural and natural attraction, although the accessibility and connectivity to the canton are appropriate and allow the development of tourism activities. Furthermore, this research indicates the existence of ecotourism potential in the Piñas canton, which implies the work of governance and the community to achieve a favorable development of the productive matrix and the skills and knowledge of human resources.

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Blended learning of tourist guides: Cultural diversity and intercultural competence

Aprendizaje a distancia de los guías del turismo: diversidad y competencia intercultural

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ABSTRACT

The article analyzes certain reflections in the creation of a conceptual scaffolding to evaluate the intercultural competence of German-language tourist guides, by making use of the theory of mediation in their professional tourism context. It begins with a discussion about the importance of the German market and examines the role of the tour guide in the intercultural setting. It is considered that the development of intercultural competence has not been sufficiently studied in courses for language improvement in the tourism sector. The objective is focused on developing distance training for the development of intercultural competence in tourist guides, by making use of the theory of mediation in their professional context. It focused on a new definition of intercultural competence and the form of distance learning was proposed to assume the design and application of training.

Keywords: word, word, word cultural diversity, intercultural competence, distance learning, tour guide

RESUMEN

En el artículo se analizan reflexiones en la creación de un andamiaje conceptual para evaluar la competencia intercultural de los guías de turismo de idioma alemán, al hacer uso de la teoría de la mediación en su contexto profesional turístico. Se inicia una discusión sobre de la importancia del mercado alemán y se examina el papel del guía de turismo en el escenario intercultural. Se considera que el desarrollo de la competencia intercultural no ha sido suficientemente estudiado en cursos para el perfeccionamiento idiomático en el sector turístico cubano. El objetivo se centra en desarrollar un entrenamiento de capacitación a distancia para el desarrollo de la competencia intercultural en guías turísticos, al hacer uso de la teoría de la mediación en su contexto profesional. El artículo reunió una nueva definición de competencia intercultural y se propuso la forma de aprendizaje a distancia para asumir el diseño y su aplicación.

Palabras clave: diversidad cultural, competencia intercultural, aprendizaje a distancia, guía de turismo

INTRODUCTION

The international tourism industry could face in the next 2021 a growing number of travelers to the Caribbean area. The tourist market has become the major source of resources in Cuba during the last decade and has shown strong growth until 2019 in arrivals to our country; specifically, from the German market that grew in 2019 by more than 243,000 travelers, so it is expected to be one of the largest sources of international tourists to Cuba beyond next year.

The increase in the proportion of the number of tourists from the German-speaking market against the number of travelers from other markets to Cuba will demand the development of new marketing strategies that need to be adapted to this tourism market. This increase is considered to have caught the tourism industry off guard. Its Cuban professionals are unable to distinguish between the peculiarities of the clients that come from this geographical area and are all contained under the label of "German market", which includes the German itself, which continues to be different according to which part of that "wall imaginario" meets and also the Austrian and Swiss client, as they do not have knowledge about the cultural particularities of these European visitors.

Consequently, the tourism training system will face new challenges and must continue to learn about the German-speaking tourism market; It has to develop more trainings with a cultural orientation more accentuated to the degree of cultural sensitivity of the visitors. According to this context, cultural sensitivity (Morales, 2017) is expressed in the "necessary capacity to assume the role of mediator between Cuban and German culture, when addressing, confronting and solving misunderstandings between these cultures and problematic situations of this nature.". It is considered a process of self-development and a resource in the face of conflicts in which the abandonment of ethnocentrism is required.

The success of retaining this still growing market in our country will depend on recognizing and responding quickly to the needs of the different clients coming from this area, especially the German, Swiss or Liechtenstein and Austrian clients and, at the same time, attend to their differences.

Tourists' perceptions of those who take care of them du-

ring their stay can reinforce their experiences or intimidate them into repeating the visit. These perceptions are extremely important, particularly for tourists of German origin. More needs to be learned about how cultural differences affect tourist behavior. Its influence on perceptions of the destination and on professionals in direct contact with visitors is considered to be of particular importance.

German-speaking tourists come to Cuba for a relatively short time, mainly in groups organized in circuits and in this environment that they develop they limit contact with local individuals. According to Armstrong and Mok (1997), "tourists develop their perceptions through direct contact with service providers who are often the only points of contact with visitors. Cultural differences between tourists and service providers can affect their social experiences and their satisfaction with each other". By understanding cultural differences, our professionals can develop and offer new cultural features of a tourism product as added values.

For a tourist destination like Cuba, it is considered vital to train its tourism employees on the cultural foundation of its visitors, especially German-speaking visitors. It is essential that suppliers understand and focus on the cultural needs of different markets. The growth of these markets with different cultural perceptions not only represents a challenge and an opportunity for the Cuban tourism sector worker but also for our tourism market. In the opinion of this author, it is of great importance to understand their cultural orientation when broadening the purpose of marketing and highlighting market segmentation and designing new advertising campaigns. Therefore, it is a challenge to possess the ability to respond to the peculiarities of each market and not simply adopt global marketing programs.

The organizers of the circuits personify the first points of contact with tourists. Therefore, the cultural differences in interpersonal interaction in the context of tourism must be clarified in these two groups, tourists and organizers. The participants in this meeting in the field of Cuban-German tourism or other German-speaking countries, start from their own cultural assumptions, many subjectively justified, when selecting travel guides, observing images and advertising in the media. Its effect is decisive for the cultural perception of the message.

The success or failure of the intercultural encounter depends a lot on the perception of cultural differences. Therefore, it is essential to train professionals who have direct contact with tourists, in this specific case our tour guides, through the design of distance training training to improve their skills in specific intercultural situations.

There is no specialized material in the field of tourism that shows how to approach intercultural communication. In this specific case, working with the specialized vocabulary in the area of tourist orientation and gathering regional information on visitors from other German-speaking countries has been insufficient for Cuban tourist guides. The ignorance of the cultural arsenal of the foreign market and the lack of recognition of the values of our own culture have become important aspects that must be considered in the content of the education and training courses aimed at this profession. Hence, the objective of this work is framed in creating a distance training training and promoting from it the development of intercultural competence in Cuban tour guides who have a direct exchange with tourists from the German market.

The study proposes the use of the two main actors in the training process: the teacher-student binomial. This responds to the Blended Learning process (García Aretio, 2001), which can be used, in moments of blendedness and in others, where it is associated with distance learning of students. This process makes use of the advantages of online and face-to-face training, combining them with a type of training that streamlines the work of both the teacher and the student.

Professional training is considered a form of professional improvement aimed at enabling university graduates or upper secondary level, such is the case of professional tourism guides, to acquire, expand and continuously improve their knowledge and skills required to raise their skills in your job performance. Furthermore, from the methodological point of view, the qualitative paradigm and the ethnographic method are assumed in this work. This method is assumed in attention to appropriate techniques and instruments to collect and analyze information and for the description of students with previous professional experience within the training courses for tourism guides. The results allowed obtaining the internal perspective of the participants in this type of training.

The selected aspects are consistent with the interests re-

flected in the instruments previously applied. The undesirable aspects that the application of these instruments produced have a precise influence on the behavior of clients who travel to Cuba. This prevents them from becoming repeaters, mediating the results of their stay, the fulfillment of their expectations, the disclosure of the experience upon their return and the persuasion for others to visit us. This situation would be reversed if a broader training approach were taken into consideration, from the training process of these professionals. To this end, it was decided to frame intercultural competence in postgraduate German language training in the system for Cuban tourism training as the object of study of this work, while its objective was concentrated on developing a distance training training for the development of this competition in German-language tour guides.

The distance training training has as a secondary objective, the consolidation and promotion of habits and skills as well as the information and values of the profession through various exercises, such as descriptions, critical debates, simulation exercises and group discussions.

METHODOLOGY MATERIALS AND METHODS

Distance education (EaD), according to Collazo (2004), emerges as a form of teaching in which students do not need to physically attend the place of study. In this teaching system, the student receives the study material personally, by email or other possibilities offered by the Internet.

Currently, the use of innovative means of communication is a constitutive part of a training in foreign languages and provides a valuable tool to support us in both professional and general issues through an additional process of distance or semi-face-to-face teaching and learning. The characterization of distance training training, together with its two components, the methodological indications and the assumed evaluation system should contribute to the gradual development of strategies based on intercultural dialogue, aimed at promoting cultural sensitivity, through the use of the foreign language.

The strategies based on intercultural dialogue defined by Böhm (2014) include "the ability to relate the culture of origin and the foreign one; one's own cultural sensitivity; the ability to identify and use strategies to establish contact with people from other cultures, together with the

ability to promote the role of cultural mediator between the mother's culture and the target culture; to deal effectively with conflict situations and the ability to overcome relationships marked by negative stereotypes towards other cultures”.

