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Temporal Study of Trend Analysis of Tourism Flow in Kullu District, Himachal Pradesh from 2008-2022 and its Seasonality for Tourism Forecasting

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Abstract:
Accelerating growth of the tourism industry in the Kullu district of Himachal Pradesh over the past decade, contributing substantially to the district economy, and creating employment opportunities for locals, attracts the attention of researchers to a greater extent. This research paper presents insights into tourism dynamism in the study area, spanning the period from 2008 to 2022. It mainly uses secondary data collected from various government departments, tourist records, and surveys to analyze the trend and seasonality of tourism and further explore their implications for tourism forecasting. The findings of the study reveal considerable fluctuations in tourist influx over an analyzed period which could be attributed to various economic, social, and climatic factors.
Further research explores seasonality, including peak and off-peak seasons, and the factors responsible for them. Cartographical methods and statistical methods such as (simple average method, annual growth rate, and coefficient of determination) are used to quantify seasonality, propose a tourism forecasting model on the basis of the former, and further check the accuracy of the model.
The results of the study help in understanding the tourism dynamism in Kullu district in a better way and provide valuable insights for the policymakers, tourism authorities, and local residents for developing various strategies to optimize tourism opportunities, manage the quality of tourism services, and ensure the development of the study area.

Keywords: temporal study, seasonality, tourism forecasting, annual growth rate, simple average method, coefficient of determination.

Introduction:

In the present-day scenario, Tourism forms an important pillar of the economy of any country, which makes it a global phenomenon. Every year, the number of people exploring different destinations for leisure, adventure, and cultural experiences is increasing. United Nations World Tourism Organisation (UNWTO) defines tourism as "a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/ professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which involve tourism expenditure." “In India the tourism industry has been showing a tremendous growth over the decade or so. The crucial

indicators of tourism such as domestic tourist arrivals, foreign tourist arrivals, foreign exchange earnings, total contribution of travel and tourism to GDP, and total contribution of travel and tourism to employment have been performing well." (Rout *et al*. 2016)

The state of Himachal Pradesh is unarguably one of the first choice of people planning to go on vacations. This in itself makes tourism sector one of the important part of states' economy. "State attracted about 139.23 lakh Tourists, of which 138.97 lakh were Indian and 0.26 lakh foreigners visited the State till November, 2022. It constitutes 7.0 per cent of Himachal's GDP, and contributes around 14.42 per cent direct and indirect employment to the total employment in the State." (Economic survey of Himachal Pradesh – 2022-2023).

In the past decade, the district of Kullu in Himachal Pradesh, India, has emerged as a great tourist hotspot. This industry has experienced significant growth, contributing a major part to the district's economy and creating employment opportunities for the locals. This significant increase can be attributed to the efforts and tourism policies of the government and the increasing popularity of tourism and its sub-divisions such as adventure tourism, eco-tourism, religious tourism, cultural tourism, snow tourism, etc. Further the stats of tourism data follow a seasonal pattern and a proper knowledge of this pattern is essential for the stakeholders for planning accordingly. "Seasonality is the systematic, although not necessarily regular, intra-year movement caused by changes in the weather, the calendar, and timing of decisions, directly or indirectly through the production and consumption decisions made by the agents of the economy. These decisions are influenced by the endowments, the expectations and the preferences of the agents, and the production techniques available in the economy." (José María Martín et al., 2019). Butler (1994, p. 332) defines seasonality as "a temporal imbalance in the phenomenon of tourism, [which] may be expressed in terms of dimensions of such elements as numbers of visitors, expenditure of visitors, traffic on highways and other forms of transportation, employment, and admissions to attractions." By analyzing this seasonality pattern, we can further make a forecasting model of tourism on the basis of seasonality for the year 2023. "Modeling seasonal variations in a tourism time series has become an important issue in tourism forecasting in recent years." (Kulendran and Wong 2005).

The purpose of this research paper is to analyze the trend and seasonality of tourism in Kullu district from 2009 to 2022 to understand the tourism dynamism of the district and examine the factors that have contributed to this trend. It provides a valuable insight into the tourism industry of the district by analysing the seasonality factor, its implication on tourism, and providing a forecasting model for 2023, serving as a paving stone for sustainable tourism planning and development in the area.

Objectives:

The key objectives of the present study are:

1. To analyze the trends of tourist influx in Kullu district from 2009–2023 and the factors responsible for them.
2. To study the seasonality of tourism in Kullu district and its implications for tourism forecasting.
3. To develop a tourism forecasting model without a trend line on the basis of the seasonality of tourism in Kullu district.
4. To check the accuracy of the developed forecasting model.

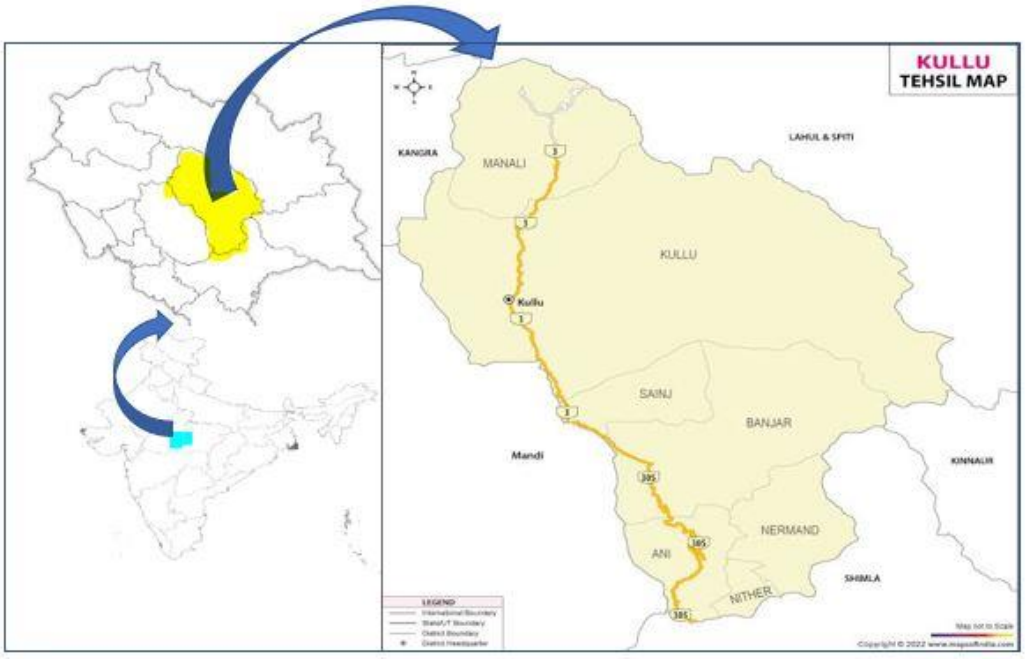
Study Area:

Located in the North-western part of Himachal Pradesh, Kullu District is often referred to as the "Valley of Gods" Resting in the lap of the Himalayas, nestled between the mighty Pir Panjal and the Dhauladhar mountain ranges, this region offers a unique blend of natural landscapes, rich cultural heritage, and adventurous outdoor activities. The district is famous for its picturesque valleys, river rapids, dense forests, and snow-capped peaks, making it a haven for nature lovers, trekkers, adventure seekers, and mountaineers. Its cultural heritage, including its annual international fair known as Kullu Dussehra and numerous ancient temples, including the famous Raghunath Temple and Hidimba Temble, attracts a massive inflow of both domestic and international tourists and pilgrims. Districts' adventure tourism has also gained immense popularity. Activities such as paragliding, river rafting, trekking, jeep safaris, camping, mountain climbing, and skiing are a few of the most famous, attracting a large number of adventure-loving people from all over the globe. Places such as Rohtang Pass, Beas Kund, Jibhi, Solang Valley, Bagha Sarahan, Hampta Pass, etc. are famous for such activities.

