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RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

## BLUE ECONOMY, ECOTOURISM, AND SUSTAINABLE TOURISM: A 10-YEAR GLOBAL DIGITAL INTEREST ANALYSIS AND FORECASTING VIA ETS MODEL

MAVİ EKONOMİ, EKOTURİZM VE SÜRDÜRÜLEBİLİR TURİZM: ETS MODELİ ARACILIĞIYLA 10 YILLIK KÜRESEL DİJİTAL İLGİ ANALİZİ VE TAHMİNİ

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# BLUE ECONOMY, ECOTOURISM, AND SUSTAINABLE TOURISM: A 10-YEAR GLOBAL DIGITAL INTEREST ANALYSIS AND FORECASTING VIA ETS MODEL

## Abstract

The global tourism and development agenda is increasingly shifting toward a more sustainable structure. While previous studies have predominantly relied on static survey data, this study analyzes the long-term global digital footprints of three critical concepts—ecotourism, sustainable tourism, and the blue economy—to reveal their dynamic evolution in societal awareness. Utilizing Google Trends data (2015–2025), future projections up to 2027 were generated using the ETS (Error, Trend, Seasonality) forecasting algorithm, specifically selected for its robustness in modeling non-linear digital search trends. The findings reveal structural differences in digital behavioral patterns. While ecotourism and sustainable tourism exhibit a consumer-oriented, seasonal, and highly predictable upward trend in search interest, the Blue Economy displays a policy-driven structure characterized by a recent surge in digital awareness but higher volatility in the face of external shocks. The study concludes that, although positive digital interest trajectories are projected to continue through 2027, this digital awareness should be interpreted as an early indicator of potential consumer and policy shifts rather than absolute actualized demand. Ultimately, the nature of this interest is evolving from a mere “popular holiday preference” into a broader “strategic and economic vision.”

**Keywords:** Blue Economy, Sustainable Tourism, Ecotourism, Google Trends, ETS Model, Future Projection.

**JEL Codes:** Z32 – Q01 – C53

## MAVİ EKONOMİ, EKOTURİZM VE SÜRDÜRÜLEBİLİR TURİZM: ETS MODELİ ARACILIĞIYLA 10 YILLIK KÜRESEL DİJİTAL İLGİ ANALİZİ VE TAHMİN

## Özet

Küresel turizm ve kalkınma gündemi giderek daha sürdürülebilir bir yapıya doğru evrilmektedir. Konu ile ilgili önceki çalışmalar ağırlıklı olarak statik anket verilerine dayanırken, bu çalışma üç kritik kavramın (ekoturizm, sürdürülebilir turizm ve mavi ekonomi) uzun vadeli küresel dijital ayak izlerini analiz ederek toplumsal farkındalıktaki dinamik evrimlerini ortaya koymayı amaçlamaktadır. Araştırmada 2015–2025 dönemini kapsayan Google Trends verileri kullanılmış olup, 2027 yılına kadar olan gelecek projeksiyonları, doğrusal olmayan dijital arama trendlerini modellemedeki gücü nedeniyle seçilen ETS (Hata, Trend, Mevsimsellik) tahmin algoritması aracılığıyla oluşturulmuştur. Elde edilen bulgular, dijital davranış kalıplarındaki yapısal farklılıkları ortaya koymaktadır. Ekoturizm ve Sürdürülebilir Turizm arama ilgisinde tüketici odaklı, mevsimsel ve yüksek oranda öngörülebilir bir yükseliş eğilimi sergilerken; Mavi Ekonomi, son dönemdeki belirgin dijital farkındalık artışıyla karakterize edilen ancak dış şoklar karşısında dalgalanmalara (volatilité) açık, politika odaklı bir yapı sergilemektedir. Çalışma, her üç kavram için de pozitif dijital ilgi eğilimlerinin 2027 yılına kadar devam etmesinin öngörüldüğünü, ancak bu dijital farkındalığın kesinleşmiş fiziksel talepten ziyade potansiyel tüketici ve politika değişimlerinin öncü bir göstergesi olarak yorumlanması gerektiği sonucuna varmaktadır. Nihayetinde bu ilginin doğası, salt “popüler bir tatil tercihidenden” daha geniş bir “stratejik ve ekonomik vizyona” dönüşmektedir.

**Anahtar Kelimeler:** Mavi Ekonomi, Sürdürülebilir Turizm, Ekoturizm, Google Trends, ETS Modeli, Gelecek Projeksiyonu.

**JEL Codes:** Z32 – Q01 – C53

## 1. INTRODUCTION

Escalating environmental waste, reckless consumption of natural resources, and damage to ecosystems have emerged as primary threats to sustainability today. To prevent this destruction, the need for environmentally compatible development models has increased; in this context, concepts such as “clean economy”, “green economy”, and “blue economy” have come to the forefront (Çoban & Ölmez, 2016). Suluk (2022) states that the Blue Economy is fundamentally based on the Green Economy and that this concept is in fact an adaptation of the Green Economy to seas and oceans. Accordingly, the Green Economy’s objectives of ensuring human well-being and reducing environmental risks have also been adopted by the Blue Economy. Built upon this foundation, the Blue Economy envisages the sustainable use of marine resources to support promoting economic growth, enhancing human well-being, and protecting ocean ecosystems (Pisarović et al., 2025).

The results of this economic transformation and environmental awareness in the tourism sector is sustainable tourism and ecotourism. Agussalim et al. (2025) define sustainable tourism as a concept in which sustainability principles are integrated into the development and management processes of tourism. Ecotourism, whose historical roots date back to the 1980s and which was first defined by Ceballos-Lascuráin as “travel to undisturbed natural areas with the purpose of studying nature and culture (Donohoe & Needham, 2006)”, is considered today by Arevin et al. (2025) as a form of tourism that emphasizes responsible travel to natural areas, environmental conservation, and the enhancement of local community well-being. Today, it is emphasized that the development and competitiveness of the tourism sector cannot be considered separately from the digital context and technological innovations (Pranita et al., 2023; Ukav, 2024).

