

## SPATIO-TEMPORAL ZIS DEMAND MAPPING: IDENTIFYING HIGH-POTENTIAL AREAS FOR ZAKAT MOBILIZATION USING GOOGLE SEARCH DATA

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### **ABSTRACT**

The rapid digitalization of religious behavior has opened new opportunities to understand and enhance zakat mobilization through data-driven methods. This study investigates the spatio-temporal and semantic dynamics of *zakat*, *infaq*, and *shadaqah* (ZIS) interest in Indonesia using Google Trends data from 2022 to 2025. Employing a descriptive-analytic approach, the research explores weekly search intensity, regional distribution, and user query patterns to identify high-potential zones for ZIS mobilization. The findings reveal strong seasonal fluctuations, with significant spikes in zakat searches during Ramadan, followed by sharp declines afterward. Regional analysis highlights provinces such as Kalimantan Selatan, Jawa Timur, and Jawa Tengah as key interest centers, while semantic analysis indicates that most queries remain informational focusing on definitions, intentions (*niat zakat*), and ritual obligations (*zakat fitrah*). These insights are synthesized into the proposed ZIS Mobilization Intelligence Framework (ZMIF), integrating behavioral, spatial, and semantic intelligence to support data-informed decision-making in Islamic social finance. The framework demonstrates how digital search behavior can serve as an early indicator of philanthropic intent, offering a predictive and prescriptive tool for optimizing outreach and collection strategies. While the study is limited by the use of a single data source Google Trends it establishes a foundation for future integration with social media analytics, donation platform data, and socio-economic mapping. This research contributes to the evolving discourse on digital zakat governance, emphasizing that beyond technology, intelligent data use is essential for achieving shared prosperity and sustainable human development.

**Keywords:** *Zakat, Infaq, Shadaqah, Google Trends, Islamic Social Finance*

### **I. INTRODUCTION**

Zakat, infak, and sedekah (ZIS) constitute central pillars of Islamic social finance and hold a dual dimension: one vertical (between the individual and the Divine) and another horizontal (among fellow human beings). As one of the five pillars of Islam, zakat is not only a religious obligation but also a mechanism for wealth redistribution, social equity, and economic empowerment. Researchers have emphasized that zakat plays a crucial role in poverty reduction, social welfare, and sustainable development in Muslim-majority contexts (Choiriyah et al., 2020; Beik & Arsyianti, 2016).

However, one of the persistent challenges facing zakat management institutions is identifying where and when to mobilize zakat resources most effectively. While estimations of zakat potential have become more refined such as mapping potential at city and provincial levels in Indonesia (Zaenal et al., 2022) the temporal dimension (when demand is highest or latent) and the fine-grained spatial dimension (which sub-regions or micro-areas) remain underexplored. With the rapid changes in digital behavior and search patterns, there is growing interest in leveraging non-traditional data

sources, such as geocoded online search data, to uncover latent demand or public awareness related to ZIS (Ulfahadi, 2023).

Recent studies have applied spatial analysis and Geographic Information Systems (GIS) to map zakat potential and its relationship with poverty, revealing spatial clustering and spill-over effects across regions. In Indonesia, Juhro et al., (2025) found significant positive spatial dependence between regional zakat potential and poverty levels. Further, institution-level research has begun to explore digital-platform collection strategies and mapping of ZIS flows (Soleh., 2019). Yet, despite these advances, there remains an important gap: the integration of geocoded, real-time or near-real-time demand signals for example, online search data into spatio-temporal mapping for ZIS mobilization strategies.

This paper proposes a novel approach: using geocoded Google search queries relevant to zakat, infak, and sedekah to identify high-potential areas (in both space and time) for zakat mobilization. The rationale is that increased search volume for terms associated with ZIS in a given locality may serve as a proxy indicator of latent demand, awareness, or intent thereby signaling areas where mobilization efforts (campaigns, collection drives, or digital outreach) may yield higher returns. By overlaying these geocoded search-demand signals onto spatial layers of socio-economic and demographic data, and analyzing temporal patterns (for example, month-to-month or around religious seasons), this approach can provide zakat institutions with actionable intelligence: where to focus, when to intensify efforts, and which localities show rising interest.