The study area is located in the middle Himalayas and is one of the most visited places in India. The district is located at 31.8246° N latitude and 77.4702° E longitude. It has a population of 18,536 and an area of 5,503 square kilometers. It is bordered by Lahaul and Spiti in the north, Shimla district in the southeast, Mandi District in the south, and Kangra district in the west. A major tributary of the Indus River, Beas, flows through the district. Its major tributaries like Parbati, Tirthan, Bhuntar Khad, and Nogli Khad drain the whole district. Administrative headquarters are located in the main Kullu town. Administratively speaking, Kullu district has four tehsils, namely Manali, Kullu, Banjar, and Nirmand, and two subtehsils, Anni and Sainj. Other major towns in the district that attract a large number of visitors every year are Manali, Naggar, Bhuntar, and Kasol.

The region experiences a warm and temperate type of climate. The summer season from April to June is very pleasant, thus attracting a large number of tourists. Further winters in November to February experience snowfall, making it a perfect hill station destination for winter sports and activity lovers.

Figure 1 Location map of Study area



Research Methodology:

1. Data collection:

The data for the study has been collected from a wide range of research articles, newspapers, websites, government reports, and books. The data has also been gathered from the Tourism Department of Kullu, Himachal Pradesh, Himachal Pradesh Tourism Policy, 2019, and the Department of Tourism and Civil Aviation, Government of Himachal Pradesh.

2. Data analysis:

- To analyze the trend, we create a **trend line** using the total number of tourist inflow in every year of the given time span. (2008–2022)
- To find the growth pattern, we calculate the **Annual growth rate** by first subtracting the total number of tourists in a particular year (the present year) from the number of tourists in the previous year (the base year), then dividing the result by the number of tourists in the previous year, i.e., the base year, and multiplying it by 100.

Annual Growth Rate (AGR) = no. of tourists (present year) – no. of tourists (base year) / no. of tourists (base year) * 100.

- To analyze the seasonality of the tourists, we use the **seasonality index or seasonality relative.** It is calculated as a percentage ratio between the average level of each month of the given time period and the general monthly average. Referring it as seasonal coefficients, Constantin & Daniela (2011) gave the formula of seasonality index as follows:

Seasonality index = ratio of the average level of each month of the given time period to the general monthly average * 100.

- For forecasting the values for next year, we use the simple average method.
- For evaluating the forecasting model, we use the coefficient of determination (R-squared).

Results and Discussion:

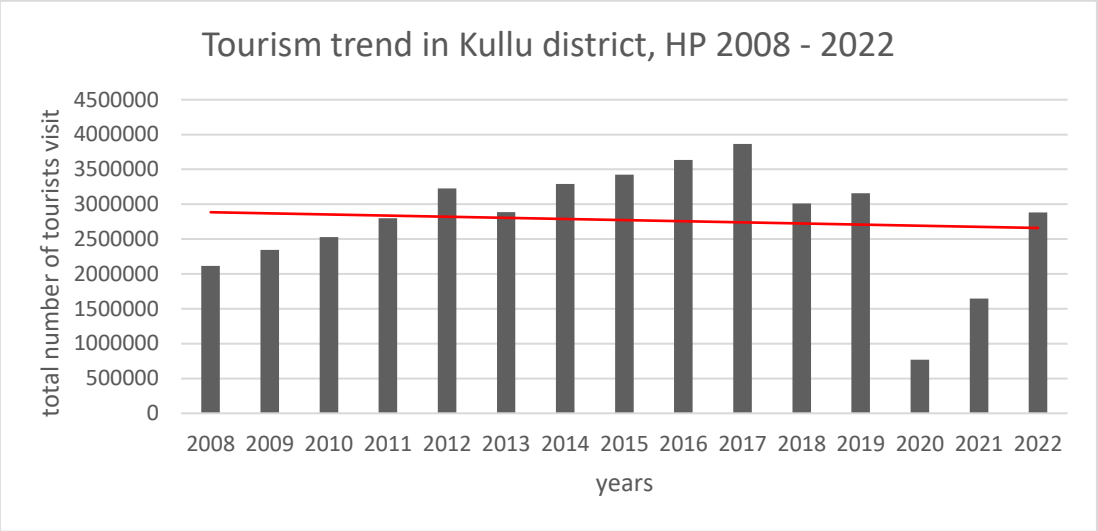
- **Temporal Analysis of Tourism in Kullu District:**

Table 1 Annual Growth Rate of each year

Years	No. of Domestic Tourists	Annual Growth Rate	No. of Foreign Tourists	Annual Growth Rate	Total	Annual Growth Rate
2008	2001674		112910		2114584	
2009	2224649	11.14%	119514	5.84%	2344163	10.85%
2010	2395990	7.7%	133707	11.87%	2529697	7.91%
2011	2659527	10.99%	138488	3.57%	2798015	10.6%
2012	3082545	15.9%	143900	3.90%	3226445	15.31%
2013	2766709	-10.2%	119341	-17.06%	2886050	-10.55%
2014	3187436	15.2%	104309	-12.59%	3291745	14.05%

2015	3314463	3.9%	109468	4.94%	3423931	4.01%
2016	3515169	6.05%	122064	11.50%	3637233	6.22%
2017	3732044	6.17%	133057	9%	3865101	6.26%
2018	2912552	-21.95%	96201	-27.69%	3008753	-22.15%
2019	3056463	4.94%	102948	7.01%	3159411	5%
2020	763379	-75.02%	7080	-93.12%	770459	-75.61%
2021	1647329	115.79%	252	-96.44%	1647581	113.84%
2022	2876513	74.62%	3706	1370.6%	2880219	74.81%

Figure 2 Bar Diagram with Trend Line of Tourists' Arrival in Kullu District, HP, 2008 - 2022



"The growth rate of tourist arrival sometimes indicates fluctuating situations and sometimes negative growth." (Virender Kaushal, 2019). Table No. 1 shows the annual growth rate of both domestic and foreign tourists from 2008 to 2022 and the total percentage change of tourist inflow from year to year in the same time frame.

From the above-mentioned data, we can see that the number of both domestic and foreign tourists grew from 2008 to 2012. The rate of growth was greater for domestic tourists than for foreign tourists. This could be attributed to the greater accessibility and popularity of the places for domestic tourists than for foreigners. In 2013 (-10.55%), a sharp decline can be seen in these numbers, which could be attributed to the early monsoon causing heavy rainfall and landslides in North India. According to the newspapers, tourists related the cloudbursts and landslide incidences of Uttarakhand to those of Kullu and Manali. Even though in 2014 there was again a rise in the number of domestic tourists (15.2%), the number of foreign tourists (-12.59%) remained low and witnessed negative growth. This shows the more precautionary nature of the foreign tourists.