Accordingly, individuals’ information-seeking behaviors and levels of interest can be monitored through big data, and search engine data are accepted as a leading indicator reflecting societal awareness and potential economic trends (Choi & Varian, 2012). Although Hutajulu (2025) has revealed, through bibliometric data, that global research on the Blue Economy and ocean sustainability has rapidly increased, understanding the digital reflection of this academic interest in society and its seasonal cycles is critical for demonstrating the extent to which theoretical discussions correspond to market realities.

Recently years, the integration of search engine data, particularly Google Trends, with time series forecasting models has gained significant traction in the tourism literature. Previous studies have successfully demonstrated the efficacy of these digital traces in forecasting tourist arrivals, predicting hotel demand, and monitoring market fluctuations (Önder, 2017; Dergiades et al., 2018). These methodological approaches provide real-time foresight, offering a distinct advantage over traditional, lagging official statistics. However, while these predictive models are frequently applied to general mass tourism demand, their application to specific, environmentally sensitive paradigms like the Blue Economy and Ecotourism remains largely underexplored.

From this perspective, the main objective of this study is to analyze the change in global digital interest in the concepts of Blue Economy, Ecotourism, and Sustainable Tourism over the 2015–2025 period, to reveal the seasonality and trend components in this change, and to produce statistically significant future projections up to 2027.

Within the scope of the study, the broad term “Marine Tourism”, which includes mass tourism activities such as mega-cruise tourism or motorized water sports that do not always align with sustainability goals, has been deliberately excluded from the analysis. This focused approach ensures that the findings provide a refined and specific set of foresights for destination managers and policymakers aiming for a genuine environmentally sensitive economic transformation.

While previous literature has extensively explored the conceptual frameworks of the Blue Economy and

sustainable tourism (Suluk, 2022; Pisarović et al., 2025) and mapped academic research trends through bibliometric analyses (Hutajulu, 2025), these concepts are primarily investigated through survey-based methodologies, cross-sectional data, or qualitative policy analyses. There remains a critical gap in understanding the long-term, dynamic evolution of these concepts and how they resonate within global societal awareness. Most studies treat these paradigms in isolation and rely on static datasets. This study aims to fill this gap by utilizing a decade-long digital trace dataset (Google Trends) and applying the ETS (Error, Trend, Seasonality) forecasting model, which offers flexibility in capturing non-linear trends in time-series analysis. By transitioning from traditional, self-reported consumer surveys to real-time, global digital behavioral tracking, this research provides a conceptual framework that offers a unique methodological and theoretical contribution to the literature.

## 2. MATERIALS AND METHODS

This study adopts a quantitative research design using secondary data analysis and an econometric forecasting approach in order to examine global sustainability trends through digital footprints. Time series data obtained from Google Trends were used in the study, and the analyses were carried out in Microsoft Excel.

### 2.1. Dataset and Collection

The data set of the study consists of Google Trends “Topic” index values for the concepts “blue economy”, “ecotourism”, and “sustainable tourism”, obtained on a global scale for the period from for the period between January 1, 2025 and December 31, 2025. By utilizing the “Topic” feature instead of literal “Search Terms”, the study ensures that the data reflects broader semantic interest and multilingual awareness, rather than being restricted to specific keyword variations. Compiling the data on a “Topic” basis enabled synonymous searches in different languages (for example, blue economy, economía azul, etc.) to be standardized within a single data set, thus allowing global interest to be represented in a more comprehensive and inclusive manner. The data were compiled at monthly, and independent time series were created for each concept.

During the data collection process, all three concepts were retrieved simultaneously within the same Google Trends query panel. This comparative approach was deliberately chosen to ensure that the search volumes were not only tracked for their historical trends but also normalized against one another on the same 0–100 scale. Because the three topics were retrieved within the same query panel, Google Trends applied a common normalization procedure, ensuring that the index values are directly comparable across the concepts. By retrieving them together, the study accurately captures the relative magnitude of global societal interest across the concepts. This method allowed the study to show to demonstrate empirically that while Ecotourism currently commands the highest search volume (setting the index peak at 100), Sustainable Tourism (peaking at 35) and the Blue Economy (peaking around 15) represent emerging, albeit lower-volume, areas of digital interest.

### 2.2. Variable Definition

The Relative Search Interest Index, normalized by Google Trends in the range of 0–100, was used in the study. This index represents the relative search intensity for the term in question during the relevant period. A value of 100 indicates the highest relative search volume within the given time interval, whereas 0 indicates either no data or a negligible search volume.

### 2.3. Data PreProcessing

In the Google Trends output, the “<1” expressions representing periods with very low search volumes were recoded as 0.5 in order to ensure the series remained continuous and statistically processable. This proxy-value approach is a recognized practice in Google Trends-based research to preserve the presence of very low search observations without artificially inflating the series or introducing zero-

value bias into the forecasting algorithm. The series were then transferred into Microsoft Excel, plotted, and arranged for forecasting procedures.

#### **2.4. Time Series Forecasting Method**

Forecasts were generated using the Exponential Triple Smoothing (ETS) algorithm, which provides high accuracy in decomposing complex trend and seasonality components in time series analyses. The analyses were carried out in Microsoft Excel (Forecast Sheet), which incorporates this algorithm.

