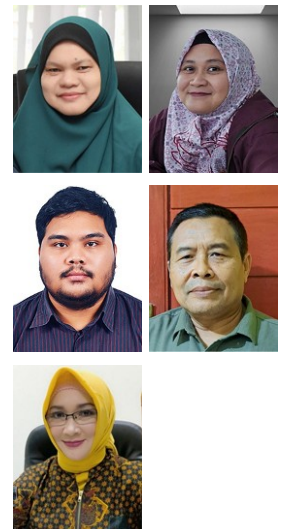
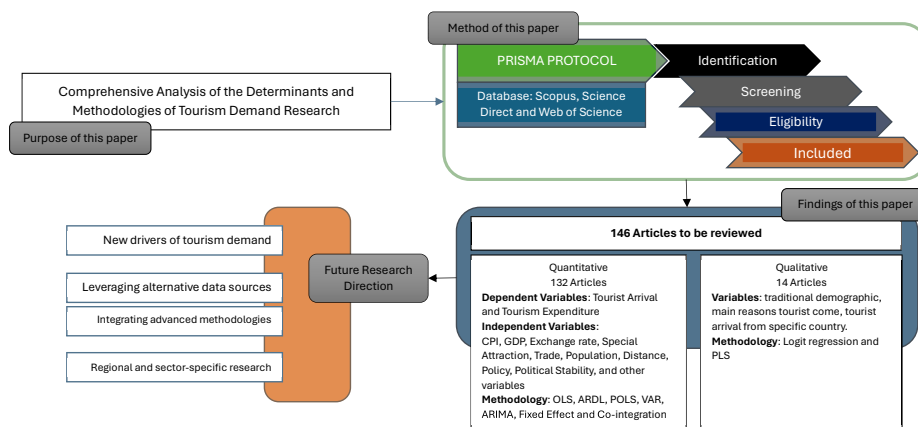


Tourism demand estimation methods: a systematic literature review

Norlida Hanim Mohd Salleh, Trisetia Wijijayanti, Mohd Fazim Ahmad, Agung Winarno and Izza Mafruhah

Graphical Abstract



Abstract

Purpose – This paper aims to provide a comprehensive analysis of the determinants and methodologies of tourism demand research from 1961 to 2022, through a systematic literature review.

Design/methodology/approach – A systematic review employing the Preferred Reported Items for Systematic Reviews and Meta-Analysis method was used to identify and evaluate relevant research papers. Criteria for selection included subject area, document type, open access status, publication stage, language and source type. The review analyzed data from databases such as Scopus, Web of Science and Science Direct.

Findings – The review revealed a significant body of work, including 132 quantitative regression studies and 14 qualitative regression studies. This synthesis highlights existing research trends and methodological approaches, offering a roadmap for future studies.

Originality/value – This paper contributes to the field by providing a detailed overview of tourism demand research methodologies and suggesting future research directions. It emphasizes the need for continued exploration and refinement of methodologies to advance the understanding of tourism demand.

Keywords Quantitative, Qualitative, Systematic literature review, Tourism demand, PRISMA protocol

Paper type Literature review

(Information about the authors can be found at the end of this article.)

旅游需求估算方法：一项系统性文献综述

摘要

目的：本文旨在通过系统文献综述（SLR）对 1961 年至 2022 年旅游需求研究的决定因素和方法论进行全面分析。

设计/方法论/研究途径：采用系统综述方法，运用 PRISMA 方法来识别和评估相关研究论文。筛选标准涵盖学科领域、文献类型、开放获取状态、发表阶段、语言和来源类型。该综述分析了来自诸如 Scopus、科学引文索引（Web of Science）和爱思唯尔科学 Direct 等数据库的数据。

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研究结果: 该综述揭示了大量的研究成果, 其中包括 132 项定量回归研究和 14 项定性回归研究。本综合性研究突出了现有的研究趋势和方法论途径, 为未来的研究提供了路线图。

原创性: 本文通过对旅游需求研究方法进行详细概述, 并提出未来的研究方向, 为该领域做出了贡献。文章强调了持续探索和完善研究方法的必要性, 以加深对旅游需求的理解。

关键词 : 旅游需求、系统性文献综述、定量研究、定性研究、PRISMA 指南。

文章类型 文献综述

Métodos DE estimación DE LA demanda turística: una revisión sistemática DE LA literatura

Resumen

Objetivo: Este artículo presenta un análisis integral de los determinantes y metodologías de la investigación de la demanda turística desde 1961 hasta 2022, a través de una revisión sistemática de la literatura (SLR).

Diseño/metodología/enfoque: Se utilizó una revisión sistemática empleando el método PRISMA para identificar y evaluar trabajos de investigación relevantes. Los criterios de selección incluyeron el área temática, el tipo de documento, el estado de acceso abierto, la etapa de publicación, el idioma y el tipo de fuente. La revisión analizó estudios procedentes de bases de datos como Scopus, Web of Science y Science Direct.

Resultados: La investigación identificó un cuerpo de trabajo significativo, que incluye 132 estudios de regresión cuantitativa y 14 estudios de regresión cualitativa. Esta revisión destaca las tendencias de investigación existentes y los enfoques metodológicos, ofreciendo una hoja de ruta para estudios futuros.

Originalidad: La contribución del artículo se centra en proporcionar una descripción detallada de las metodologías de investigación de la demanda turística y sugerir futuras direcciones de investigación. Se destaca la necesidad de seguir explorando y perfeccionando las metodologías para avanzar en la comprensión de la demanda turística.

Palabras clave Demanda turística, Revisión sistemática de la literatura, Cuantitativo, Cualitativo, Protocolo PRISMA

Tipo de papel Revisión de literatura

Introduction

Global international tourist arrivals (overnight visitors) swelled from 278 million in 1980 to 1.5 billion in 2019 (UNWTO, 2020). Also, United Nations World Tourism Organization (UNWTO) reported that with more than one billion tourists travelling to an international destination every year, tourism has become a leading economic sector, contributing 9.8% of the global gross domestic product (GDP), which represents 7% of the world's total exports. Tourism has shown a great significant growth in GDP for the past few decades until 2020 because of the COVID-19 pandemic. According to the UNWTO, global international arrivals dropped by 74% in 2020 due to a fall in demand and travel restrictions (United Nations, 2020). Before the pandemic, the data showed there was an increase in revenue and international tourist arrivals from year to year. Areas that offer tourism activities have boosted the local economy, such as restaurants, hotels and souvenir shops. Overall, tourism has a positive impact on the country's economic growth. Thus, economists predict the indicators that affect tourism through forecasting techniques based on primary and secondary data.

Economists have extensively studied factors of tourism demand. Numerous factors were considered to predict the demand for tourism, and these factors were analyzed for future planning for the development of a country through creating policies. This technique can identify weaknesses for future fixes, given the intense competition between domestic and international tourist spots. However, accurate forecasting of tourism demand remains a difficult issue. When developing forecasting models, researchers must consider two important factors:

1. data quality; and
2. the features of the data used in the modeling process.

In this context, data quality refers to the predictive potential of the given data, which is significant in determining the effectiveness of forecasting models (Goh and Law, 2002). However, forecasting model development is not an easy task due to various issues, such as insufficient data and insincere respondents when filling out the questionnaire, hindering economists from reaching their objectives (Dalal and Hakel, 2016).

Forecasting demand for tourism started a few decades ago. In 1961, Ullman and Volk (1961) published one of the earliest studies on tourism using econometric methods, while Uysal and Crompton's (1984) study is recognized as an early comprehensive review of tourism research, providing a foundation for subsequent scholarly work. Currently, 124 journals have been listed in the *Journal of Travel Research* and ranked first in the SCIMAGO Journal Rank indicator (SJR), with 1,309 articles (SJR, 2020). This record shows how important tourism is to this day as one of the components of GDP.

Zhao *et al.* (2021) showed that the highest reasons for travelling are to appreciate natural and cultural scenery, relieve stress and improve mood, and travel with family and friends to promote interpersonal relationships. Nesbit (1973) also identified the four reasons for visiting a destination, namely, personal business travel, government or corporate business travel, visiting friends and relatives, and vacation travel for pleasure, and these motivations contributed to the increase in the tourism industry. Tourism is a popular activity in modern life, and it contributes significantly toward economic development and sociocultural contributions. Examples of sociocultural contributions include national integration and the creation of opportunities through economic linkage at the destination. These contributions are closely related to the activities carried out by tourists to form the basis of tourism demand.

Numerous papers on tourism demand using the econometrics method have been published since 1961. One of the oldest papers examining tourism papers was in 1984 by Uysal and Crompton. In 2010, Wang and Song conducted a study to determine the methodology and forecast the demand for air travel using literature reviews from 1950 to 2008. The latest paper was published in 2021 by Gao and Wang, who conducted a similar study by Wang and Song (2010). Both papers conducted comprehensive literature reviews on air transportation papers.