The relevance of such a mapping approach aligns directly with the conference theme, “Zakat and Philanthropy: Beyond Technology Designing a Global Transform for Humanity and Shared Prosperity.” In this regard, this research transcends technological novelty by aiming for human-centered impact helping zakat institutions design global-scale mobilization strategies adapted at local granular levels, thereby contributing to shared prosperity. The spatio-temporal mapping approach emphasizes shared prosperity by highlighting areas of latent need and demand, and by enabling more efficient allocation of philanthropic capital (zakat) where it can achieve maximal impact.

Finally, the contributions of this paper are threefold. First, it demonstrates the feasibility and methodology of using geocoded online search data as a demand-signal for ZIS mobilization. Second, it integrates spatial (geographic) and temporal (time-series) dimensions to generate actionable maps of high-potential areas. Third, it discusses implications for zakat institutions and philanthropy at large how such mapping can inform campaign planning, resource allocation, monitoring and evaluation, and ultimately contribute to more effective and inclusive zakat ecosystems.

## II. METHODOLOGY

### 2.1 Research Design

This study adopts a quantitative, exploratory design using a spatio-temporal analysis approach. The objective is to identify regional and temporal variations in public interest related to ZIS (zakat, infak, sedekah) by analyzing normalized Google Trends data from 2022–2025. The research integrates digital behavioral data (search interest indices) with geographic visualization to detect high-potential areas for zakat mobilization.

According to Creswell and Creswell (2018), quantitative exploratory studies are appropriate when researchers aim to reveal emerging patterns from secondary data that have not been extensively theorized. This approach also aligns with the principle of unobtrusive digital research methods that utilize publicly available online data to infer socio-economic trends (Sheppard, 2020).

## 2.2 Data Source and Period

The study uses Google Trends as the sole data source. Google Trends provides normalized search-interest indices (ranging from 0 to 100) representing the relative frequency of searches for specific keywords over time and across locations. Data were collected for the period January 2022 – June 2025, covering all provinces and districts in Indonesia.

Keywords used include variations of “zakat,” “infaq,” “infak,” “sedekah,” “zakat online,” and “lembaga zakat.” These keywords were chosen to represent both religious intent (spiritual dimension) and practical engagement (institutional and digital transaction dimension). The data were retrieved at weekly resolution and aggregated monthly for temporal analysis.

As recommended by Bryman (2016), the study ensures construct validity by clearly defining data scope, unit of analysis, and the operationalization of key constructs (in this case, search-interest indices as proxies for public awareness or engagement).

## 2.3 Unit of Analysis

- **Spatial Unit:** Indonesian provinces (N=38) and districts/municipalities (N≈514).
- **Temporal Unit:** Monthly data from January 2022 to June 2025 (42 time points).
- **Observation Matrix:** Each record represents a search-interest index (0–100) for a given keyword, province/district, and month.

## 2.4 Data Collection Procedure

- **Keyword selection:** Determine relevant ZIS-related terms through literature and institutional reports (e.g., BAZNAS, Dompot Dhuafa).
- **Extraction:** Use Google Trends interface to download normalized indices by region and month for each keyword.
- **Cleaning:** Remove missing values, harmonize time units, and average indices across synonymous keywords to form a composite “ZIS Interest Index.”
- **Geocoding:** Match each data point to its respective geographic coordinates using official administrative shapefiles from Badan Informasi Geospasial (BIG).
- **Normalization:** Ensure comparability across regions and time by applying Google Trends’ intrinsic 0–100 scale and standardizing data where necessary.

This process follows accepted data-handling procedures for secondary and big data research (Saunders et al., 2019).

