

## **TOURISM CONSUMER BEHAVIOR: FORECASTING TOURIST DEMAND AFTER THE COVID-19 PANDEMIC**

By :

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### **ABSTRACT**

Tourism is one of the sectors in which the Covid-19 pandemic has been hardest hit. As one of Indonesia's ten priority destinations, North Sumatra also feels the economic impact. After the Covid-19 pandemic, the tourism industry is predicted to experience a surge and change in trends. This study aims to (1) determine the post-pandemic tourist behavior in the cities of North Sumatra and (2) forecast demand for domestic tourist visits to tourist sites in North Sumatra. Methods of data collection through questionnaires, observation, and documentation Data analysis was carried out in descriptive quantitative with one-way ANOVA and quadratic regression analysis. The sample in this study is 400 people who have been vaccinated. The results of this study are: (1) Consumer behavior after the covid-19 pandemic has changed, namely in terms of health, cleanliness, crowds, travel procedures, touchless technology, and being selective in choosing tour packages, (2) Karo (Brastagi), Prapat (Simalungun), and the west coast of Sumatra (Central Tapanuli) are three tourist locations that are predicted an increase in tourist visits after the pandemic. The tourism industry must prepare early to meet the demands of consumers who have experienced behavioral changes after the COVID-19 pandemic.

**Keywords:** Tourist Behavior; Tourist Demand; Tourism Marketing; Tourism Management

## **ABSTRAK**

Sektor pariwisata merupakan salah satu sektor yang paling terdampak oleh pandemi Covid-19. Sebagai salah satu dari 10 destinasi prioritas Indonesia, Sumatera Utara turut merasakan dampak ekonominya. Pasca pandemi Covid-19, industri pariwisata diprediksi akan mengalami lonjakan dan perubahan tren. Penelitian ini bertujuan untuk: (1) mengetahui perilaku wisatawan pasca pandemi di kota-kota Sumatera Utara (2) meramalkan permintaan kunjungan wisatawan nusantara ke lokasi-lokasi wisata di Sumatera Utara. Metode pengumpulan data melalui kuesioner, observasi, dan dokumentasi Analisis data dilakukan secara deskriptif kuantitatif dengan Anova satu arah, dan analisis regresi kuadratik. Sampel dalam penelitian ini adalah 400 orang yang telah divaksinasi. Hasil dari penelitian ini adalah: (1) Perilaku konsumen pasca pandemi covid-19 mengalami perubahan, yaitu dari segi kesehatan, kebersihan, keramaian, prosedur perjalanan, teknologi tanpa sentuhan, dan selektif dalam memilih paket wisata, (2) Karo (Brastagi), Prapat (Simalungun), dan pesisir barat Sumatera (Tapanuli Tengah) merupakan tiga lokasi wisata yang diprediksi mengalami peningkatan kunjungan wisatawan pasca pandemi. Industri pariwisata harus mempersiapkan diri sejak dini untuk memenuhi tuntutan konsumen pariwisata yang mengalami perubahan perilaku pasca pandemi COVID-19.

**Kata Kunci:** Perilaku Wisatawan; Permintaan Wisatawan; Pemasaran Pariwisata; Manajemen Pariwisata

### **A. INTRODUCTION**

On March 11, 2020, the World Health Organization (WHO) declared the Coronavirus Disease 2019 (Covid-19) a global pandemic. (Cucinotta & Vanelli, 2020). This measure was implemented due to worldwide apprehension about the virus's rapid transmission and its alarming consequences. It served as a reminder for nations to implement and enhance emergency response systems. Simultaneously, there is a global recognition that every individual is susceptible to contracting Covid-19. The extensive dissemination of the virus, coupled with its high fatality rates, has led to certain regions experiencing a standstill in everyday operations. Numerous countries have enforced lockdowns, restricting movement and suspending community engagements to curb the virus's spread (Dempster et al., 2020).

Tourism activity has declined globally due to the introduction of these limitations. According to the UNWTO (United et al. Organization), the Coronavirus outbreak will reduce the number of international tourists by 850 million to 1.1 billion people by 2020. The cost of reduced tourist numbers is between \$910 billion and 1.2 trillion dollars. According to the UNWTO, international travel decreased by 97 percent in April 2020, resulting in a loss of \$195 billion. This indicates that worldwide travel restrictions are in place to limit the spread of the pandemic's impact. (Economic, 2020).