As far as researchers are concerned, despite the abundance of research on tourism demand, there remains a lack of comprehensive synthesis of methodologies and determinants within the economic, business and accounting domains. This study addresses this gap by using a systematic literature review (SLR) to analyze research trends, methodologies and key determinants from 1961 to 2022, thereby providing a consolidated foundation for advancing theoretical and practical understanding of tourism demand.

The significance of this review lies in its ability to bridge fragmented knowledge by identifying consistent patterns and methodological advancements in tourism demand forecasting. This study is particularly timely as tourism continues to recover and evolve post-pandemic, necessitating a robust understanding of its economic underpinnings. Therefore, the purpose of the paper is to determine the variables and methodologies in past studies using a SLR method.

Methodology

This paper used a SLR to analyze the research objective. SLR entails a careful and in-depth analysis of the body of literature that has already been written about a given subject (Popay *et al.*, 2006). Finding, assessing and synthesizing all relevant works on a given subject are the aims of a SLR, as they give an in-depth understanding of the current state of knowledge (Fisch and Block, 2018). A well-defined research topic and a set of inclusion and exclusion criteria are often the first steps in the SLR process. This step looks for publications that fulfill predetermined standards (Alexander, 2020).

The Preferred Reported Items for Systematic Reviews and Meta-Analysis (PRISMA) processes were used to choose academic papers in databases. Three databases were selected: Scopus, Web of Science (WoS) and Science Direct. This process contains four steps: identification, screening, eligibility and inclusion. Before starting this process, a search string (Table 1) was designed to be used to search for academic papers in the database. During this stage, discussions were made to determine the inclusion and exclusion criteria for manuscripts regarding tourism demand. These criteria ensure the most relevant and rigorous studies were selected for review, and any studies that did not meet the criteria were excluded.

The first step began with the PRISMA protocol. This step is to identify academic papers in the databases using the search strings method. The inclusion criteria were deliberately limited to the fields of economics, business and accounting to ensure that the reviewed studies align closely with the research objectives of understanding economic modeling and policy implications for tourism demand. These subject areas encompass foundational theories and quantitative methods critical for understanding tourism demand from an economic perspective. From the result, 41,625 papers from Scopus, 66,927 papers from WoS and 93,356 papers from Science Direct were extracted. The next step is screening, and this step filters academic papers from the first step based on selected criteria: subject area, document type, open access, publication stage, language and source type. Table 2 describes the criteria for the screening step.

From the three databases, 3,472 papers were chosen. The next step is eligibility. This process chooses academic papers that relate to the research objective and removes any duplicate paper. During the eligibility stage, 3,138 papers were removed due to not being related to the research objective, and 188 papers were removed due to duplicate papers. The PRISMA method synthesis was finalized with 146 papers. The criteria for the exclusion of manuscripts included the nature of the issues dealt with, the journal in which the paper appears, the scientific rigor, the originality and the relevance of the subject (Xiao and Watson, 2019). The inclusion criteria, meanwhile, perfectly met the research objectives. The PRISMA protocol for this study is shown in Figure 1.

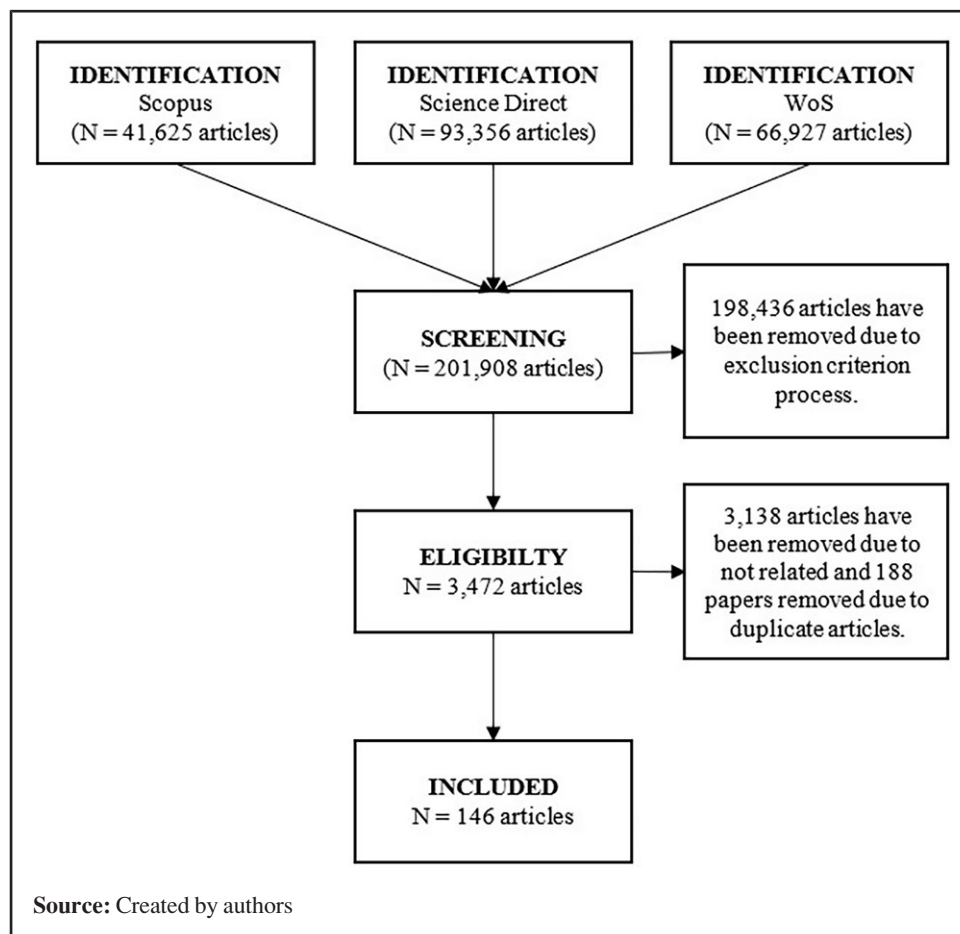
Table 1 Research search string

Database	Keyword
Scopus	((("Demand*" OR "Factor*" OR "Cause*" OR "Influence*" OR "Component*" OR "Determinan*") AND ("Tourism*" OR "Travel*" Or "Trip*"))
Web of Science	((("Demand*" OR "Factor*" OR "Cause*" OR "Influence*" OR "Component*" OR "Determinan*") AND ("Tourism*" OR "Travel*" Or "Trip*"))
Science Direct	((("Demand*" OR "Factor*" OR "Cause*" OR "Influence*" OR "Component*" OR "Determinan*") AND ("Tourism*" OR "Travel*" Or "Trip*"))
Source(s): Authors' own work (2023)	

Table 2 Exclusion criterion

Criterion	Inclusion	Exclusion
Subject area	Economics, business and accounting	Non-economics, business and accounting
Document type	Article	Non-article
Publication stage	Final	Article in press
Source type	Journal article	Non-journal article
Language	English	Non-English
Year	1961–2022	<1961 and >2022
Source(s): Authors' own work (2023)		

Figure 1 PRISMA protocol



Result and discussion

Findings

In this section, the findings of the data analysis regarding a summary of the quantitative regression literature review (Table 3), a summary of the qualitative regression literature review (Table 4) and a summary of the methodology and variables used (Table 5) are reported. Table 3 states the author's name, year of publication and title of the article. The methodologies used in measuring tourism demand and the variables are also included.

Next, the studies are classified based on the author's name, year of publication, article title and qualitative regression methodology. Table 4 shows the author's name, year of publication, article title and qualitative regression methodology.

Table 5 summarizes the SLR findings of methodology and variables that were used in the 131 papers.

As illustrated in Figure 2, the number of publications on tourism demand every five years appeared to be generally developing between 2015 and 2019, reflecting the increasingly extensive attention given to this emerging field of study.

Accurate forecasting of tourism demand requires two critical factors:

1. data quality; and
2. features of the data used.

