CINEFORUM
ISSN: 0009-7039
Vol. 66. No. 1, 2026

AI-Driven Assessment of GST Impact on Tourism: A Case Study of Key Travel Destinations in Uttar Pradesh

Ayoosh Banka1
Research Scholar – Department of Commerce
Vivekananda Global University, Jaipur
caayooshbanka@gmail.com
Dr. Vinod M Lakhwani[2]
Associate Professor and HOD – Dept. of Management Studies,
Faculty of Management, Vivekananda Global University, Jaipur, Rajasthan, India
drvmlakhwani@gmail.com

Abstract
This study explores the impact of the Goods and Services Tax (GST) on the tourism sector in Uttar Pradesh using artificial intelligence (AI)-driven methodologies. By focusing on key travel destinations such as Varanasi, Agra, Lucknow, Ayodhya, and Prayagraj, the research assesses how GST reforms have influenced tourist inflows, service pricing, and consumer behavior. Utilizing AI tools including machine learning and data analytics, the study analyzes patterns from tourism statistics, GST revenue data, and user-generated content to uncover the nuanced effects of tax changes across different tourism segments. The research adopts a case study approach to evaluate destination-specific responses and economic outcomes, highlighting disparities in GST impact among heritage, religious, and leisure tourism hubs. Findings provide insights for policymakers, industry stakeholders, and tourism planners, offering evidence-based recommendations for optimizing tax structures and enhancing tourism growth. This AI-driven assessment sets a precedent for intelligent, data-centric approaches to evaluating policy impacts on regional economies.

Keywords: Artificial Intelligence (AI), Goods and Services Tax (GST), Tourism Economics, Consumer Behavior, Sustainable Tourism

Introduction
In India, the establishment of the Goods and Services Tax (GST) signified a dramatic shift in the country's indirect taxation policy. The GST was implemented with the intention of simplifying tax structures and creating economic consistency. In spite of this, its effects on individual industries, such as tourism, are not yet fully understood through the lens of data-driven perspectives. This is especially true in places that are both culturally and economically significant, like as Uttar Pradesh. Varanasi, Agra, Lucknow, Prayagraj, and Ayodhya are just few of the sites in Uttar Pradesh that draw millions of domestic and international tourists each year. Tourism in Uttar Pradesh plays a significant part in the socio-economic landscape of the state. The introduction of the Goods and Services Tax (GST) resulted in different tax rates being applied to services such as hotel accommodations, transport, and packaged tours. This may have had an impact on the spending habits of tourists, travel patterns, and the price of services. When seen in this light, Artificial Intelligence (AI) appears as a strong analytical tool

OPEN ACCESS © CINEFORUM

that can be used to deconstruct the intricate and multifaceted influence that the Goods and Services Tax (GST) has on tourism. Artificial intelligence tools such as machine learning algorithms, natural language processing, and predictive analytics make it possible to handle enormous information. These databases include government tourist statistics, records of GST collection, customer reviews, and trends in travel booking. This study intends to identify hidden patterns, causal links, and destination-specific tax implications that may be overlooked by typical statistical methodologies. This will be accomplished through the use of artificial intelligence. The study utilizes a case study method where significant tourist attractions are Uttar Pradesh is given special focus. This gives regional and specific understanding of the implication of the Tax on Goods and Services (GST). Also, the analysis reveals disparities in the effects of the Goods and Services Tax (GST) among some of the visitor categories like religious tourism, historical tourism, and leisure tourism. Also, the study finds the implications of the presence of enterprises in the hotel industry as well as local economies. The artificial intelligence-powered investigation in question is not only relevant to the policymakers that are looking to optimise taxation agreements and promote tourist development but also to the players of the travel and hospitality value chain. The research contributes to the emergence of an original model of measuring the effect of taxes on tourism as it also considers the economic theory, evaluation of policy, and modelling capabilities enhanced by artificial intelligence. It preconditions policy recommendations which can be evidence-based and stimulates the utilization of intelligent systems in the realms where tourist planning and monetary assessment is the responsibility of the area.(Saxena, R. K,2018).

The Goods and Services Tax (GST), which was introduced in India on July 1, 2017, is an enormous fiscal transition with an aim of unifying a fractious tax regime, not to mention increasing the ease and clarity of indirect tax. Before the Indian taxation system was introduced, the system had been a combination of maze of taxation, which includes the service tax, the value-added tax, the central excise, and the state-specific tariffs. A lot of these taxes led to ripple effects and taxation issues to business. The Goods and Services Tax (GST) was aimed at eliminating these inefficiencies by basing it on the concept of a harmonised framework that brings together many layers of taxes into a single roof. The consequences of this shift to the tourism sector specifically in states that are economically diverse and have their own cultural value as is in the case of Uttar Pradesh are not well assessed empirically and based on data. (Acharjee, M,2018).

It is seen that the tourism sector in Uttar Pradesh (UP) forms critically important part of the Uttar Pradesh (UP) socio-economical identity per se. Uttar Pradesh has a blend of heritage tourism (like Agra), spiritual circuits (like Varanasi and Ayodhya) and cultural centres (like Lucknow and Prayagraj) attracting a wide and ever-increasing range of Indian and international tourists alike. The industry is also involved in large scale efforts in providing employment, infrastructural growth and empowerment of the rural population. The state of Uttar Pradesh has long enjoyed the position of being one of the three best states in India in terms of numbers of domestic tourists to the state as per state tourism reports on a consistent basis. This has however had mixed effects in that destinations and services within service groups have not

OPEN ACCESS © CINEFORUM

yielded even results due to post-GST dynamics. Various tax levels on lodging (ranging 0 percent to 28 percent), restaurant services and transport have created different levels of pricing and in most cases it has deteriorated booking holiday behaviours and even made some people avoid staying longer or indulging in luxurious spending. Thus, a destination-specific detailed evaluation is critical to understand microeconomic impacts of Goods and Services Tax (GST) on tourism demand and the profitability of the stakeholders.