In 2020, the total international visitor arrivals at all entry points in Indonesia witnessed a significant decrease, reaching 4,052,923 visits, marking a decline of 74.84% compared to the previous year's 16,108,600 visits. The tourist arrivals at the three significant gates among the 26 main entry points in December 2020, as

compared to December 2019, showed substantial decreases: Ngurah Rai by 83.02%, Soekarno-Hatta by 82.01%, and Batam by 84.84%. Analyzing the nationalities, the highest number of foreign tourist arrivals in 2020 at all entry points were from Timor Leste with 994,590 visits, followed by Malaysia with 980,118 visits, Singapore with 280,492 visits, Australia with 256,291 visits, and China with 239,768 visits. (Center for Data and Information Systems, 2021).

The introduction of Large-Scale Social Restrictions (PSBB) in Indonesia is a measure established to restrict the movement of individuals, goods, and services. This is implemented to manage and curb the spread of the virus effectively, as outlined in the Health Quarantine Law Number 6 of 2018. (Ristyawati, 2020). The Covid-19 outbreak is escalating, affecting both the number of cases and fatalities. Its impact extends globally, influencing political, economic, social, cultural, defense, and security aspects, along with the well-being of the Indonesian population. According to a Ministry of Tourism and Creative Economy survey, the pandemic has led to a staggering 92 percent job loss among the 5,242 workers in the tourism sector. The most affected businesses include accommodation (87.3 percent), transportation (9.4 percent), restaurants (2.4 percent), and other sectors (0.097 percent). (Suprihatin, 2020).

Without exception, the North Sumatra tourism sector is one of the sectors that has been hardest hit by the COVID-19 pandemic (Disbudpar Provsu, 2020). As one of Indonesia's ten priority destinations, North Sumatra also feels the economic impact, as indicated by the many *travel agents* accepting cancellations of tour packages until June 2020 and the absence of requests for new tour packages. The impact of the cancellation system also affects the tour guides and hotels, so the room occupancy rate at the Medan City Hotel and several other tourist objects has decreased drastically, and the tour guides are unable to guide. In fact, according to the North Sumatra PHRI secretary, there are 24-star hotels that have closed their operations in the city of Medan (Siregar, 2020).

In addition, according to the Central Statistics Agency, in April 2020, only 17 foreign tourists came to North Sumatra, including 5 Singaporean citizens, 2 Vietnamese citizens, 1 Thai citizen, 1 Chinese citizen, and eight visits from other countries. The foreign tourists entered North Sumatra through Belawan Port and Kualanamu Airport. This condition means North Sumatra experienced a drastic decrease in foreign tourist arrivals, up to 99.78%, compared to March, when it reached 7,832 foreign tourist visits (Mdk/Noe, 2020).

As statistics decline, countries are now starting to revive the tourism sector. Following the Covid-19 pandemic, the tourism industry is expected to see a spike in business and a shift in trends. This is inseparable from the emergence of new behavior patterns in the community that pay more attention to health and safety (Goretti et al., 2021). In response, the Indonesian government has prepared health protocols and verified the implementation of Clean, Health, and Safety (CHS) Standard Operating Procedures (SOP) through the Ministry of Tourism and Creative Economy. The scheme of the new regular order is considered very important in encouraging the tourism sector in the future. The CHS protocol was created to increase the trust and comfort of tourists in the tourism industry and destinations in Indonesia after COVID-19. The hope is that the destination will be

ready to receive back visits from tourists, starting from domestic tourists (Pamela, 2020).

Changing consumer behavior is certainly a challenge for tourism industry activists. That is an inevitable change. The pandemic has changed the trend, and the community needs to travel. Some travel trends, such as solo or small-group travel, are expected to emerge in this normal phase. This trend is the result of social distancing. People become hesitant to travel in groups or visit crowded places.

The tendency of people to travel using land transportation routes can also occur. This could be an effect of the air transportation policy, which requires more requirements, such as the results of the COVID test and a doctor's certificate. In addition, the unopened factor for overseas trips can also be an opportunity to increase tourists' interest in exploring more local tourism potential. Encouraging domestic tourism can be a way to counteract the loss of tourism revenue due to the absence of foreign tourists. Tourism trends have changed, and the pandemic has also changed people's needs in planning their vacations (Bahurekso, 2021).

According to the news released by Kompas (2020), the chairman of the Indonesian Tourism Intellectuals Association, Azril Azhari, said that one thing that people consider when traveling is cleanliness according to health protocol standards. In addition to cleanliness, the price factor is still a public consideration when traveling (Bahurekso, 2021). The implementation of health protocols certainly makes tourism service providers spend more. On the other hand, people's purchasing power also decreases due to a disrupted economic situation.