From 2015 to 2017, the number of both increased to a greater extent. But this trend witnessed a dip again in 2018 (-22.15%). The reason behind this was heavy rainfall, which caused the swelling of the river Beas, raising it to the level of the Manali Chandigarh highway. This heavy rainfall eventually led to flash floods in many areas of the district. A cloudburst in the upper Parbati valley near Rasol in August triggered more floods. Khokhan Nullah caused flash floods in Bhuntar, which is a major town in Kullu district.

Though next year, i.e., in 2019, things went back to normal, the year 2020 witnessed the largest dip in the number of tourists as the country was facing the worldwide pandemic situation caused by COVID. COVID caused a severe strain on economies all over the world. The tourism sector was one of the most affected sectors because of the lockdown. In 2021 (-75.61%), the domestic tourist number increased once again in the district, but the foreign tourist influx still witnessed more negative growth. The reason behind this was the precautions taken by individuals on a personal level and the stringent government rules on movements from one place to another.

Figure 3 Tourist Inflow from 2008 - 2022

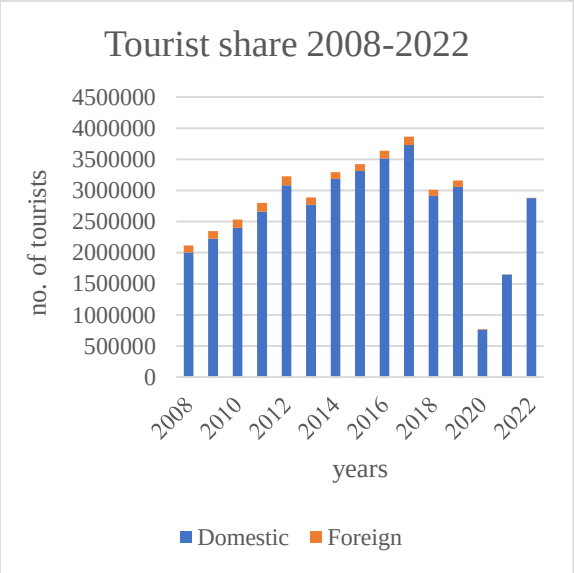
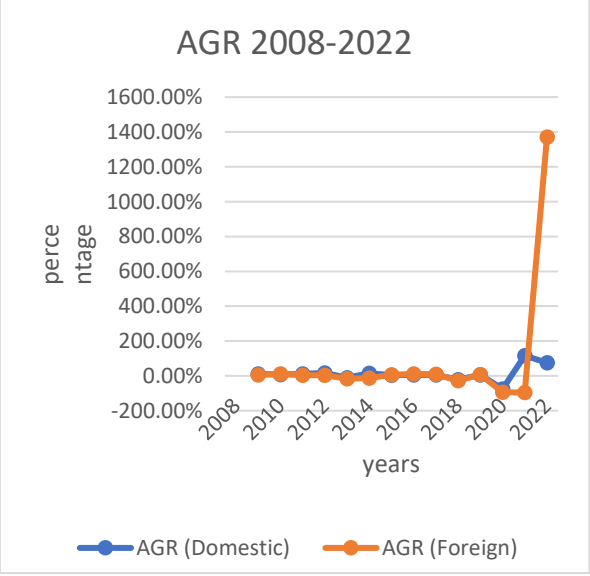


Figure 4 Annual Growth Rate (AGR) of tourists' arrival from 2008 - 2022



These fluctuations in the pattern were mainly because of heavy rains, floods, snowfalls in the state of Himachal Pradesh and occurrence of the global pandemic.

- **Analysis of Seasonality in tourism in Kullu District:**

According to Constantin Secăreanu, Daniela Firoiu (2011), "In tourism, seasonal variation concretizes in a greater or lesser concentration of tourist flows in certain periods of the year, as a result of the impact of:

natural factors (the succession of seasons, climate conditions); social factors (legal holidays, days off, the structure of the school and university years etc.)" From the above-drawn line diagrams, we can easily envisage a particular pattern of tourist arrivals every year and give the reason of formation of such patterns on the basis of natural and social factors as suggested by Constantin and Daniela.

Table 2 Seasonality index of each month from 2008 to 2022 of Domestic Tourists' data

months	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	monthly average	SI / Seasonal relative	
Jan	9257 7	9573 9	1062 70	1192 34	8346 4	8430 0	1062 18	1094 04	1424 04	1782 54	1433 29	1447 63	1563 45	1962 74	1796 31	1292 13.7	0.58	58%
Feb	1052 34	1181 56	1311 53	1485 30	9951 6	1114 66	1159 24	1205 60	1212 80	1392 78	1062 54	1081 14	1037 89	1626 29	1859 13	1251 86.4	0.56	56%
Mar	1512 37	1725 67	1967 26	2405 20	2116 58	2518 73	2531 32	2632 57	3245 72	3381 08	2768 54	2837 76	1329 42	1524 01	2244 50	2316 04.9	1.04	104%
April	2961 46	3105 44	3326 59	3808 85	3427 97	2913 77	3205 14	3365 39	3525 80	3748 03	3223 31	3155 67	0	8741 8	2583 50	2881 67.3	1.29	129%
May	2884 65	2959 17	3012 35	3448 10	3938 45	3426 45	3837 62	4067 87	4183 54	4585 60	4016 20	4116 20	53	1597 1	3785 23	3228 11.1	1.45	145%
June	3904 19	3424 26	3665 42	3895 08	4255 53	3309 10	4136 37	4425 91	4412 59	4974 09	4421 98	4148 41	18	1645 78	4105 23	3648 27.5	1.64	164%
July	1376 71	1583 21	1683 20	1805 34	2008 07	1402 83	3296 65	3527 41	3726 03	3819 03	2789 54	3761 74	108	2134 98	1859 40	2318 34.8	1.04	104%
Aug	9951 9	1504 05	1654 37	1804 12	2899 19	2718 28	4566 71	3425 03	3564 38	3241 09	2196 03	2239 96	483	5330 7	1594 56	2196	0.98	98%

																05.7		
Sep	1143 6825	1579 2564	1756 7893	1978 0176	2801 6986	2969 8865	3088 5042	3150 7094	3370 9012	3590 1246	1651 0101	1701 2901	1129 2	6818 7	1872 03	2096 63.6	0.94	94%
Oct	1745 1950	2365 5062	2455 1432	2714 3297	3428 1818	2743 7061	2770 4896	2548 6738	2567 2356	2723 9697	1924 9720	2078 9701	6184 1	9784 2	1999 28	2244 22.3	1.01	101%
Nov	7216 2	1034 4242	1121 9479	1025 7989	1865 3131	1679 1289	1712 8913	2809 3288	2932 5645	2956 0168	2601 8435	2835 846	8574 6822	1368 5720	2089 57	1840 87.3	0.83	83%
Dec	7935 7	8265 7	9422 8	1031 90	2253 24	2027 92	5069 8	8923 0	9855 9	1126 07	1035 98	1160 30	2107 62	2984 02	2976 39	1443 38.2	0.65	65%

By analyzing the above-calculated seasonality indices for each month from 2008 to 2022, we can easily conclude that the trimester of April-May-June witnesses the largest domestic tourist inflow every year, which is 129%, 145%, and 164%, respectively. The reason behind this pattern could be the summer break in schools, colleges, and universities during these months. After this trimester, the number first decreases because of the monsoon arrival; in general, this decreasing trend reverses in October (101%), which could be attributed to the international fair of Dussehra, which showcases the cultural and religious heritage of the state. Further decreases from November (83%) to February (56%) because of the harsh winters and inaccessibility of many areas due to heavy winter snowfall. Further, with the arrival of spring in March (101%), many places in the district witnessed scenic views of beautiful flowers, attracting people in large numbers.

