

RESEARCH ARTICLE

STATISTICAL ANALYSIS OF THE FOREIGN TOURIST FLOW IN WAKHAN DISTRICT OF BADAKSHAN PROVINCE, AFGHANISTAN

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ARTICLE DETAILS

Article History:

Received 13 December 2024

Revised 05 January 2025

Accepted 10 January 2025

Available online 17 February 2025

ABSTRACT

The present study was conducted in the Wakhan District a tourist attraction region in the Badakhshan Province of Afghanistan. The current research aims are a statistical analysis of the foreign tourist flow in the Pamir region. The interview was conducted using semi-structured questionnaires. A total of 137 respondents were interviewed and respondents were government officials and local people. Descriptive statistics were applied to analyze the tourism condition and local people's income in the last fifteen years. The results indicate that 2004 tourists visited this area, the number of male tourists 471 (24%) is more than the number of female tourists 116 (6%). As well as the percentage of young tourists 1050 (51%) and adult tourists 366(19%). According to Carrent's analysis, during the last 15 years, local income in one was 388.5 dollars from tourism. In conclusion, in the last fifteen years, 2004 tourists visited the Pamir region, and local people's income was 5827.9 dollars.

KEYWORDS

Wakhan, tourism, attraction, statistics, similiation.

1. INTRODUCTION

The Wakhan District, a remote yet breathtaking region in the Badakhshan Province of Afghanistan, is characterized by its stunning landscapes, rich cultural heritage, and strategic geopolitical significance. Nestled between the towering peaks of the Pamir Mountains and the expansive Wakhan Corridor, this district has increasingly attracted the attention of foreign tourists seeking adventure, cultural immersion, and natural beauty. As Afghanistan continues to navigate its complex socio-political landscape, understanding the dynamics of foreign tourist flow in the Wakhan District becomes paramount for sustainable tourism development and economic revitalization in the region (DOA, 2022). This study aims to provide a comprehensive statistical analysis of the foreign tourist flow in the Wakhan District. By examining visitor demographics, travel patterns, and seasonal variations, we seek to uncover trends that can inform better planning and resource allocation for tourism stakeholders. Furthermore, this analysis will explore the impact of infrastructural challenges and security concerns on tourist perceptions and experiences. Through a data-driven approach, this research will not only highlight the potential of the Wakhan District as a burgeoning tourist destination but also advocate for strategies to enhance its appeal while preserving its unique cultural and environmental assets. Ultimately, this investigation strives to contribute to a deeper understanding of tourism's role in fostering economic growth and social cohesion in one of Afghanistan's most storied regions(DIC, 2019).

Wakhan is one of the border districts of Badakhshan province in northeastern Afghanistan, with a population of over 18,500 people. It is located in the eastern part of Badakhshan province, bordered by China to the east, Tajikistan's Kuhistan Badakhshan province to the north, the Gilgit region of Pakistan to the south, and the Ashkashim district to the west. It is one of the oldest districts in Badakhshan province and was established as a district during the reign of Muhammad Zahir Shah (Coulson et al.,

2014).

In this mountainous and lush district, most of the population consists of the Wakhi and Kyrgyz ethnic groups, who migrated from Kyrgyzstan in the distant past. Wakhan is known for its two famous areas, known as Little Pamir and Big Pamir, and due to its high altitude, it is often referred to as the Roof of the World. When Pamir is mentioned, the towering mountains housing wildlife, including the globally renowned Marco Polo sheep and the Urial, come to mind, captivating the imagination and drawing visitors both domestic and international. The presence of these two types of sheep and the tourism activities highlight the greenery and good living environment of the region(Sabooryar et al., 2023). The naming of Wakhan holds significant importance for the tourism industry in the country, especially for the local population and the Kyrgyz tribes, creating considerable national and economic opportunities(DOA, 2022).

The current livelihood of the people of Wakhan is estimated to be derived from agriculture (25%), animal husbandry (50%), teaching and government jobs (3%), trade and freelance work (5%), external income (5%), and animal products (12%)(DOA, 2022).