In addition to predicting changes in tourist behavior, tourist visits are also predicted to experience a surge. The Ministry of Tourism and Creative Economy predicts that in 2021, 310 million domestic tourists will travel to various local destinations. 2020 there will be only around 120 to 140 million domestic tourists. Meanwhile, the Indonesian Hotel and Restaurant Association (PHRI) estimates that foreign tourist arrivals in 2021 will reach 13-14 million people, which previously only reached 3.56 million tourists in 2020. Visits of domestic tourists began to squirm again after the easing of the PSBB, and the government began opening economic activities (Mdk/Bim, 2021).

In this study, gap analysis identifies discrepancies between the current knowledge and practice and the desired state. The current state of knowledge: 1) The COVID-19 pandemic has significantly altered tourist behaviors, with increased health and safety concerns, a preference for domestic over international travel, and a heightened interest in nature-based and less crowded destinations (Garcez, 2021); 2) There has been a surge in the use of technology, such as contactless payments, virtual tours, and online booking platforms (Zukhri & Rosalina, 2020); 3) Frequent changes in travel restrictions and policies have made planning and predicting travel patterns more complex (Dempster et al., 2020), and 4) The economic downturn has affected disposable incomes, influencing travel spending and destination choices. (Wyman, 2020).

A lack of long-term data on post-pandemic tourist behavior makes it challenging to identify lasting trends. Also, existing models often need to account for the unprecedented factors introduced by the pandemic, such as varying travel restrictions and health concerns. So, there is a need for more research on the

preferences of tourism consumers. The need for research is reinforced by the condition that differences in the impact of COVID-19 across regions need to be sufficiently reflected in current demand forecasting models, and health-related data, such as vaccination rates and infection trends, need to be adequately integrated into tourism demand forecasts.

The current state of knowledge needs a robust understanding of the new determinants of tourist behavior to forecast demand accurately, adaptable developing strategies for tourism businesses to manage demand fluctuations and ensure sustainability, leveraging advanced technologies for data collection and analysis to gain deeper insights into consumer preferences and behaviors, and enhancing collaboration between stakeholders to create cohesive policies that support the recovery and growth of the tourism sector (Wang et al., 2021).

The COVID-19 pandemic has changed tourists' purchasing of tourism products and services. Tourists demand comfort through hygiene, health, and protection against COVID-19 infection when traveling. Tourist places affect not only tourists but also workers and the local population. All tourist stakeholders must anticipate changes in behavior, and the tourism industry must improve to enter the post-pandemic tourism trend.

Kotler and Keller (2016) define consumer behavior as the study of how individuals, organizations, and groups buy, choose, and use ideas, products, and services to satisfy needs and wants. The consumer behavior approach aims to obtain information in predicting, explaining, and controlling consumers. Thus, the information obtained will help an industry formulate marketing strategies closer to consumer needs.

Various predictions about the surge in tourist visits and changes in tourist behavior after the COVID-19 pandemic are exciting to be studied scientifically. Post-pandemic, the tourism industry must have various systems, facilities, and infrastructure that support the assurance of cleanliness, comfort, health, and safety of tourists to avoid infection with COVID-19. Not only that, the tourism industry also provides types of tourism that have also changed after the pandemic.

## **B. LITERATURE REVIEW**

### ***Tourism Marketing***

Marketing products and services are critical to the success of any section of the travel and tourist industry. Because tourism is a service business, service marketing differs from most product marketing because what is marketed is an experience rather than a real thing. Marketing in the tourist industry is defined as a policy pushed by the tourism industry that continually investigates the current and future conditions of the tourism market. This goal is to determine a constant modification to provide tourism customers with the best possible service. (Sofronov, 2019).

Tourism marketing keeps up with the industry's fast-paced changes and needs (Kasemsap, 2015). Tourism marketing assists tourism product and service providers promote their businesses, brands, and destinations based on consumer preferences.

### ***Consumer Behavior***

Consumer behavior has extensively examined consumer behavior since the early 21st century (Victor et al., 2018). with a primary emphasis on understanding how consumers perceive and respond to various brands, offers, sellers, and business strategies (Mokrysz, 2016). Numerous studies indicate that consumers anticipate drawbacks when making product choices, leading them to opt for low-risk alternatives strategically. The significance of risk perception is particularly evident in the decision-making process of tourist consumers (Alyahya & McLean, 2022).

The tourism consumer develops new consumer behaviors during times of crisis, as illustrated by the following examples: More flights will likely be canceled, avoiding close human interaction and favoring outdoor activities, more car trips, extra reservations made at the last minute, and a more significant concern for hygiene, as well as a greater focus on ecotourism (R. et al., 2024).