Figure 5: Line Graph showing Seasonality Pattern of Domestic Tourists' Arrival of each Year from 2008 to 2012

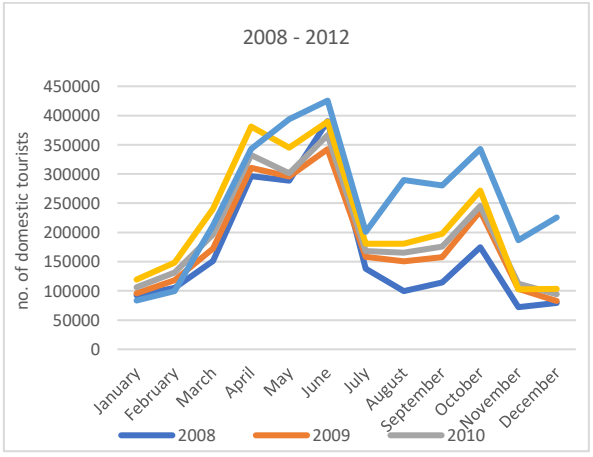


Figure 6 Line Graph showing Seasonality Pattern of Domestic Tourists' Arrival of each Year from 2013 to 2017

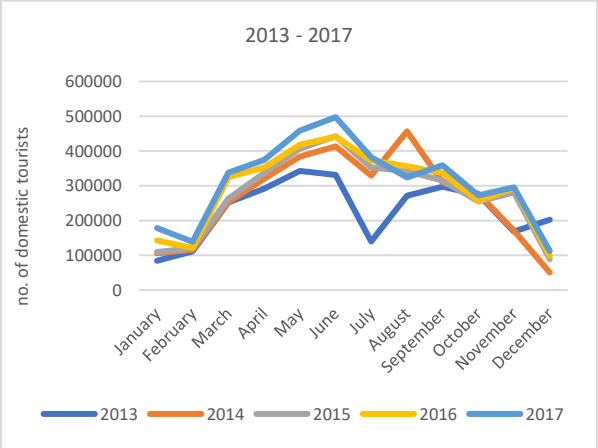
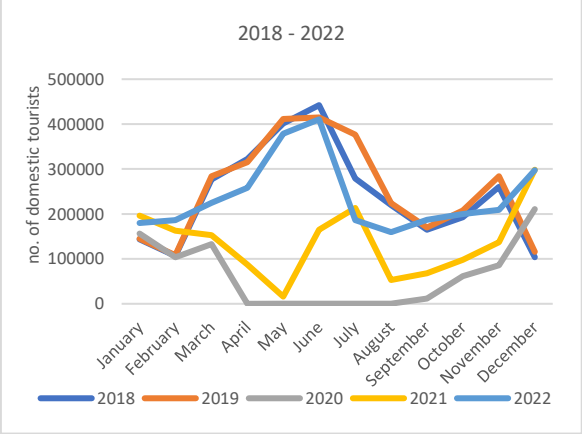


Figure 7 Line Graph showing Seasonality Pattern of Domestic Tourists' Arrival of each Year from 2018 to 2022



Major discrepancies in this seasonality pattern, particularly in the years 2020 and 2021, were caused by the outbreak of the global pandemic COVID-19. Other minor differences were predominantly caused by natural factors such as early monsoons, cloudbursts, and flash floods in particular years.

Table 3 Seasonality index of each month from 2008 to 2022 of Foreign Tourists' data

Months	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	monthly average	SI / Seasonal relative	
Jan	4520	4990	5714	5247	3673	3713	3342	3442	3792	3954	3186	3250	3478	23	36	3490.667	0.43	43%
Feb	5701	4244	4895	5367	3596	4039	3636	3781	3972	4352	3250	3352	2413	16	23	3509.133	0.44	44%

March	7912	6257	7383	7811	6874	8180	7363	7657	8289	9320	8437	8733	1095	25	36	6358.133	0.79	79%
April	13572	14211	14113	12897	11608	9867	8881	9325	9780	9830	8159	8318	0	17	28	8707.067	1.08	108%
May	14264	7452	12534	14828	17385	15125	11344	12024	12951	13520	12174	12479	37	4	329	10430	1.30	130%
June	17157	15522	16147	14694	16214	11855	10432	11162	11279	14988	14970	10578	0	15	194	11013.8	1.37	137%
July	9650	11580	13221	14470	15367	10718	13397	14334	15708	17602	14691	17954	0	23	449	11277.6	1.40	140%
Aug	9276	13117	14091	15361	17524	11537	13267	9950	15930	16430	13025	5208	3	4	350	9556.667	1.19	119%
Sep	10916	15084	16520	17136	12658	11899	12136	12379	13059	13706	6305	6416	6	35	1313	9971.2	1.24	124%
Oct	11211	15385	15888	16117	14894	11916	12035	11072	11965	12786	9035	10391	22	18	728	10230.87	1.27	127%
Nov	5344	7385	7871	7844	8893	7560	7182	12065	12930	13768	12116	13328	12	38	108	7762.933	0.97	97%
Dec	3387	4287	5330	6716	15214	12932	1294	2277	2409	2801	2576	2941	14	34	112	4154.933	0.52	52%

Foreign tourist arrivals (FTAs) follow more or less a similar pattern of seasonality to that of domestic tourists, with few variations. Here, the seasonal index increases from April (108%) to July (140%). This could be because of their long stay in the country, generally from 1 month to 5 months. Further high values of SI in the months of September (124%) and October (127%) can be because of Dussehera. In the winter season, the pattern is similar to that of domestic tourists' arrival.