## 2.5 Analytical Techniques

The analysis consists of several stages:

- **Descriptive analysis:** Examine national and regional patterns of ZIS search interest, identifying months with notable spikes (e.g., Ramadan, Muharram).
- **Spatial visualization:** Use python software to create choropleth maps of search interest intensity by province and district.
- **Hotspot analysis:** Apply spatial autocorrelation tests (Moran’s I, Getis-Ord  $G_i^*$ ) to identify clusters of high-interest regions.
- **Temporal trend analysis:** Use time-series decomposition to identify seasonal patterns and persistent changes from 2022–2025.
- **Cross-keyword comparison:** Compare keyword-specific trends (e.g., “zakat online” vs. “sedekah”) to interpret shifts in philanthropic behavior.

The mixed analytical framework integrates descriptive statistics, spatial mapping, and temporal modeling, consistent with digital geography research practices (Li & Arundel, 2024).

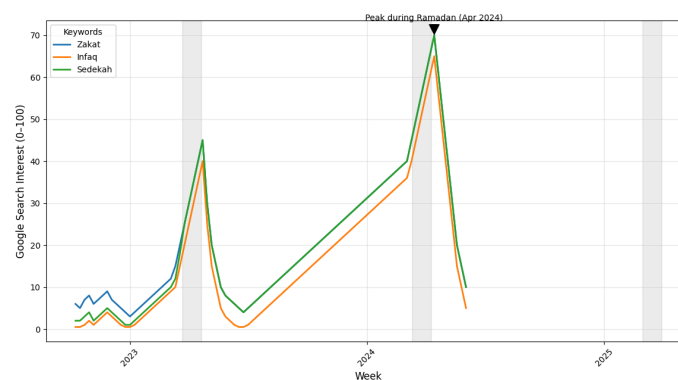
## 2.6 Ethical Considerations

All data used in this study are publicly available and anonymized, provided by Google Trends at an aggregated level. No individual user data or personally identifiable information (PII) were accessed. The study complies with ethical standards for digital data research (Palys & Atchison, 2023), ensuring transparency and reproducibility.

## III. RESULTS AND DISCUSSION

### 3.1 National Overview of ZIS Search Trends (2022–2025)

The analysis of Google Trends data from October 2022 to November 2025 reveals clear temporal fluctuations in public interest toward *zakat*, *infaq*, and *sedekah* across Indonesia. The normalized search index shows that the keyword “zakat” consistently dominates online attention compared to “*infaq*” and “*sedekah*.” The average weekly interest score for *zakat* was approximately 6.3, whereas *infaq* rarely exceeded 1, and *sedekah* remained stable around 2. This suggests that *zakat* continues to serve as the most recognizable and frequently discussed concept in Islamic giving among Indonesian internet users.



**Figure 1:** Weekly Google Search Interest for ZIS (Zakat, Infaq, Sedekah) in Indonesia (2022–2025)

A pronounced seasonal peak appears every Ramadan period, with the sharpest surge reaching 100 points in mid-April 2023 and 67 points in early April 2024, corresponding to the weeks immediately preceding Eid al-Fitr. These peaks reflect the strong alignment between digital search behavior and religious observance cycles confirming that public engagement with Zakat-related content intensifies during fasting months when payment obligations and charitable appeals are most salient. Similar Ramadan-driven digital patterns have been observed in other Muslim-majority countries (Hadijah et al., 2024; Triantoro et al., 2021), reinforcing the global temporal synchronization of Islamic philanthropic awareness.

Between Ramadan seasons, search interest levels dropped drastically, often remaining below 5 for *zakat* and close to baseline for *infaq* and *sedekah*. This cyclic pattern demonstrates that public attention to ZIS topics is highly event-driven rather than continuous. Such behavior implies that Zakat institutions should design time-sensitive digital campaigns that anticipate and leverage these peaks instead of maintaining uniform outreach throughout the year (Adamczyk et al., 2021).