In order to establish marketing policies, the tourist industry must first understand the social and cultural causes of consumer behavior. Customer's acceptance of beliefs and behavior is based on belonging to a particular culture or subculture (In-Jin et al., 2019). These elements play a significant part in the development of the marketing concept.

### **C. RESEARCH METHOD**

The methodology employed in this study is quantitative. Quantitative research, as defined by Sugiyono (2014), involves the analysis of quantitative data, which can be numerical or qualitative data that has been quantified, utilizing statistics as a testing tool. The quantitative research outcomes are then subjected to descriptive analysis through qualitative research. Utilizing statistical data for both study descriptions and analysis proves to be a time-saving approach for researchers, eliminating the need for extensive result descriptions. The research falls under the survey category by (Sari et al., 2023), Signifying that it investigates data from samples to unveil relative occurrences, distributions, and correlations in sociological and psychological characteristics within both large and small populations.

This study is directed to determine changes in tourism consumer behavior after the COVID-19 pandemic and the potential for tourist visits to North Sumatran destinations after the COVID-19 pandemic. Through survey research with a quantitative approach, tourism consumer behavior and the potential for post-pandemic tourist visits can be described clearly.

### ***Population and Sample***

The population refers to a broader domain consisting of entities or individuals possessing particular attributes and characteristics selected by researchers for examination and drawing conclusions (Sugiyono, 2014). The population of this study was the entire population of North Sumatra Province, which had carried out both the first and second stages of the vaccine. According to the WHO statement, the pandemic will conclude once 70% of the population is vaccinated (AFP, 2021). Therefore, vaccinated people are a strong representation for forecasting post-pandemic consumer behavior.

Based on data obtained from the North Sumatra Provincial government on July 16, 2021, it is known that the population of North Sumatra who has taken the first dose of the vaccine is 1,705,477, and the second phase is 708,661 people (Farida, 2021). So, the total population is 2,414,138 people. Calculation of the sample using the calculation formula:

$$n = \frac{N}{(1 + N \cdot Moe^2)}$$

where  $n$  as number of samples,  $N$  as total population,  $Moe$  as *maximum margin of error*. In this study, it was set at 5% with a 95% confidence level. So so the calculation result is  $n = 399,9337$  rounded to 400, so the sample is 400 people.

The sampling technique used in this study was random sampling. According to (Neuman, 2014), random sampling is a method of selecting individuals from a population or universe so that each individual has an equal probability of being chosen or taken. The sample comes from four North Sumatra cities that are the furthest from tourist sites: Medan, Medan, Binjai, Tebing Tinggi, and Tanjung Balai. Urban was chosen because of the characteristics of urban people who are highly interested in traveling due to saturation and dense urban activities.

### ***Collecting Data Method***

In this study, the triangulation method was employed for data collection using a questionnaire comprising three sections. The first section comprised factual questions designed to identify the socio-economic dimensions of the population under study. The second section included open-ended questions accompanied by closed-ended questions, with the objective of identifying behavioural changes that may occur when implementing health protocols. The third section consisted of closed-ended questions, with the aim of identifying changes in travellers' behaviour related to motives and forms. Observation and Documentation Study by studying relevant data regarding tourist behavior after the COVID-19 pandemic. Observation and Documentation Studies are part of other triangulations by studying relevant data regarding tourist behaviour after the COVID-19 pandemic.

### ***Analysis Data Method***

In this study, a quantitative data analysis technique is employed, where each alternative response selected by the respondents in the questionnaire is assigned a numerical score or weighted value. The data analysis method utilized is perceived value analysis, as described by (Sugiyono, 2014):

$$NP = \frac{n}{N} \times 100 \%$$

where NP is a variable that explains the Perception Value which is converted in the percentage process (%);  $n$  is a variable that explains the score obtained; and  $N$  is the maximum score. Then, set the class interval table and value criteria:

**Table 1.**  
**Class Interval and Perceived Value Criteria**

No	Interval	Criteria	Decision
1	< 70 %	Not Important	Accept H <sub>0</sub> , reject H <sub>1</sub>
2	≥ 70%	Important	Accept H <sub>1</sub> , reject H <sub>0</sub>

Source: data proceed by author, 2024

A quadratic regression was performed using hotel and accommodation occupancy data to forecast tourist demand for tourism in several tourist sites in North Sumatra. In this study, 2017 is set to be the base year. The quadratic method involves the dependent variable exhibiting a linear or parabolic increase or decrease when represented in a scatter plot, indicating a quadratic relationship between the dependent and independent variables. This method is a non-linear regression approach (Yusuf, 2016). The mathematical form is as follows:

$$y = a + bx + cx^2$$

Where  $y$  is the dependent variable that explains the *Predicted Value*;  $a$  is a constant;  $b$  and  $c$  coefficients;  $x$  is the independent variable that explains *Time* (year or month)

Furthermore, the discussion is directed to use a predictive analysis approach. Predictive analysis is a branch of advanced analytics that makes predictions about future outcomes (IBM, 2019). Predictive modeling combines quadratic regression results and descriptive data to forecast tourist demand. Among the benefits of using predictive analysis is determining consumer responses or purchases, in this case, tourists. Predictive models help tourism stakeholders to retain and grow the most profitable tourists.