Specifically, the built-in forecasting engine in Excel utilizes an additive ETS framework, which simultaneously incorporates additive error, additive trend, and additive seasonality components. This additive structure is particularly suitable for the dataset used in this study, as the absolute variations in the search indices and the structure of seasonal fluctuations remain relatively stable over the analyzed 10-year period. Therefore, forecast values for the period 2026-early 2027 were obtained for each concept using Excel's automatic ETS optimization procedure. Given the monthly frequency of the data, the seasonal period was set to 12, and the ETS routine internally selected and optimized the smoothing parameters for the level, trend, and seasonal components by minimizing forecast errors. In its general form, the ETS algorithm is based on a structure that simultaneously models the series level ( $L_t$ ), trend component ( $T_t$ ), and seasonal effects ( $S_t$ ), together with the error term, and calculates the forecast value ( $Y_{t+h}$ ) for  $h$  steps ahead.

The ETS framework was specifically selected over alternative time-series models, such as ARIMA, due to its superior performance in capturing dynamic, non-linear trend components typical of tourism-related digital search data. While ARIMA heavily relies on stationarity assumptions, ETS directly models the structural components of the series through exponential smoothing, making it highly robust for medium-term forecasting. Furthermore, instead of manual parameter tuning, Excel's ETS algorithm automatically optimizes smoothing parameters through internal error minimization procedures. This automated optimization process selects the most appropriate smoothing constants for the level, trend, and seasonal components of the series, thereby reducing potential researcher bias and ensuring a statistically consistent forecasting process.

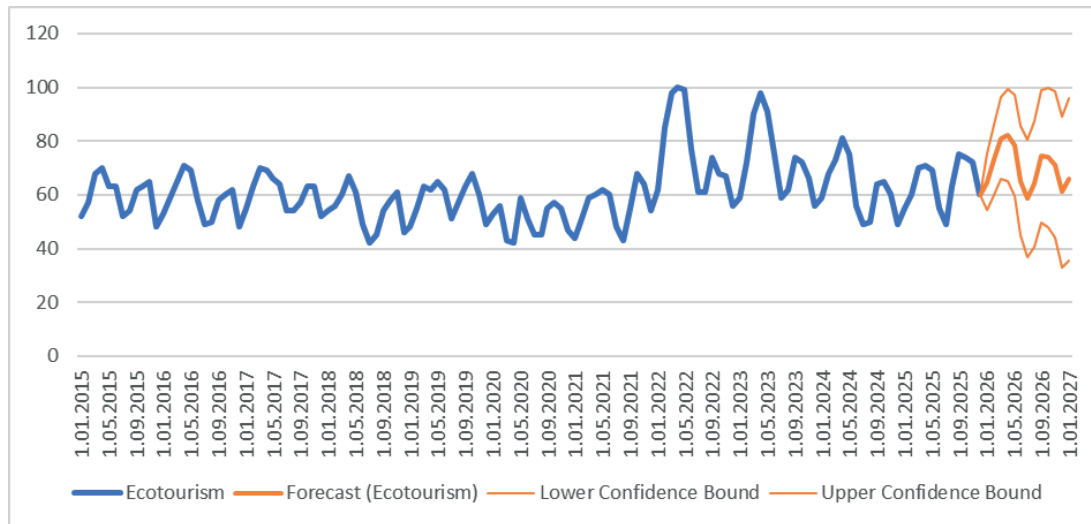
#### **2.5. Confidence Intervals and Visualization**

In addition to point forecasts for each series, upper and lower confidence intervals at the 95% confidence level were calculated using Excel's Forecast Sheet tool. The forecast series and their associated confidence intervals are presented in the figures in the study as "Forecast", "Lower Confidence Bound", and "Upper Confidence Bound". In this way, the projections can be interpreted not only as point estimates but also in a manner that incorporates the margin of uncertainty.

### **3.RESULTS**

#### **3.1. Digital Interest in the Concept of Ecotourism and Future Projection**

The time series analysis showing the global digital footprints and future trends of the concept of ecotourism is presented in Figure 1. The findings obtained from Google Trends data indicate that the time series covering the years 2015–2025 can be examined in three different periods in terms of its characteristic features.

**Figure 1.** Global Search Volume and Future Forecast for the Concept of Ecotourism (2015–2027)

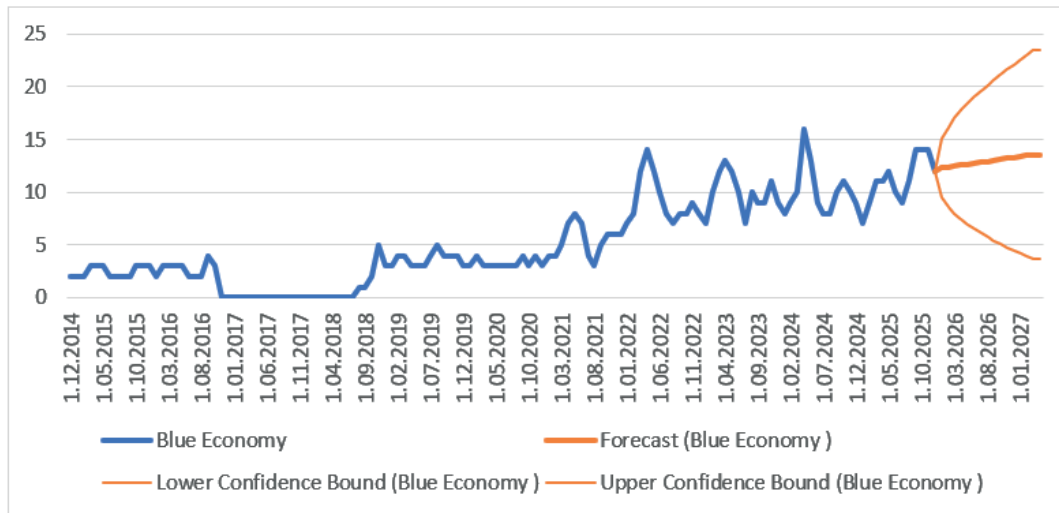
**First period (2015–2019):** It is observed that the search volume for ecotourism moves within a certain band range (40–70 index points) and is under a strong seasonality effect. In this period, the data exhibited regular increases and decreases in parallel with the tourism season, without any structural break. This situation confirms that ecotourism had a niche but stable market structure in the pre-pandemic period.