In this regard, the researcher Bachmann (2017) deciphered certain questions from the study on intercultural sensitivity within the Development Model for Intercultural Sensitivity (DMIS), described in 1993 by Bennet and Hammer. The DMIS outlines the successive phases of cultural sensitivity and is understood through individual progress, associated with particular attitudes and behaviors. They are characterized by a phase of ethnocentric rejection, defense, and minimization, states in which the individual sees his own culture as the center and makes judgments about other cultures according to his own and another known as the ethno-relative phase, when the individual accepts, he adapts and integrates. In this phase, individuals recognize cultural differences and understand that their own culture is one of many and is considered equally valid.

The tour guide, if he does not have university training in the foreign language, is generally unaware of aspects of the target culture that should be addressed in the training. To achieve the desired ethnorelative phase, the experiences of the guides 'work will be considered and it is advocated to fill the students' gaps in the knowledge of their own culture. From the moment he begins to go through that phase, his role is not limited to that of a profession in the sector, but must be seen as cultural mediators. As the dependence of visitors on tour guides is high, their performance as a cultural mediator is a significant factor that contributes to the quality of intercultural encounters and their experiences.

According to Torres (2003), a cultural mediator requires “a broader cultural and linguistic perspective than that of the average educated man or that of the professional in other spheres of knowledge”. The tour guide must have skills that allow him to act favorably on the quality of the interaction, that facilitate the establishment, maintenance and repair of communication between people of different languages and cultures. He must have knowledge in relation to the interaction processes at a social and individual level and know the characteristic social groups of both cultures, their beliefs, meanings and values and the expected behaviors.

The guide's performance influences the tourist's experience in a fundamental way. In the same way that the group depends on its guide for idiomatic interpretation, the latter establishes the mediation and interaction of the group with the communities of the mediator in different social settings. In his role as cultural mediator he facilitates communication, understanding and action between people who differ in language and culture. Guides play a direct role in mediating cultural exchange between visitors and representatives of the target culture and reinforcing the experiences of tourists.

The theory and research in this aspect of the mediation of tour guides have not anticipated the considerable increase in tourists from this market, despite its obvious importance. In this framework, for guides who lead tourist groups made up of different cultures, it is key to reflect on the reference frameworks used to understand and address, for example, cultural diversity, referred to by Costa and Ravetto (2018). These frameworks refer to the “degrees of knowledge that is handled about the cultures with which they are related, ways of understanding cultural diversity and the identification of their contributions in the processes to operate”. Likewise, it is pertinent to identify which are the skills that the organization promotes or tolerates of its members (for example, promoting meaningful experiences that allow interaction and exchange of meanings between members of different cultures).

From the activities to be developed during the training they will make the students reflect on their own social reality and contrast it with others so that the tasks contribute to training in the foreign working language, respect and tolerance of cultural diversity. As an example, it is correct to identify interaction features according to the relationships established between the Cuban guide and Latin American representatives and, on the other hand, the work of our professionals with German tourists or tourists of this origin. In the first case; Among members of collectivist cultures, such as ours, interaction is geared towards the group's interests and needs. Social relations between individuals are perceived as referring to their social utility and within the circuit these are characterized by group activities; sharing and doing things together establishes dependency, group loyalty and prevails general agreement, inclusion and immediacy as features to be highlighted.

In contrast, Germans or their German-speaking neighbors, belonging to a more individualistic culture, care

more about the needs of the individual and their well-being. They place greater emphasis on exclusive relationships and "perform the acts as their own" Müller-Jacquier, B. (2017). The perception of recollection is strong and the relationships between individuals that coincide within the groups in the most distant circuit. Isolation is positively perceived and withdrawal from other people is respected. Consequently, this is seen as a phenomenon with selfish nuances where individual benefit is detrimental to collective interests. Depending on the degree of cultural divergence, the guide must make use of their cultural competencies and assimilate that guiding is not conceived in the same way for a group of Spanish-speakers as for a German-speaking group, even when the same objects are observed in the same places.

The repertoire of the types of communicative interaction varies according to each culture in question. Solutions to communication problems within one culture need not correspond to solutions in another culture. Furthermore, a specific communication problem can be seen as something habitual within one culture, while the same problem emerges in another culture as something unusual. Held, G. (2019) expresses that "knowledge about the types of communicative interaction not only refers to the knowledge of the type or situations that are used, but also to the types that are also involved in this knowledge."

According to cultural and historical changes and on the basis of cultural variations, the types of communicative interaction have become an unavoidable topic in the intercultural research field, as well as the linguistic in the idiomatic context for professional purposes. The types of interaction are not only complex, but also generate an interactive model of performance during exchanges between professionals and visitors. They are built acting reciprocally by means of a scaffolding and represent a considerable palliative to communication; They relieve the individual of the need to reflect again on a specific model in each communicative situation and when deciding between uncertain possibilities.

German-speaking tourists come from different territories and try to become familiar with social and cultural practices, experiences and condition their habits explicitly or implicitly to the established models that reach them through communication. At this moment a mutual enrichment can originate, which would also involve our professional, as, in the same way, cooperation can be jeopardized by deriving

in the drag of stereotypical attitudes until developing an apprehensive and alarming behavior.

A trait identified by Ting-Toomey (1999) as important for the successful performance of our professionals is the so-called intercultural empathy, manifested in the "ability to respectfully observe and react to the other communication process through verbal language and non-verbal sensitivity". In fact, many intercultural communication theorists judge this perceptual acuity of certain individuals as important for observing and interpreting other actions through a broad cultural prism. This author also describes an important factor for the success of intercultural competence, highlighting the ability to manage psychological tension. The emotional aspect of facing failures, confusion and mistakes and continuing to work towards positive interactions is identified as an effective component for the development of intercultural communication skills.

RESULTS AND DISCUSION

In this study, intercultural competence is assumed as the ability of the learner with command of the foreign language to exercise self-awareness about their culture, possess knowledge of the target culture and know how to interact and behave between both, making use of knowledge, strategies or skills and attitudes in his conversion as a cultural mediator. Knowing and being able to sensitize, raise awareness, relativize and get involved in effectively solving specific problems of a social nature fosters this ability, by properly handling situations that arise from communication with people from other cultural settings.

The achievement of intercultural competence is the result of the adaptability or the individual's ability to suspend or modify some archaic cultural behaviors, to learn and accommodate new ones, and to find ways to handle the dynamics of difference, assuming an intergroup position and diminishing the tension. Certainly, Kim (2001) proposed three dimensions related to the concept of intercultural adaptability and made them correspond with the cognitive dimension that is established when the interpretive mechanisms of an individual or structures that assign meaning to the messages, the affective dimension linked to motivation intercultural of an individual and the behavioral dimension, by reflecting the abilities of an individual to be flexible and be willing using their cognitive and affective abilities.

Success before the cultural mediation of a tour guide depends largely on three essential factors, such as: knowledge of the language and of their own culture, their organizational attitudes and their skills in interpersonal communication. These three dimensions, as well as cognitive, affective and behavioral factors contribute to understanding and analyzing intercultural communicative competence in the context of the tour guide. According to Sommer (2018), effective guides have an "arsenal of extensive knowledge about tourist sites and attractions. In addition, they must have a solid foundation of the culture they interpret, as well as the culture of their clients". Your cultural arsenal could be considered the most important and includes cultural values, idiomatic, communication styles, customs and gadgets. Armed with such knowledge, guides can provide their clients with insightful insights into a destination, leading to an understanding of what is presumed to be "real" and "authentic" in a way; which is considered unlikely of success without attending cultural trainings for these professionals or having been "culturally immersed".

From the communicative point of view, the anecdotes of the tour guides help tourists to understand and accept local customs without the superfluous value judgments that are made on them, and they can show visitors how to act in a way that Do not consider the opposite of the norms and the projections of local thought, by personifying, according to the tourist's vision, many of the national characteristics of the indigenous population. The attitude that the guides project, in the eyes of the visitor, reflects a lot about the local culture and makes a lasting impression on the destination that the visitors will take home with them. It is perhaps this element that exerts a notable influence on the psyche of the tourist, when it is taken up again in the narrations about the tourist destination visited before friends, family and other new potential clients.

However, just the knowledge of a tour guide is not enough in mediation. Guides also need to have the right attitudes for effective mediation, including fostering empathy and respect for visitors. In a given situation, cultural mistakes and misunderstandings can be avoided or they can be more easily reconciled by the intervention of the guide who possesses this intercultural heritage and the ability to communicate effectively between the two cultures. Effective communication means that guides negotiate shared meanings by appropriating them and deploying dissimilar strategies and effective behaviors to achieve the results that they and their clients desire.

The intercultural communicative competence of a tour guide has a positive effect on visitor satisfaction by contributing to the quality of the intercultural experience during their trip. The narration of historical anecdotes and the proper use of sayings should be present on the tourist route. For this, the guide must show off his previous personal knowledge and observe frequently how the group is manifesting itself. It is vitally important how people and groups are socially categorized during the sightseeing tour.