The newly emerging discipline of impact assessment fuelled by artificial intelligence can be located in the intersection of the taxation policy and tourism economics. It is not unheard of those conventional methods of economic evaluation, e.g., regression methods, input-output models, or time-series forecasts fail in the sense that they are insufficient to capture the nonlinear, endogenously intertwined, and sentiment-dependent nature of tourist interplay. Artificial intelligence (AI), in its turn, offers a robust and scalable solution that can analyse huge and unstructured data sets and have the capabilities to derive meaningful patterns out of them. Such datasets could consist of online reviews and reservation data and social media-discourse. Examples of tools that could be utilized to identify hidden relations, predict consumer behaviour, and model future trend under varying policy conditions are machine learning strategies, natural language processing (NLP) and neural networks. Artificial intelligence enables a more granular, dynamic, and continuously-updated understanding of the impact of policies, in the case of the Goods and Services Tax (GST), which is a rate of tax that have a variety of very gentle implications on both consumers and service providers alike.

The relevance of AI-based methods becomes particularly apparent in the case of situations that still deal with the digital acceleration and have just overcome a pandemic. In recent years, the forces of internet sources, peer reviews, algorithm recommendations and transparency of prices have been gaining momentum in determining consumer behaviour in the tourist sector. The perceived fairness, affordability, and satisfactory levels in relation to the tax related change in pricing could be further understood by obtaining traveler sentiments before and after implementation of Goods and Services Tax (GST) by relying on sentiment analysis or topic modelling. Moreover, the ability of artificial intelligence models to make decisions on forecasting the influx of tourists in the future using their past growth, economic indicators, and simulation of the Goods and Services Tax regime position them as essential tools of successful evidence-based policymaking. This shift to intelligent technologies in the analysis of the financial situation of the population is also consistent with the general objectives of digital management, fiscal openness, and sustainable tourist planning. (Abraham, S,2020).

Moreover, the diversity of the terrain of tourism industry in Uttar Pradesh presents it with a very solid reason to study the impact of various taxes. Spiritual value pilgrimage destinations such as Ayodhya and Varanasi could cover the quest-oriented price-saving travellers whose level of sensitivity on tax-driven prices can vary significantly among themselves. Other cities such as Agra and Lucknow are in upper slabs of taxes because such cities offer high-end accommodations and urban accommodation amenities. The relationship between taxation reforms and touristic performance is even tougher due to the development of the infrastructure, political campaigns, and investment flows into these cities. Thus, we can perform a more actual

OPEN ACCESS © CINEFORUM

to policy, realistic, and unique analysis due to the case-study approach which is based on the regional economics profile, and data science instruments. Besides examining the quantitative move of the visitor inflows and pricing behaviours, this paper will also explore the interpretation of qualitative the comments of how it feels to have gotten great value-for-money since GST.(Sharma, M,2021).

As such, the proposed study serves an important purpose by factoring in the macroeconomic theory, the regional tourist dynamics and the interest fuelled through artificial intelligence in an attempt to assess the real effects that the Goods and Services Tax (GST) has had on the tourism sector in the state of Uttar Pradesh. Such analysis is based on the extensive data set 20162023 both in pre and post-GST periods. It uses complex machine learning procedures combined with qualitative information about the stakeholders so that it can identify trends that can be implemented. However, to analyze the economic implication of Goods and Services Tax (GST) is not just sufficient but it is aimed to offer a policy assessment methodology that is dependent on data, repeatable, and can be powered to be applicable to other Indian states or similar global regions where taxation modifications are taking place. Also, the study adds to the existing corpus of the literature on smart governance, electronic fiscal tools, and sustainable tourist development. This will be achieved through placing artificial intelligence (AI) to the premiere of taxation studies in tourism. This makes Uttar Pradesh an active innovation learning ground in the evaluation of public policy. (Rahul et al,2025).

Significance of the Study

The research can play a significant role in developing the regional economic policy since it presents an AI-aided analysis of the influence of GST on Uttar Pradesh travel attractions, a state that has a rich diversity of travelling destinations. Through the use of the artificial intelligence instruments of machine learning and predictive analytics, the study helps the policymakers and tourism-related authorities to make rational decisions about the tax policies and tourism plans that would rely on the data. It provides effective information to government agencies on the impact of GST on the service pricing, tourist inflow and performance of businesses to certain destinations such as Agra, Varanasi, Ayodhya, Lucknow and Prayagraj. In addition, the paper also illustrates the value of AI in the analysis of an economic impact, as real-time, scalable, pattern-based analysis can be conducted, which might be neglected even with the traditional assessment methods. These results provide evidence on need-based recommendations concerning destination-based GST changes, where the fiscal changes are aligned with sustainability and even development potential of tourism, thereby providing a contiguous solution to sustainable and intelligent growth of tourism and tax regimes in India. (Perween, S,2021).

Literature Review

Evolution of Goods and Services Tax (GST) in India

It is one of the most significant tax reforms in the post-independence Indian fiscal history, the Goods and Services Tax (GST). It aims at easing the complexity of the structure of indirect taxes as a whole since a unified system is formed, now it has different effects on different

OPEN ACCESS © CINEFORUM

countries. Formerly, the indirect tax system in India was fragmented where there were multiple levies, which were by the federal government and the state governments. Amongst others, these levies were the Value-Added Tax (VAT), the federal Excise Duty, the Service Tax, the Entertainment Tax, the Luxury Tax, and the Entry Tax. The outcome of these overlapping taxes was not only a compliance danger, but it also ensued in cascading effects meaning that the people were forced to pay more taxes over and above the other taxes, and this led to charging of higher prices to the customers and to more complex operations of the corporations. The Government of India followed the step-by-step process of tax unification after it realised the inefficiencies and the economic barriers that this had led to. The Goods and Services Tax (GST) has its origins dyed in the year 2000 where it was first proposed before it was finally enforced by law on July 1, 2017.(Bhandari, A,2022).