**Second period (2020–2024):** This period indicates a structural transformation. In the first half of 2020, due to the halt in global mobility caused by the pandemic, an expected contraction in search volume occurred. However, the most striking finding is the upward momentum that started after 2021 and reached its historical peak at 100 index points in 2022. This sharp increase serves as a strong digital indicator that, in the post-pandemic period, consumer interest may have shifted from crowded mass tourism toward isolated, nature-oriented, and sustainable options. Although the index retreated somewhat from the 100 level in 2023 and 2024, it managed to hold at a high base that is well above the pre-pandemic averages (2015–2019).

**Third period and Future Projection (2025–2027):** The forecast model produced using the ETS (Error, Trend, Seasonality) algorithm predicts that **digital** interest in ecotourism will remain vibrant. The forecast curve (orange line) shows that seasonal fluctuations will continue and that search interest will consolidate in an average band of 60–85 index points, which is clearly higher than the pre-pandemic 2015–2019 baseline. The widening of the lower and upper confidence intervals (thin orange lines) over time in the graph is a natural consequence of statistical uncertainty in long-term forecasts; nevertheless, the model suggests that ecotourism will maintain a robust and structurally elevated level of digital interest in the medium term.

### 3.2. Digital Interest in the Concept of Blue Economy and Future Projection

The time series analysis showing the global level of awareness of the concept of the Blue Economy and the historical development of its digital search volume is presented in Figure 2. Unlike the ecotourism data, the development of digital interest in the Blue Economy displays a threestage growth trend shaped more by conjunctural developments than by seasonality.

**Figure 2.** Global Search Volume and Future Forecast for the Concept of Blue Economy (2015–2027)

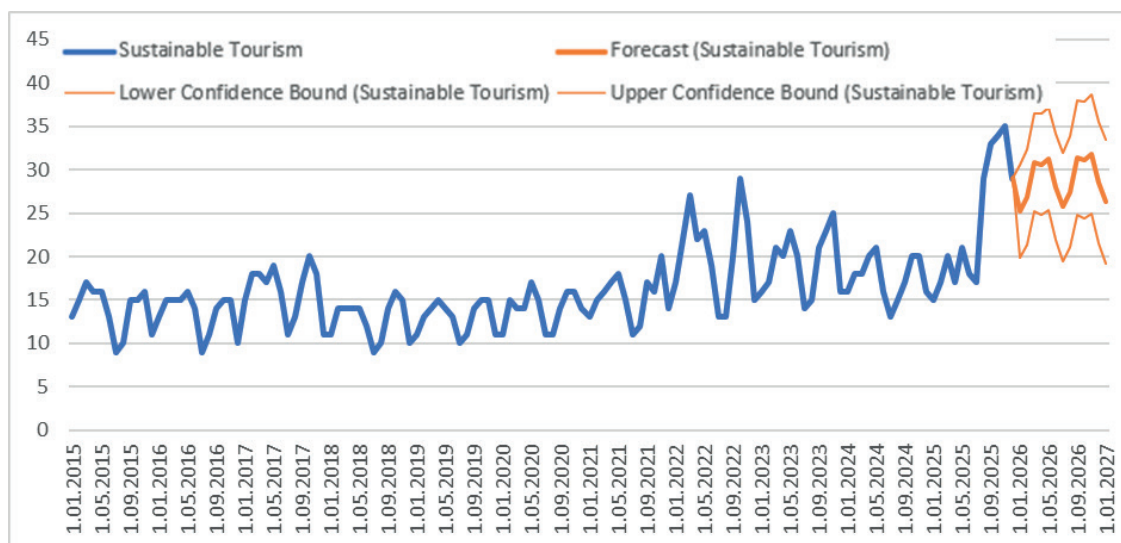
**First period (2015–2018):** In this period, which can be described as the “Incubation Period”, the search volume followed an extremely low and flat course (0–3 index points). In this phase, the blue economy appears as a niche concept that had not yet attracted the attention of the general public and was discussed only within certain academic and technical circles.

**Second period (2019–2024):** As of 2019, a significant structural break occurred in the series, and a strong upward momentum began. The index values first exceeded the level of 5, then 10, and approached 15 in the 2022–2024 period; trend shows the concept has assumed a central position on the international sustainability agenda (for example, through initiatives such as the EU Green Deal and the UN Decade of Ocean Science). The fluctuating pattern of this rise in the graph indicates that interest is triggered by external events such as global summits, environmental reports, and policy announcements, rather than by seasonal holiday plans.

**Third period and Future Projection (2025–2027):** The sharp peak observed in the last part of the series (end of 2024 – beginning of 2025) indicates that digital search interest has reached its highest level within the analyzed timeframe. The 2026–2027 projection generated by the ETS algorithm predicts that this interest will not disappear; on the contrary, it will stabilize at an elevated plateau compared to the pre-2019 period, maintaining average values in the band of 12–14 index points. The most critical finding in the forecast graph is that the upper confidence bound (the thin orange line at the top) rises rapidly. This indicates that the Blue Economy has the potential to become much more popular in the future than it is today, but that this growth contains high volatility (uncertainty) depending on global policies and economic developments.

### 3.3. Digital Interest in the Concept of Sustainable Tourism and Future Projection

The change in the global search volume of the concept of Sustainable Tourism and its future projection are presented in Figure 3.