Figure 8 Line Graph showing Seasonality Pattern of Foreign Tourists' Arrival of each Year from 2008 to 2012

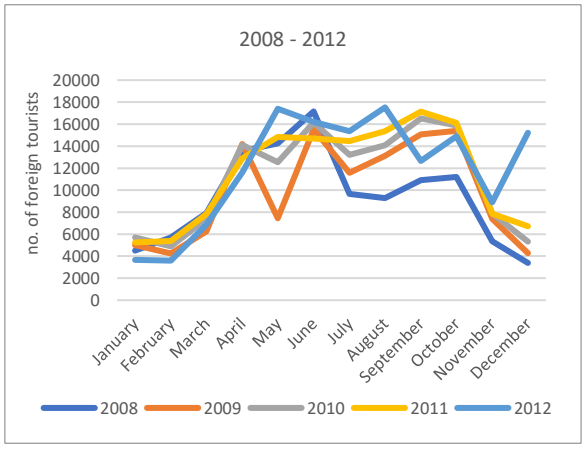


Figure 9 Line Graph showing Seasonality Pattern of Foreign Tourists' Arrival of each Year from 2013 to 2017

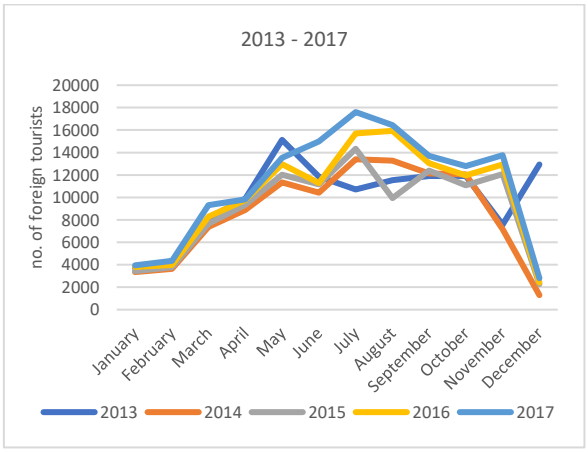
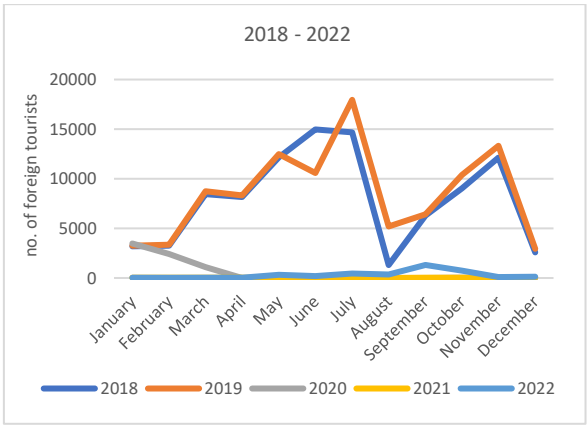


Figure 10 Line Graph showing Seasonality Pattern of Foreign Tourists' Arrival of each Year from 2018 to 2022



- **Implications of the Seasonality of tourism in Kullu District on tourism forecasting:**

The changes in tourists' arrivals and activities throughout the different seasons of the year define the seasonality of the place. Analyzing this pattern and its implications is very important for the further forecasting and development of this industry. Following are certain implications of seasonality for tourism forecasting in Kullu district of Himachal Pradesh:

1 **Demand Analysis:** By analyzing the seasonality, one can get insights into peak seasons with high demand coinciding with summers and festivals and off-peak seasons with lower demands, such as winters. From the above analysis, we can see a pattern of a decrease in the tourist's inflow in the winter seasons and an increase in the same during the April-May-June trimester. By identifying this pattern, stakeholders can allocate resources and plan their strategies accordingly.

2 **Capacity Arrangement:** Seasonality data assists in forecasting and planning the capacity of tourism-related services and infrastructure in Kullu district. During peak seasons, such as Dussehera and summer holidays in schools, the demand for accommodations, transportation, and attractions is high. Understanding seasonality helps improve the allocation of resources to match the expected demand.

3. **Revenue Management:** Seasonality impacts pricing strategies in Kullu District. During peak seasons, when demand is high, prices for accommodations, tours, and activities can be adjusted accordingly. Forecasting seasonality allows businesses to optimize revenue generation by implementing dynamic pricing strategies to maximize profits during peak periods.

4. **Staffing and Employment:** The seasonality of tourism influences employment patterns in the district. During peak seasons, there is a higher demand for tourism-related services, leading to an increased need for staff and temporary employment opportunities. By forecasting seasonality, businesses can plan their staffing needs accordingly, ensuring a sufficient workforce during busy periods.

5. **Marketing strategies:** by identifying the seasonality pattern of tourism authorities and stakeholders, they can prepare effective marketing and promotional strategies varying from season to season by modifying their tourism campaigns. It can help in balancing the number of tourists from off-season to peak season, eventually reducing the dependency on a single season and thus reducing the losses.

6. **Risk Management:** This analysis helps detect the possible risks and vulnerabilities in the district's tourism industry, such as early monsoons, COVID pandemic situations, and harsh winters. By identifying such fluctuations, individuals as well as authorities can plan for eventualities accordingly. They can even diversify their market reach to reduce the impacts of such external factors.

- **Seasonality Forecasting Model:**

We have used the simple average method for forecasting seasonality (without a trend line) for the months of 2023. This approach simply assumes that future values will be similar to the historical average values for corresponding time periods. Owing to the simplicity of the model, it may not capture more complex variations in the data. It forecasts the estimates for the year 2023 by first simply calculating the average for each month in 2023 and further dividing it by the seasonal index, or seasonal relative. We can calculate the monthly average of 2023 by first calculating the average tourist inflow of each year and further calculating the average total average value of each year from 2008 to 2022.

Table 4 Seasonal Forecast for the year 2023

For Domestic tourists	SI / Seasonal relative	average for each month in 2023	seasonal forecast 2023	For Foreign tourists	SI / Seasonal relative	average for each month in 2023	seasonal forecast 2023
January	0.58	222980.3	129213.7	January	0.43	8038.58	3490.665
February	0.56	222980.3	125186.4	February	0.44	8038.58	3509.132
March	1.04	222980.3	231604.9	March	0.79	8038.58	6358.131
April	1.29	222980.3	288167.4	April	1.08	8038.58	8707.063
May	1.45	222980.3	322811.2	May	1.30	8038.58	10430
June	1.64	222980.3	364827.5	June	1.37	8038.58	11013.8
July	1.04	222980.3	231834.8	July	1.40	8038.58	11277.6
August	0.98	222980.3	219605.7	August	1.19	8038.58	9556.663
September	0.94	222980.3	209663.6	September	1.24	8038.58	9971.196
October	1.01	222980.3	224422.3	October	1.27	8038.58	10230.86
November	0.83	222980.3	184087.3	November	0.97	8038.58	7762.93
December	0.65	222980.3	144338.2	December	0.52	8038.58	4154.932

Figure 11 Line Graph showing seasonal pattern of forecasted values of Domestic Tourists' arrival in 2023 in Kullu District