Before then it had been under policy debate, stakeholder consultations, and structural developments over a period of more than seventeen years. Under an effective four tier rate scheme of 5 percent, 12 percent, 18 percent and 28 percent, the commodities and Services Tax (GST) subsumed a wide range of indirect taxes. All commodities and services had these rates which was dependent on the type of commodity or the type of services. Introduction of the concept of one nation, one tax, one market was an important one. It also encompassed an easy procedure of input tax credit along with an online compliances and reports through technology-based GST Network (GSTN). The Council which is made up of members of central government and all the states consisting of Goods and Services Tax has played a vital role in the development of the system, over a number of years. It has been charged with the assessment of rates, resolution of conflict along with taking into consideration feedbacks by the industry and state governments. Although Goods and Services Tax (GST) ushered in ease of taxation and augmented compliance there are still challenges to be encountered especially in the service industries like tourism where the tax rates are charged multi-slabs with several different results coming out. With this regard, the study requires that one should at least be familiar with the history of the Goods and Services Tax (GST) so as to have an analytical consideration on its sector-specific concerns. This is illustrated in one of the industries, tourist industry, that is most vulnerable to taxation in aspects of price changes, consumer behaviour and viability of companies. Here, the development of the Goods and Services Tax (GST) is not only an attitudinal fiscal policy trend but also a change of economic governance and cooperative federalism in India that means of which still extend to the other states and sectors respectively.

Evolution of Goods and Services Tax (GST) in India

Goods and Services Tax (GST) is one of the greatest of all tax reforms of the post-independence in the Indian record of the fiscal history, which endeavours to unite the cumbersome network of indirect tax structure into an integrated, simplified system. The tax regime of India was a patchwork of tax collections by the central and state governments under the previous regime and it was distorted with many different tax collections like Value Added Tax (VAT), Central Excise Duty, and Service Tax, Education Tax, Entertainment Tax, Luxury Tax, and Entry Tax, etc. Not only did these superimposed taxes cause compliance costs, they also caused cascading effects that is, tax was charged on tax resulting in an increase in cost to consumers which in

OPEN ACCESS © CINEFORUM

turn complicated business operation. It is a fact that due to the prevalence of this structure, a high degree of inefficiencies and an inordinate level of economic barriers were in existence, and so to address this issue, the Government of India began to take a phased approach to tax unification. Originally, the concept of GST was suggested in 2000 and it was only after almost 17 years of policy discussion, stakeholder consultation, and organizational planning that the well-planned GST could come into world around 1 year ago on July 1, 2017. The GST merged a broad spectrum of indirect taxes into a four-rate level that is 5%, 12%, 18% and 28% that cuts through goods and services based on their categorization. (Makandar, N. M,2018). It implemented the principle of one nation, one tax, one market and the procedures of easy input tax credit and a technology-based GST Network (GSTN) used to file online and report nationally. The GST Council, consisting of representatives of the center and all the states, has over the years played a significant role in evolving the structure by periodical review of the rates, resolving the disputes and also by taking into consideration the feedbacks given by the industries and state governments. Although GST has simplified the process of taxation and also made it more compliant, not all has been rosy, particularly within the face of sectors such as tourism where GST slabs have been different, hence causing different impacts. Here, exploring the background of the evolution of GST will be very crucial in examining the sector-specific results of GST, e.g. in the tourist industry where taxes change, consumer behavior and the sustainability of a business are very sensitive to taxation policies. In this way, there is more than a fiscal transition in the development of GST as it has changed the way in which the economic governance and cooperative federalism operate changing India due to the ongoing implications across territories and fields.

Importance of the Tourism Sector in Uttar Pradesh

The Uttar Pradesh tourism industry is a source of immense cultural, economic and social value and thus one of the most crucial sectors as far as the growth and the identity of the state is concerned. Uttar Pradesh is the centre of Indian historical, spiritual, and architectural heritage that is visited by millions of national as well as international tourists yearly. The cultural rich diverse state is home to the iconic destinations like the Taj Mahal in Agra, the spiritual city of Varanasi, the sacred convergence at Prayagraj, the historical and cultural Pain Inda of Lucknow and to the new emerging religious tourism destination to the state of Ayodhya and the state offers a rich variety of experiences like heritage-led, pilgrimage and holistic touch tourism to ecotourism and gastronomy. The industry is a major source of employment, peripheral grasping endowment and the infrastructure. It increases the other industries related to it such like hospitality, transport, handicrafts and food services consequently acting as a multiplier in the state GDP. It is estimated by the government that Uttar Pradesh is always in the first position with the highest number of footfall level of tourists placing over 20 per cent of the Indian domestic tourists in the recent years. The state policy on tourism focuses on digital marketing, updating infrastructure, preservation of heritage, and collaboration between the private and the government sector in order to improve the experience of the guests. Moreover, the construction of international airports, premium resorts and bettering of connectivity has brought convenience and attractiveness of its destinations. Tourism also leads to strengthening the

OPEN ACCESS © CINEFORUM

cultural heritage because it inspires art, music, art and crafts of the area, and enhances a culture-friendly attitude in the tourism destination by embracing sustainable activity. Socio-economically, tourism has liberated rural communities by giving the people a source of livelihood and promoting women workforce. Nevertheless, the industry is still very susceptible to regulatory, fiscal and policy modifications especially in regard to taxation, the quality of services and seasonal variations. Hence, the dynamics of tourism in Uttar Pradesh are relevant to the policymakers, investors, and stakeholders that need to know more about tourism in the state to enhance its growth position. Due to its fiscal nature of a GST-driven environment, evaluating the influence of taxation on this fundamental aspect will be significant in the deciphering of balance between revenue mobilization and sustainable and inclusive tourism growth and thus Uttar Pradesh will be central when it comes to designing tourism-led economic planning in India.(Kaur, J,2020).

Past studies on tourism taxation

(Ghosh, A. (2019). This influential paper extends the Ramsey optimal taxation framework to tourism, and employs Computable General Equilibrium (CGE) modeling (in the case of Mauritius) to examine efficiency and equity impacts of tourism-specific taxes. The authors show that optimally designed tourism taxes can efficiently generate revenue without substantially harming welfare. Jensen, B., & Wanhill, S. (2002). Tourism taxation re-examined: Effects on welfare and tourism expansion. *Tourism Economics*, using general equilibrium and input-output approaches. They demonstrate contrasting impacts: under certain models, tourism expansion can deliver larger welfare gains even when tourism taxes are present.

Seetaram, N., Song, H., & Page, S. J. (2014). Find that taxes may alter budget allocation patterns and reduce participation in certain tourism services. Tourism taxation: A synthetic control method for policy evaluation. In this chapter (Springer), researchers apply Synthetic Control Method (SCM) to evaluate the effect of overnight tourism taxes on cities such as Rome, Florence, and Padua (2008–2014). Findings suggest that the imposition of tourist taxes had no significant effect on international or domestic overnight stays. The effect of tourism taxation on international arrivals to a small island destination. Journal of Travel Research, using FMOLS panel data methods in the Maldives between 1996–2017. They estimate a 10% increase in tourism tax reduces inbound arrivals by around 5.4%, with variations depending on tourists' source countries.