2. TOURISM AND ITS SEASONS IN WAKHAN NATIONAL PARK

Wakhan National Park has a long history of tourism, attracting both domestic and foreign tourists who travel here to enjoy the high-altitude landscapes and its rare wildlife. This tourism has generated significant income for the local community through the provision of services such as taxis, pack animals, translators, guides, food, accommodation, and the sale of handicrafts (Ismail zadeh et al., 2022).

Statistical data indicates that every year between 300 to 400 foreign tourists visit the interesting and scenic areas of Wakhan National Park. Moreover, Wakhan is one of the poorest and most remote districts in Badakhshan province, with its inhabitants experiencing higher levels of

Quick Response Code



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Website:

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DOI:

[10.26480/ccsj.02.2024.58.63](https://doi.org/10.26480/ccsj.02.2024.58.63)

poverty compared to other districts in Badakhshan (DOA, 2022).

The tourism season runs during the spring (autumn) and summer months, from (April to October), as the weather conditions in these seasons are generally more favorable for travelers and tourists (DIC, 2019).

3. TOURIST ATTRACTIONS IN WAKHAN NATIONAL PARK

The presence of rare animals such as the snow leopard, Marco Polo sheep, ibex, brown bear, fox, rabbit, and Asian wild goats has further enhanced the global reputation of this area (Bahl Olszewski et al., 2022). Additionally, the presence of picturesque and lush valleys, clear and cold springs, pleasant hot springs, beautiful and enchanting waterfalls, stunning natural forests, various medicinal plants, colorful wildflowers, fragrant meadows, natural landscapes, and sightseeing spots makes this region a renowned tourism destination (Simms et al., 2011).

The ancient historical forts, rich cultural heritage, and mineral resources of Wakhan also contribute to its worldwide fame. Furthermore, mountain fruits like apricots, berries, and wild vegetables such as wild onions, cumin, and both bitter and sweet sumac attract the attention of tourists in Wakhan (Pour Saied et al., 2022).

Descriptive statistics is a method used to describe and analyze data. In this approach, the data, which can be numbers, texts, or other types of information, are summarized and presented in a useful manner to provide us with a better understanding of their various characteristics. The descriptions used in this method include measures of central tendency (mean, median), variance, the shape of the distribution (normal distribution and its simulations, the presence of peaks), and different relationships between the data (Bland, 2015).

A simple example of descriptive statistics could involve describing the monthly income of ten international tourists from ten European countries in the Wakhan district (in dollars). If we have the monthly income of each tourist from different countries last year as follows: (Ismail zadeh et al., 2002).

30000 .25000 .20000 .15000 .12000 .9000 .5000 .3000 .2000 .1000

We can obtain various values using descriptive statistics. First, there is averaging, which helps us understand the average dispersion of numbers within a certain range. To calculate the mean of a set of data, it is sufficient to sum the different numbers and then divide by the number of data points. Therefore, according to this definition, the formula for calculating the mean will be: (Jance and Thomopoulos, 2009)

$$\bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n} = 12200$$

Also, we can consider the median of the income distribution, which is the median of the population that divides the data into two equal parts. By arranging the incomes as follows:

1000, 2000, 3000, 5000, 9000, 12000, 15000, 20000, 25000, 30000. The median between the values 9000 and 12000 is equal to ((9000 +

12000))/2=21000/2=10500

- Maximum is the largest possible value in a data set. In other words, the maximum is the largest data in the set. Mathematically, the maximum is represented by the symbol Max and is defined as follows (Townsend and Colonius, 2005).

max(X) = largest data in X. For example, if the data set of X is {1, 3, 2, 5, 4}, then the maximum number is 5.

- min, or minimum, is the smallest possible value in a data set. In other words, half is the smallest data in the set. Mathematically, half is represented by the symbol min and is defined as follows.

min(X) = smallest data in X. For example, if the data set of X is {1, 3, 2, 5, 4}, then min is the number 1 (Rochet and Serra, 2016).