CONCLUSIONS

Based on the experiences gathered in the exchanges with some tour guides, it is concluded that this training should be designed and implemented to improve their skills in certain intercultural situations. Its design is feasible to encourage the mediation of situations, with the outline of the following reasons: The tourist guide, if he does not have university training in the foreign language, does not know aspects of the target culture. The experiences of the work of the tour guides will be considered, the students' gaps in the knowledge of their own culture will be supplied, activities for group work will be incorporated, as the daily performance of the professional tour guide is considered.

The exposed reflections have prepared a basis for evaluating, from there to the intercultural competence of these professionals, when making use of intercultural communication and the theory of mediation in the tourist context. The factors that affect the intercultural competence of the guide are contained in this framework, together with the characteristics of the visitor and their combined influence on tourist satisfaction. The conceptual framework that has been outlined suggests that a combination of these factors will determine the level of understanding of the visitors and their satisfaction with the intercultural experience in the guided tour.

These reflections are expected to contribute to further research on the role of this competence in the work of the tour guide. Given the scarcity of explorations in this area, scaffolding should prove useful in capturing a good understanding of the intercultural experience during a tourist trip and the role of the guide in that experience. On a practical level, it is expected that the factors of intercultural competence can be applied in training, according to the needs, as well as in experimental behaviors that help to regenerate and further expand the growing flow of visitors from the German market to our country.

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Research paper

Mapping sustainable tourism through scientific publications: Progress towards the 2030 agenda

La cartografía del turismo sostenible a través de las publicaciones científicas: Avances en pos de la agenda 2030

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ABSTRACT

Tourism has become one of the main sectors in promoting the economic development of localities and job creation. Given the magnitude and projection of tourism activity, it represents a high risk for the geographic space where it is developed and sustainability in the sector is an increasingly perceptible global challenge. In this sense, the academic community has paid special interest in recent years to research associated with sustainability in tourism. The present study seeks to describe the state of the construct based on the analysis of bibliometric indicators of productivity, dispersion and visibility or impact, as well as a visualization of the networks of authorial and institutional collaboration and a temporal analysis of the lines of research or fundamental thematic axes. The main results show a progressive increase in the number of research studies, a high dispersion of scientific production, as well as a collaborative network dominated almost entirely by the most notable authors. The research allows us to characterize the state of the art of the construct and provides researchers with important bibliometric information to guide future studies.

Keywords: Sustainable tourism, research, bibliometric

RESUMEN

El turismo se ha convertido en uno de los principales sectores en la promoción del desarrollo económico de las localidades y la creación de empleos. Dada la magnitud y proyección de la actividad turística esta representa un alto riesgo para el espacio geográfico donde se desarrolla y la sostenibilidad en el sector constituye un reto global cada día más perceptible. En tal sentido la comunidad académica le ha prestado un especial interés en los últimos años a las investigaciones asociadas a la sostenibilidad en el turismo. El presente estudio busca describir el estado del constructo partiendo del análisis de indicadores bibliométrico de productividad, dispersión y visibilidad o impacto, así como una visualización de las redes de colaboración autorial e institucional y un análisis temporal de las líneas de investigación o ejes temáticos fundamentales. Los principales resultados evidencian un incremento progresivo en el número de investigaciones, una alta dispersión de la producción científica, así como una red de colaboración dominada prácticamente en su totalidad por los autores más notables. La investigación permite caracterizar el estado del arte del constructo y dota a los investigadores de información bibliométrica importante para encausar futuros estudios.

Palabras clave: Turismo sostenible, investigación, bibliometría.

INTRODUCTION

Awareness of sustainability in organizations, both in the business sector and in other sectors, has been increasing in recent years since most nations have assumed the need for a sustainable development agenda materialized in the Sustainable Development Goals until 2030. Many organizations have assumed sustainability as a significant factor that integrates corporate social responsibility with a relevant impact at the organizational level on employees, customers, suppliers, strategic partners, other stakeholders and the community in general. (Tovar et al., 2015).

Tourism is a sector where there is a direct interaction with both customers and the environment, so the responsibility associated with the environment, natural and anthropic resources and local communities is even greater than in other business sectors. (Millán et al., 2015). As tourism activity increases in magnitude and projection, the impacts it causes on the environment where it is developed become more alarming and can become a serious threat. It is precisely the development of sustainability in tourism that aims to minimize damage to the geographical and socio-cultural environment while promoting local economies. (Costa y Lima, 2021; Cruz-Sintes et al., 2020).

Despite the relevant role of sustainable development in today's business context, three decades ago the concept of sustainability in tourism was virtually ignored by the academic community. (Bramwell et al., 2017). Since its emergence at the end of the 1980s, the study of this phenomenon has become a major topic in the academic, business, legal and governance spheres. (Moyle et al., 2020).

However, given its holistic approach that facilitates diverse interpretations, there is still no broad consensus regarding the conceptualization of sustainable tourism (Brankov et al., 2015; Niavis et al., 2019). This is mainly due to the fact that sustainability is a complex concept, made up of diverse perspectives sometimes perceived in opposing ways by the actors involved in tourism management (Niavis et al., 2019; Saarinen, 2006).

According to World Tourism Organization and United Nations Development Programme (2017), sustainable tourism is that "which takes full account of current and future economic, social and environmental impacts to meet the needs of visitors, the industry, the environment and

host communities". Thus, sustainable tourism presents a multidimensional conception from different approaches such as economic, political, cultural, environmental, social and ethical. In spite of this, many studies approach the construct from a context limited only to some approaches such as environmental or economic, without conceiving a holistic conception of this concept (Bramwell y Lane, 2005; Saarinen, 2006).

According to Moyle et al. (2020) instead of focusing narrowly on a theoretical approach from a single approach, research on sustainable tourism should address issues such as the possibilities of the tourism industry in contributing to the overall development objectives of a destination, society and, from a broader perspective, to the global objectives associated with sustainability. Consistent with this Weiler et al. (2018) raises the need to assume multidisciplinary and interdisciplinary terms as a key requirement for an integrated approach from science that allows a broader perspective of the phenomenon under investigation.

Sustainable tourism represents the complementarity between the production and exploitation of resources and respect for the environment in which tourism activity takes place (Cardoso et al., 2014). Sustainability in the sector allows not only the preservation of natural resources, but also focuses on other aspects such as the authenticity of local culture and the fair distribution of wealth. It also addresses the negative impacts of unstructured and mass tourism, which has been developing for decades and to which both business stakeholders and the academic community have paid special attention in recent years (Millán et al., 2015).

In turn, awareness of environmental issues and policies has allowed consumers to increasingly value the efforts made by companies in the area of corporate social responsibility, and the efforts of institutions have made sustainable tourism a reality in certain companies associated with the sector. (Cardoso et al., 2014).

Despite this, some studies claim that sustainable tourism needs to demonstrate relevance and impact in an uncertain and complex global landscape (Bramwell et al., 2017; Bramwell y Lane, 2015; Fodness, 2017). This position is

based on the gap between theoretical contributions on the construct and the relatively limited evidence of implementation in practice, despite the relevant importance that the topic has assumed today (Moyle et al., 2020). Given this ineffectiveness for implementation in practice, many researchers propose to broaden the narrow perspective of the phenomenon from its three fundamental pillars to a broader conception that addresses other essential factors that are catalysts for the implementation of sustainability in the sector (Mihalic et al., 2021).

Likewise, some authors recognize that studies on sustainability in tourism are expanding in volume, but remain static in content (Bramwell y Lane, 2013; Moyle et al., 2020). This is primarily due to the limitations of the methods used in the research that restrict the extrapolation of the findings to a broader context that certainly favors the development of such a field of science (Moyle et al., 2020).

In such a scenario, it is essential to understand the dynamics of this construct since sustainable tourism constitutes a central element in many of the recent reflections of other fields associated with hospitality and tourism (Qian et al., 2018). From this perspective, the study of the behavior of scientific production on the construct provides researchers with a panoramic view of it, while facilitating the understanding of its current state through the visualization of trends and thematic axes. (Costa y Lima, 2021).

Bibliometrics is a relatively innovative methodology compared to the traditional method of systematic literature review (Serrano et al., 2019). It consists of the analysis of the patterns of scientific production of a given field of science or discipline with the aim of evaluating it quantitatively, through the use of statistical tools (Koseoglu, 2016).

Bibliometric analyses facilitate the understanding of various aspects associated with the theoretical structure of a given discipline such as the direction of the lines of research, the authors who constitute the vanguard and lead a specific field of science, the journals in which the largest number of research papers are published, as well as the gaps, problems and evolution of the scientific production of a field at a given time (Okumus et al., 2018; Serrano et al., 2019). In addition, they provide useful information for researchers and academics to evaluate the scientific ac-

tivity associated with a discipline (De Oliveira y Baracho, 2018), serving as a guide to deepen the actual state of a given research topic (Rey-Martí et al., 2016; Serrano et al., 2019).