## D. RESULTS AND DISCUSSION

### *Respondents Characteristics*

**Table 2.**  
**Characteristic of Respondent**

	Characteristic	Respondents	Percentage (%)
Origin	Medan	100	25
	Binjai	100	25
	Tebing Tinggi	100	25
	Tanjung Balai	100	25
Occupation	Civil Servant	92	23,1
	BUMD/BUMN	22	5,5
	Employees	35	8,8
	Farmer	9	2,2
	Teacher	26	6,6
	Student	92	23,1
	Entrepreneur	44	11
	Service	58	14,2
	Others	2	5,5



Characteristic		Respondents	Percentage (%)
Education	Primary School	0	0
	Junior High School	4	1,1
	Senior High School	97	24,2
	University	202	50,5
	Post Graduate	97	24,2
Gender	Man	202	50,5
	Women	198	49,5
Age	15-30 yo	228	57,1
	31-40 yo	114	28,6
	41-50 yo	13	3,3
	51-60 yo	13	3,3
	61-70 yo	32	7,7
	> 70 yo	0	0

Source: primary research data processed by author, 2024

Respondents in this study were people vaccinated in Medan, Binjai, Tebing Tinggi, and Tanjung Balai, amounting to 400 people. Those who are vaccinated are chosen as representatives of post-pandemic tourism consumer behavior. To ascertain the profile and characteristics of the respondents, one can examine the general overview provided about them in the research. The subsequent section details the respondent characteristics, categorized by gender, education, age, occupation, and place of origin. For a more straightforward presentation, please refer to Table 2.

### **Data Analysis**

Validity in this research instrument is calculated using the product moment correlation formula or Pearson correlation. Then, after the value of the validity coefficient of each questionnaire item is obtained, the results are compared with the table value at a significance level of 5%. If  $t_{count} > t_{table}$ , the questionnaire item is declared valid, and vice versa. Based on the validity test results, all questionnaire items were declared valid because  $r_{count} > r_{table}$ .

**Table 3**  
**Readability Test**

Numb. of Question Items	Number of Respondents	$r_{count}$	$r_{table}$
18	400	0,467	0,097

Source: Primary research data processed by author, 2024

In this study, the reliability test of the research instrument was carried out using a single test or single test. A single test is done by finding the values of count and stable. If the value of  $r_{count} > r_{table}$ , then the research instrument is declared reliable. Table 3 shows the results of the single test reliability test. Based on it, we know that research instrument is reliable, because  $r_{count} > r_{table}$ .

**Theme 1: Consumer Behavior Analysis**

According to this study's chosen data analysis approach, the assessment of perceived value from 400 respondents across 18 questions reveals that 91,2% of the responses are categorized as "important," exceeding the 70% benchmark. Furthermore, the value of the chi-square count, 587.1506, is greater than the chi-square table, 446.5742. This means rejecting  $H_0$  and accepting  $H_1$ , or tourism consumer behavior has changed after the pandemic. For more details, see Figure 1 and Table 4.

**Table 4.**  
**Perception Value Analysis**

Number of Questionnaire Items	Number of Respondents	Perception Value	Category	Decision
18	400	91,2%	important	Reject $H_0$
$\chi^2_{count}$ :	587,1506	$\chi^2_{table}$ :	446,5742	Accept $H_1$

*Source: Primary research data processed by author, 2024*

Based on data analysis, it is known that consumer behavior has changed after the pandemic. The change in question means that changes in consumer behavior during a pandemic tend to be permanent and not transitional, even though the COVID-19 pandemic has ended. This is indicated by the fact that 91,2% of people who have been vaccinated still consider the aspects of safety, health, hygiene, visitor density, and the location of tourist destinations to be necessary. So, the form of travel and tourism motivation also undergo changes that must be responded to well by the tourism industry.

The results of this study are similar to the study of (Chebli & Said, 2020), which used the chi-square test and content analysis of 308 respondents. The results of his research show that the COVID-19 pandemic has impacted changing tourist behavior in terms of security, economy, establishment, and behavior. Another study also revealed the same thing; for example, Santos et al. (2020) released a report, "Behavioural changes in tourism in times of Covid 19". They revealed that the COVID-19 pandemic affected consumer behavior, and even tourism travel expectations after the COVID-19 pandemic tended to be lower than before the pandemic.