- Quad split means dividing the data into four halves, each of which contains a quarter of the sorted data. The first quadrant is formed by the set of data that 25% can accept. The second quadrant is a set of data that 50% can accept and the third quadrant contains a set of data that 75% can accept (Townsend and Colonius, 2005).

4. METHODOLOGY

4.1 Simple size

The statistical data required for the analysis of the number of tourists who visited Wakhan district in 15 years reaches the number of 2004 people, consisting of men and women. each of them to visit Wakhan district between 2008 and 2022 with a different number. From visitors and different places to see such as Wakhan National Park, Wakhan lakes of wild animals, etc(DOA, 2022).

4.2 Data collection method

All the tourists who traveled in the past 15 years and the interviews we had between 2022 and 2023 in one year from the head of agriculture of Badakhshan Province and the Directorate of Tourism, as well as from the number of employees of the Department of Information and Culture that we interviewed and from the local people of Wakhan District and the outskirts of Wakhan National Park gave us enough information about foreign tourists. 2004 tourists, consisting of male, female, young and adult traveled to this place. First, we obtained the raw data from the Department of Agriculture (DOA) of Badakhshan province, the Directorate of Tourism(DOT) and the Department of Information and Culture(DOIC) and obtained accurate statistics of the number of tourists. And a series of information from different sources such as. We collected scientific articles and authentic books and Library method. We used Excel software for data analysis and R- programming language for data simulation. (DOA, 2022).

4.3 Analyzing Real data with the help of graphs in Excel

Based on the data that was available to us, the number of tourists who traveled to Wakhan district in 15 years in the number of 2004 people and visited the places of interest in this district, we will analyze the data based on simulation software (Coulson et al., 2014).

Table 1: Data of tourists from 2008 up to 2022 years

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
No of tourists	93	124	148	160	86	163	158	110	123	134	181	472	4	7	41

The following dot chart shows the interest of foreign tourists by year.

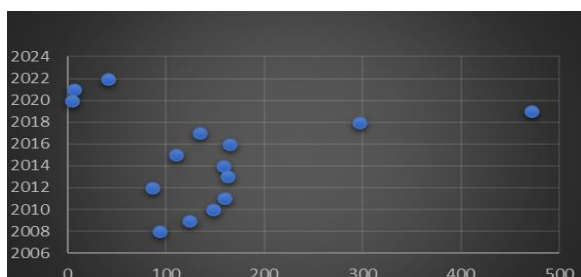


Figure 1: dot chart, interest of foreign tourists by year.

This chart, which is drawn on two axes, shows us information such as the most and least interest of foreign tourists. Conducting market research can provide useful information about the interest of foreign tourists in Wakhan district. According to the above graph, most of the foreign tourists from China, Italy, Thailand, England, Switzerland, Hungary and Germany came to this tourist attraction in 2018, which constituted the most tourists, and the lowest number of tourists was between the years 2018 and 2019, due to Various factors have caused the reduction of tourism to this place that have been present. While analyzing the data, paying attention to the available sources and also comparing them with the geography of the surrounding reality can help in better accuracy and understanding in analyzing the interest of foreign tourists in Wakhan district (Iacobucci et al., 2015).

The chart below defines the exact number of tourists by year without considering the gender of the tourists.