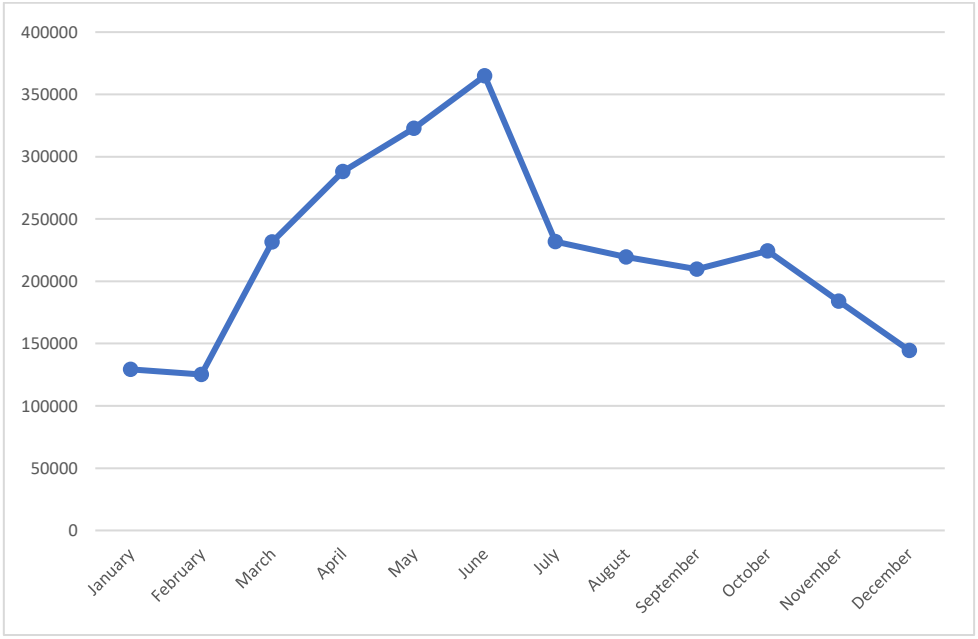
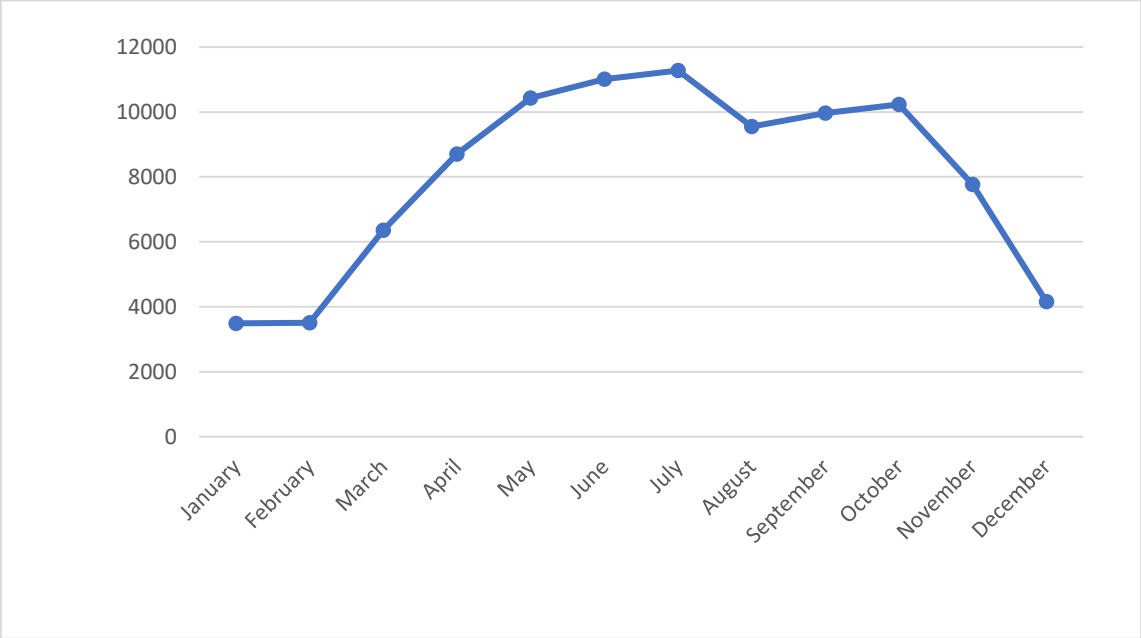


Figure 12 Line Graph showing seasonal pattern of forecasted values of Foreign Tourists' arrival in 2023 in Kullu District



By constructing line graphs using the calculated forecasted values of each month of 2023, we can visualize a similar pattern of the diagram to that of previous years graphs, which had a definite peak and off-peak season.

- **Evaluation of the seasonality forecasting model:**

The **coefficient of determination,** or **R-squared,** measures the ratio of variance in the dependent variable, i.e., actual value, that can be explained by the independent variable, i.e., forecasted values, in this model. It provides us with an indication of how well the forecasted model fits the observed data. Its value ranges from 0 to 1. Following are the major interpretations of different ranges:

1. Close to 0 means the model does not explain much of the variance in the observed data, and this is not a good fit.
2. 3 to 0.5 suggests a moderate fit. Here, though the model explains a reasonable amount of variance in the data, there is still need for improvement.
3. 5 to 0.7 indicates a relatively good fit, and here the model explains a substantial part of the variance in the observed data.
4. 7 to 0.9 range indicates a strong fit, where the model explains a large portion of the variance in the observed data.
5. Close to 1 shows an excellent fit where the model explains almost all of the variance in the observed data.

We can employ coefficient of determination as a measure of the goodness-of-fit or accuracy of seasonality forecasting model in this tourism research.

Based on the above interpretations, the values of R^2 obtained from the calculations can be properly evaluated.

Evaluation of Domestic Tourists forecasted values from 2008 to 2022:

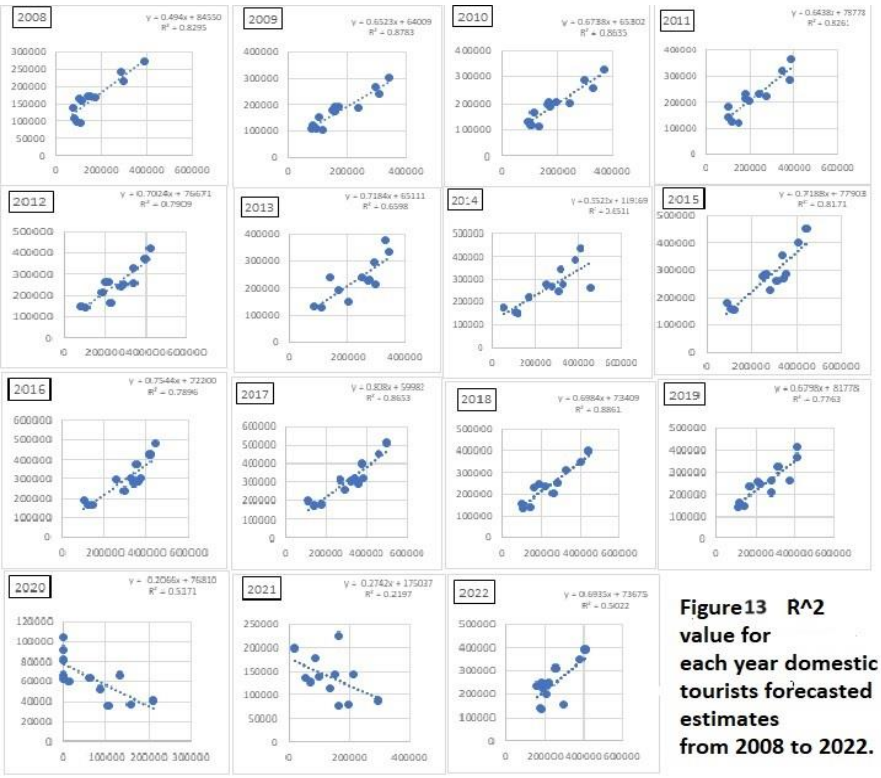
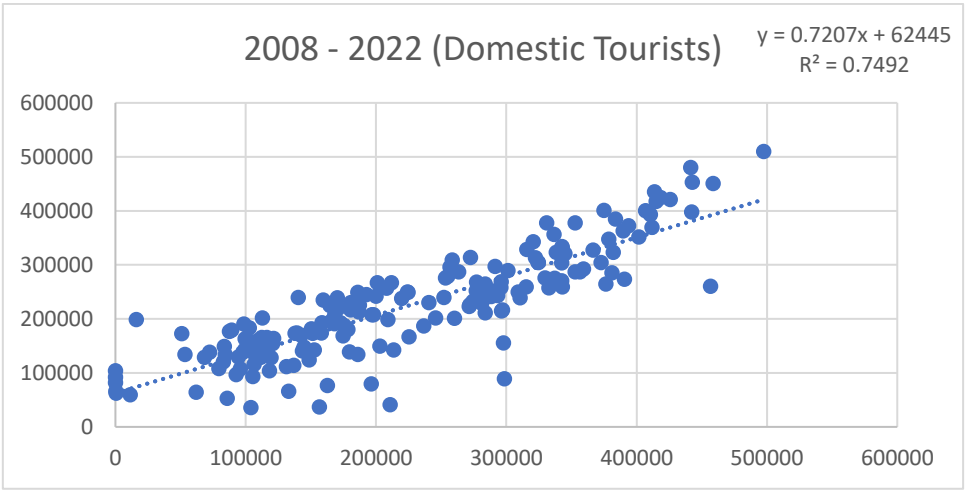