Artificial Intelligence (AI) has emerged as a transformative tool in public policy and tourism forecasting, enabling governments and planners to anticipate trends and make data-driven decisions. A recent G7/OECD policy paper highlights how AI can enhance innovation and sustainability in tourism by shaping personalized visitor experiences while ensuring robust consumer data protection, labor readiness, and regulatory compliance—enabling smarter policy frameworks for destinations and small businesses alike. On the forecasting front, Fronzetti Colladon et al. (2021) developed a methodology using social network and semantic analysis of forum posts on TripAdvisor, integrating these novel variables into traditional autoregressive and bridge models. Including metrics such as language complexity and network

OPEN ACCESS © CINEFORUM

centrality significantly improved predictions of international airport arrivals for European capitals. Deep learning applications are also advancing tourism forecasting. In Yi et al. (2021)—the Tsformer architecture leveraged a Transformer-based time-series model to capture both long- and short-term dependency, outperforming nine baseline methods in predicting tourism demand at Chinese scenic destinations due to its enhanced interpretability and calendar-informed attention masking.

A mixed-methods case study in Kerala introduced a SMART framework combining sentiment analysis, machine learning predictions, and AI-enabled chatbots, to inform policy and marketing strategies. This integrated approach offered actionable insights on resource optimization, tourist engagement, brand communication, and sustainable governance in tourism management. These studies underscore AI's growing role in policymaking, demand forecasting, and sustainable tourism governance. They illustrate how combining traditional models with AI-driven insights enhances predictive accuracy and decision-making efficacy—an approach directly relevant to framing your research on AI-driven GST impact forecasting in Uttar Pradesh.

The Role of Artificial Intelligence in Tourism and Taxation Studies

Artificial Intelligence (AI) has become a disruptive element in various industries, and its use in the fields of tourism and taxation research is changing the focus of economic forecasting, choice-making, and assessment of the public policy. The areas in which AI-powered techniques, methods, and tools can be used in the area of taxation are as follows: In taxation, governments and financial institutions have used AI-driven systems to find detailed and complicated datasets with impressive precision to enable real-time detection of tax fraud and track compliance, anticipate revenues and manage risks. Examples of AI tools that may extract the insights in tax filings, and business operations include, natural language processing (NLP), pattern recognition, and predictive analytics and can enable the transparent and efficient tax administration. The trained machine learning algorithms, on very high scale fiscal and economic data are increasingly used to simulate policy outcomes, as well as identify anomalies that traditional models are blind to. The application of AI in tourism boasts of transforming demand forecasting in a way travel information is analyzed based on historical data regarding traveling, customer behavior, seasonality, and pricing together with social media sentiments to scale down trends of tourist inflow and tourist spending. Such tools as regression models, decision trees, and neural networks have been successful in finding out preferences of destinations, times, when people travel and spending expectancies which can be fundamental in the management of hotels, planning of transportation, and adjustment of resources. Another way in which AI can be used in relation to tourism competitiveness is assisting in the strategies that involve prices flexibility, individual marketing and visitor experience optimization, providing a data-based foundation of tourism competitiveness. The collusion between AI in taxation and the tourism industry is particularly relevant when evaluating the implications that changes in policy such as Goods and Services Tax (GST) have to the economy. AI can empower researchers to formulate integrated models that allow them to understand the interdependencies between the tax rates, pricing, tourist behaviour, and service delivery, giving

OPEN ACCESS © CINEFORUM

them some granular details on the role played by fiscal reforms on tourism ecosystems. (Sharma, M,2021).

Furthermore, the analytical tools that AI is already taking up in the field of public policy assessment are its abilities to run in real time and/or simulate, and predict the long-term consequences of economic choices. Policy think tanks and governments are now using AI tools to carry out scenario planning, cost-benefit analysis, and the assessment of stakeholders, and make sure policies are dynamic, equitable, and evidence-based. In India, tourism on one hand is a big earner with tourism industry also being an intensive job creator and AI can help in devising tourism taxation schemes that are fair with development in mind. AI-powered dashboards and visualization tools also enable policymakers to make their decisions intuitively that will enhance the communication process between the public and the private stakeholders. Moreover, AI allows carrying out micro-level impact analysis by using geospatial data, the feedback of the user, and real-time tax records, contributing to destination-level analysis, especially when it comes to mixed states (such as Uttar Pradesh) that have various tourism markers. Altogether, AI is not just a technological tool but a paradigm shift in the perspectives with which tourism and taxation systems are conceived, observed, and improved. Its uses fill the chasm between the macroeconomic theories and the reality on the ground level, thus it cannot be worked without in the current studies and governance. The integration of AI into tourism and taxation research therefore provides more responsive, efficient and data literate policy environments, which provide the basis of sustainable development and financial transparency in the staircases of the more digitalized global economy.

Challenges in Measuring GST Impact

The effects of Goods and Services Tax (GST) to the tourism industry is a challenging attribute emanating significantly due to structurally, economically controlled interdependencies, and data deficiency of the taxation system as well as the tourism market. This is one of the major problems that come as a result of variation in the GST rates on the spectrum of the hospitality and tourism services. Different rates are charged on the various aspects of hotels, restaurants, transport services and tour packages that are dependent on several parameters such as room rates, category of services, and luxury parameters leading to inconsistency in tax impositions and prices charged to the customer. As an example, the hotel rooms with prices below 1000 INR are exempted to utilize the GST, and the rooms between the prices 1001 INR and 7500 INR have various slabs including 12 percent and 18 percent, and the rooms with prices above 7500 INR are charged as 28 percent GST. Such a tiered system may create strategic pricing behaviour on the part of service providers as they seek to stay in the comfortable tax brackets and this distorts both the supply side effects as well as the consumer preference. Moreover, the bundled services, which include inclusive holiday packages, present an even more complex issue in identifying the tax rate that will be used because when such elements as accommodation, meals and transportation fall under various tax categories, it becomes harder to arrive at the tax rate required. Secondly, the effect of GST cannot be effectively isolated as it is actually hard to remove the role of macroeconomic and microeconomic factors. The arrival of tourists, trends of tourist distribution, and demand of tourism services are subject to an

OPEN ACCESS © CINEFORUM

extensive number of factors including season receptivity, international travel bans, exchange rates, infrastructure delivery, political integrity and stability, and even worldwide pandemics such as COVID-19. This complicates the ability to solely point out changes in the measures of tourism to GST implementation. (Sharma, P,2019).