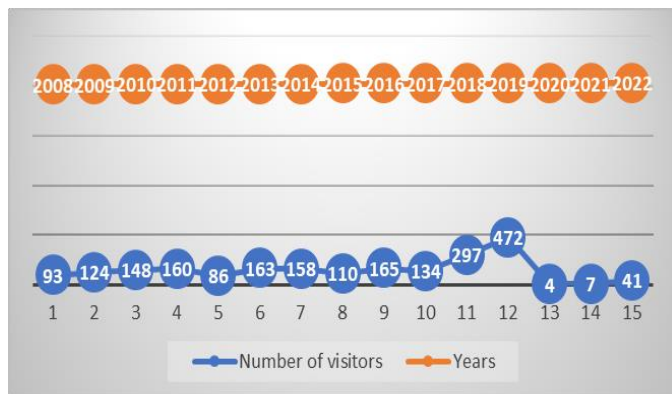


Figure 2: The number of tourists varies by year

Tourists who came to this scenic place such as Wakhan National Park between 2008-2022, according to the above chart, it has the highest number in 2019, about 472 tourists visited Wakhan National Park and other sightseeing places in this district (Ismail zadeh et al., 2022).

The following chart shows us the number of foreign tourists in the last 15 years in the form of a histogram. 10 foreign tourists from Spain, 5 from Russia, 3 from China, and from neighboring Central Asian countries had the highest number of tourists in this place.

The following charts shows the number of tourists, male and female.

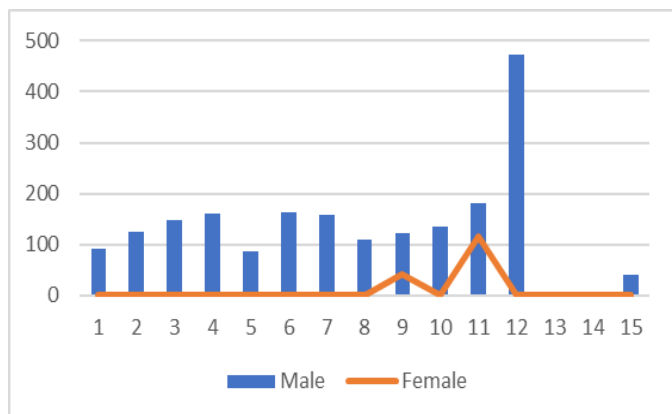


Figure 3: number of tourists, male and female.

The above chart shows that the number of tourists who traveled in a combined way in Wakhan Valley and its national park during the last ten years were able to visit all Wakhan valleys to visit wild animals and to get mineral information for global economic growth (Ismail zadeh et al., 2022).

The following chart separately shows the number of male tourists in recent years.

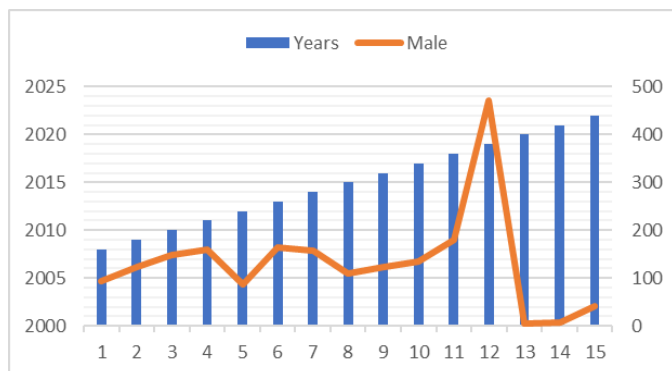


Figure 4: number of male tourists in recent years.

The following chart separately shows the number of female tourists in the last 15 years.

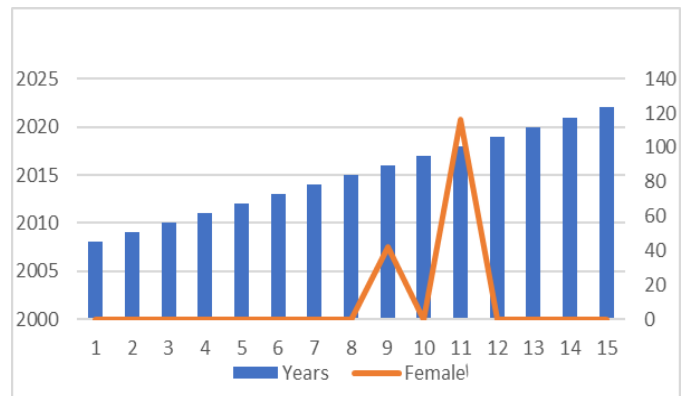


Figure 5: number of female tourists in the last 15 years.