The usefulness of bibliometric studies is widely recognized in various disciplines so it is not surprising that sustainable tourism has not been skeptical of the emersion of this methodology, which is expressed in the growing number of research on the subject that use bibliometric analysis as a fundamental method of study (Bramwell et al., 2017; Costa y Lima, 2021; Cruz-Sintes et al., 2020; Garrigos-Simon et al., 2018; Moyle et al., 2020; Niñerola et al., 2019; Qian et al., 2018; Ruhanen et al., 2018; Ruhanen et al., 2015; Serrano et al., 2019).

These investigations differ in their approach, objectives, databases used, time frame and key terms in the search for relevant literature, as well as the software used and the types of analysis developed. For example, some of the studies seek through a series of bibliometric indicators, both of production and of visibility or impact, to describe the state of the art of the construct (Costa y Lima, 2021; Cruz-Sintes et al., 2020; Niñerola et al., 2019; Qian et al., 2018); while others focus on the study of the theoretical, methodological and empirical approaches to sustainable tourism (Ruhanen et al., 2015) including analyzing its evolution by periods as is the case of the research conducted by Moyle et al. (2020).

Regarding databases, there are also tangible differences as some researchers use prestigious databases such as Scopus or Web of Science (Costa y Lima, 2021; Garrigos-Simon et al., 2018; Niñerola et al., 2019) while others prefer to use high impact journals such as *Journal of Sustainable Tourism*, *Annals of Tourism Research* and *Tourism Management* to conduct their studies (Moyle et al., 2020; Ruhanen et al., 2018; Ruhanen et al., 2015). On the other hand, several articles temporally frame their research from 1987 (Moyle et al., 2020; Niñerola et al., 2019; Ruhanen et al., 2015) as this was the year in which the World Commission on Environment and Development presented its report "Our Common Future" which popularized the ideology of sustainable development in both the academic community and the business sector.

Likewise, the key terms used in the literature search differ as some authors use equations where several keywords converge given the very multidisciplinary nature of the construct (Garrigos-Simon et al., 2018; Niñerola et al., 2019), although others prefer only the term "sustainable tourism" with the inclusion of its possible variations (Costa y Lima, 2021; Moyle et al., 2020; Ruhanen et al., 2015).

The present study systematizes the results of bibliometric indicators referring to the construct, extends the time frame under investigation and uses the Dimensions database in the bibliographic search, in which a large number of high impact journals are indexed, as well as others of lower visibility. The objective is to describe the state of the construct "sustainable tourism" from the analysis of scientific production using indicators of productivity and visibility or impact, as well as a brief analysis of the authorial collaboration networks, both through the institutions and the collaboration between authors, which facilitates the understanding of the structure of this field of science and allows understanding the relationships established between authors and institutions through joint publication.

Similarly, the most frequently addressed research topics and those with the highest rates of obsolescence or current relevance are analyzed based on the analysis of co-occurrences of key terms contained in the titles and abstracts, which allows the systematization of those topics that are trends in the field under study.

METHODOLOGY MATERIALS AND METHODS

The methodology used by Costa and Lima (2021) is adapted to achieve the proposed objectives based on the joint use of bibliometric indicators and analysis of collaborative social networks to understand the structure of the construct, as well as to determine patterns in scientific production on the subject. For the collection of bibliometric information, the articles indexed in the Dimension database were used with the inclusion criterion that they were only scientific articles. This database indexes very useful bibliometric information and includes a large number of journals associated with the hospitality and tourism sector, making it a relevant source for the development of the research.

The period of analysis chosen was from 1970, which coincides with the oldest article located in the database on the subject, to 2020, the year in which the research was carried out. Given the multidimensional nature of sustaina-

ble tourism, the union or interception of several key descriptors is used based on the following search equation: "sustainable tourism" OR ("tourism" AND "sustainability") OR ("tourism" AND "sustainable development") OR "ecotourism".

Once the articles were located, they were exported in different formats for subsequent analysis in statistical software. The bibliometric software VOSviewer version 1.6.16 was used for data processing, as well as the Microsoft Excel statistical manager for the normalization of the information obtained and its tabulation and processing.

In order to analyze the scientific production on the construct, bibliometric indicators of productivity and impact were chosen together with social network analysis or SNA (Social Networks Analysis). Bibliometric indicators allow describing, monitoring and evaluating scientific production (Costa y Lima, 2021; Koseoglu et al., 2016) while social network analysis is widely used (Costa y Lima, 2021; Garrigos-Simon et al., 2018; Koseoglu, 2016; Qian et al., 2018) to study the structure of the fields of science and the behavior and degree of relationship between authors. The interaction between the two forms of study is essential to understand to a greater degree the current state of any construct or field of science.

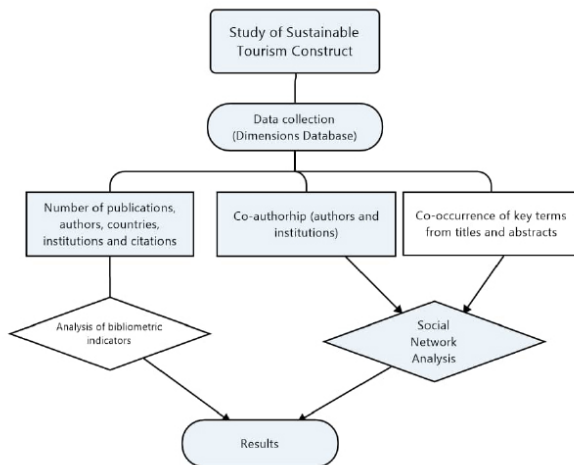
As part of the analysis, variables associated with productivity and visibility or impact are used, such as the number of articles published, the year of publication, the scientific journals, the number of authors, the country of origin, as well as the total frequency of citations both by author and by source. In addition, cooperation networks between authors and institutions are studied through the analysis of co-authorship that expresses the relationship between two authors, institutions or countries established through the number of publications they share (Perianes-Rodriguez et al., 2016). These observations are based on essential indicators in the study of social networks such as density and centrality measures and allow studying how knowledge is shared between authors and institutions that show high levels of cooperation (Koseoglu, 2016; Perianes-Rodriguez et al., 2016).

In addition to these indicators, the co-occurrence of terms contained in the titles and abstracts of the research was studied and, given their extensive number, only those that co-occurred more than 50 times were chosen. The key terms contained in titles and abstracts are important

for understanding a field of science because the authors assume a correlation when choosing these terms and this relationship becomes even more significant when observed in their interaction with the rest of the cooccurrence network (Costa y Lima, 2021). Likewise, these relationships are observed through a temporal visualization that allows a longitudinal study over time of those research topics with greater or lesser obsolescence.

Based on the procedure described above, Figure 1 illustrates and systematizes it for a better understanding of the readers.

Figure 1. Flow chart of the method used for data collection and analysis



RESULTS

Temporal analysis of scientific production

The first studies of sustainability in the tourism sector are evident in a discrete and sporadic way in the 70s of the last century not being until 1990 that a steady growth of scientific production on the subject is manifested (Figure 2). A total of 1646 scientific articles have been published, highlighting a growing interest in the construct and an exponential growth of its scientific production in the period 2016-2020.

Figure 2. Evolution over time of the scientific production on sustainable tourism.

Table 1: Journals with the highest productivity in relation to the Sustainable Tourism construct

Scientific Journal	number of items	%	% accumulated
Journal of Sustainable Tourism	292	17.74	17.74
Tourism Management	87	5.29	23.03
Annals of Tourism Research	63	3.83	26.85
Worldwide Hospitality and Tourism Themes	52	3.16	30.01
Current Issues in Tourism	51	3.10	33.11
Tourism Recreation Research	49	2.98	36.09
Journal of Travel Research	39	2.37	38.46
Tourism and Hospitality Research	32	1.94	40.40
Anatolia	29	1.76	42.16
International Journal Of Tourism Research	29	1.76	43.92
Tourism Management Perspectives	29	1.76	45.69
Tourism Review	28	1.70	47.39
Tourism Geographies	27	1.64	49.03
Asia Pacific Journal of Tourism Research	26	1.58	50.61



Distribution of production by journals

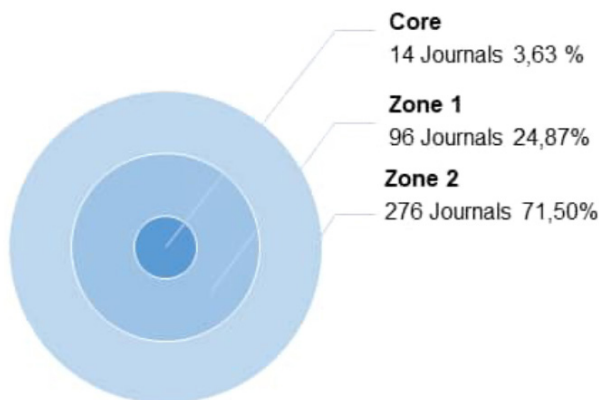
The scientific journal with the highest number of publications is the Journal of Sustainable Tourism, which represents 17.74% of the total number of publications and which, together with the 13 consecutive journals listed in Table 1, constitute the core around the field of science under study.