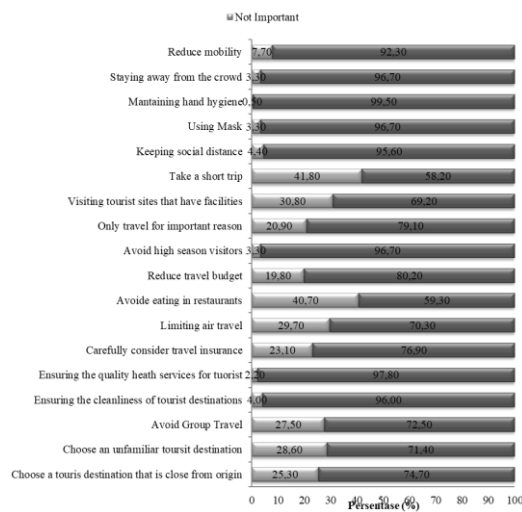
The COVID-19 pandemic has underscored the significance of sanitation and public healthcare, which heightened emphasis on cleanliness in various aspects of travel, including airports, hotels, restaurants, public spaces, tourist attractions, and essential services. Consequently, passengers are expected to prioritize health standards and the effectiveness of the destination's healthcare system in their travel plans. There is a strong inclination to travel during off-peak periods, and the tourism industry should strategize to attract additional visitors. In summary, the anticipated changes in tourism consumer behavior post-COVID-19 are:

**Health Protocols and Hygiene Facilities are Vital**

Clean living behavior has now become a new habit that will be practiced when traveling (Batam Tourism Polytechnic (BTP), 2020). Thus, cleaning equipment such as hand soap, hand sanitizer, and masks will become mandatory for tourists.

This study showed that implementing health protocols, health services, and hygiene are deemed necessary by tourists when visiting tourist destinations, with an average rate above 90%.

In order to meet these objectives, tourist sites or public locations must take precautions and follow proper cleanliness and health practices at all times. (Chebli & Said, 2020). The entire tourism business should prioritize this stringent and ongoing procedure. As cleanliness and health are crucial considerations for tourists when selecting travel destinations, the business sector must prioritize and advocate for implementing hygiene standards. This effort is essential to enhance the destination's image and appeal to visitors.



**Figure 1**  
**Distribution of the Percentage of Tourism Consumer Behavior**  
**after the Pandemic in North**

***Limitation of the Number of Visitors***

During the pandemic, tourists are used to social distancing and avoiding crowds, so after the pandemic, it is predicted that tourists will prefer to be in tourist locations that tend to be less crowded. This is confirmed in this study that tourists perceive the importance of avoiding crowds (96,7%), avoiding high season visitors (96,7%), keeping a social distance (95,6%), avoiding group trips (72,5%), and choosing an unfamiliar location (71,40%).

In order to meet these demands, tourist sites must impose limits on the number of visitors so that they can become a new tourist attraction. Further restrictions on visitors will create more convenience for tourists traveling for holiday purposes (Chebli & Said, 2020). Limiting the number of visitors must be followed by an online reservation mechanism so that tourists know the condition of visitors and room availability before arriving at the tourist location.

### ***Strict Travel Procedures***

Tourists' comfort is expected to be maintained by implementing health protocols on various forms of transportation (Batam Tourism Polytechnic (BTP), 2020). One of the most straightforward examples is the procedure of traveling by plane. In Indonesia, the aviation sector now requires passengers to have a COVID-19-free certificate. This is often why many people avoid air travel; apart from being complicated, it is also expensive. This condition is confirmed by the results of this study, where tourists limit themselves to air travel (72,5%).

Even though it was introduced during the pandemic, strict travel procedures are predicted to become one of the mandatory requirements in the future. However, given the importance of these procedures, airports must expand their services by offering direct medical checks and tests, particularly at airports with famous tourist destinations (Sheth, 2020).