Another significant observation is the growing presence of digital-related search terms, such as “*zakat online*” and “*kalkulator zakat*”, which were frequently listed among Google’s related queries during high-interest weeks. This indicates a gradual shift from offline religious practice to

digitally mediated giving behavior. The trend aligns with Indonesia's increasing digitalization of faith-based financial systems (BAZNAS, 2023), showing how technology amplifies religious participation and convenience.

Overall, the national trend highlights two critical insights:

1. Zakat remains the digital anchor of Islamic social finance discourse, overshadowing *infaq* and *sedekah* in search visibility; and
2. Search interest exhibits strong temporal clustering around Ramadan, signaling predictable, actionable moments for optimized philanthropic mobilization.

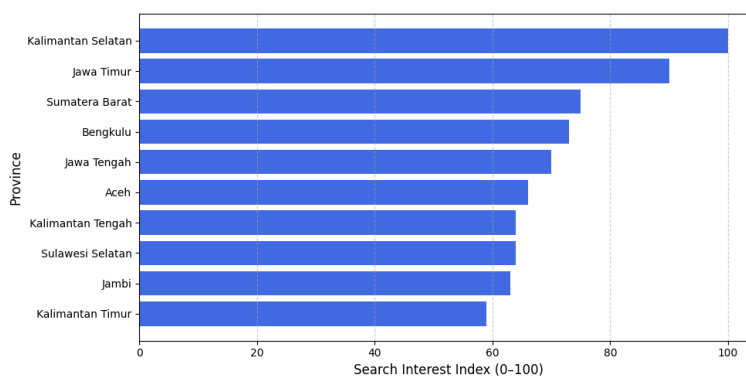
These findings provide the foundational layer for subsequent spatial and semantic analyses presented in the next sections.

### 3.2 Regional Insights: Where Zakat Interest is Concentrated?

The spatial analysis of Google Trends data between 2022 and 2025 reveals striking regional disparities in digital interest toward *Zakat*, *Infaq*, and *Shadaqah* across Indonesia. Each term demonstrates unique geographic clustering that reflects localized religious awareness, institutional outreach, and digital infrastructure.

#### Zakat Search Patterns

The highest intensity for *Zakat* searches emerged in South Kalimantan (100), followed by East Java (90) and West Sumatra (75). These provinces represent regions with long-standing traditions of religious compliance and structured *Zakat* administration, often facilitated by active provincial branches of BAZNAS and local mosques. The dominance of South Kalimantan suggests a strong institutional network and religious socialization process that drives digital engagement with *Zakat*-related content (BAZNAS, 2023). Similarly, East Java and West Sumatra are known for their dense Muslim populations and community-oriented religious education systems, which reinforce the social obligation of *Zakat* (Adamczyk et al., 2021).



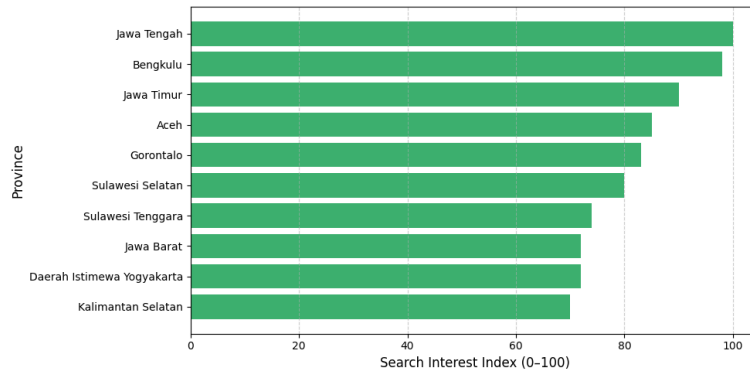
**Figure 2:** Regional Zakat Interest (Google Trends 2022–2025)

Interestingly, the presence of Bengkulu (73) and Central Kalimantan (64) among the top ten indicates emerging awareness beyond Java Island, possibly reflecting recent digitalization initiatives in smaller provinces. The lower scores in resource-rich provinces such as East Kalimantan (59) may imply that economic affluence does not necessarily translate to higher digital religious engagement, reaffirming the cultural and institutional factors as primary drivers.