Table 3 Summary of quantitative regression literature review

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	O	F	M	S	L	Z	Q
1	Guthries (1961)	Demand for tourists' goods and services in a world market	OLS	✓			✓	✓										
2	Gerakis (1965)	Effects of exchange rate devaluations and revaluations of receipts from tourism	Quasi	✓			✓	✓										
3	Gray (1966)	The demand for international travel by the United States and Canada	OLS	✓			✓	✓			✓							✓
4	Blackwell (1970)	Tourist traffic and the demand for accommodation: some projections	OLS	✓	✓		✓											✓
5	Artus (1970)	The effect of revaluation in the foreign travel balance of Germany	OLS	✓	✓		✓	✓										✓
6	Oliver (1971)	The effectiveness of the UK travel allowance	OLS	✓	✓		✓	✓			✓							✓
7	Bary and O'Hagan (1972)	An econometric study of British tourist expenditure in Ireland	OLS	✓	✓			✓										
8	Bond and Ladman (1972)	International tourism and economic development: a special case for Latin America	OLS	✓			✓	✓								✓		✓
9	Rugg (1973)	The choice of journey destination: a theoretical and empirical analysis	OLS	✓	✓		✓	✓										
10	Crampon and Tan (1973)	A model of tourism flow into the Pacific	OLS	✓	✓		✓	✓			✓							✓
11	Bedthdolt (1974)	Cross-sectional travel demand functions: U.S. visitors to Hawaii	OLS	✓			✓	✓										✓
12	Jud and Joseph (1974)	International demand for Latin American	OLS	✓	✓		✓	✓										
13	Askar (1973)	Demand for travel to Europe by American citizens	OLS	✓			✓	✓			✓							✓
14	Mutti and Murai (1977)	Airline travel on the North Atlantic: is profitability possible?	OLS	✓				✓			✓					✓		
15	Straszheim (1978)	Atlantic demand functions in the North Atlantic and their pricing implications	Cochrane	✓			✓	✓										
16	Sunday (1978)	Foreign travel and tourism prices and demand	OLS	✓	✓						✓							✓
17	Cigliano (1980)	Price and income elasticities of airlines travel: the North Atlantic Market	OLS	✓			✓	✓										✓
18	Witt (1980a, 1980b)	An abstract mode-abstract (destination) node model of foreign holiday demand	OLS	✓	✓		✓	✓										✓
19	Witt (1980b)	An econometric comparison of UK and German foreign holiday behavior	OLS	✓	✓		✓	✓										
20	Fuji and Mak (1981)	Forecasting tourism demand: some methodological issues	OLS	✓			✓	✓										✓
21	Kliman (1981)	A quantitative analysis of Canadian overseas tourism	OLS	✓	✓		✓	✓								✓		

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	O	F	M	S	L	Z	Q
22	Loeb (1982)	International travel to the United States: an econometric evaluation	OLS	✓	✓			✓			✓							✓
23	Quayson and Var (1982)	A tourism demand function for the Okanagan	OLS	✓	✓		✓	✓			✓							
24	Stronge and Redman (1982)	U.S. tourism in Mexico: an empirical analysis	OLS	✓	✓		✓	✓										
25	Truett and Truett (1982)	Public policy and the growth of the American tourism industry	OLS	✓														✓
26	Uysal and Crompton (1984)	Determinants of demand for international tourism flow to Turkey	OLS	✓	✓			✓			✓							✓
27	O'Hagan and Harrison (1984a)	Market share of U.S. tourist expenditures in Europe: an econometric analysis	AIDS	✓														✓
28	O'Hagan and Harrison (1984b)	UK and US visitor expenditure in Ireland: some econometric findings	MLR	✓														✓
29	Gunadhi and Boey (1986)	Demand elasticities of tourism in Singapore	OLS	✓	✓			✓										
30	Uysal and O'Leary (1986)	A canonical analysis of international tourism demand	CCA	✓	✓			✓			✓							
31	Summary (1987)	Estimation of tourism demand by multivariate regression analysis: evidence from Kenya	OLS	✓	✓		✓	✓			✓							
32	Chadeeard and Mieczkowski (1987)	An empirical analysis of the effects of the exchange rate on Canadian tourism	OLS	✓	✓			✓								✓		✓
33	Witt and Martin (1987)	Econometric models for forecasting international tourism demand	OLS	✓	✓		✓	✓			✓							✓
34	Halovsky <i>et al.</i> (1987)	The economic impact of charter flights on tourism to Israel: an econometric approach	GLS	✓	✓						✓							
35	Martin and Witt (1988)	Substitute prices in models of tourism demand	OLS	✓	✓		✓	✓			✓							✓
36	Rosensweig (1988)	Elasticities of substitution in Caribbean tourism	SUR	✓	✓			✓										✓
37	Smeral (1988)	Tourism demand: economic theory, and econometrics: an integrated approach	OLS	✓	✓			✓										
38	Tremblay (1989)	Pooling international tourism in Western Europe	OLS	✓	✓		✓	✓			✓							✓
39	Anastasopoulos (1989)	The U.S. travel account: the impact of fluctuations of the U.S. dollar	OLS	✓	✓						✓							✓
40	Var <i>et al.</i> (1990)	Factor affecting international tourism demand for Turkey	OLS	✓				✓			✓							
41	Crouch <i>et al.</i> (1992)	Marketing international tourism to Australia: a regression analysis	OLS	✓	✓		✓	✓			✓					✓		✓
42	Garín-Muñoz and Amara (2000)	An econometric model for international tourism flows to Spain	POLS	✓	✓			✓			✓							

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	O	F	M	S	L	Z	Q
43	Morley (1998)	A dynamic international demand model	OLS	✓	✓													
44	Law and Au (1999)	A neural network model to forecast Japanese demand for travel to Hong Kong	Cointe	✓	✓						✓					✓		✓
45	Balaguer and Cantavella-Jordá (2002)	Tourism as a long-run economic growth factor: the Spanish case	Cointe	✓		✓					✓							
46	Kulendran and Witt (2001)	Cointegration versus least squares regression	OLS, cointe	✓	✓		✓	✓			✓							
47	Lim and McAleer (2001)	Cointegration analysis of quarterly tourism demand by Hong Kong and Singapore for Australia	Cointe	✓	✓		✓	✓			✓							✓
48	De Mello <i>et al.</i> (2002)	A system of equations model of UK tourism demand in neighbouring countries	AIDS	✓	✓		✓				✓							
49	Song <i>et al.</i> (2003)	Modelling and forecasting the demand for Hong Kong tourism	ARDL	✓	✓			✓										✓
50	Song and Witt (2003)	Tourism forecasting: the general-to-specific approach	Cointe	✓	✓			✓			✓							
51	Halicioglu (2004)	An ARDL model of aggregate tourism demand for Turkey	ARDL	✓	✓		✓	✓										
52	Dritsakis (2004)	Tourism as a long-run economic growth factor: an empirical investigation for Greece using causality analysis	Cointe	✓	✓		✓	✓			✓							✓
53	Smeral and Wüger (2008)	Methods for measuring the effects of the EU presidency on international tourism	ARIMA	✓														
54	Song and Witt (2006)	Forecasting international tourists flows to Macau	VAR	✓	✓			✓										✓
55	Toh <i>et al.</i> (2006)	Japanese demand for tourism in Singapore: a cointegration approach	Cointe	✓	✓			✓			✓							✓
56	Garin-Muñoz (2006)	Inbound international tourism to canary islands: a dynamic panel data model	GMM	✓	✓		✓	✓										
57	Han <i>et al.</i> (2006)	Modelling US tourism demand for European destinations	AIDS	✓														
58	Sequeira and Nunes (2008)	Does tourism influence economic growth? A dynamic panel data approach	GMM	✓		✓								✓				
59	Halicioglu (2010)	An econometric analysis of aggregate outbound tourism demand of Turkey	ARDL	✓				✓				✓						
60	Lorde <i>et al.</i> (2011)	Tourism services exports and economic growth in Barbados	VAR	✓		✓												

(continued)

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	Variable	O	F	M	S	L	Z	Q
61	Katircioglu <i>et al.</i> (2010)	A long run equilibrium relationship between international tourism, higher education, and economic growth in Northern Cyprus	ARDL	✓		✓					✓								✓
62	Fleiding and Shortland (2011)	How do tourists react to political violence? – an empirical analysis of tourism in Egypt	ARDL	✓												✓			
63	Keum (2010)	Tourism flows and trade theory: a panel data analysis with the gravity model	POLS	✓		✓		✓										✓	
64	Yang <i>et al.</i> (2011)	An empirical analysis of influential factors in international tourism income in Sichuan province	OLS	✓				✓											
65	Surugiu <i>et al.</i> (2011)	A panel data modelling of international tourism demand: evidences for Romania	FE	✓		✓	✓								✓		✓		✓
66	Quadri and Zheng (2010)	A revisit to the impact of exchange rates on tourism demand: the case of Italy	OLS	✓							✓								
67	Thushara <i>et al.</i> (2019)	Forecasting international tourist arrivals in formulating tourism strategies and planning: the case of Sri Lanka	ARIMA	✓															
68	Tsangari (2012)	Determinants of tourism for “Sun and Sea” Cyprus	OLS	✓		✓	✓												
69	Leejáraga and Walkenhorst (2013)	Economic policy, tourism trade and productive diversification	Stepwise	✓					✓	✓					✓				
70	Reis and Varela (2015)	Travel channel meets discovery channel or how tourism can encourage better export performance and diversification in Nepal	VAR	✓			✓				✓				✓				
71	Ridderstaat and Nijkamp (2015)	Measuring pattern, amplitude and timing differences between monetary and non-monetary seasonal factors of tourism – the case of Aruba	ARIMA	✓															
72	Claveria and Torra (2014)	Forecasting tourism demand to Catalonia: neural networks vs. time series models	ARIMA	✓															
73	Antonakakis <i>et al.</i> (2015)	How strong is the linkage between tourism and economic growth in Europe?	VAR	✓		✓													
74	Agiomirgianakis <i>et al.</i> (2014)	Exchange rate volatility and tourist flows into Turkey	ARDL	✓	✓	✓					✓								
75	Glapić <i>et al.</i> (2016)	Drivers of growth in the travel and tourism industry in Malaysia: a Geweke causality analysis	OLS	✓		✓									✓				