### ***Touchless Tourism***

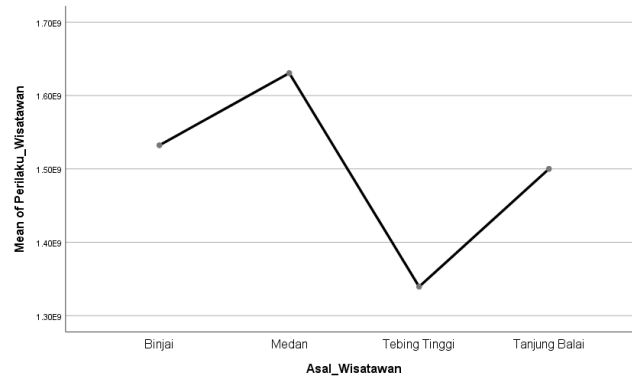
As with point (2), tourists are used to social distancing and avoiding crowds during the pandemic, so the potential for contact decreases. It is also predicted that this will change the pattern of tourism to be touchless (Batam Tourism Polytechnic (BTP), 2020). This is because there is still a substantial risk of infection despite solid cleanliness standards in hotels and public spaces. As a result, future use of technology will become the new norm, with tourists not needing to touch public spaces, minimizing the risk of virus transmission.

### ***Tourism is getting more selective.***

Tourists are expected to be more selective when determining their trip. This is not only because of perfect knowledge and various information received about tourist destinations but also because tourists perceive it as crucial to reduce mobility (92,3%), reduce travel budget (80,2%), and Only travel for essential reasons (79,1%). The tourism industry should consider strategies to attract more tourists, for example, by presenting MICE promos and other promo packages. Offers of competitive prices of tour packages need to be rethought because tourists have increased their spending on health insurance and health and hygiene facilities.

### ***Theme 2: Potential Post-Pandemic Tourist Sites in North Sumatra***

To predict the potential of tourist sites to be visited by tourists in North Sumatra, a quadratic regression analysis was carried out by first making the mean plot. The Means plot graph in Figure 2 shows the mean graph of changes in tourism consumer behavior in each city. The figure shows that the city of Medan has the highest changes in tourism consumer behavior compared to other cities. Meanwhile, the city with the lowest change in tourism consumer behavior is Tebing Tinggi.



**Figure 2.**  
**Means plotting a graph of tourism consumer behavior**

The analysis results of Anova obtained the value of  $F = 3,243$  with  $p = 0,022$  ( $p < 0,05$ ). By the decision-making basis that has been presented in the previous chapter, if sig:  $p < 0,05$ , then the decision is to reject  $H_{01}$  and accept  $H_{11}$ , meaning that there are significant differences in consumer behavior changes between cities ( $F = 3,243$ ;  $p < 0,05$ ).

Furthermore, The multiple comparisons test between cities shows the changes in tourism consumer behavior in each city. Because, in general, there are differences in changes in tourism consumer behavior between cities, it is necessary to see in detail which cities are significantly different. From Table 6, it can be seen that the two cities are significantly different, namely Medan dan Tebing Tinggi. Medan City to Tebing Tinggi City has a positive Mean Deference and  $p = 0,012$  ( $p < 0,05$ ). Thus, there is a significant difference in changes in tourism consumer behavior between the city of Medan and the city of Tebing Tinggi. Medan City has a change in tourism consumer behavior, which is higher than the city of Tebing Tinggi.

Differences in population density, the dominance of economic activity, and the distance to tourist sites are essential factors for differences in consumer behavior in tourism in the cities of Medan and Tebing Tinggi. The population density of Tebing is high at only  $4.130$  people/ $km^2$ , while Medan is twice as dense at  $8.409$  people/ $km^2$ . In addition, the trade and agriculture sectors dominate Tebing Tinggi's economic activities. Meanwhile, the city of Medan is dominated by the big trade, construction, and processing industries. The scale of economic activity in the two cities shows that community activities are also dense apart from dense population. Avoiding people and crowded activities is one of the travel motivations related to the formation of tourist behavior (Utama, 2016).

Stationarity is an essential concept in time series analysis. Time series data is stationary if the mean and variance do not change systematically over Time, or in other words, the average and variance are constant. To find the best estimation model, the time series data must first be stationary. One of the ways to determine the stationarity of time series data is by using the autocorrelation function by looking at the correlogram graph. This study determined six tourist destinations in north Sumatra by district: Karo, Simalungun, Tapanuli Tengah, Sibolga, Samosir, and Nias. The selection of these tourist destinations is not without reason, but

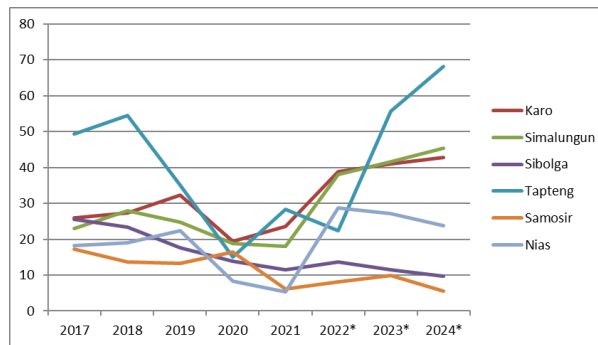
because of intensified tourism promotion and tourism development has been known.