Figure13 R^2 value for each year domestic tourists forecasted estimates from 2008 to 2022.

We have calculated the value of R^2 both yearly and all together from 2008 to 2022 for domestic and foreign tourists separately. Results for years from 2008 to 2012 are above 0.7, which shows a strong fit of the model. Further, the value decreased for 2013 (0.6598) and 2014 (0.6511), which could be attributed to the early monsoon, heavy rainfall, landslides, and cloudbursts in the region. Further, the R^2 value from 2015 to 2022 is again above 0.7, showing a strong fit of the model to the data. The decline of the value in 2020 (0.5171), 2021 (0.2197), and 2022 (0.5022) was the result of an unpredicted global pandemic, COVID 19, which severely affected the global economy. The value of R^2 for overall domestic tourist data spanning from 2008 to 2022 is 0.7492, which again indicates a strong fit, which means the prepared forecasting model explains a large part of the variance in the observed data.

Figure 14 R^2 value for Domestic Tourists forecasted data from 2008-2022



Evaluation of Foreign tourists forecasted values from 2008 to 2022:

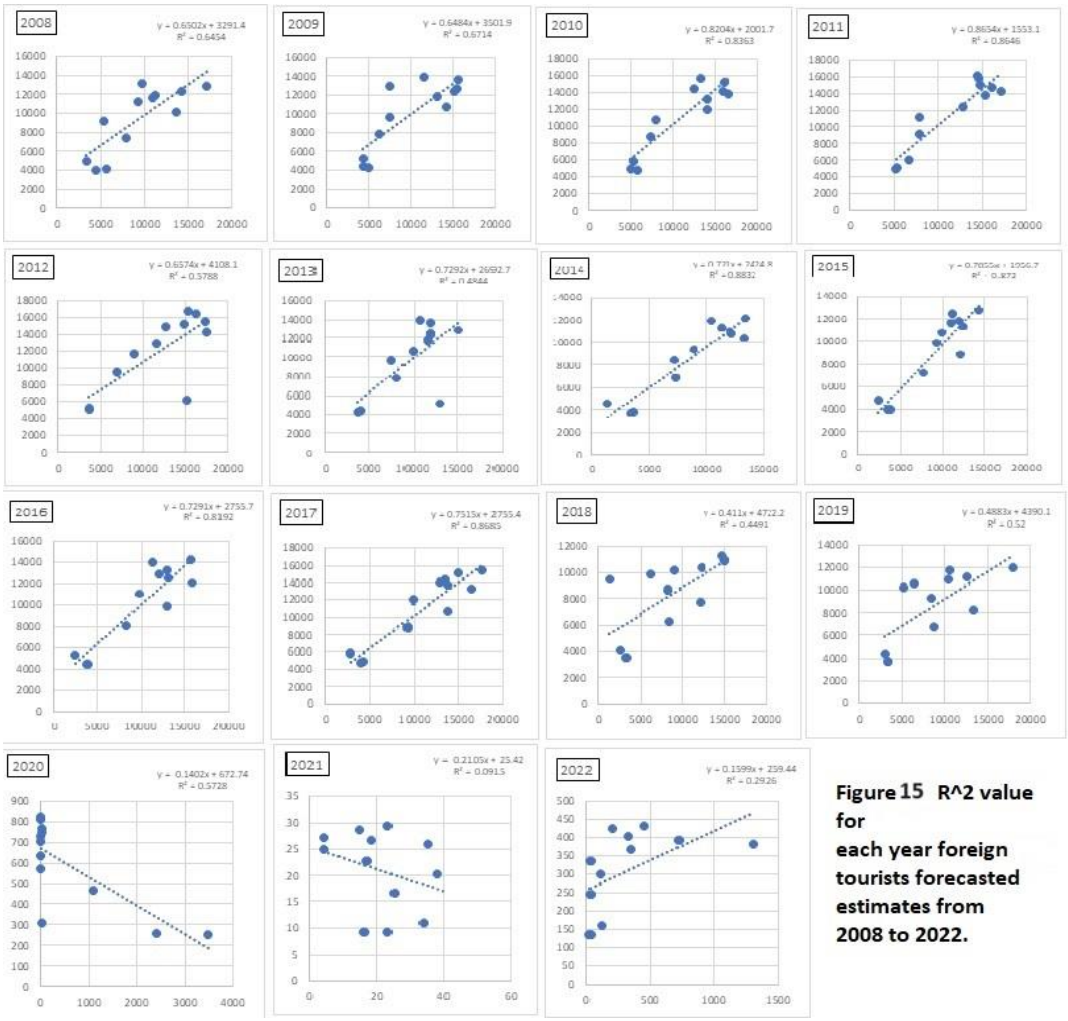


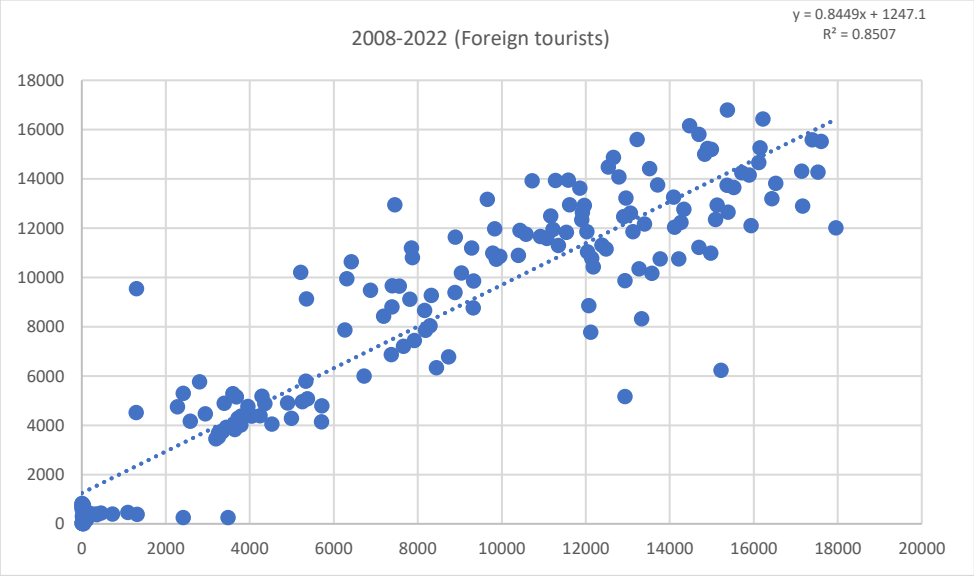
Figure 15 R^2 value for each year foreign tourists forecasted estimates from 2008 to 2022.