The next graph shows us the interest of tourists in the sightseeing places of Wakhan district, especially 2 historical and recreational places (Wakhan National Park and Shiloh).

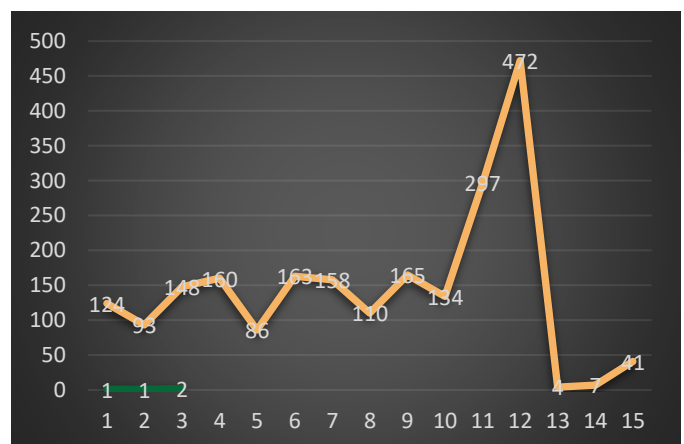


Figure 6: The diagram is based on 2 places of interest

The chart below shows the income of local people in Wakhan district.

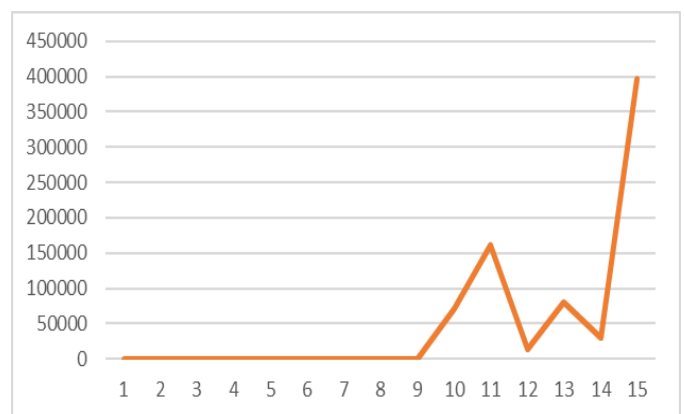


Figure 7: Income chart of the people of Wakhan district according to each year

According to this chart, it is observed that the local people have earned the highest income from tourists over a period of 15 years, amounting to 396300 Afghani, which is equivalent to 5827.9 dollars (Simms et al., 2011).

Recently, data analysis has been simulated by statistical software (R-language programming) as follows.

5. RESULT AND DISCUSSION

5.1 Simulating data of foreign tourists by R-language Programing

The normal distribution is one of the most important and widely used probability distributions. This distribution is widely used in various fields such as statistics, natural sciences, engineering and economics.

In normal distribution, the random variable is continuously distributed in an interval of real numbers. This distribution is described by two important parameters, i.e., mean (μ) and variance σ^2 . The probability distribution function of this distribution is as follows (Marsaglia, (2004).

$$f(x; \mu, \sigma^2) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-(x-\mu)^2/(2\sigma^2)}, \quad x \in \mathbb{R}$$

$f(x)$, is a symmetric function around $x=\mu$. Also, μ is the mean, mode and median of the distribution.

In this distribution, for example, variance and standard deviation are equal to μ , σ^2 and σ , respectively. A normal distribution graph is an infinite graph of drugs, where the horizontal axis represents the random variable and the vertical axis represents the probability distribution function (Marsaglia, 2004).

Now, the number of female tourists who traveled to the National Park and Wakhan Valley separately from men during 15 years, according to our statistics, which we simulated in R- programming language using Gaussian distribution, and the simulation diagram is as follows (Nadarajah, 2005).