**Figure 3.** Global Search Volume and Future Forecast for the Concept of Sustainable Tourism (2015–2027)

Unlike other forms of tourism, the data on Sustainable Tourism reflect a gradual and cumulative increase in awareness rather than a pattern of periodic popularity.

**First period (2015–2019):** In the first half of the analyzed period, the index remained within the 10–20 point range, drawing a low-intensity yet balanced trajectory. In this period, the concept appears to be confined to academic circles and small-scale sectoral areas of expertise, rather than having become a broader social trend.

**Second period (2020–2025):** In the post-pandemic period, sustainable tourism has gained significant traction, reflecting a growing societal prioritization. The upward trend that started in 2021 reached 35 index points at the end of 2024 and the beginning of 2025, testing the highest level in the series. This sharp increase can be interpreted as a digital reflection of growing awareness of the climate crisis, green deals, and changing consumer behaviors (responsible travel). The upward momentum in the graph **suggests** that the concept has now moved toward the center of the “mainstream” tourism literature and market.

**Future Projection (2026–2027):** The forecasts produced by the ETS model indicate that digital interest in Sustainable Tourism is not a temporary fad. The forecast curve predicts that interest will remain at a high plateau within the 25–35 index band throughout 2026 and 2027. In contrast to the widening uncertainty band in the Blue Economy graph, it is noteworthy here that the lower and upper confidence bounds (thin orange lines) move close to and parallel with the forecast line. This narrow confidence interval statistically supports the conclusion that the future trajectory of Sustainable Tourism is highly predictable and that the concept has attained an increasingly institutionalized demand structure in the sector.

### 3.4. Comparative Evaluation and Synthesis of the Concepts

When the historical trajectories and future projections of the three analyzed concepts are evaluated together, a clear hierarchy and structural differentiation emerge in terms of digital interest levels and market maturities.

**In Terms of Volume and Maturity Level:** Throughout the period examined, ecotourism has a higher and more established search volume compared to the other two concepts. This can be explained by the

fact that ecotourism is a more wellknown and established holiday preference at the consumer level (B2C). Sustainable Tourism, on the other hand, exhibits a mediumlevel yet steady growth, reflecting the transformation from a niche market into a mainstream preference. In contrast, while the Blue Economy had the lowest visibility at the beginning of the period, it draws attention with the most dynamic upward momentum it achieved after 2018. This behavior of the Blue Economy is associated with the concept being brought onto the agenda more intensively in recent years by global policymakers and international organizations (B2G/B2B).

**In Terms of Predictability and Risk Analysis:** The confidence intervals in the future forecasting models provide important clues regarding the structural characteristics of the concepts.

- Compared to the Blue Economy, Sustainable Tourism and Ecotourism have relatively narrower and more consistent confidence bands around the forecast curve. This statistical outlook suggests that both concepts represent trends that are becoming increasingly institutionalized in the Tourism literature and market, approaching a saturation point and exhibiting higher predictability.
- Conversely, the funnelshaped widening (high variance) of the confidence intervals in the Blue Economy projections indicates that the concept is still in its development phase. This wide range suggests that future interest in the Blue Economy will be highly sensitive (elastic) to external shocks and macrolevel changes such as international agreements, environmental policies, and economic conditions.

## 4. DISCUSSION

This study analyzes the digital footprints of ecotourism, sustainable tourism, and the blue economy—concepts that are elements of sustainable development—to reveal their place in societal perception and future projections. Overall, the findings suggest, although all three concepts exhibit a rising digital trajectory, the underlying motivations behind this interest appear to differ substantially between consumer-led awareness and policy-driven strategic agendas.

### 4.1. Consumer-Oriented Trends and the “New Normal” Tourist Profile

According to the analysis results, the concepts of ecotourism and sustainable tourism display a linear upward trend and a clear seasonality. This **suggests** that these concepts have moved beyond being merely academic terms and **are increasingly aligning with** established consumer behaviors. The recent study by Kavak and Can (2025) emphasizes that, in the post-pandemic period, individuals’ heightened perception of climate change **strongly influences** their intentions toward ecotourism. This theoretically supports the stable upward trend **indicated by** our 2027 projections (Figure 1). Such a shift is consistent with the evolving definition of ecotourism as a mainstream preference for nature-based responsible travel (Donohoe & Needham, 2006).

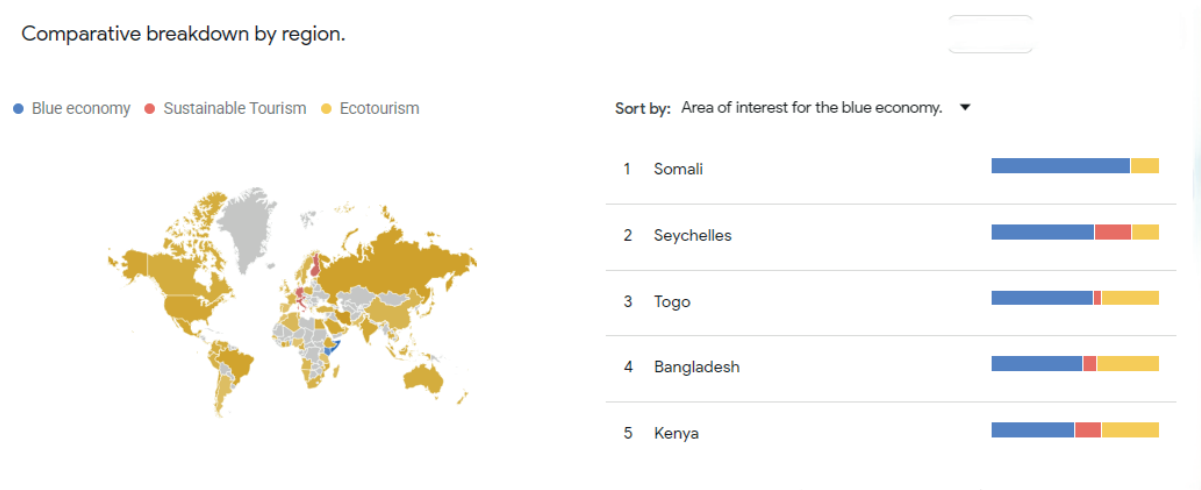
However, this increase in digital interest also brings with it the risk, expressed by Evren et al. (2019), of “sustainability turning into a marketing slogan.” A critical challenge identified in sustainable hospitality is the so-called intention–behaviour gap (Khan et al., 2024). Recent research suggests that while a substantial share of travelers express support for sustainability in principle, this intention does not always translate into actual green bookings, partly due to factors such as perceived relative value and social desirability (Khan et al., 2024; Viglia & Acuti, 2022).