Figure 3. Bradford dispersion areas

constitute the core around the field of science under study.

For the analysis of the dispersion of productivity from the sources, the Bradford dispersion areas were used as shown in Figure 3. Given that the traditional way of determining the Bradford areas from the graphical representation on a similogarithmic scale and its superposition on a straight line is not always practical, the authors determined these areas by classifying the journals in decreasing order of citation frequency and calculating the core from the accumulated 50%.

As Figure 3 shows, even though the topic is widely studied by numerous journals, Bradford's core includes only 14 journals representing only 3.63% of the total number of journals addressed. This core indicates the concentration of a small group of journals with the highest production and visibility, which implies a rapid drop in performance if the search is extended beyond the core.



Analysis of scientific production by author

The study yields a total of 1001 authors who have published scientific articles on the subject, of which the most productive are listed in Table 2. The author with the highest number of articles is Bramwell, Bill with a total of 27; followed by Lane, Bernard with 24; Hall, C. Michael with 14 articles and Dolnicar, Sara with 12 manuscripts on the construct.

Table 2: Productivity by authors

Authors	number of items
Bramwell, Bill	27
Lane, Bernard	24
Hall, C. Michael	14
Dolnicar, Sara	12
Font, Xavier	11
Dwyer, Larry	10
Jayawardena, Chandana	10
Weaver, David B.	10
Boley, B. Bynum	9

Analysis of scientific production by country

As in the analysis of the sources, when studying productivity by country, a great dispersion of scientific production is evident. Of the 89 countries that ventured into the field, Table 3 shows the most productive ones, with the United Kingdom being the country with the highest number of articles on Sustainable Tourism with a total of 160, followed by the United States with 119 and Australia with 108. In the case of the Latin American region, the number of articles published represents only 2.55% of the total, with Mexico and Brazil being the two most productive countries with 9 and 8 articles respectively.

Table 3: Productivity by country

Scientific Journal	number of items	%
United Kingdom	160	9.72
United States	119	7.23
Australia	108	6.56
China	69	4.19
Spain	54	3.28
Canada	47	2.86
Indonesia	45	2.73
Italy	35	2.13
New Zealand	29	1.76
South Afric	22	1.34

Analysis of the visibility or impact of the articles

For the analysis of the visibility or impact of the references, the total number of citations received by each document was used (table 4), as well as the Platz index, which is simply the decimal logarithm of the total number of citations and allows a more appropriate comparison. The document with the greatest impact was Sustainable tourism as an adaptive paradigm (Hunter, C. 1997) published in the journal Annals of Tourism Research, which received a net total of 458 citations.

Table 4: Visibility or impact of scientific articles

Reference Cited	citations	Platz Index
Hunter, C. (1997). Sustainable tourism as an adaptive paradigm. Annals of Tourism Research, 24(4), 850–867.	458	2.66
Butler, R. W. (1999). Sustainable tourism: A state-of-the-art review. Tourism Geographies, 1(1), 7–25.	450	2.65
Liu, Z. (2003). Sustainable Tourism Development: A Critique. Journal of Sustainable Tourism, 11(6), 459–475.	436	2.64
Choi, H. C., & Sirakaya, E. (2006). Sustainability indicators for managing community tourism. Tourism Management, 27(6), 1274–1289.	434	2.64
Buckley, R. (2012). Sustainable tourism: Research and reality. Annals of Tourism Research, 39(2), 528–546.	422	2.63
Sharpley, R. (2000). Tourism and Sustainable Development: Exploring the Theoretical Divide. Journal of Sustainable Tourism, 8(1), 1–19.	410	2.61
Saarinen, J. (2006). Traditions of sustainability in tourism studies. Annals of Tourism Research, 33(4), 1121–1140.	405	2.61

Bramwell, B., & Lane, B. (1993). Sustainable Tourism: An Evolving Global Approach. Journal of Sustainable Tourism, 1(1), 1–5.	343	2.54
Moscardo, G. (1996). Mindful visitors. Annals of Tourism Research, 23(2), 376–397.	339	2.53
Lee, T. H. (2013). Influence analysis of community resident support for sustainable tourism development. Tourism Management, 34, 37-46.	325	2.51

Analysis of the visibility or impact of the authors

The most prolix author is Bramwell, Bill who has received a total of 394 citations and who presents the highest Platz index, this coincides with the fact that he is the most productive author which increases the chances that he will be cited in a paper. Similarly, other authors with high visibility and impact show a direct and increasing relationship with productivity (table 5). Among other authors who are references in the field are Hall, C. Michael, Gössling, Stefan y Lane, Bernard.

Table 5: Visibility or impact of authors

Author	Citations	Platz Index
Bramwell, Bill	394	2.60
Hall, C. Michael	389	2.59
Gössling, Stefan	368	2.57
Lane, Bernard	261	2.42
Scott, Daniel	211	2.32
Buckley, Ralf	189	2.28
Gursoy, Dogan	186	2.27
Dolnicar, Sara	185	2.27
Becken, Susanne	173	2.23
Peeters, Paul	173	2.23

Analysis of the visibility or impact of the journals

As has occurred with the authors, the journals with the highest visibility coincide to some extent with the most productive ones, the highest impact journal being the Journal of Sustainable Tourism with a total of 3837 citations and a Platz index of 3.58. Other journals (table 6) with the highest visibility are Tourism Management and Annals of Tourism Research.

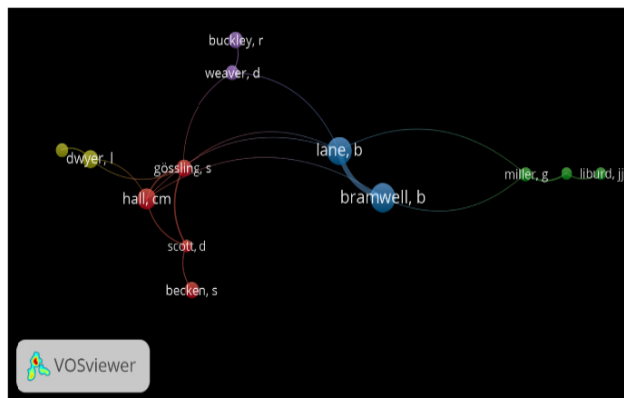
Table 6: Visibility or impact of journals

Journals	Citations	Platz Index
Journal of Sustainable Tourism	3837	3.58
Tourism Management	3526	3.55
Annals of Tourism Research	3388	3.53
Journal of Travel Research	1420	3.15
Current Issues in Tourism	586	2.77
Tourism Geographies	446	2.65
International Journal of Tourism Research	362	2.56
Tourism Recreation Research	361	2.56
International Journal Of Hospitality Management	272	2.43

Author collaboration network

The base criterion is established as those authors who have published at least five scientific articles on sustainability in tourism. The collaboration network indicates that there is a great interrelation between the most productive and prestigious authors (figure 4), as they tend to publish together, which justifies their presence in the four clusters of the network.

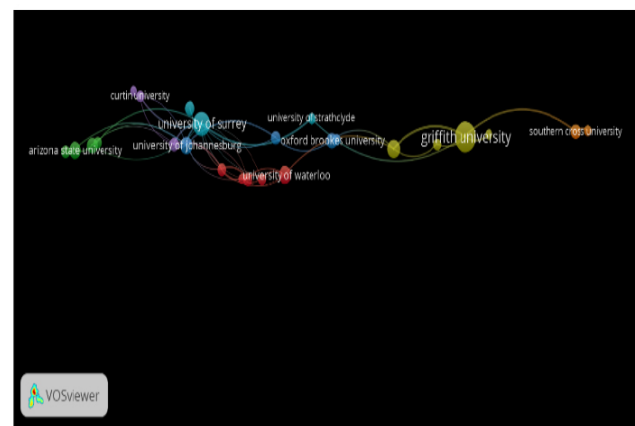
Figure 4. Author collaboration network



Institutional collaboration network

The institutional collaboration network reveals the existence of close collaboration between a group of universities in various regions of the world. The largest nodes correspond to those institutions with the highest levels of productivity, while the thickness of the lines connecting the nodes indicates the intensity of the interrelationships between the various universities (figure 5). The largest nodes correspond to universities located in Australia (Griffith University, University of Queensland, Southern Cross University), the United States (Arizona State University, Texas A&M

Figure 5. Institutional collaboration network



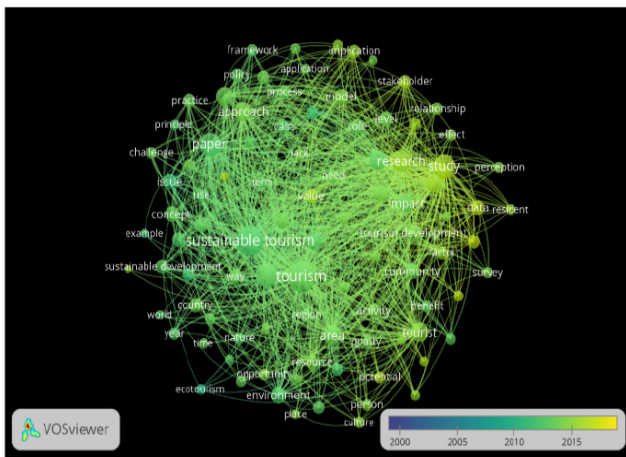
University, University of Georgia) and the United Kingdom (University of Surrey, Sheffield Hallam University, Oxford Brookes University and University of Brighton), which considerably reaffirms the high levels of scientific production in these countries.