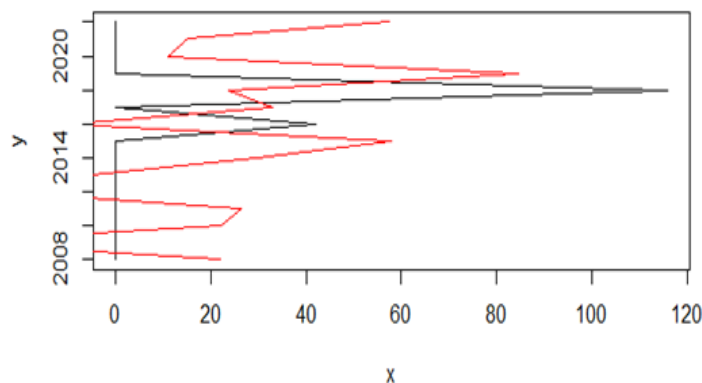


Figure 8: Simulation of female tourist by year

This simulation shows that many tourists were left behind in Wakhan district due to the lack of good and better security during the last few years, and the local people also faced economic stagnation and little (even zero) income.

We considered the number of male tourists separately. In the simulation below, in 2018, the interest of the Wakhan style was more, due to the internal disturbance and internal security of Afghanistan, it caused a decrease in tourism.

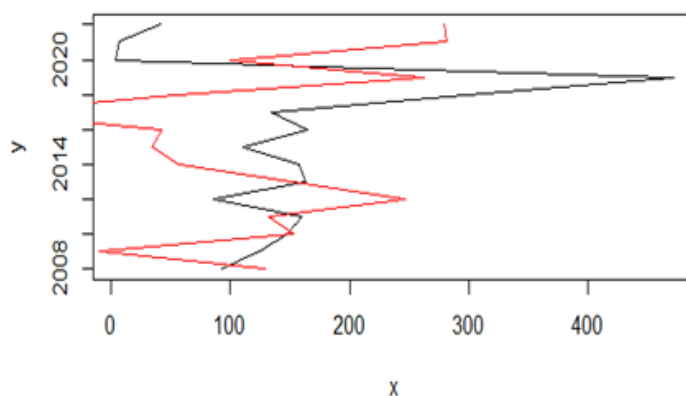
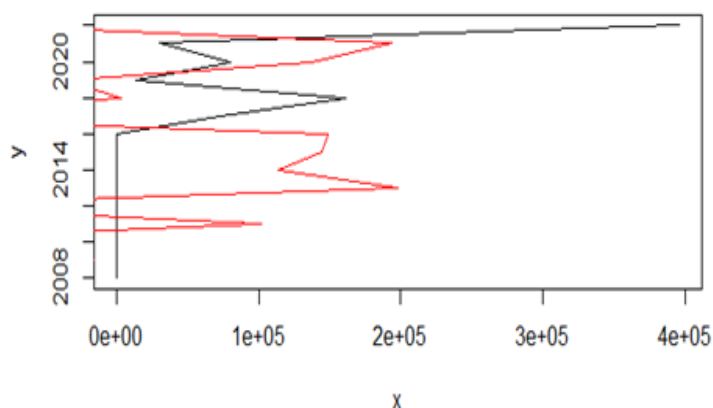


Figure 9: Simulation of male tourists by year

The simulated graph below also shows the income of the local people based on the duration of stay and

the number of tourists. which had the most revenue in 2018.



Figuring 10: Simulating local people's income based on the year

The number of tourists in general based on the year was simulated as

follows, which were the largest in group form between 2016 and 2018.