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	O	F	M	S	L	Z	Q
76	Tica and Kožić (2015)	Forecasting Croatian inbound tourism demand	PCausality	✓	✓	✓								✓				
77	Nasir <i>et al.</i> (2015)	Economic growth, exchange rate and constrained competitiveness of the tourism sector in Andalucía	OLS	✓		✓					✓							
78	Sun <i>et al.</i> (2022)	Tourism demand forecasting: an ensemble deep learning approach	ARIMA	✓	✓			✓										
79	Zieba (2016)	Tourism flows and the demand for regional and city theatres in Austria	FGLS	✓					✓									
80	Albalade and Fageda (2016)	High speed rail and tourism: empirical evidence from Spain	FE	✓		✓				✓						✓		
81	Chatziantoniou <i>et al.</i> (2016)	Forecasting tourist arrivals using origin country macroeconomics	ARIMA	✓	✓				✓									
82	Ongan <i>et al.</i> (2017)	The effects of real exchange rates and income on international tourism demand for the USA from some European Union countries	ECM	✓		✓					✓							
83	Petrevska (2017)	Predicting tourism demand by A.R.I. models	ARIMA	✓														
84	Álvarez-Díaz <i>et al.</i> (2017)	Modelling inter- and intra-regional tourism flows in Spain – a spatial econometric approach	SAR	✓				✓		✓								
85	Bae <i>et al.</i> (2017)	The effect of Hallyu on tourism in Korea	FE & RE	✓	✓	✓				✓	✓							
86	Işık <i>et al.</i> (2017)	Analyzing the tourism–energy–growth nexus for the Top 10 most-visited countries	VAR	✓		✓												
87	Gouveia <i>et al.</i> (2017)	International demand for the Douro (Portugal) river cruises: a gravity model approach	POLS, FE & RE	✓	✓			✓			✓					✓		
88	Martins <i>et al.</i> (2017)	An empirical analysis of the influence of macroeconomic determinants on world tourism demand	Poisson	✓	✓						✓					✓		✓
89	Baumann and Matheson (2018)	Mega-events and tourism: the case of Brazil	FE	✓						✓								
90	Salgado-Barandela <i>et al.</i> (2018)	Determinants of the spending of sporting tourists: the case of attendees at professional basketball	Quan	✓						✓								
91	Loganathan <i>et al.</i> (2019)	How real oil prices and domestic financial instabilities are good for GCC countries tourism demand in Malaysia?	OLS	✓								✓	✓					
92	Ismail <i>et al.</i> (2018)	Factors influencing the Middle East tourist travelling to Malaysia: the quantile estimates	Quan	✓	✓						✓							(continued)

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	O	F	M	S	L	Z	Q
93	Radić et al. (2019)	The tourism-led terrorism hypothesis – evidence from Italy, Spain, UK, Germany and Turkey	VAR	✓											✓			
94	Albaladejo and González-Martínez (2018)	A nonlinear dynamic model for international tourism demand on the Spanish Mediterranean Coasts	GMM	✓	✓	✓												
95	Hanna et al. (2015)	Intra-tourism trade, income distribution and tourism endowment: an econometric investigation	GLS	✓		✓		✓										
96	Adeola et al. (2018)	Drivers of international tourism demand in Africa	Poisson	✓	✓	✓	✓	✓		✓	✓			✓	✓			
97	Puah et al. (2018)	Determinants of Chinese demand for tourism in Malaysia	ARDL	✓			✓	✓			✓			✓	✓			
98	Badulescu et al. (2018)	The complex relationship between international tourism demand and economic growth: an analysis on central and eastern European economies	PARDL	✓				✓										
99	Hatemi-J et al. (2018)	Does tourism cause growth asymmetrically in a panel of G-7 countries? A short note	PCausality	✓		✓												
100	Iglesias et al. (2018)	Tourism economics	PVAR	✓		✓					✓							
101	Volček et al. (2019)	Forecasting tourist arrivals at attractions: search engine empowered methodologies	ARIMA	✓														
102	Loganathan et al. (2019)	The effects of exchange rate, price competitiveness indices and taxation on international tourism demand in Malaysia	Quan	✓	✓				✓				✓					
103	Šergo and Gržinić (2018)	Does the international tourism industry relax sovereign credit ratings: the case of countries most reliant on tourism	POLS and FE	✓			✓	✓										
104	Tan et al. (2019)	The relationship between human development, tourism and economic growth: evidence from Malaysia	VECM	✓		✓												✓
105	Flores-Muñoz et al. (2019)	Predictability and self-similarity in demand maturity of tourist destinations: the case of Tenerife	ARIMA	✓													✓	
106	Charles et al. (2019)	How resilient is La Réunion in terms of international tourism attractiveness: an assessment from unit root tests with structural breaks from 1981–2015	ARIMA	✓														

(continued)

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	X	O	F	M	S	L	Z	Q
107	Mohamed Mustafa (2019)	Contribution of tourism and foreign direct investment to gross domestic product: econometric analysis in the case of Sri Lanka	OLS	✓		✓												✓
108	López and Marcelo (2019)	Kidnapping as a long-term factor for cruise tourism demand: evidence from Mexico	ARDL	✓		✓												✓
109	Radić <i>et al.</i> (2019)	Causality between terrorism and FDI in tourism: evidence from panel data	PVAR	✓		✓												✓
110	Viljoen <i>et al.</i> (2019)	Examining intra-African tourism: a trade theory perspective	LSDV	✓	✓		✓	✓								✓		
111	Jernsitiparsert and Chankoson (2019)	Behavior of tourism industry under the situation of environmental threats and carbon emission: time series analysis from Thailand	OLS	✓			✓											✓
112	Álvarez-Díaz <i>et al.</i> (2019)	Estimating the economic impact of a political conflict on tourism: the case of the Catalan separatist challenge	ARIMA	✓					✓									
113	Andraz <i>et al.</i> (2009)	Modeling and forecasting the UK tourism growth cycle in Algarve	ARIMA	✓														
114	Jong <i>et al.</i> (2020)	Modeling tourism demand: an augmented gravity model	POLS, RE and FE	✓		✓	✓	✓										
115	Soylu (2020)	Panel granger causality analysis of relationships between tourism and economic growth in the top eight tourist destination	PCausality	✓		✓	✓	✓										
116	Jeon (2020)	Macro and non-macro determinants of Korean tourism stock performance: a quantile regression approach	Quan	✓	✓		✓				✓							
117	Djurovic <i>et al.</i> (2020)	The macroeconomic effects of Covid-19 in Montenegro: a Bayesian varx approach	VAR	✓		✓												
118	Badulescu <i>et al.</i> (2020)	Tourism – economic growth nexus. The case of Romania	Cointe	✓				✓										
119	Lin and Lee (2020)	Taiwan's opening policy to Chinese tourists and cross-strait relations: the impacts on inbound tourism into Taiwan	POLS, RE and FE	✓	✓			✓										
120	Che (2013)	Panel threshold analysis of Taiwan's outbound visitors	TAR	✓	✓													
121	Belke <i>et al.</i> (2021)	The impact of tourism on the economic growth in the Mediterranean countries: evidences from hidden panel cointegration test	PCointe	✓		✓												

(continued)