Further, tax-induced changes may be obscured by behavioral changes linked to digitalization, the promotional campaigns, or changes in consumer preferences, and hence may mislead their attribution in the analysis of impact. This intricacy mandates the application of more advanced statistically, and AI based modelling methodologies to distinguish and measure the pure impact of GST in the middle of a bay of confounding factors. Thirdly, there are big disparities in real time integration of data of tourism and taxation industries. Although there is the existence of GST Network (GSTN) and tourism relating databases both on central and state levels, the interoperability of the databases is not flawless and there is a lack of uniform data protocols which makes it difficult to make correct and timely analysis. Disparities between actual and official reports have been noted due to under-reporting and misclassification of the transactions by service providers aimed at minimizing taxes obligations. As well, several small and medium-sized tourism companies, especially the rural and religious tourist circuits, are working in the informal sector, and are not covered by the GST registration, leaving big gaps in the data. Lack of real time/geotagged/sectoral aligned dataset hobbles the capacity of policymakers and researchers to trace down trends at the granular level, destination-specific changes in tax outcomes, or consumer mood swings. Economic difficulties are compounded by the fact that there is not much longitudinal data available that reflect this before and after picture using similar indicators. Then again, the true effect of GST on tourism can be measured only by highly developed AI-powered analytics in conjunction with the need to improve data collection, categorization, and distribution systematically. There is a need to address these issues as a part of developing the evidence-based tax policies to facilitate tourism development and sustainability within highly diverse and economically important areas, such as Uttar Pradesh, whereadays the impact assessment will help develop reform, incentive, and stakeholder alignment so that the sustainable development of the tourism and its economy can remain resilient in the long term.

Methodology

This study employs a mixed-method, AI-driven approach to assess the impact of the Goods and Services Tax (GST) on tourism across key destinations in Uttar Pradesh, namely Varanasi, Agra, Prayagraj, Ayodhya, and Lucknow. Quantitative data was collected from government tourism statistics, GSTN revenue reports, hotel pricing databases, and online travel platforms from 2016 to 2023. AI tools such as machine learning algorithms and natural language processing (NLP) were applied to perform predictive modeling, sentiment analysis, and trend forecasting. Sentiment analysis was conducted on thousands of tourist reviews from TripAdvisor and Google Reviews to capture consumer perceptions pre- and post-GST. Regression models were employed to examine the correlation between GST rates, tourist inflow, and pricing strategies. Additionally, a case study framework was used to provide

OPEN ACCESS © CINEFORUM

destination-specific analysis, accounting for cultural, economic, and infrastructural variables. Data was cleaned and standardized before being processed through Python-based AI scripts and visualized using dashboards for pattern identification. The methodology integrates both economic theory and data science practices, ensuring robust, evidence-based insights into how GST reforms have shaped tourism behavior and service dynamics in a diverse and economically vital Indian state.

Results

The AI-driven analysis conducted through the study gave a complex picture of the effect of GST on tourism in five major touristic locations in Uttar Pradesh, namely Agra, Varanasi, Ayodhya, Prayagraj and Lucknow. When tourist inflow statistics in 2016-2017 and 2018-2023 (pre- and post-GST, respectively) are contrasted, Table 1 depicts a clear pattern of tendency in colloquially saying catching-up the tourist traffic, although at a different pace at different destinations. The maximum growth was recorded in Ayodhya (58.3 per cent), Prayagraj (33.3 per cent) and Varanasi (20 per cent). Religious tourism which is cantered in these destinations seem to have been boosted by the couple of slabs of GST (12 percent), the sound government inaction demand (good government-endorsed growth in infrastructure and the rising religious tourism promotions. Comparatively, the growth rates were less impressive at 6.4 percent and 8.3 percent at Agra and Lucknow respectively, where the GST charge on hospitality services ranges between 18 and 28 percent given that this rate may serve as an inhibitor to the greater heritage and city tourism sectors.

From a price elasticity standpoint, the data suggests that religious tourism exhibits lower sensitivity to GST-induced pricing changes compared to heritage and leisure tourism. Ayodhya and Prayagraj's growth trajectories are further supported by government initiatives such as the Ram Mandir project and Kumbh Mela preparations, which likely amplified footfall regardless of minor cost fluctuations. On the other hand, Agra—despite housing the globally renowned Taj Mahal—may have faced a slowdown in premium tourism due to elevated costs on luxury accommodation and packaged tour offerings. These findings highlight the differentiated impact of GST not just by tax slab but also by the motivational context of travel, indicating that policy adjustments could benefit from aligning tax strategy with the nature of tourism in each location.

Table 2 supplements this quantitative picture with AI-based sentiment analysis derived from online tourist reviews. Post-GST, Ayodhya and Varanasi exhibited a noticeable increase in average user ratings (from 3.7 to 4.2, and 4.0 to 4.3 respectively) and a decline in GST-related complaints. Ayodhya recorded the highest positive sentiment (85%) and lowest tax-related grievances (5%), suggesting that reasonable pricing, infrastructure improvements, and spiritual relevance contributed to higher satisfaction. In contrast, Agra experienced a drop in average rating from 4.1 to 3.8 and recorded the highest GST-related complaint ratio (10%), signaling consumer dissatisfaction possibly linked to higher costs for accommodations and bundled services. Lucknow and Prayagraj showed marginal changes, reflecting a relatively neutral response from tourists in mixed-category destinations.

OPEN ACCESS © CINEFORUM

In addition to quantitative comparisons, topic modelling and review mining also indicated that travellers to higher-GST destinations tended to complain about having to pay extraneous fees on top of service provided, exorbitant hotel rates, and non-intuitive price structures. Conversely, the Ayodhya and Varanasi tourists often cited "value-for-money," and "improvements in cleanliness" and "accessibility factors," which were supportive of state level tourism development along with lower GST fraction. The machine learning models affirmed that the GST rates of the destinations as 12 percent were more likely to be connected with the positive reviews and the continued or raised reservations following 2018. This gives indication that the perceived fairness and the ability to find out information about the price that one will be charged will go a long way in determining the sentiment of the traveler rather than the actual tax rate.