Analysis of the main lines of research on Sustainable Tourism

To analyze the main lines of research, the authors used a map of key terms in the title and summary of the research with a temporal visualization (Figure 6) that allows a longitudinal analysis over time of which research topics have been most addressed and the relationships between them, as well as which of them are more obsolescent or current.

The map indicates the existence of three fundamental clusters: one referring to theoretical and methodological analyses of sustainable tourism, another that studies the economic, sociocultural and environmental pillars of sustainability in the sector, as well as the possibility of applying sustainable principles to tourism in a given context, and a final cluster referring to the measurement and impact of the implementation of sustainable tourism.

Figure 6. Map of key terms on Sustainable Tourism



DISCUSSION AND CONCLUSIONS

The bibliometric study on sustainable tourism of scientific articles indexed in the Dimension database reflects the existence of a growing interest of the scientific community in sustainability in the sector, which is manifested in the progressive increase of research published in the last three decades. These results correspond with those of other bibliometric studies such as the research conducted by (Costa y Lima, 2021; Cruz-Sintes et al., 2020; Moyle et al., 2020; Niñerola et al., 2019; Ruhanen et al., 2018; Ruhanen et al., 2015). Environmental threats and the possibility that these may multiply, added to an increasingly conscious perception of the need to preserve the fundamental resources for the development of tourism activities, are some of the reasons that justify the growing interest of the academic community in the study of sustainable tourism (Cruz-Sintes et al., 2020).

Researchers from various tourist destinations on the planet and especially from those with greater affluence, have devoted great efforts to include issues associated with sustainability in the sector both in the academic and business environment and the results of their studies have generated theoretical contributions and practical implications on sustainable tourism (Qian et al., 2018). According to Price's exponential growth criteria the field is precisely at the stage of exponential growth in which it becomes a research front with high possibilities of increasing its productivity in the coming years.

The study indicates that an average of 51.5 articles per year are published, with an increasing trend in the coming decades. The first articles published systematically on the construct date back to the 1990s, coinciding with the period of awareness of States and the international community on the problem of climate change and the need for sustainable development as an essential pillar of human progress since the presentation of the popularly called Brundtland Report in 1987, which expressed the need for multilateral support to call for awareness and cooperation for the sake of a more balanced approach to development (Ruhanen et al., 2015).

It should be noted that sustainable tourism is widely studied throughout the world, as there are publications in a total of 386 journals from different countries and even 75% of the scientific production is distributed in 78 journals, which continues to be a significant number. The most relevant articles are found in the most productive journals such as the Journal of Sustainable Tourism, Tourism Management and Annals of Tourism Research, which is consistent with Bradford's Law that explains that in the core of a field the most visible references are found (Sembay et al., 2020). These results are consistent with those obtained from other research that highlight these journals as those with the highest impact and productivity and that make them a reference in the field under study (Costa y Lima, 2021; Qian et al., 2018). In particular, the Journal of Sustainable Tourism stands out as the first journal created to promote critical thinking and innovation regarding the relationship between sustainability and tourism (Qian et al., 2018).

Similarly, the research has important theoretical implications, since from this point of view it is useful for researchers and academics to identify Bramwell, Bill; Hall, C. Michael; Gosling, Stefan and Lane, Bernard as the most prolific authors with publications internationally recognized for their quality. This indicator, as well as authorial and institutional collaboration can be of great use for future contributions, as well as for the choice of countries for the development of projects and academic scholarships. It is worth highlighting the role of Griffith University, which has the highest number of publications, as well as strong links with several universities, which consequently justifies its high rate of collaboration. This university was the first institution in Australia to offer courses in Hospitality and Tourism Management and has become a reference in the field (Costa y Lima, 2021).

Consequently, it is not surprising that Australia is positioned among the regions with the highest productivity in terms of scientific production related to sustainable tourism, since this country occupies first place among the economies that are benchmarks for sustainable development in the tourism sector (Costa y Lima, 2021). As for the rest of the countries, the geographical analysis indicates that the regions of Europe, North America, Australia and Oceania are those with the highest number of published manuscripts.

Likewise, from the analysis of key terms contained in the titles and abstracts, it can be concluded that the map shows a fairly high index of topicality, which implies that this is a field of science under study and that its theoretical bases are still being debated by researchers, so it is likely that in the coming years greater theoretical, methodological and empirical contributions will be made. Sustainable tourism is closely associated with the study of tourism geography and tourism management, with strong links to issues related to geographic space, context, biological and natural risks, as well as strategic management, planning, tourism industry processes, and local and sector development. The most current topics are related to the role of local communities and stakeholders of tourism companies such as customers, suppliers and competitors, as well as the implementation of sustainable tourism in tourist destinations.

This is consistent with the results obtained from other studies such as those carried out by Mauleon Mendez et al. (2018) and Qian et al. (2018) where the highest co-occurrence rates were found in terms such as sustainable tourism, management, sustainable development, sustainability, ecotourism and conservation. Thus sustainable tourism integrates aspects of various economic, social, cultural and environmental phenomena, indicating the need to investigate this construct as a multidimensional phenomenon (Qian et al., 2018).

It should also be noted that among the limitations of the study is the use of only key descriptors in English for the literature search, as well as a single database, which, together with the exclusive selection of scientific articles as units of analysis, favors the possibility that some relevant works have not been identified.

Sustainable tourism is closely related both to studies on tourism geography and environmental factors and to the strategic management of tourism entities (Cardoso et al.,

2014) and, given the importance that stakeholders attribute to sustainability, it will be a decisive factor in the development of organizations in the tourism sector (Tovar et al., 2015).

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The cellulose industry and its impact on the population: From the social to the biochemical

La industria de la celulosa y su impacto en la población: Desde lo social a lo bioquímico

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ABSTRACT

The Biobío region in Chile is characterized by a strong forestry industry, which provides jobs and supports regional GDP. Cellulose production is one of the most economically relevant activities, but it causes environmental, social, and public health problems. The generation of polycyclic organic compounds in cellulose production is one of the primary pollutants. It can produce endocrine effects and DNA alteration through interaction with enzymes of the CYP family and Aryl hydrocarbon receptors, affecting organisms' functioning. Retene is one of the polycyclic aromatic organic compounds generated in cellulose production. However, its harmful potential for human health remains poorly explored. From another perspective, the circular economy seeks to use production waste as inputs. However, cellulose contaminants are found in traces, resulting in a limitation for promoting a valorization industry. Under a reduction approach, there is a potential to improve production processes that increase retene and form other organic compounds, thus preventing cellulose contaminants from entering the environment. This review approaches the environmental problem from an interdisciplinary perspective, to highlight biochemistry and circular economy in order to determine and solve a priori environmental problems.

Keywords: wastewater pollution, polycyclic aromatic hydrocarbons, environmental pollution, pull mill, endocrine disruptors.

RESUMEN

La región del Biobío en Chile posee una fuerte industria forestal, que genera empleos y sostiene el PIB regional. La producción de celulosa es una de las actividades más relevantes económicamente, generando problemas ambientales, sociales y de salud pública. La generación de compuestos orgánicos en la producción de celulosa es uno de los principales contaminantes pudiendo producir efectos endocrinos y alteración del ADN a través de la interacción con enzimas de la familia CYP y receptores de hidrocarburos arilo, afectando el funcionamiento de los organismos. El Reteno es uno de los compuestos generados en la producción de celulosa. Sin embargo, su potencial efecto para la salud humana sigue siendo poco conocido. Desde otra perspectiva, la economía circular busca utilizar los residuos de la producción como insumos. Sin embargo, los contaminantes de celulosa se encuentran en trazas, lo que resulta en una limitante para promover una industria de valorización. Bajo un enfoque reduccionista, se pueden mejorar el proceso de producción que aumentan el reteno y forman otros compuestos orgánicos, evitando así que los contaminantes de celulosa ingresen al medio ambiente. Esta revisión aborda el problema ambiental desde una perspectiva interdisciplinaria, con el fin de determinar y resolver problemas ambientales a priori.

Palabras clave: Hidrocarburos aromáticos policíclicos, contaminación ambiental, celulosa.