It is considered that the intense interest of consumers in digital platforms may, in some cases, be directed more toward the popular image of the concept rather than toward actual sustainability practices on the ground. Therefore, the projected growth in digital interest needs to be interpreted with caution and accompanied by policies and management strategies aimed at narrowing the gap between online awareness and on-site behavioural change.

4.2. Blue Economy: A Policy-Driven and Fragile Structure

In contrast to ecotourism, the Blue Economy exhibits a more volatile structure in our analyses and is highly sensitive to external shocks. This finding suggests that the Blue Economy has not yet been fully internalized by the broader public and is progressing more as a “topdown” policy agenda focused on ocean ecosystem health and sustainable economic growth (Hanafiah, 2022; Lubchenco & Haugan, 2023).

**Figure 4.** Regional Distribution of Global Digital Interest in the Concepts and Comparative Country Ranking  
Comparative breakdown by region.



While searches related to Ecotourism and Sustainable Tourism are generally concentrated in developed, tourist-sending countries, digital interest in the Blue Economy peaks in developing coastal states such as Somalia, Seychelles, Togo, Bangladesh, and Kenya (Figure 4). This implies that the Blue Economy is, rather than an individual travel motivation, primarily a strategic development model implemented by states to address poverty reduction and resource management, a role that is particularly emphasized in African policy debates (Okafor-Yarwood et al., 2020; Karani et al., 2022). In similar island and coastal contexts, marine ecotourism is increasingly viewed in policy and development discourses as a potentially important tool for strengthening economic resilience (Kim et al., 2024), which is conceptually consistent with the patterns observed in our digital interest data.

On the other hand, technological integration may potentially mitigate this structural disconnect. Pranita et al. (2023) emphasize that blockchain and digitalization tools can strengthen the link between the Blue Economy and local tourism destinations (such as smart islands) by enhancing transparency. From this perspective, the volatile structure observed in our Blue Economy projections provides a basis for cautiously expecting that, in the future, it may rest on a more stable foundation through datadriven smart governance and egovernment models (Rahman et al., 2023; Ukav, 2024). Nevertheless, the wide confidence intervals around the Blue Economy forecasts underline that such a stabilization process is contingent on the consistency and credibility of these governance reforms.

4.3. Methodological Evaluation and Future Prospects

The combination of Google Trends and the ETS algorithm used in the study is in line with modern forecasting approaches in the tourism literature. Havranek and Zeynalov (2018) demonstrate that digital traces can provide much faster results than traditional statistics in forecasting tourism arrivals and demand. This “nowcasting” capability allows researchers to “predict the present” and immediate future trends with greater agility than lagged official data (Choi & Varian, 2012).

In this context, the upward projections we produced for the year 2027 can be interpreted not only as mathematical outputs but also as leading indicators of the structural transformation that the global

tourism market may undergo along the axis of sustainability. While digital data remains subject to demographic and regional biases, previous evidence of the usefulness of Google Trends for predicting tourism demand at both country and city levels lends support to the suitability of our modeling approach (Önder, 2017; Önder & Gunter, 2016). Even so, the results presented here should be viewed as indicative signals rather than precise forecasts of actual visitor numbers, and they are best interpreted in combination with traditional tourism statistics and survey-based evidence.

#### 4.4. A Synthesized Perspective on Digital Sustainability Trajectories

Beyond the individual trends, the synthesized analysis of ecotourism, sustainable tourism, and the Blue Economy reveals a “dualtrack” evolution in global sustainability awareness. Our 2027 projections suggest that while Ecotourism follows a bottomup, consumerdriven trajectory—rooted in individual lifestyle choices and seasonal preferences—the Blue Economy operates on a topdown, institutional trajectory driven by international policy frameworks (Das, 2023; Lubchenco & Haugan, 2023). The transition of Sustainable Tourism into a “mainstream” digital interest signal indicates that the gap between these two tracks is gradually narrowing. This convergence may imply that by 2027, the global digital audience will increasingly perceive sustainability not as a collection of niche segments but as an integrated economic and ethical imperative (Viglia & Acuti, 2022). Consequently, the high predictability of the ETS model for Ecotourism and Sustainable Tourism, contrasted with the high volatility of the Blue Economy, suggests that the market is maturing at different speeds; however, the overarching direction appears to be positive, pointing toward a digitized and datainformed era of environmental governance supported by tools like blockchain and egovernment (Pranita et al., 2023; Rahman et al., 2023).

### 5. CONCLUSION AND RECOMMENDATIONS

This research has demonstrated that big data mining can be used as a powerful “early warning system” in tourism and development planning. In the light of the 2015–2025 data and the 2027 projections, the results obtained provide the following strategic implications for the future of the sector:

**First**, it is projected that digital interest and potential demand for Sustainable Tourism and Ecotourism will reach historical peaks by 2027. This entails the risk of creating an “overtourism” pressure on sensitive natural areas. While converting this increasing digital interest into physical visitation, destination managers should not focus solely on marketing; they must also implement strict carrying capacity analyses and visitor management plans. Otherwise, the pursuit of sustainability may paradoxically lead to resource degradation.