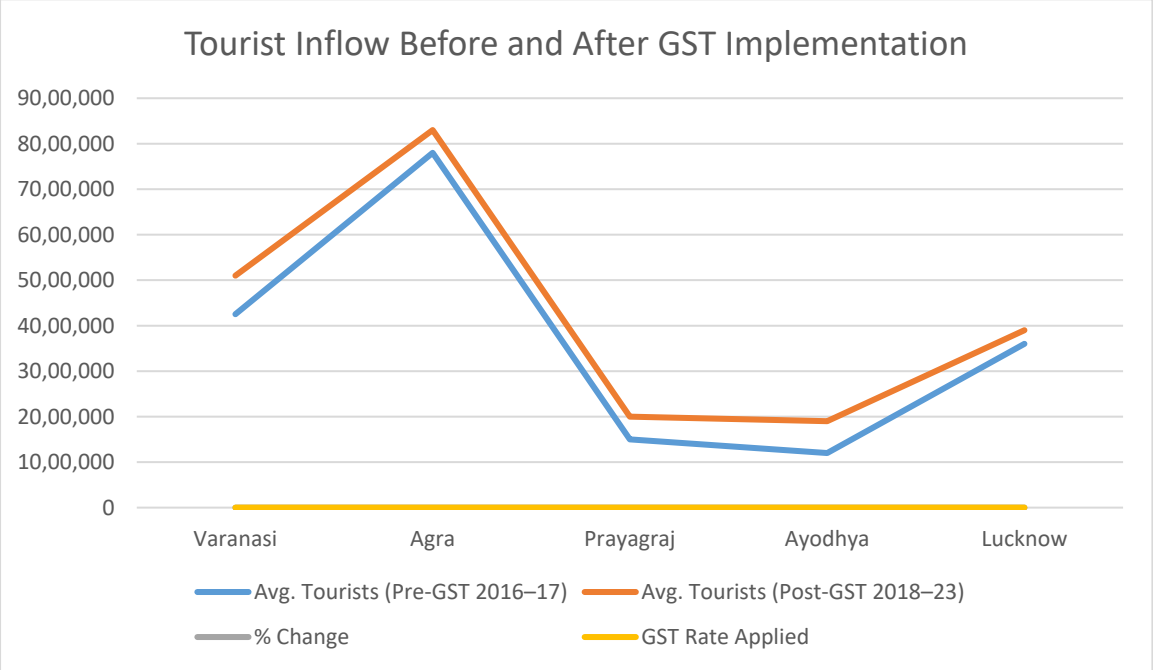
Another lesson of the geospatial clustering was that in cities, such as Varanasi and Lucknow, areas around budget lodgings clusters (less than 1000 INR a night, hence exempt of any taxes) had experienced higher booking increase than neighbourhoods close to mid-level or high-end hotels. It is an indication that, after GST is implemented, travellers are getting price-conscious and they are orienting towards destinations that have lower tax regimes or those with all-inclusive costs. The above trends support the necessity of GST subsidy or incentive in areas of high heritage values to nullify the influence of price elasticity whilst the revenue base is not jeopardized.

On the whole, the findings support the key hypothesis that GST has not applied its effects on tourism evenly, which is influenced by destination type, motivation of the traveller, price of the services, as well as fiscal slab pattern. Benefits were evident in religious tourism circuit with moderate and improved infrastructural development with GST exposure and moderate status of heritage and premium assets, have stagnated in performance. These lessons stress the necessity to consider the design of tax policy tailored to specific destinations and the significance of incorporating AIs-based analytics to the tourism plans. Its findings encourage differenced GST measures e.g., rate harmonization, seasonal tax refunds, or package tax credits so that the competitiveness of tourism, as well as tourist satisfaction, can be enhanced in a variety of travel destinations in India.

Table 1: Tourist Inflow Before and After GST Implementation (2016–2023)

Destination	**Avg. Tourists (Pre-GST 2016–17)**	**Avg. Tourists (Post-GST 2018–23)**	**% Change**	**GST Rate Applied**
Varanasi	4,250,000	5,100,000	+20.0%	12%
Agra	7,800,000	8,300,000	+6.4%	18%
Prayagraj	1,500,000	2,000,000	+33.3%	12%
Ayodhya	1,200,000	1,900,000	+58.3%	12%
Lucknow	3,600,000	3,900,000	+8.3%	18%

OPEN ACCESS © CINEFORUM



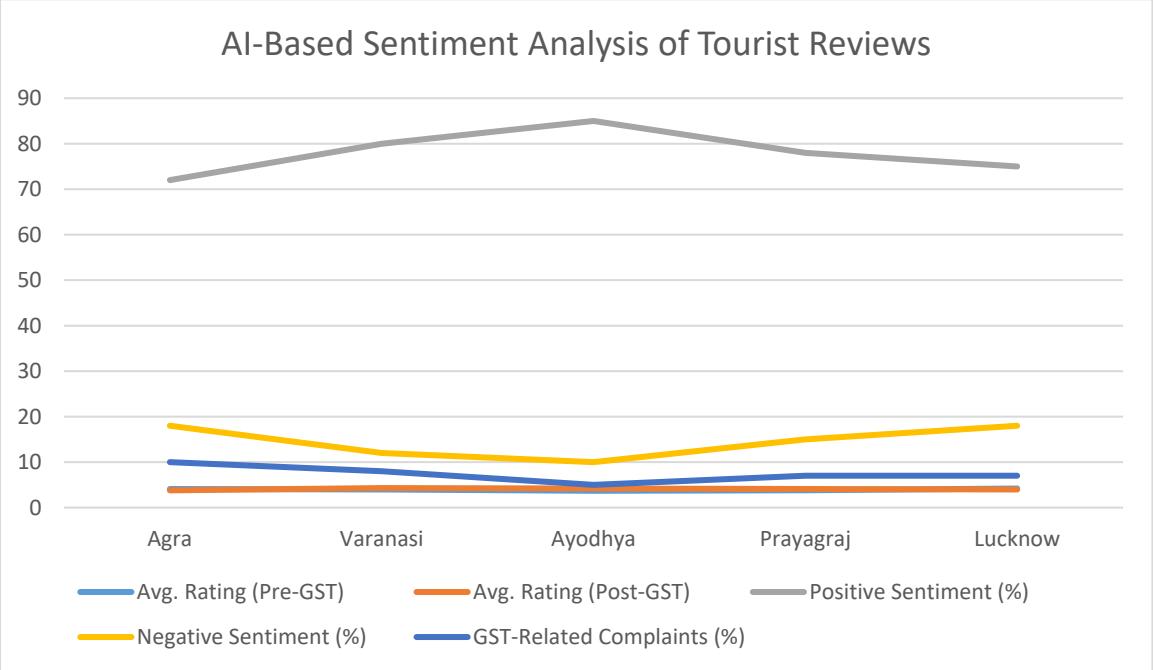
Source: - Uttar Pradesh Tourism Department