Table 3

No.	Author and year	Title	Method	T	C	G	H	A	P	E	Variable									
											X	O	F	M	S	L	Z	Q		
122	Bozkurt <i>et al.</i> (2021)	An investigation of demand and exchange rate shocks in the tourism sector	DCCE	✓							✓									
123	Kadir and Nayan (2021)	International demand for medical tourism in Malaysia: evidence from panel data	ARDL	✓			✓	✓			✓									
124	Badulescu <i>et al.</i> (2021)	Do economic growth and environment quality contribute to tourism development in EU countries? A panel data analysis	PARDL	✓				✓												
125	Castillo-Manzano <i>et al.</i> (2021)	Assessing the tourism attractiveness of World Heritage Sites: the case of Spain	PCSE	✓	✓					✓										
126	Mayis <i>et al.</i> (2021)	Estimation of tourism demand and supply functions for Azerbaijan: 2SLS approach	2SLS	✓	✓			✓												✓
127	Opstad <i>et al.</i> (2021)	The influence of income and currency changes on tourist inflow to Norwegian campsites: the case of Swedish and German visitors	OLS	✓	✓	✓					✓									
128	Nguyen (2021)	Impact of investment in tourism infrastructure development on attracting international visitors: a nonlinear panel ARDL approach using Vietnam's data	NPARDL	✓						✓										✓
129	Naseem (2021)	The role of tourism in economic growth: empirical evidence from Saudi Arabia	Colite	✓		✓	✓													
130	Biglii <i>et al.</i> (2021)	The determinants of demand for tourism in Turkey: does terror-threat matter? A Markov regime switching-VAR approach	MS-VAR	✓																✓
131	Nguyen (2022)	Tourism demand elasticities by income and prices of international market regions: evidence using Vietnam's data	NPARDL	✓	✓			✓												
132	Lopez <i>et al.</i> (2022)	Does official development assistance promote tourism demand for donor countries? Evidence from Switzerland	POLS	✓		✓			✓		✓			✓		✓				

Note(s): T = tourist; C = consumer price index/relative price (CPI); G = gross domestic product (GDP); H = tourist price; A = GDP per capita (GDPPC); P = policy; E = special attraction; X = exchange rate; O = crude oil and gas; F = stock market; M = trade (import and export); S = political stability; L = population; Z = distance; Q = others

Source(s): Authors' own work (2023)

Table 4 Summary of qualitative regression of literature review

No.	Author	Title	Method
1	Eugenio-Martin and Campos-Soria (2010)	The role of income and the substitution pattern between domestic and international tourism	Probit
2	Brida <i>et al.</i> (2012)	Cruise tourism externalities and residents' support: a mixed approach	Logit
3	Salman and Hasim (2012)	Factors and competitiveness of Malaysia as a tourist destination: a study of outbound Middle East tourists	Logit
4	Malec and Abrahám (2016)	Determinants of tourism industry in selected European countries: a smooth partial least squares approach	PLS
5	Mahadevan (2018)	Examining domestic and international visits in Australia's aboriginal tourism	Logit
6	Araújo <i>et al.</i> (2021)	Film tourism in Spain: destination awareness and visit motivation as determinants to visit places seen in TV series	Cronbach
7	Devkota <i>et al.</i> (2020)	Does westernization influence the business culture of a touristic city?	Logit
8	Sánchez-Sánchez <i>et al.</i> (2021)	A behaviour model for cultural tourism: loyalty to destination	PLS
9	Adwan (2020)	The impact of motivation factors and intention to adopt Jordan as a destination for medical tourism in the Middle East	PLS
10	Gregori <i>et al.</i> (2022)	Residents' perception of a mature and mass tourism destination: the determinant factors in Gran Canaria	LOGIT
11	Dinu <i>et al.</i> (2021)	Factors that influence the adoption of the Internet of Things in tourism by Romanian consumers	LOGIT
12	Martaleni <i>et al.</i> (2021)	Role of tourist motivation as mediating variable on visitor decisions at Indonesian tourism village	PLS
13	Hoang and Tučková (2021)	The impact of sensory marketing on street food for the return of international visitors: case study in Vietnam	PLS
14	Ballina (2022)	Smart concept in rural tourism: a comparison between two phases (2016–2019)	Cronbach

Source(s): Authors' own work (2023)

Data quality refers to the reliability, consistency and completeness of the data, which directly impacts the credibility of model predictions. Several studies in this review highlighted challenges such as incomplete data sets, outdated sources or inconsistent reporting standards. Addressing these challenges through standardized data collection practices, advanced cleaning techniques and integration of real-time data sources would greatly enhance model reliability.

The features of the data, such as temporal resolution and type, also play a pivotal role. For instance, granular data (e.g. daily or weekly metrics) can capture short-term trends more effectively, while annual data provides insights into long-term patterns. Furthermore, structured data such as historical tourist arrivals has been the focus of most studies, but unstructured data from sources like social media or travelers reviews could offer valuable behavioral insights. Future research should prioritize feature engineering to extract meaningful variables and consider integrating diverse data sources to enhance model performance.

Drivers of tourism demand for quantitative regression

Dependent variable. Based on the results from Table 3, 132 papers used quantitative regression. The majority of papers used tourist arrival as the dependent variable, and several papers used tourism expenditure as the dependent variable. The arrival of each person measures the tourist's arrival at the destination country one at a time (The World Data, 2020). From 1961 until 2022, there have been no changes in dependent variables except as the authors mentioned.

Tourism arrivals have been widely used as a dependent variable in tourism demand studies due to their accessibility and standardized nature, offering a direct measure of tourist activity.

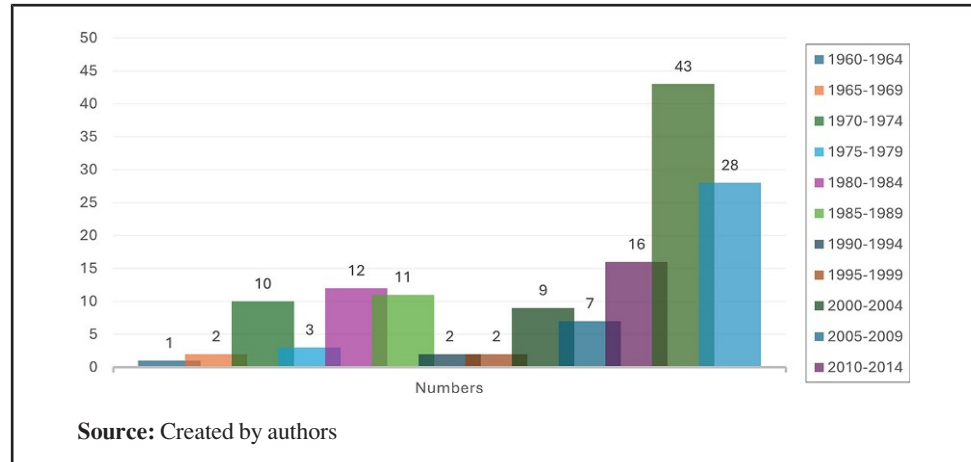
Table 5 Summary of methodology and variable

Acronyms	Definition	Total used in papers
<i>Methodology</i>		
Quantitative regression		
2SLS	Two-stage least square	1
AIDS	Almost ideal demand system	3
ARDL	Autoregressive distributed lag	9
ARIMA	Autoregressive integrated moving average	12
CCA	Canonical correction analysis	1
Cochrane	Multiple regression Cochrane-Orcutt	1
Cointe	Co-integration	9
DCCE	Dynamic common correlated effects	1
ECM	Error correction model	1
FE	Fixed-effect model	8
FGLS	Feasible generalized least square	1
GLS	Generalized least square	2
GMM	Generalized method of method	3
LSDV	Least square dummy variable	1
MLR	Maximum likelihood maximum	1
NPARDL	Nonlinear panel autoregressive distributed lag	2
OLS	Ordinary least square	45
PARDL	Panel autoregressive distributed lag	2
PCAUUSALITY	Panel causality	3
PCointe	Panel co-integration	1
PCSE	Panel corrected standard error	1
Poisson	Poisson regression	2
POLS	Panel ordinary least square	7
PVAR	Panel vector autoregressive	2
QUAN	Quantile regression	4
Quasi	Quasi-experimental static group comparison	1
RE	Random-effect model	4
SAR	Spatial autoregressive	1
Stepwise	Stepwise regression	1
SUR	Seemly unrelated regression	1
VAR	Vector autoregressive	7
TAR	Threshold regression	1
VECM	Vector error correction model	1
MS VAR	Markov-switching vector autoregressions	1
Qualitative regression		
Cronbach	Cronbach's alpha	2
Probit	Probit model	1
PLS	Partial least square	5
LOGIT	Logistic regression	6
<i>Variable</i>		
Dependent variable		
T	Tourist	132
Independent variable		
C	Consumer price index/relative price (CPI)	59
G	Gross domestic product (GDP)	32
H	Tourist price	42
A	GDP per capita (GDPPC)	63
P	Policy	5
E	Special attraction	10
X	Exchange rate	46
M	Trade (import and export)	9
F	Stock market	2
S	Political stability	3
Z	Distance	5
L	Population	11
Q	Others	38
O	Crude oil and gas	3

Source(s): Authors' own work (2023)

This metric allows for straightforward comparisons across regions and time periods. Despite its advantages, focusing solely on arrivals fails to capture the broader economic impact of tourism. Metrics like total tourism expenditure, average length of stay or tourism-generated revenue may better reflect the quality and sustainability of tourism activities. For instance, an increase in arrivals does not necessarily equate to higher revenue if the tourists are low-spending travelers.