**Second**, the wide confidence interval (95% CI) in the Blue Economy projections indicates that this field still carries uncertainties for investments. For policymakers, this finding serves as a warning. In order for the Blue Economy not to remain merely a “buzzword” and to transform into a stable sector, there is a need for an ecosystem that is resilient to external shocks, has a clearly defined legal framework, and is supported by robust governance mechanisms.

From a policy perspective, these findings may assist tourism planners and destination managers in monitoring emerging sustainability trends through digital behavioral signals. Integrating such digital indicators into tourism planning may contribute to more adaptive and data-informed sustainability policies.

In conclusion, tourism and development policies are no longer one-dimensional. The future of the sector is evolving into a hybrid structure shaped, on the one hand, by the “Green” axis (Sustainable/ Eco), driven by established consumer demand, and, on the other, by the “Blue” axis (Economy), steered by global policies. It is considered that success in development policies will depend on holistic strategies capable of integrating these two axes.

### 5.1. Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. First, Google Trends provides relative search volumes (a 0-100 index) rather than absolute search numbers, which restricts the ability to determine exact demand quantities. Second, the dataset inherently excludes populations without internet access or those utilizing alternative search engines (e.g., Yandex). Finally, and most importantly, while digital search interest measured via Google Trends is a strong signal indicating consumer awareness and information-seeking behavior, it should not be strictly interpreted as a direct translation into finalized purchasing decisions or actualized tourism demand. Future research is recommended to integrate such digital trace data with actual tourist arrival statistics and primary survey data to establish more definitive causal relationships.

| ETİK BEYAN ve KATKI ORANLARI                                                     |                                                                                              |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Yazar Katkı Oranı:</b><br><br>1. Yazar: %33<br>2. Yazar: %34<br>3. Yazar: %33 | <b>Contribution Rate:</b><br><br>1. Author: 33%<br>2. Author: 34%<br>3. Author: 33%          |
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## REFERENCES

- Agussalim, Heriningsih, S., & Heriyanto. (2025). Local community participation in sustainable tourism development in Sleman Regency: A human rights approach. *SHS Web of Conferences*, 212, Article 04031. <https://doi.org/10.1051/shsconf/202521204031>
- Arevin, A. T., Semet, M. M., & Syamlal, G. S. (2025). The rise of ecotourism and its contribution to green economic development. *International Journal of Innovation and Thinking*, 2(3), 155–167. <https://doi.org/10.71364/ijit.v2i3.14>
- Choi, H., & Varian, H. (2012). Predicting the present with Google Trends. *Economic Record*, 88, 2–9. <https://doi.org/10.1111/j.1475-4932.2012.00809.x>
- Çoban, M. N., & Ölmez, Ü. (2016). The blue economy and the blue growth. *Turkish Studies*, 12(3), 155–166. <https://doi.org/10.7827/TurkishStudies.11122>
- Das, J. (2023). Blue Economy, blue growth, social squity and small-scale fisheries: A Global and national level review. *Studies in Social Science Research*, 4(1). <https://doi.org/10.22158/sssr.v4n1p38>
- Dergiades, T., Mavragani, E., & Pan, B. (2018). Google Trends and tourists' arrivals: Emerging biases and proposed corrections. *Tourism Management*, 66, 108–120. <https://doi.org/10.1016/j.tourman.2017.10.014>
- Donohoe, H. M., & Needham, R. D. (2006). Ecotourism: The evolving contemporary definition. *Journal of Ecotourism*, 5(3), 192–210. <https://doi.org/10.2167/joe152.0>
- Evren, S., Şimşek Evren, E., Çakıcı, A. C., & Çakır, O. (2019). Sürdürülebilir Turizm Gerçekten Sürdürülebilir Mi?: Sürdürülebilir Turizme Yönelik Eleştirel Değerlendirmeler. *Gümüşhane Üniversitesi Sosyal Bilimler Enstitüsü Elektronik Dergisi*, 10(Ek Sayı), 211–220.
- Hanafiah, M. H. (2022). Framing the future agenda of blue tourism in sustainable coastal tourism destinations. *Tourism and Hospitality Management*, 28(2), 465–470. <https://doi.org/10.20867/thm.28.2.6>
- Havranek, T., & Zeynalov, A. (2018). Forecasting Tourist Arrivals with Google Trends and Mixed Frequency Data. ZBW- Leibniz Information Centre for Economics. <https://hdl.handle.net/10419/187420>
- Hutajulu, H. (2025). Blue economy and ocean sustainability: A bibliometric review of global research. *The Es Economics and Entrepreneurship*, 3(3), 302–316. <https://doi.org/10.58812/esee.v3i03>
- Karani, P., Failler, P., Gilau, A. M., Ndende, M., & Diop, S. T. (2022). Africa Blue Economy strategies integrated in planning to achieve sustainable development at national and regional economic communities (RECS). *Journal of Sustainability Research*, 4(3), e220011. <https://doi.org/10.20900/jsr20220011>
- Kavak, M., & Can, I. I. (2025). Post-Pandemic Ecotourism Intentions and Climate Change Perceptions: The Role of Personality Domains. *Sustainability*, 17(1), 7320. <https://doi.org/10.3390/su17167320>
- Khan, N., Acuti, D., Lemarié, L., & Viglia, G. (2024). The intention-behaviour gap in sustainable hospitality: a critical literature review. *International Journal of Contemporary Hospitality Management*, 36(5), 1627–1646. <https://doi.org/10.1108/ijchm-06-2023-0840>
- Kim, A., Scott, C. P., & Swartz, W. (2024). Local perspectives on marine ecotourism development in a water-insecure island region: the case of Bocas del Toro, Panama. *Frontiers in Marine Science*, 11:1377053. <https://doi.org/10.3389/fmars.2024.1377053>
- Lubchenco, J., & Haugan, P. M. (2023). The Blue Compendium. From Knowledge to Action for a Sustainable Ocean Economy. <https://doi.org/10.1007/978-3-031-16277-0>
- Okafor-Yarwood, I., Kadagi, N. I., Miranda, N. A. F., Uku, J., Elegbede, I. O., & Adewumi, I. J. (2020). The Blue Economy-Cultural Livelihood-Ecosystem Conservation Triangle. The African Experience. *Frontiers in Marine Science*, 7, 586. <https://doi.org/10.3389/fmars.2020.00586>
- Önder, İ. (2017). Forecasting tourism demand with Google trends: Accuracy comparison of countries versus cities. *International Journal of Tourism Research*. 19:648–660 <https://doi.org/10.1002/jtr.2137>
- Önder, İ., & Gunter, U. (2016). Forecasting Tourism Demand with Google Trends For a Major European City Destination. *Tourism Analysis*, 21(2), 203. <https://doi.org/10.3727/108354216x14559233984773>
- Pisarović, A., Janković, M., & Tišma, S. (2025). Sustainable tourism for blue growth. *Athens Journal of Tourism*, 12(2),