Based on the autocorrelation result, it is known that the value is below 0,5 and around zero. In addition, it is also clear that the autocorrelation value is moving towards zero. Thus, the data used in this study met the stationary requirements, so the next stage was carried out namely the quadratic regression test.

Based on the result of regression quadratic model obtained with constant and variable coefficients in the Unstandardized Coefficients. The regression quadratic equation model is obtained

Karo	$Y = 23,564 + 3,884X - 0,162X^2$
Tapanuli Tengah	$Y = 68,690 - 14,783X + 2,103X^2$
Simalungun	$Y = 20,972 + 3,279X + 0,029X^2$
Samosir	$Y = 14,252 + 2,268X - 0,5X^2$
Nias	$Y = 12,926 + 7,173X - 0,803X^2$
Sibolga	$Y = 30,556 - 4,434X + 0,208X^2$

Furthermore, based on the quadratic regression estimation model, the forecasting of tourist visits is carried out, and the results are obtained according to Figure 3. Based on this, it can be seen that the curve forms the letter "W" or "M." Based on quadratic regression, post-pandemic tourist visits will return to normal. In fact, in Simalungun, Karo, and Central Tapanuli, it is predicted that there will be a surge in tourist visits. On the other hand, in Samosir and Nias, there was a decline. Different things happened in Sibolga because before the pandemic occurred, the number of visits had decreased.

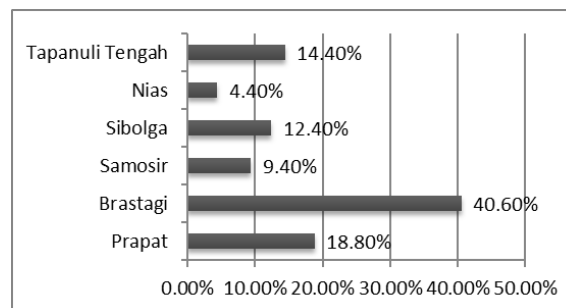


**Figure 3.**  
**Forecasting of Tourist Visit by Quadratic Regression**

Simalungun Regency has a tourist attraction in the form of Lake Toba, known to the public as Prapat. Karo Regency has a tourist attraction in the form of peaks and a cool climate that is well known to the public, namely Berastagi. Central Tapanuli is aggressively promoting its territory as the "Tourism Country of a Million Enchantments." It can be understood that all these conditions are the reason why tourists are more interested in visiting these tourist destinations.

Because the data used in this study is hotel and accommodation occupancy data, the decline in tourist visits in Samosir and Sibolga is only partially accurate. This is due to the proximity of the two areas to Simalungun and Central Tapanuli districts, respectively. Thus, many tourists who visit Lake Toba and the West Coast of Sumatra prefer to stay in Simalungun and Central Tapanuli rather than Samosir and Sibolga.

There is a similarity in the forecasting results between the descriptive questionnaire data and the estimated quadratic regression in Karo, Simalungun, and Central Tapanuli. It is predicted that an increase in post-pandemic tourist visits will occur. Based on the results of descriptive analysis from the questionnaire, it is known that the tours are carried out with various destinations, starting from Berastasi, Karo district, with the most significant potential visit of 40,6%, followed by Prapat (Simalungun), Tapanuli Tengah, Sibolga, Samosir, and Nias respectively. More clearly, see Figure 4.



**Figure 4.**  
**Forecasting of Tourist Visit by Descriptive Questionnaire**

The Berastagi destination, which is only 66.3 km from the center of Medan, has become a tourist destination with the highest potential. This condition is confirmed by the results of this study, where the tourists choose a destination to travel to close to the origin (74,70%). Berastagi, followed by Prapat, Tapanuli Tengah, and Samosir, must be prepared to welcome tourists by ensuring conditions and facilities.

## **E. CONCLUSION**

Changes in consumer behavior during the pandemic tend to be permanent and not transitional, even though the COVID-19 pandemic has ended. This is indicated by most people who have been vaccinated still consider aspects of safety, health, cleanliness, visitor density, and the location of tourist destinations still need to be considered. The form of travel and tourism has also changed. This must be responded well by the tourism industry. In addition, the tourism industry must also respond well to the potential for domestic tourist visits in the North Sumatra region which is quite large. Berastagi, Prapat, Sibolga, and Samosir are tourist destinations that must be immediately prepared to meet the wishes of tourists with all their new behaviors: paying attention to health, safety, cleanliness, economic affordability, and visitor density.

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