1. INTRODUCTION

The pollution of freshwater bodies is not exclusively a local problem, but rather a global one. The cellulose industry is a profitable business that grows every year worldwide. It is one of the main activities responsible for water resources deterioration due to the amount of water required for the process and the amount of liquid industrial waste it generates, ranking globally as the sixth largest industrial generator of liquid pollutants (Uğurlu et al., 2008; Simão et al., 2018; Singh & Chandra, 2019).

Forestry sector operations in Chile have not been far from this reality. The Chilean forestry industry dates back to Spanish colonization in the 16th century, undergoing an intense modernization process in the last fifty years (Donoso & Otero, 2005; Camus & Solari, 2008). In 2018, the forestry sector contributed \$US 4.581 billion annually to the country's gross domestic product (GDP), of which \$US 4.277 billion came from cellulose production. This generated 113,769 jobs, of which 7,765 correspond to employees linked to cellulose production (Gysling et al., 2019). In the same year, \$US 3.66 billion were exported, mainly to China,

South Korea, and the Netherlands (Gysling et al., 2019). The forestry industry's increased relevance has resulted in a series of economic expansion policies dating back to the 1970s. This expansion has generated a high presence of corporations associated with cellulose production in Chile and South America. Their operations have had environmental effects and also affected a socio-cultural level by excluding surrounding social actors. The most recognized effect occurred in 2005 when there was a significant decrease in the population of black-necked swans in Valdivia due to the waste dumped by the Arauco pulp mill in the Cruces River (Ehrnström-Fuentes, 2015; Ehrnström-Fuentes & Kröger, 2017). As an approach that seeks to minimize the socio-environmental impacts of production processes, the Circular Economy (CE) has acquired prominence as demonstrated through public policies and research centers promising to affect all industrial sectors. In this context, it is interesting to establish a first analysis that allows the exploration of CE offers for the cellulose case, accompanied by a biochemical perspective aiming to understand the effect of production on the population.

1.1 Context of the forest industry in the Biobío region

In the Biobío region, the industry dedicated to cellulose production is found mainly in the basin of the Biobío River, which runs between 36°45'S; 72°59' W and 38°20'S; 71°15' W with a length of 380 Km, from headwaters in the Icalma and Galletué lakes in the Andes Mountains (Orrego et al., 2006). The Biobío River receives 100000 tons per year of wastewater from the cellulose industry, containing residues from pulp production and paper manufacture based on monoculture forest species *Pinus radiata* and *Eucalyptus nitens* (Videla & Diez, 1997; Orrego et al, 2006). The Biobío River basin is a complex system because of its diversity and because 5% of its population belongs to the indigenous Mapuche ethnic group. On a national level, the Biobío River is of great importance for economic development. Apart from the cellulose industry, farms, industrial refineries and hydroelectric plants also use the river. Therefore, the Biobío River Basin represents a complex mosaic of activities, inhabitants, and biological diversity (Díaz et al., 2018). It is important to note that there are five cellulose production plants in the Biobío region (Table 1). These plants impact the area's industrialization and employment rates. They contribute 15.8% of the forest GDP and generate 7,765 jobs (Salas et al., 2016; Gysling et al., 2019). However, they also impact the native state of the river in terms of its composition since the waste originated in the production process will directly alter these industries' environmental dynamics.

Table 1. Cellulose production plants in the Biobío region (Gysling et al., 2019).

Pulp mill plant	class	Production (tons)	Location (Commune)
BO Paper Bío-Bío SA	Thermo-mechanical	125000	San Pedro de la Paz
Celulosa Arauco y Constitución S.A	Chemical	790000	Arauco
CMPC Pulp SPA	Chemical	330000	Laja
CMPC Pulp SPA	Chemical	1500000	Nacimiento

2. LIQUID INDUSTRIAL WASTE FROM CELLULOSE PRODUCTION

The liquid waste from cellulose production has a contaminant load based on the contribution of suspended solids from biodegradable organic matter. This figure is measured as biological oxygen demand (BOD₅) in the order of 744 mgL⁻¹ to 400 mgL⁻¹ according to samples obtained from two effluents near the Biobío River (Gaete et al., 2000). The cellulose industry has introduced improvements to reduce the BOD₅ rates, integrating physical-chemical treatments to eliminate suspended solids (SS) and biological treatments to reduce organic matter (Chamorro et al., 2013). However, certain compounds resist biological treatment. They are present in the wastewater that goes to the receiving bodies, intervening in various organisms' physiology and metabolism (Gaete & Paredes, 1996; Gaete et al., 2000; Orrego et al., 2006; Chiang et al., 2015). The characterization of the liquid industrial wastes originating from cellulose production is problematic since these wastes constitute a complex matrix of organic compounds. We can find compounds usually present in nature, such as tannins, resin acids, lignin, phytohormones, phytosterols, and stilbenes. Simultaneously, we have compounds that originate in the production process and enter the environment as exogenous elements known as xenobiotics (Top & Springael, 2003). The Xenobiotics found in the residues of the cellulose production process include chlorinated lignins, phenols, dioxin, polychlorinated dibenzodioxins, benzo[a]pyrene (B[a]P), benzoanthracenes, benzoflavones, and retene, among other polycyclic aromatic hydrocarbons (PHA) (Ali & Sreekrishnan, 2001; Lahdelma & Oikari, 2005; Hernández et al., 2013; Murray et al., 2014). Xenobiotics have an anthropogenic origin and are molecules that enter the environment in higher concentrations than natural ones (Top & Springael, 2003). When discharged into rivers, these molecules form sediment. The benthos retains and progressively releases the contaminants, expanding the species inhabiting this particular environment and inducing molecular machinery expression that metabolizes these compounds and maintains cellular homeostasis.

In general, xenobiotics altering the normal functioning of organisms are called endocrine disruptors (ED). They directly alter the production, delivery, and metabolism of some hormones, or through a functional mimicry effect, produce epigenetic changes in subsequent generations and obesity problems (Birkett & Lester, 2002; Anway &

Skinner, 2006; Casals-Casas & Desvergne, 2011; Darbre, 2017). Xenobiotics can enter the cell by passive transport (Fig.1). For example, once in the cytosol, PHA binds to the Aryl hydrocarbon receptor (AHR), triggering a signal that will end in the expression of the Cytochrome P450 (CYP) protein. The AHR receptor belongs to the subfamily of transcription factors called bHLH (basic Helix-Loop-Helix). It forms a cytosolic complex with the 90-kDa heat shock protein (HSP90) and hepatitis B virus X-associated protein 2 (XAP2) (Plant et al., 1987; Beischlag et al., 2008). The xenobiotic binds to AHR as an agonist. Then, the xenobiotic-AHR complex migrates to the nucleus, forming a dimer with the aryl hydrocarbon receptor nuclear translocator (ARNT) and dissociating from the HSP90 and XAP2 proteins (Bersten et al., 2013; Murray et al., 2014). ARNT leads the protein/ligand complex, formed by polycyclic hydrocarbon and AHR, to regions of the DNA called dioxin response elements (DRE) (Murray et al., 2014). DRE are consensus sequences found upstream of genes expressed by dioxins. The AHR/ARNT/ligand complex binds to the DRE sequences hosted in gene-promoting regions such as CYP1A1 (Li et al., 2014), promoting the expression of enzymes required for degradation of xenobiotic compounds. The cytochrome P450 enzyme (CYP) is a highly conserved hemoprotein in the animal kingdom, which uses NADPH as a cofactor. It participates in the degradation of xenobiotic compounds by catabolizing mono-oxidation reactions (Fujii-Kuriyama & Mimura, 2005). CYP is a superfamily that includes more than 13,000 genes grouped in 400 families. In *Homo sapiens*, at least 57 genes and 58 pseudogenes grouped in 18 families and 44 subfamilies have been documented. Families 1-3 of CYP are the most active, and their expression and activity are concentrated in the liver to metabolize organic compounds (Manikandan & Nagini, 2018). Therefore, these enzymes are useful molecular biomarkers of environmental quality since they are overexpressed by organisms exposed to xenobiotics in their environment. Environmental and toxicology studies widely use the measurement of the activity or expression of CYP isoforms (Hong & Yang, 1997; Fujita et al., 2001; Takano et al., 2002; Buratti et al., 2003; Räsänen et al., 2012; Jansen van Rensburg et al., 2019; Vähäkangas et al., 2019) After PHA metabolization, epoxies can form, pass from the cytoplasm into the nucleus and react with the DNA, generating what is known as an adduct. The adduct is formed from covalent bonds of the benzyl carbon of the xenobiotic and the amino group of deoxyadenosines and deoxy-

guanosine residues (Essigmann et al, 1977; Massion et al, 2016; Barnes et al, 2018; Estévez et al, 2019). When the DNA replicates, the adducts' interference results in mutations with the potential to develop neoplasms (Denissenko et al, 1996; Hecht, 1998; Szeliga & Dipple, 1998; Vineis and Perera, 2000; Tarantini et al., 2011; Poirier, 2016).