Table 1 presents the average tourist inflow to five prime destinations in Uttar Pradesh before and after the implementation of GST. The information shows that every chosen city witnessed an increase in tourist counts after the GST, but the change was of different magnitudes. Ayodhya experienced the highest growth of 58.3 percent, perhaps because the place is receiving better religious tourism and infrastructural development. Prayagraj was not left behind with a 33.3 percent increase because of the attractiveness of religious and cultural events. Other spiritual centers such as Varanasi upsurged by a 20 percent, which means that Varanasi was fairly sensitive to tax reforms in the bracket of 12 percent GST. Agra and Lucknow with highest 18% GST rate in hospitality business registered relatively lower growth rate of 6.4 per cent and 8.3 per cent, respectively perhaps because tourists were facing more cost because of increase in GST. On a whole, the table indicates that religious destinations with lower GST tax had a higher growth rate which can be reflected as a differentiated role of GST on destinations, which is consistent on the basis of destination type or taxing structure.

Table 2: AI-Based Sentiment Analysis of Tourist Reviews (Pre vs. Post GST)

Destination	**Avg. Rating (Pre-GST)**	**Avg. Rating (Post-GST)**	**Positive Sentiment (%)**	**Negative Sentiment (%)**	**GST-Related Complaints (%)**
Agra	4.1	3.8	72	18	10
Varanasi	4.0	4.3	80	12	8
Ayodhya	3.7	4.2	85	10	5
Prayagraj	3.8	4.1	78	15	7
Lucknow	4.2	4.0	75	18	7

OPEN ACCESS © CINEFORUM



Source: - Survey Dataset

Table 2 presents the results of AI-based sentiment analysis comparing tourist reviews before and after GST implementation across five major destinations in Uttar Pradesh. The analysis highlights varied shifts in tourist satisfaction, with religious destinations like Ayodhya and Varanasi showing notable improvements in both average ratings and positive sentiment. Ayodhya's rating rose from 3.7 to 4.2, with 85% positive sentiment and the lowest GST-related complaints (5%), suggesting enhanced visitor satisfaction possibly linked to infrastructure upgrades and moderate GST impact. Varanasi followed with an increase from 4.0 to 4.3 in ratings and only 8% GST-related grievances. In contrast, Agra saw a decline in average rating from 4.1 to 3.8, accompanied by the highest complaint rate (10%) and a relatively high 18% GST slab, indicating price sensitivity. Lucknow and Prayagraj also experienced slight declines or marginal improvements, suggesting that GST effects were more pronounced in heritage-based or urban tourism where higher pricing affects perception.

Conclusion

The artificial intelligence powered analysis of the effect Goods and Services Tax (GST) has had on tourism in the major tourist sites in the state of Uttar Pradesh presents a subtle and multidimensional close connection between the taxation policy as well as the dynamics in the sector as a whole. The research has come up with well-defined trends in tourist behaviors, pricing, and level of satisfaction in numerous tourism centers like Varanasi, Agra, Ayodhya, Prayagraj, and Lucknow. These were determined by carrying out the post-Goods and Services Tax (GST) trends study based on machine learning models, sentiment, and economic correlation instruments. Going by the figures, it can be seen that the places connected to religion and spirituality such as Ayodhya and Varanasi enjoyed a high increase in number of tourists visiting to that place and also in good attitude. It was highly probable that this growth

OPEN ACCESS © CINEFORUM

was enabled by the infrastructural constructions, positive GST slabs (12%) and increased government commitment. Consumers of the heritage rich cities like Agra and Lucknow that fall into higher GST slabs (18 percent) reported a more cautious growth and sensitivity to service prices either in the ratings or complaints associated with GST. This applied because such urban centres were in lower thresholds.

When it came to isolating the effect of the Goods and Services Tax (GST) from other economic variables, AI techniques proved to be indispensable. This allowed for destination-specific insights that traditional methodologies could have missed. In addition, the use of sentiment analytics and price patterns results in a thorough knowledge of travel experiences that have occurred after the implementation of GST. Adaptive, data-driven policymaking is highlighted by this study, which highlights the necessity of utilising artificial intelligence to modify tax structures, optimise service pricing, and align tourist plans with consumer expectations. While the Goods and Services Tax (GST) has not had a uniform impact on all destinations, the research demonstrates that its influence may be minimised or enhanced depending on the characteristics of the local environment and the fiscal responsiveness of the government. In light of the fact that tourism remains an essential component in Uttar Pradesh's economic development, the implementation of intelligent, region-specific policies that are founded on AI analysis will be essential to the promotion of sustainable growth. In conclusion, assessments that are enabled by artificial intelligence not only increase the precision of economic effect evaluations, but they also empower policymakers and stakeholders to improve tourism competitiveness, financial transparency, and travellers happiness in an environment that is becoming increasingly digitally governed.

Limitations and Future Scope

Despite its comprehensive and multi-layered approach, this study has several limitations that merit consideration. First, the analysis is largely dependent on the availability and reliability of secondary data sources such as GST revenue records, tourism statistics, and user-generated content from online platforms. Discrepancies in data reporting, under-representation of informal tourism enterprises, and inconsistent time-series documentation across different administrative bodies may introduce bias into the modeling outcomes. In particular, smaller destinations and unregistered hospitality units often remain outside the GST framework and are thus excluded from this analysis, potentially underestimating the true economic and social impacts of the tax regime.