The R^2 values for the years 2008 and 2009 are 0.6454 and 0.6714, respectively. It indicates a relatively good fit, and here the model explains a substantial part of the variance in the observed data. Further, this value increases for the years 2010 and 2011, and the value is above 0.8, which shows a strong fit. The decline in value in 2012 and 2013 can be attributed to the same reason as that of domestic tourism's value decline.

A strong fit can be further seen from 2014 to 2017. But due to heavy rainfall in 2018, eventually leading to major flash floods, the actual value of tourists declined from the predicted value. Its impact could also be seen in the 2019 data. This value further declined because of the COVID-19 pandemic in 2020–2021. Though the value again returned to normal in 2022 with domestic tourists' influx, the value still remained low in the case of foreign tourists in flux because of the much more stringent rules of both the home and destination countries.

Regardless of a few discrepancies in the year-wise calculated values of R^2, the total value of R^2 from 2008 to 2022 is 0.8507, which shows a strong goodness of fit, proving the accuracy of the created forecasting model.

Figure 16 R^2 value for Foreign Tourists forecasted data from 2008-2022



Conclusion:

This study revolved around conducting a temporal study of tourism in the Kullu district of Himachal Pradesh from 2008 to 2022 and analyzing the seasonality of the same for further tourism forecasting. We got a deeper understanding of the district's tourism dynamics from the valuable insights regarding the patterns and trends in tourist arrivals gained by analyzing the pre-available tourist data. The research objectives were successfully achieved by examining the tourism statistics. Seasonal variation was identified, and it enabled the prediction of a forecasting model for the next 12 months of 2023. The findings of the study provide insights for tourism planning and decision-making in the district. Further, the identification of peak and off-peak seasons, along with an understanding of seasonal fluctuations, can guide resource allocation, capacity planning, pricing strategies, and employment management.

The findings of this research provide valuable implications for tourism planning, management, and decision-making in the Kullu district. The identification of peak and off-peak seasons, along with an understanding of seasonal fluctuations, can guide resource allocation, capacity planning, pricing strategies, marketing campaigns, and employment management. Moreover, the forecasting model developed based on seasonality patterns enables stakeholders to make informed decisions, optimize resource utilization, and effectively manage tourism demand throughout the year. However, it is important to note that the accuracy and reliability of the forecasting model depend on various factors, including the quality and availability of data, the accuracy of assumptions, and the modeling techniques employed. Additionally, it is crucial to consider external factors such as socio-economic changes, political situations, and natural events such as rainfall, landslides, floods, etc. that may influence tourism demand beyond the identified seasonality patterns. Additionally, analyzing the impact of external factors and conducting sensitivity analyses could provide a more comprehensive understanding of the complexities of tourism forecasting in the Kullu district. Overall, this study contributes to the knowledge and understanding of tourism trends and seasonality in the Kullu district of Himachal Pradesh, facilitating better planning, management, and sustainable development of tourism in the region. The insights gained from this study can guide policymakers, tourism authorities, businesses, and other stakeholders in making informed decisions and

formulating effective strategies to optimize tourism opportunities and mitigate the challenges associated with seasonality.

References:

1. Balokhra, J. (2010), "About Himachal Pradesh" Objective Himachal, India & World, H G Publications, ISBN: 81-86351-02-7.
2. Butler, R. W. (1994). Seasonality in tourism: issues and problems. In A. V. Seaton (ed.), *Tourism: The state of the art*, 332-339.
3. Constantin, S. & Daniela, F. (2011). Statistical methods used in the analysis and forecast of the tourism activity affected by seasonality. Romanian Economic and Business Review, 6,4.
4. Corluka, G. (2018). Tourism seasonality-an overview. Journal of Business Paradigms,4(1), 21-43.
5. "Economic Survey of Himachal Pradesh" 2022- 2023 Department of Economics and Statistics. Himachal Pradesh.
6. Gardner, J., Sinclair, J., Berkes F., &Singh, R.B. (2002). Accelerated tourism development and its impacts in Kullu-Manali, H.P., India. Tourism Recreation Research, 7(3), 9-20.
7. Gupta, J. (2015). Tourism in Himachal Pradesh: a study of Kullu Manali. IJERMT, 2(3), 183-191.
8. Himachal Pradesh tourism policy, 2019, Department of Tourism and Civil Aviation, Government of Himachal Pradesh.
9. https://en.m.wikipedia.org/wiki/2013_North_India_floods
10. https://himachaltourism.gov.in
11. https://hpkullu.nic.in/map-of-district/
12. https://www.google.com/amp/s/m.tribuneindia.com/news/himachal/decline-in-tourist-influx-worries-stakeholders-in-kullu-511724
13. https://www.indiatoday.in/india/story/swollen-beas-river-sweeps-away-bus-in-manali-flash-floods-in-himachal-1347313-2018-09-23
14. https://www.unwto.org/glossary-tourism-terms
15. Jangra, R., & Kaushik, S.P. (2018). Analysis of trends ad seasonality in the tourism industry: the case of a cold desert destination – Kinnaur, Himachal Pradesh. Tourism Today, 18(1), 45-60.
16. Kaushal, V. (2019). Growth and development: a study of tourism industry of Himachal Pradesh. Confluence of Knowledge, 7(1), 46-54.
17. Kulendran, N., K. K. F. Wong. (2005). Modelling seasonality in tourism forecasting. Journal of Travel Research, 44, 163-70.
18. Martín, J.M., et al., (2019). Analysis of tourism seasonality as a factor limiting the sustainable development of rural areas. Journal of Hospitality & Tourism Research, 44(1), 45-75.
19. Mishra, P.K., Rout, H.B., Pradhan, B.B., (2018). Seasonality in tourism and forecasting foreign tourist arrivals in India. Iranian Journal of Management Studies, 11(4), 629-258.
20. Rout, H.B., Mishra, P.K., Pradhan, B.B., (2016). Trend and progress of tourism in India: an empirical analysis. IJER, 13(5), 2265-2275.
21. Sahani, N. (2018). Spatio-temporal dynamism in tourist arrival in Himachal Pradesh, India. Asian Resonance, 7(4) ,90-100.
22. Tourism statistics report, Department of Tourism and Civil Aviation, Government of Himachal Pradesh.