Figure 2 Number of papers every five years



Moreover, this measure does not account for seasonal or regional disparities. Future studies could consider composite metrics, such as tourism revenue per arrival or expenditure-to-arrival ratios, to provide a more nuanced understanding of tourism demand. These alternatives could bridge the gap between volume- and value-based assessments.

Independent variable. Consumer price index and tourism price. Consumer price index (CPI) is one of the main factors of demand for tourism. Eighty-one papers are using CPI for tourism demand. CPI has a negative impact on tourist arrival because CPI is a measurement of the cost of living in the destination country (Viljoen *et al.*, 2019). When the domestic cost of living is high, then international tourists tend to have less demand. The majority of papers calculated CPI using relative CPI between the origin country and the destination country. These papers use Real CPI, which is calculated using relative CPI and exchange rate. Tourism prices have a definition with CPI, but tourism prices include travel costs, which CPI does not count travel costs. Many papers use both variables, which use CPI as the cost of living and tourism price as travel cost.

Several impactful variables remain underexplored in the existing literature. For example, environmental variables such as air quality, climate conditions and natural disasters could significantly influence tourist decisions, particularly for destinations emphasizing eco-tourism or outdoor activities. Similarly, technological advancements like the rise of digital platforms and travel applications, as well as internet accessibility, are shaping modern tourism behavior and deserve greater attention. In the post-pandemic context, health and safety metrics which includes vaccination rates, healthcare infrastructure and perceived safety are likely to play a pivotal role in tourism decisions. Expanding the scope to include cultural and social factors like local festivals, community attitudes toward tourists and heritage tourism could offer a more holistic perspective for future research.

Gross domestic product per capita and gross domestic product. Gross domestic product per capita (GDPPC) is a measurement of the income level of tourists (Álvarez-Díaz *et al.*, 2017). The higher income leads to higher demand for tourism, denoting that the impact is positive. Ninety-one papers used this variable. Meanwhile, 32 papers used GDP as the independent variable. GDP also has a definition, and most researchers use GDP as a measurement of income level, but there are papers using GDP as a measurement of economic growth to determine tourism demand. Therefore, the result found that economic growth of the country or the world has the most influential impact on tourism demand (Iglesias *et al.*, 2018; Martins *et al.*, 2017).

Exchange rate. The exchange rate plays a big role in the demand for tourism, as the exchange rate directly affects the tourism price. When the value of the exchange rate origin country increases or the value of the exchange rate destination country decreases, the tourism price to the destination country becomes cheaper, and there will be a demand for tourism in the destination country and vice versa. There are 57 papers using this variable as the independent variable. Usually, many researchers used exchange rates based on measuring the value of the exchange rate tourist country divided by the value of the exchange rate destination country. Several researchers used the real exchange rate which is measured by exchange divided by a price deflator or CPI (Bozkurt *et al.*, 2021). Many papers found that the exchange rate is highly significant to tourist arrival, but Quadri and Zheng (2010) found an opposite result.

Special attraction. Special attraction is the main reason for tourist arrival. For example, Zieba (2016) found that tourists go to their destinations because of the city theatre. Besides that, sports events have become a main attraction to tourists (Salgado-Barandela *et al.*, 2018). Currently K-pop industry becomes worldwide and becomes the main attraction to tourist transportation like high-speed rail in Spain (Albalade and Fageda, 2016). Places for sightseeing such as beaches, heritages, museums, national natural parks and theme parks are also special attractions for tourists coming to the destination country.

Trade. Trade is one of the components of GDP. Trade is significantly positive with tourist arrival (Surugiu *et al.*, 2011). Usually, trade is measured by the total of exports and imports (Adeola *et al.*, 2018; Surugiu *et al.*, 2011). Sequeira and Nunes (2008) used export to measured trade and Reis and Varela (2015) and Tica and Kožić (2015) used export and import separately in one model to analyze trade. Puah *et al.* (2018) used net export to analyze trade influenced tourist arrival.

Population. Population changes in a country could positively sustain tourism flows (Surugiu *et al.*, 2011). Population has a positive impact on tourist arrival (Gouveia *et al.*, 2017). This variable is measured by total population of destination country (Viljoen *et al.*, 2019).

Distance. Distance from the origin country to the destination country is a powerful motivation for travelers (Surugiu *et al.*, 2011). Travelers will choose a nearby location because it will take less time to travel. The relationship between distance and tourist arrival is negative (Keum, 2010; Lopez *et al.*, 2022; Viljoen *et al.*, 2019).

Policy. Policy is vital to the tourism industry. Identifying the country conditions can help policymakers understand, and it can promote coordination between local entrepreneurs and the foreign demand signals of the tourism economy. Policy can have positive or negative impacts on tourism. For example, if a tax policy was implemented on tourists, it could reduce demand for tourism and vice versa. A policy can be measured by using the economic policy uncertainty index (Chatziantoniou *et al.*, 2016).

Political stability. Political stability plays a big role in the tourism industry. Unstable politics can lead to no tourism, and a conflict in the country will lead to risky tourism. The study found that unstable politics have negative impacts on tourism. Two ways were used to measure political stability: using a dummy variable and a political stability index. Big events like war and election in a specific year were used as a dummy during analysis (Garín-Muñoz and Amaral, 2000).

Other variables. Other factors have been used by researchers, such as investment, crude oil, human capital, stock market, and carbon emissions. These variables might have an impact on the tourism industry, but these variables are rarely used.

Drivers of tourism demand for qualitative regression

Based on Table 4, 14 papers using qualitative regression. All papers designed their questionnaires that matched with research objective. Generally, all papers put

demographics as the first variable, consisting of age, gender, occupation, country of origin and ethnicity. Some papers take other variables into account, such as education, marital status, income, religion, employment transportation, length of stay and choice of destination (Eugenio-Martin and Campos-Soria, 2010). For the following parts, they used their specific variable that relate to the research objective. Some papers focused on tourist arrival at specific country like Malaysia (Salman and Hasim, 2012), European countries (Malec and Abrahám, 2016), Australia (Mahadevan, 2018), Gran Canaria (Gregori *et al.*, 2022), Romania (Dinu *et al.*, 2021) and Indonesia (Martaleni *et al.*, 2021). There are also papers using variable related to main reasons tourist come to the destination such as cruise ship tourism (Brida *et al.*, 2012), film tourism (Araújo *et al.*, 2021), medical tourism (Adwan, 2020), culture tourism (Devkota *et al.*, 2020; Sánchez-Sánchez *et al.*, 2021), street food (Hoang and Tučková, 2021) and rural tourism (Ballina, 2022).

The reviewed studies predominantly employed qualitative regression methods such as Logit and partial least square (PLS), with questionnaire designs tailored to their specific objectives. While these approaches are effective, the reliance on traditional demographic variables such as age, gender, income and country of origin limits the scope of analysis. Demographic variables provide valuable baseline information but may overlook behavioral, psychological and situational factors critical to understanding tourism demand in dynamic contexts.

To address these gaps, we propose incorporating additional variables in future studies. For instance, behavioral variables like travel motivations, perceived risks and preferences for sustainable or eco-friendly tourism could offer deeper insights into contemporary travel behaviors. Similarly, post-pandemic health concerns, such as vaccination rates and healthcare access, are likely to influence tourism decisions and should be considered in subsequent research. Expanding the scope to include these dimensions would provide a more comprehensive understanding of tourism demand drivers.