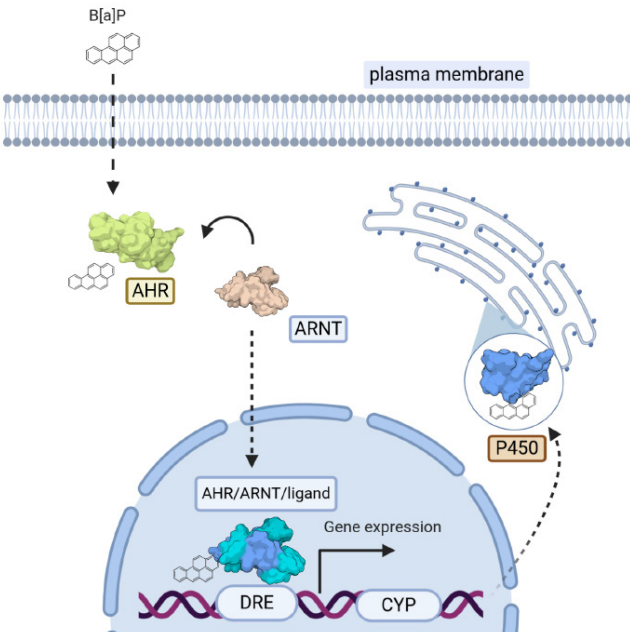


Figure 1. Diagram of the Cytochrome P450 expression induced by polycyclic aromatic hydrocarbons such as Benzo[a]pyrene. PHA enters the cell by facilitated transport. It promotes the expression of genes of the CYP1A and CYP1B family through coordination between the Aryl hydrocarbon receptor, the Aryl hydrocarbon translocator, and the xenobiotic. This complex translocates to the nucleus where it binds to dioxin response sequences upstream of the CYP genes, being a regulatory transcription factor in CIS.

3. HUMAN HEALTH RISKS ASSOCIATED WITH RETENE

Retene (1-methyl-7-isopropyl phenanthrene) is a polycyclic organic compound formed from abiatane skeletons by combustion processes, such as wood burning. For this reason, it is a molecular marker of environmental pollution. When subjected to high-temperature thermal processes, this compound is reduced and generally transformed into retene and is considered like a new compound toxic for metabolism (Ramdahl, 1983; Marchand-Geneste & Carpy, 2003; Diniz et al., 2010). Retene has been found in lakes

and sediments without anthropogenic activity in concentrations of nanograms to micrograms per dry gram of sediment by bacterial aromatization of abiatic acid (Zender et al, 1994; Billiard et al, 1999). This concentration increases by many orders of magnitude in sediments located downstream from liquid industrial waste discharge originating from cellulose production, reaching concentrations of 1330 µg-g⁻¹ (Lahdelma & Okari, 2005; Räsänen et al., 2012).

Studies on aquatic vertebrates, such as Danio rerio, Onchorhynchus mykiss and Xenopus Tropicalis, associated retene and other aromatic compounds, such as Benzo[a] Pyrene, with disruptive activity on several processes, including apoptosis, teratogenesis, cell growth, cell adhesion and mobility, cardiovascular development, xenobiotic metabolism, lipid transport and metabolism, and amino acid metabolism (Regnault et al., 2018).

These compounds are closely related to the expression of CYP1A genes by binding to the AHR and show dioxin-like toxic behavior (Gelboin, 1980; Billiard et al., 2002; Oikari et al., 2002; Hawliczek et al., 2012; Regnault et al., 2018). Few studies have been done on the effect of retene in humans, partly because it is not on the PHA list that the United States Environmental Protection Agency (US-EPA) monitors for compounds with carcinogenic potential (Jarvis et al., 2014). Cytotoxicity has been demonstrated in human lung cells treated with 30 ngml⁻¹ retene for 72 hours, and subsequent experiments have shown retene-induced cell death and oxidative stress (de Oliveira Alves et al., 2017; Peixoto et al., 2019). In the hepG2 liver cell line, retene is metabolized in 24 hours through the ortho-quinone route, where the cytochrome P450 protein expression is also stimulated (Huang et al., 2017).

Retene and several other PHAs are not regulated by Chilean legislation; furthermore, there are no constant updates based on regulations of other countries (DS 609/1998, MOP; DS 90/2000, SEGPRES; DS 148/2003, MINSAL). According to all this biochemical context, from a normative point of view, environmental legislation is lax. Additionally, the lack of innovation spaces has generated an organizational culture that focuses only on treating downstream cellulose production pollutants. However, the potential scale of pulp industry impacts on natural ecosystems and human sites, along with consumers demanding better production standards, necessitates the application of cross-cutting approaches to minimization, such as the Circular Economy.

4. CIRCULARITY STRATEGIES

Circular Economy (CE) is currently positioned as one of the most relevant principles of industrial ecology, promoting the decoupling of economic growth and socio-environmental impact. At the productive level, the objective of CE is to minimize waste generation, especially those wastes which do not present alternatives to recovery. A CE-based approach takes natural cycles as its technical references. Each material or energy flow is integrated as a recoverable component within other natural systems. CE has been interpreted through a hierarchy of circular strategies in waste management, extending to a maximum of 10 strategies (Figure 2). Systems that focus on the higher hierarchy strategies are preferable because they involve minimal or nonexistent natural resource extraction. In the cellulose industry and particularly for retene, two main constraints make the implementation of CE strategies difficult. The first is related to the microscopic retene concentrations, making its identification and extraction difficult. The second is based on the state of the art of polycyclic aromatic hydrocarbon valorization. At present, no processes have been identified in which retene and other similar organic components originating from cellulose production processes can be used as input.

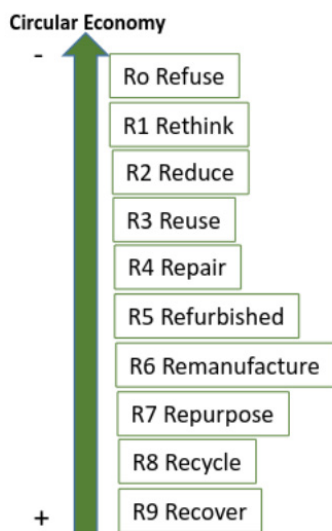


Figure 2. CE hierarchy according to Potting et al., 2017

Only wastewater recycling and industrial symbiosis strategies have been used in European countries such as Sweden and Norway (Molina-Sánchez et al, 2018; Domenech et al, 2019). For both limitations, the promotion of research lines to explore detection and valorization methods is a critical element that can add value to the industry. Despite these limitations, the CE hierarchy offers two relevant foci to minimize the environmental, social, and economic impact of the cellulose production cycle. The first is associated with the Reduction strategy that can succeed by improving processes. In particular, the control of the thermal processes, to reach complete combustion, would allow an early decrease in retene production (Simoneit, 2002). The second focus corresponds to the reprocessing of cellulose products through recycling, considering that the combustion stage that occurs in the recycling stages is not directly associated with the production of retene, although it is related to other highly persistent compounds, such as resin acids (Rigol et al., 2002; Terasaki, 2008). If the generation of pollutants from recycling were lower than in the industry that uses virgin material, this would further enhance an iconic industry characterized by its maturity and scope. In Chile, paper and cardboard recycling alone leads the rates per material with 80% (Pacto Global, 2015). Notably, the use of paper and cardboard to generate new cellulose products avoids the extraction of forest resources and, therefore, the socio-environmental conflicts associated with their exploitation.

5. CONCLUSIONS

In the BioBio region of Chile, deaths and mortality rates since 2000 show an increasing trend (MINSAL, 2011; Itriago et al., 2013). Environmental risk factors affecting the prevalence of some types of cancer are associated with economic activity, mainly the forestry and agricultural industry, exposing the population to residual chemicals (Itriago et al., 2013). Based on this, it is urgent to study the possible impacts on human health from liquid industrial waste PHAs, particularly retene. On the other hand, environmental pollution is not restricted to the empirical determination of the effects of a particular compound on human health or its impact on the environment. Still, it acquires a much greater value when the problem is addressed from its socio-cultural context since it originates from this context. Scientific alignment in environmental matters must go hand in hand with applying new technologies, such as mass sequencing and spectroscopy. These

technologies can determine the metabolic pathways and possible a priori impacts of compounds originating in cellulose production, and in the industry at large, to adopt precautionary measures. The concentration at the trace level, together with the lack of productive processes that use retene and other polycyclic organic compounds as inputs, makes it difficult for CE to minimize environmental impacts. However, a macro analysis allows us to reinforce the importance of improving combustion processes and paper and cardboard recycling benefits. For the latter, other studies are needed to compare the generation of a broader range of pollutants in both cellulose production lines (virgin material vs. recycling) to minimize the impact on public, environmental and social health.

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