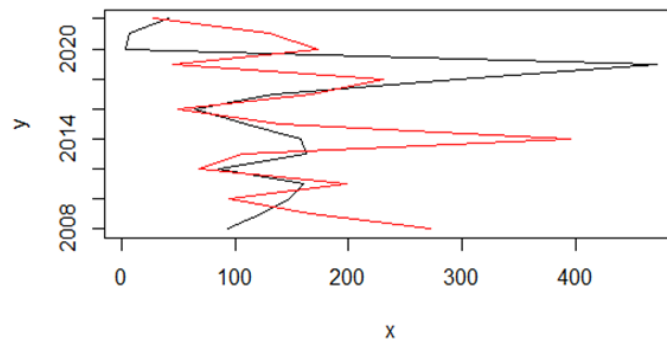


Figure 11: Simulation of tourists based on the year

Now we will compare the theoretical calculations with the calculations made for simulation. If both are the same in comparison, we consider the conclusion for the simulation to be positive.

- First, we will calculate the data we have in the software, and briefly express it in the table below.

Table 2: Calculation of 6 items in R-language programing

Total tourists		Man		Famel		Local people's income in Afghani currency	
Min	4	Min	4	Min	0	Min	0
1st Qu	89.5	1st Qu	89.5	1st Qu	0	1st Qu	0
Median	134	Median	124	Median	0	Median	0
Mean	144.1	Mean	133.6	Mean	10.53	Mean	50227
3rd Qu	161.5	3rd Qu	159	3rd Qu	0	3rd Qu	51100
Max	472	Max	472	Max	116	Max	396300

5.2 Coding used with R-language programing and calculation

In the table above, six measures (minimum, first quartile, median, mean, third quartile, and maximum) of the number of tourists were calculated based on the mentioned simulations using the R-programming language.

Now, we will also perform the theoretical calculations, including the mean, and we will omit the calculations of the other six measures(Manly, 1998).

Examples of the number of female tourists in the years between 2008 and 2022 are as follows. We calculate its sample mean.

Table 3: Data of tourists from 2008 up to 2022 years

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
No of tourists	93	124	148	160	86	163	158	110	123	134	181	472	4	7	41

First, we examine the average number of tourists between 2008 and 2022. Based on the average formula, we have:

$$\bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$$\bar{x} = \frac{41 + 7 + 4 + 472 + 181 + 134 + 123 + 110 + 158 + 163 + 86 + 160 + 148 + 124 + 93}{15}$$

$$\bar{x} = 133.6$$

So, the average number of tourists in 15 years is equal to 133.6.

It can be seen that the results of the R-language programing yield the same outcome as the theoretical calculations; therefore, the data obtained from international tourists in this location is reliable.

6. CONCLUSION

The statistical population studied consisted of 2004 foreign tourists over a period of 15 years in the region. This research showed that most tourists are seeking an unforgettable experience in the pristine nature of Wakhan. Statistical analysis can help us understand the behavior of tourists. By examining activities such as length of stay, travel expenses, and types of activities at the destination, we can identify distinctions among subgroups of tourists. This analysis will assist us in designing more precise strategies and plans to enhance the tourist experience.

- Based on the above analysis, we conclude that the highest number of tourists visited this sight in 2019 due to complete security and the absence of widespread diseases like COVID-19.

- The lowest tourism statistics in recent years were influenced by the pandemic, with a lack of complete security being another contributing factor.
- Among foreign tourists, women have visited these attractions less than men, and in these 15 years, foreign women have only traveled to this location in the years 2016 and 2018. Problems related to traveling, such as the lack of transportation options, airplanes, and deteriorating roads, have contributed to the lack of attention from international female tourists.
- The highest income for local people was recorded between the years 2018 and 2022, as the Wakhan National Park attracted the attention of international tourists. Before 2017, the locals had zero income, and after 2021, the income of the locals has been close to zero again.
- Positive results obtained from comparing the calculations of actual data in the R programming language (simulation) and theoretical calculations yielded the same results.

Based on the results obtained, it can be concluded that the Wakhan district, with its beautiful nature and appropriate services, is an attractive destination for foreign tourists. Ultimately, utilizing tourists' analysis and descriptive statistics allows us to gain a comprehensive overview of patterns, behaviors, and needs of tourists. This perspective helps us make better decisions regarding the development and improvement of the tourism industry and provides a better user experience for tourists.

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