169–188. <https://doi.org/10.30958/ajt.12-2-4>

Pranita, D., Sarjana, S., Musthofa, B. M., Kusumastuti, H., & Rasul, M. S. (2023). Blockchain technology to enhance integrated blue economy: A case study in strengthening sustainable tourism on smart islands. *Sustainability*, 15(6), 5342. <https://doi.org/10.3390/su15065342>

Rahman, A., Mawar, M., & Hermanto, A. (2023). Optimalization the Blue Economy Policy of the Tourism Sector using E-Government in the Coastal Area of Ambon Island. *E3S Web of Conferences*, 440, 6004. <https://doi.org/10.1051/e3sconf/202344006004>

Suluk, S. (2022). Ekonominin renkleri: Sürdürülebilir mavi ekonomi bağlamında Türkiye'nin değerlendirilmesi. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, 74, 132–150. <https://doi.org/10.51290/dpusbe.1123257>

Ukav, İ., (2024). *Dijital Dönüşüm ve Turizm Ekonomisi*. Dijital Dönüşüm: Geleceği Şekillendiren Güç, (Editör : Özaktaş, F.D., Narin, M.), Eğitim Yayınevi Konya, E-ISBN: 978-625-5997-74-6, s295-310.

Viglia, G., & Acuti, D. (2022). How to overcome the intention–behavior gap in sustainable tourism: Tourism Agenda 2030 perspective article. *Tourism Review*, 78(2), 321-325. <https://doi.org/10.1108/tr-07-2022-0326>

# ***BLUE ECONOMY, ECOTOURISM, AND SUSTAINABLE TOURISM: A 10-YEAR GLOBAL DIGITAL INTEREST ANALYSIS AND FORECASTING VIA ETS MODEL***

## **Extended Abstract**

This study examines the evolution and future trajectory of global digital interest in Ecotourism, Sustainable Tourism, and the Blue Economy, three interrelated concepts central to contemporary sustainable development debates. Motivated by escalating environmental degradation and shifting consumer and policy priorities, the research aims to determine how societal awareness of these concepts has evolved over the past decade and how it is likely to develop in the near future. Using Google Trends topic-based monthly data at the global level for the period 2015–2025, the study applies a quantitative time-series forecasting approach. Relative Search Interest indices (0–100) are analyzed separately for each concept, ensuring cross-language comparability. Future projections for 2026–2027 are generated using the Error, Trend, Seasonality (ETS) model implemented in Microsoft Excel, allowing for the decomposition of trend and seasonality components and the calculation of 95% confidence intervals. The findings reveal distinct structural patterns across the three concepts. Ecotourism exhibits the highest and most mature level of digital interest, characterized by strong seasonality and a stable upward trend. Following a temporary decline during the early phase of the COVID-19 pandemic, interest surged sharply after 2021, reaching a historical peak in 2022. Forecasts suggest that ecotourism will maintain high and stable demand levels through 2027, indicating its consolidation as an established consumer-oriented tourism preference. Sustainable Tourism demonstrates a more gradual but consistent increase in digital interest over the study period. Unlike ecotourism, its trajectory shows limited seasonality and reflects cumulative awareness rather than cyclical popularity. Post-pandemic growth signals a shift from niche academic discourse to mainstream adoption, with forecasts indicating a stable and highly predictable demand structure in the coming years. In contrast, the Blue Economy displays a fundamentally different pattern. Digital interest remained minimal until 2018, followed by a marked upward shift driven largely by international policy initiatives and global sustainability agendas. The absence of strong seasonality and the presence of wide forecast confidence intervals indicate a policy-driven and volatile structure, suggesting that future interest will be highly sensitive to macroeconomic conditions, international agreements, and governance frameworks. Comparative analysis highlights a clear hierarchy in terms of maturity and predictability. Ecotourism and Sustainable Tourism appear as institutionalized, consumer-facing trends with relatively low forecasting risk, whereas the Blue Economy remains an emerging and uncertain development paradigm. Overall, the study demonstrates that digital trace data can serve as an effective early indicator of structural transformation in tourism and development policies, emphasizing the need for integrated strategies that align consumer-driven “green” demand with policy-led “blue” economic initiatives.

**Keywords:** Blue Economy, Sustainable Tourism, Ecotourism, Google Trends, ETS Model, Future Projection.

**JEL Classification Codes:** Z32 – Q01 – C53