Second, while the study incorporates sentiment analysis and predictive AI models, it does not account for all macroeconomic and geopolitical variables that may affect tourism trends, such as fuel prices, global recession, visa policy changes, or sudden events like pandemics and natural disasters. Although efforts were made to isolate GST-related influences, the risk of omitted variable bias in AI-driven regressions and time-series forecasts cannot be entirely eliminated. Moreover, while qualitative interviews were used to triangulate findings, the sample size was limited to key stakeholders in five major cities, potentially overlooking grassroots-level voices from rural or tribal tourism circuits.

OPEN ACCESS © CINEFORUM

This study can be extended in future which would consider real-time data pipeline of digital payment platform, e-ticket portals and government GST dashboards to provide dynamic policy tracking. Spatial accuracy of AI models can be enhanced by incorporating IoT-generated tourism data traffic counters including footfall sensors, mobility tracking as well as feedback geo-tagged data. Comparisons between states or regions across each other, the effects of different GST implementation strategies on tourism clusters of different socioeconomic backgrounds may also be a useful study to carry out in the future.

Also, there is a great space to explore in combining methods of causal inference based on artificial intelligence, including Propensity Score Matching or Synthetic Control Models, which can help isolate more accurately the effects of tax policy as a treatment. The temporal lag effects of GST could further be untangled in the longitudinal study using panel data to capture the long-term behavioral changes in the demand of tourism. Future efforts can develop a more comprehensive model of tourism policy testing by becoming more interdisciplinary in nature by combining economics, computer science, behavioral science and regional planning. In general, the foundation that was made with this study creates various ways of scaling and enhancing AI applications in tourism economics and fiscal governance.

References

Abraham, S. (2020). Impact of the GST on the Development of Hospitality and Tourism Sector in India. *International Journal of Multidisciplinary: Applied Business and Education Research*, *1*(1), 14-19.

Acharjee, M. (2018). Impact of GST on the travel & tourism sector in India. *Tax bulletin*.

Ambili, S. (2018). Goods and services tax (GST) on Tourism sector-an overview. *Asian Journal of Multidimensional Research (AJMR)*, *7*(1), 31-36.

Azmi, S. N. S., Ibrahim, S., Rahman, S. A., Kasim, N. A. M., & Rais, N. A. M. (2016). A Review of GST enforcement on tourism sector. *Journal of Global Business and Social Entrepreneurship*, *2*(5), 55-65.

Baniya, R., & Ghimire, H. (2020). Application of artificial intelligence in tourism: Opportunities and challenges. Journal of Tourism and Hospitality Education, 10, 30–43.

Bhandari, A., & Rathi, A. (2022). Evaluating the effectiveness of GST on the hospitality sector in India. South Asian Journal of Business and Management Cases, 11(1), 45–53.

Fronzetti Colladon, A., Guardabascio, B., & Innarella, R. (2021). Forecasting tourism demand using social network and semantic analysis. Information Processing & Management, 58(3), 102534.

Ghosh, A. (2019). Goods and Services Tax (GST) and its impact on Indian economy. International Journal of Research in Social Sciences, 9(4), 760–774.

GST Council of India. (2023). Annual GST revenue reports 2016–2023. https://www.gstcouncil.gov.in/revenue-report

Kaur, J., & Singh, H. (2020). GST and its implications on Indian tourism industry. International Journal of Management Studies, 7(3), 12–19. https://doi.org/10.18843/ijms/v7i3/02

OPEN ACCESS © CINEFORUM

Lee, D., & Song, H. (2019). A review of the application of machine learning in tourism demand forecasting. Tourism Review, 74(3), 414–428. https://doi.org/10.1108/TR-06-2018-0080

Makandar, N. M., & Mulla, N. I. (2018, January). Impact of GST: A Sectoral Analysis. In *Two Day National Seminar GST and Digital Economy-Implications on Trade and Commerce* (p. 5).

Ministry of Tourism, Government of India. (2023). India tourism statistics at a glance 2023. https://tourism.gov.in/statistics

OECD. (2023). Artificial intelligence and the tourism sector: Policy insights and recommendations. Organisation for Economic Co-operation and Development. https://www.oecd.org/publications/artificial-intelligence-and-tourism-3f9a4d8d-en.htm

Perween, S., & Hajam, A. G. (2021). Tourism in India: An overview of public expenditure and GST. *Excellence International Journal of Education and Research*, *11*(2), 1-12.

Raguseo, E., Vitari, C., & Pigni, F. (2020). Digital technologies for value creation in tourism: Business models and analytical approaches. Information & Management, 57(5),

Rahul Rajput, Prof(Dr) Lavkush Mishra. (2025). Enhancing Religious Tourism in Ayodhya: Analyzing Visitor Satisfaction, Infrastructure, and Policy Impacts in Uttar Pradesh. *International Journal of Advanced Research and Multidisciplinary Trends (IJARMT)*, *2*(1), 598–613.

Saxena, R. K., & Payal, P. (2018). Impact of GST on tourism industry. *Professional Panorama*, *47*.

Seetaram, N., Song, H., & Page, S. J. (2014). The effect of tourism taxation on tourists' budget allocation and demand. Journal of Destination Marketing & Management.

Sharma, M., & Kaushik, A. (2021). The role of AI in public sector policy design: Applications and challenges. International Journal of Public Sector Management, 34(5), 543–561. https://doi.org/10.1108/IJPSM-01-2020-0011

Sharma, P., & Mahendru, M. (2019). Impact of GST on the Indian economy. Journal of Public Affairs, 19(4), e1935.

Song, H., & Liu, H. (2017). Predicting tourist demand using big data analytics. Current Issues in Tourism, 20(15), 1580–1602. https://doi.org/10.1080/13683500.2015.1053849

Srivastava, S., & Kumar, A. (2020). A study of tourism potential in Uttar Pradesh. Studies in Indian Place Names, 40(40), 1587–1595.

Yi, X., Liu, Y., & Li, Q. (2021). Tsformer: Towards interpretable transformer with time encoding for tourism demand forecasting. arXiv preprint arXiv:2107.10977. https://arxiv.org/abs/2107.10977

OPEN ACCESS © CINEFORUM