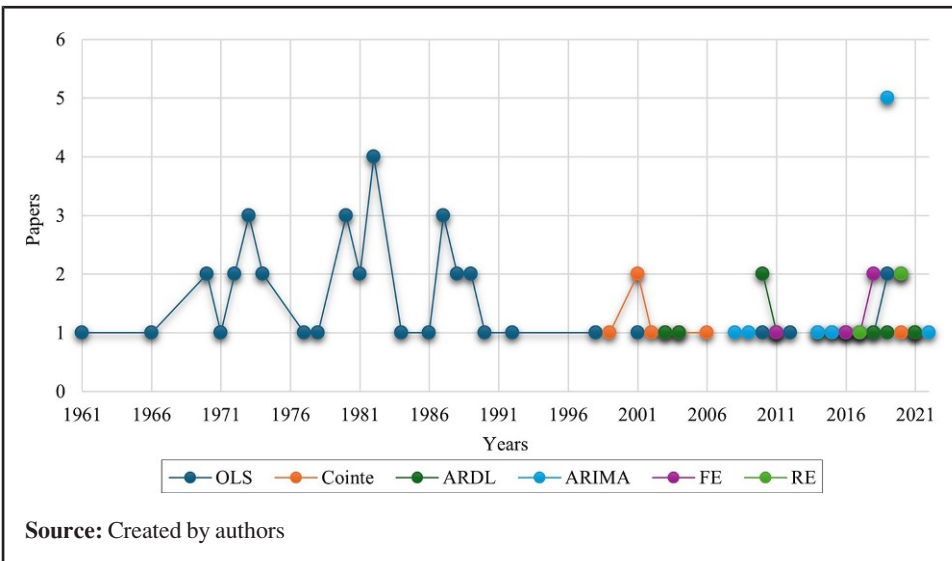
From a methodological perspective, Logit models effectively analyze binary outcomes, making them suitable for understanding yes-or-no decisions, such as destination selection or travel participation. However, they may oversimplify complex relationships and fail to capture nuances. PLS is a robust tool for analyzing relationships between multiple variables, especially when the data involve latent constructs. However, it requires careful consideration of sample size, data quality and the validity of constructs. Combining these methods with observational data or experimental designs could address inherent biases, such as social desirability or recall errors, often present in self-reported data.

Finally, a comparative evaluation of qualitative regression methods reveals their respective strengths and limitations. For instance, while Logit is practical for binary decision-making, it may not adequately explore multi-dimensional constructs where PLS excels. Future research could benefit from systematically testing the applicability of these methods across different contexts, such as cultural tourism, health tourism or adventure tourism.

Research methodology of tourism demand for quantitative regression

Based on Figure 3, the ordinary least square (OLS) method has been frequently used from the 1960s until the late 1990s. Since then, various methods have been used, such as autoregressive distributed lag (ARDL), panel ordinary least square (POLS), vector autoregressive (VAR), autoregressive integrated moving average (ARIMA), fixed effect (FE) and co-integration. Research tourism methods have evolved from OLS to other methods. The OLS method can only determine the factors of tourism in one place or in one period of time, and thus, it provides limited information. As new methods were introduced in the 2000s, the researchers gained more information, such as short-run and long-run, speed of adjustment, data regression using various times and places, and cause and effect between variables. This evolution of methodology in tourism demand has produced more information in the tourism industry, leading to more precise decision-making. For this research, most

Figure 3 Top 6 methodology in quantitative regression papers



papers used the OLS method. The modified OLS regressions that eliminate the heteroscedasticity problems are GLS (Haitovsky *et al.*, 1987; Hanna *et al.*, 2015) and FGLS (Zieba, 2016).

Various methods lead to different results due to the purpose of the research. ARDL method finds the long run and short run between variables. Kadir and Nayan (2021) used this method to find the long run and short run for tourism demand. Badulescu *et al.* (2021) and Nguyen (2021, 2022) used PARDL and NPARDL for various countries and various time periods.

Law and Au (1999) and others used co-integration to analyze the determinants of tourism. Usually, researchers use Johansen co-integration to analyze determinants (but some papers used Engle-granger and co-integration (Naseem, 2021). Panel co-integration has been used as well (Belke *et al.*, 2021).

ARIMA model also has been used to analyze the demand. ARIMA is a method to predict future data based on past data. The basic model is the ARIMA model, a model without nonstationary data. Only one paper used this method (Andraz *et al.*, 2009). Claveria and Torra (2014), Petrevska (2017) and Charles *et al.* (2019) used ARIMA to analyze tourism demand. Other factors were considered to create a new method but in the ARIMA circle, such as REGARIMA (Smeral and Wüger, 2008), SARIMA (Álvarez-Díaz *et al.*, 2019; Chatziantoniou *et al.*, 2016; Thushara *et al.*, 2019), SARIMAX (Sun *et al.*, 2022), SARFIMA (Flores-Muñoz *et al.*, 2019) and X12-ARIMA (Ridderstaat and Nijkamp, 2015).

VAR is a nonstructural econometric model that allows the dependent variables from the structural model to depend not only upon the theoretical predefined economic relationships but also on each of the other variables (Lutkepohl, 2007). Song and Witt (2006) and other researchers used this method as their main methodology. However, Djurovic *et al.* (2020) and Radić *et al.* (2019) used panel VAR and Bilgili *et al.* (2021) used MS-VAR. VECM has the same purpose as VAR, but VECM can estimate in multiple levels of unit roots. The difference between VECM and ECM is VECM has multiple equations, but ECM only has a single equation. Only Tan *et al.* (2019) used VECM and only Ongan *et al.* (2017) used ECM as research methodology.

Since early 2000s, panel regression was popular among researchers. One of the popular methods is POLS (Garín-Muñoz and Amaral, 2000), but this method treated error term as identical (Millimet and Bellemere, 2023). Thus, many researchers used the other two methods:

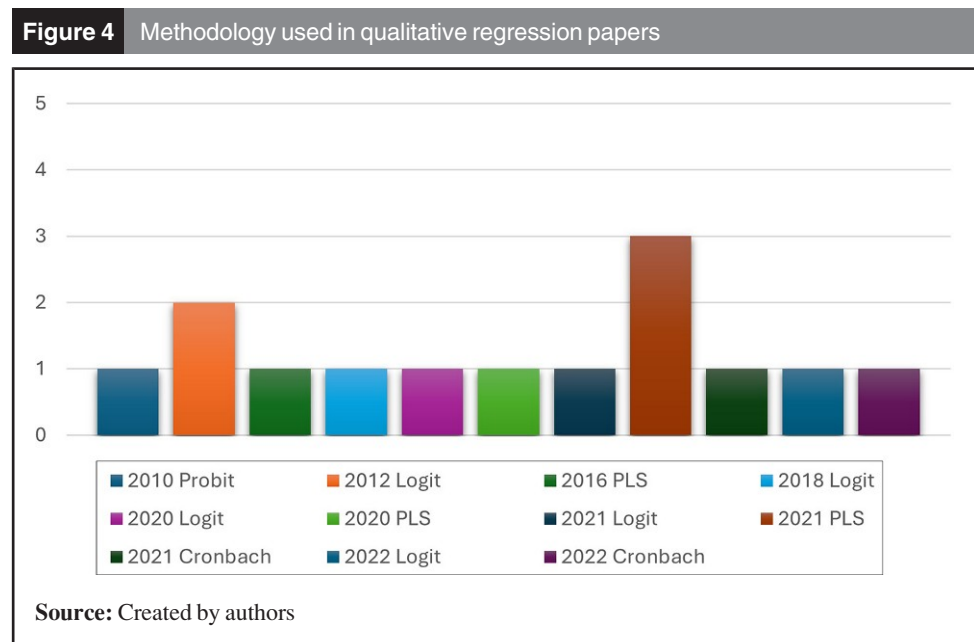
the FE and random-effect (RE) model to compare between the three methods because FE and RE have difference definition of error terms (Gouveia *et al.*, 2017; Jong *et al.*, 2020; Lin and Lee, 2020). But, some papers did not compare between the three methods and used only one of the methods for analysis (Albaladejo and Fageda, 2016). Other panel regressions have been used for determining tourism demand such as panel causality (Hatemi-J *et al.*, 2018; Soylu, 2020; Tica and Kožić, 2015), generalized method of method (GMM) (Albaladejo and González-Martínez, 2018; Garín-Muñoz, 2006; Sequeira and Nunes, 2008), Quan (Ismail *et al.*, 2018; Jeon, 2020; Loganathan *et al.*, 2019) and TAR (Che, 2013).

There are other methods that have been used such as two-stage least square (2SLS) (Mayis *et al.*, 2021), almost ideal demand system (AIDS) (Han *et al.*, 2006; De Mello *et al.*, 2002; O'Hagan and Harrison, 1984a), canonical correction analysis (CCA) (Uysal and O'Leary, 1986), Cochrane (Straszheim, 1978), dynamic common correlated effects (DCCE) (Bozkurt *et al.*, 2021), least square dummy variable (LSDV) (Viljoen *et al.*, 2019), maximum likelihood maximum (MLR) (O'Hagan and Harrison, 1984b), panel corrected standard error (PCSE) (Castillo-Manzano *et al.*, 2021), Poisson (Adeola *et al.*, 2018; Martins *et al.*, 2017), Quasi (Gerakis, 1965), SAR (Álvarez-Díaz *et al.*, 2017), SUR (Garín-Muñoz and Amaral, 2000; Rosensweig, 1988) and stepwise (Leejárraga and Walkenhorst, 2013). These methods are not popular among researchers rarely used but it can be used to determine tourism demand.

Research methodology of tourism demand for qualitative regression

Based on Figure 4, most papers used Logit regression as main methodology from 2007 to 2021. Logit regression has been used for one dependent to multiple independent variables with binary form falls under between 0 and 1. There are four types that have been used which are ordered logistic regression (Devkota *et al.*, 2020; Mahadevan, 2018; Salman and Hasim, 2012), ordinal logistic regression (Gregori *et al.*, 2022), generalized logistic regression (Brida *et al.*, 2012) and ordered multinomial regression (Dinu *et al.*, 2021).

PLS is a regression for multiple dependent variables to multiple independent variables with binary form falls under between 0 and 1. PLS (Sánchez-Sánchez *et al.*, 2021), PLS-SVD (Malec and Abrahám, 2016), PLS-SEM (Adwan, 2020; Hoang and Tučková, 2021) and Warp PLS



(Martaleni *et al.*, 2021) have been used in papers since 2016–2021. Other methods are Probit (Eugenio-Martin and Campos-Soria, 2010) and Cronbach (Araújo *et al.*, 2021; Ballina, 2022).

While Logit and PLS are widely used, there is room for methodological advancement. For instance, hybrid methods that combine Logit with machine-learning algorithms could address limitations in handling large data sets and capturing nonlinear relationships. Similarly, Bayesian approaches to Logit regression might provide deeper insights by incorporating prior knowledge and addressing uncertainty in parameter estimation.

Another key limitation of existing qualitative regression methodologies is their reliance on self-reported data, which is prone to biases like social desirability and recall errors. To mitigate this, future research could integrate experimental or observational data to complement questionnaire-based findings. Mixed-methods approaches combining qualitative and quantitative regressions could also provide richer, multi-dimensional insights.

Finally, while current methods are effective in analyzing binary and ordinal outcomes, emerging areas like sentiment analysis from social media or real-time travel behavior tracking may require adapting or extending these methodologies. Integrating such data sources with qualitative regression models could significantly enhance the granularity and applicability of tourism demand studies.

Practical implications, theoretical contributions and future research roadmap

Practical implications for policy and industry. The results underscore the importance of economic variables such as GDP growth, CPI and exchange rates in influencing tourism demand. Policymakers can use these insights to develop targeted measures to boost tourism during economic downturns, such as tax incentives, promotional campaigns or subsidies for infrastructure development. For example, improving transportation systems or supporting cultural events can attract more visitors while enhancing the overall competitiveness of a destination.

For the tourism industry, understanding the impact of these variables helps businesses make informed decisions about pricing strategies and service offerings. For instance, when exchange rates are favorable, tourism operators could offer discounts to international travelers or introduce premium packages for high-value tourists. These actions can contribute to sustainable growth while aligning with broader economic trends.

Theoretical contributions to tourism research. The review contributes to academic literature by mapping the evolution of methodologies used in tourism demand studies. While traditional methods like OLS and ARDL have provided foundational insights, newer approaches like PLS and hybrid models offer enhanced capabilities for analyzing complex relationships. However, the review also identifies gaps, such as the limited integration of new variables like environmental indicators, technological adoption or health-related metrics, which are becoming increasingly relevant in the post-pandemic era.

The role of advanced time series and machine learning in future research. The methodologies used in tourism demand research have evolved significantly over time, reflecting the growing complexity of the field. Early studies relied heavily on traditional econometric models like OLS and ARDL, which were valuable for establishing basic relationships between key variables. However, these models have their limitations, particularly in handling nonlinear relationships and the larger, more complex data sets now commonly available. Over time, time series models such as ARIMA and co-integration gained popularity because of their ability to analyze trends and long-term relationships effectively. Still, these approaches have their own constraints, especially in addressing the dynamic, real-time needs of modern tourism research.

To further advance the field, integrating advanced time series methods such as ARIMA-X, VARMA and nonlinear autoregressive distributed lag (NARDL) models can enhance forecasting precision by accounting for dynamic and complex relationships over time. These models are

particularly suited for addressing temporal dependencies and exogenous shocks in tourism demand data.

Moreover, machine learning (ML) approaches, including neural networks, ensemble methods (e.g. random forests, gradient boosting) and deep learning frameworks, present new opportunities for analyzing large and complex data sets. Unlike traditional methods, ML algorithms can capture nonlinear relationships and interactions among variables, providing more accurate and adaptive forecasts. These techniques are especially beneficial when working with unstructured data sources, such as social media activity or search engine trends, which are increasingly influencing tourism behavior.

Roadmap for future research. To build on the findings, this study outlines several key areas for future exploration.

New drivers of tourism demand. Future studies should explore the role of emerging factors such as environmental sustainability, digital platforms and health safety measures in shaping tourist behavior. These variables reflect contemporary priorities and can deepen our understanding of modern tourism dynamics.

Leveraging alternative data sources. Traditional data sources often lack the granularity needed for dynamic analyses. Incorporating real-time data from social media, travel apps or mobility patterns can provide richer insights into tourist preferences and trends.

Integrating advanced methodologies. Combining advanced time series models with ML techniques can significantly improve forecasting accuracy. For example, hybrid approaches such as ARIMA coupled with neural networks can address both temporal dependencies and complex nonlinear relationships in tourism demand data.

Regional and sector-specific research. Tourism demand varies significantly across regions and sectors. Tailored studies focusing on specific areas such as cultural or eco-tourism can generate actionable recommendations for local policymakers and businesses.

Conclusion

Using SLR, 146 papers related to tourism demand from 1961 to 2022 were found. This research identified two types of regression which are quantitative regression and qualitative regression. Most papers used OLS in quantitative regression and Logit in qualitative regression. Based on the database, most papers on tourism demand were published between 2015 and 2019, amounting to 40 papers.

This research covered all determinant of tourism demand compared to [Gao and Wang \(2021\)](#) who focused solely on air travel. This research is up to date based on databases from Scopus, WoS and Science Direct. These papers covered seventy years of research since the 1960s. This research discovers an interesting matter which is the evolution of methodologies which leads to precise decision making. Since 2000, the use of OLS as a primary methodology has diminished due to advancements in forecasting models, each tailored to specific objectives for analyzing tourism demand. Some studies have also compared methodologies to identify the most suitable models for their purposes. In qualitative regression, Logit remains the most widely used approach among researchers. By tracing the development of methodologies, this study identifies a clear trend which is a shift from traditional econometric models to advanced hybrid approaches that integrate ML, reflecting the growing need for tools that are both flexible and capable of addressing the complexities of modern tourism systems.

This analysis also bridges theoretical insights with practical applications, providing a roadmap for future research to address pressing challenges in tourism demand forecasting. The findings offer valuable guidance for policymakers, industry stakeholders and researchers in developing strategies to promote sustainable tourism growth, respond to emerging trends and adapt to changing global conditions. To guarantee that tourism demand methodologies remain relevant and efficient in addressing emerging challenges,

future studies should keep investigating the possibilities of hybrid models and sophisticated forecasting tools. For more accurate predictions, the research also suggests using higher-quality data and data variables throughout the modeling process. While this study focuses on economic, business and accounting areas, future research could also include insights from hospitality or other related fields for a more complete understanding.

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About the authors

Norlida Hanim Mohd Salleh is an Associate Professor at the Department of Economics and the Head of Sustainable and Inclusive Development Studies (SID), Faculty of Economics and Management, National University of Malaysia. Her research interests include tourism development, tourism economics, resource economics and environmental economics.

Trisetia Wijijayanti is an Assistant Professor at the Department of Management, Universitas Negeri Malang, Indonesia. She finished her doctoral studies at Faculty of Economics and Management, National University of Malaysia in October of 2024. Her research interests include rural tourism management, rural tourism development and rural development. Trisetia Wijijayanti is the corresponding author and is the corresponding author and can be contacted at: trisetia.wijijayanti.fe@um.ac.id

Mohd Fazim Ahmad is a full-time PhD student specializing in financial economics. He has published several articles in various economic fields, including agriculture and tourism. Alongside his studies, he works as a part-time research assistant, contributing to academic projects and enhancing his expertise in economic research and analysis.

Agung Winarno is a Professor within the discipline for management and entrepreneurship education in Faculty of Economics and Business, Universitas Negeri Malang, Indonesia. His specific interests cover entrepreneurship education in rural areas and tourism development through entrepreneurship. He is also active in academic research activities including conferences and articles publishing.

Izza Mafruhah is a Professor within the discipline for Economics in Faculty of Economics and Business, Sebelas Maret University, Indonesia. She actively participates in scientific conferences and has published articles in international scientific journals, especially economic and social sciences. Her specific interests cover empowerment, migrant worker, poverty and economic development.

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