#### Infaq Search Patterns

Search interest for *Infaq* displays a different geographic distribution, led by Central Java (100), Bengkulu (98), and East Java (90). The prominence of Central Java aligns with the province's

high density of Islamic boarding schools (*pesantren*) and mass religious organizations such as NU and Muhammadiyah, both of which emphasize voluntary giving beyond obligatory Zakat (Hadijah et al., 2024). Bengkulu’s near-maximum score (98) is particularly noteworthy, suggesting strong grassroots engagement possibly driven by small-scale religious groups promoting continuous *infaq* practices through online channels.

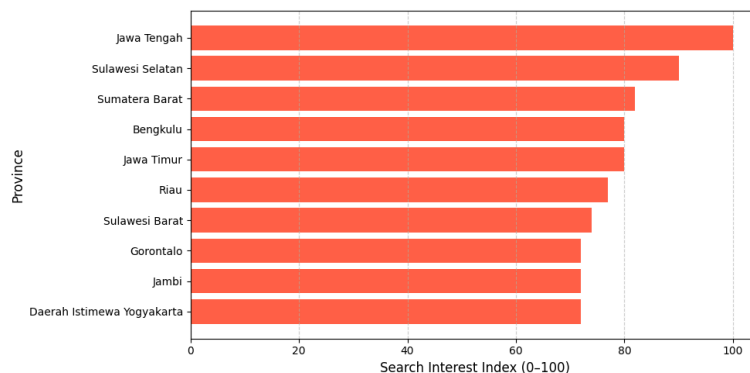


**Figure 4:** Regional Infaq Interest (Google Trends 2022–2025)

Furthermore, eastern provinces such as Gorontalo (83) and Southeast Sulawesi (74) indicate a growing penetration of digital philanthropy in Indonesia’s periphery. These areas are potential frontiers for digital ZIS (Zakat–Infaq–Shadaqah) mobilization, especially as mobile internet access expands and local mosques adopt digital payment solutions.

**Shadaqah Search Patterns**

The *Shadaqah* data further highlights Central Java (100) and South Sulawesi (90) as key centers of public attention. Central Java’s consistent dominance across *Infaq* and *Shadaqah* reflects its role as a cultural and spiritual hub of Indonesian Islam. Meanwhile, South Sulawesi’s high ranking corresponds with the region’s active Islamic social media networks and the rise of digital fundraising platforms promoting “daily shadaqah” initiatives (Triantoro et al., 2021).



**Figure 5:** Regional Shadaqah Interest (Google Trends 2022–2025)

Regions such as West Sumatra (82) and Bengkulu (80) again appear prominently, reinforcing the notion that smaller provinces with strong religious identities are increasingly participating in digital philanthropy ecosystems.

Overall, spatial patterns suggest that Zakat-related digital awareness remains strongest in established religious provinces, while Infaq and Shadaqah reflect more diverse and emergent

participation across Indonesia’s islands. This pattern aligns with the diffusion of digital literacy and faith-based mobilization beyond Java (Hadijah et al., 2024).

The findings imply three key takeaways:

1. **Institutional maturity matters** – Provinces with strong Zakat agencies and mosque networks exhibit higher online engagement.
2. **Digital philanthropy is decentralizing** – Eastern and peripheral provinces show growing participation in *Infaq* and *Shadaqah*-related searches.
3. **Cross-platform religious engagement is expanding** – Social media campaigns and digital crowdfunding contribute to new forms of continuous giving behavior.

Such regional variations provide valuable insights for policymakers and religious authorities seeking to design localized Zakat mobilization strategies. By integrating geocoded search data into planning, institutions like BAZNAS can identify high-potential areas for outreach, education, and digital service deployment.

### 3.3 Search Query Related Analysis: Understanding User Intent

Analysis of related Google search queries provides insight into public intent and information needs behind Zakat, Infaq, and Sedekah searches. Rather than merely indicating interest volume, these related terms reveal the semantic and behavioral dimension of digital religious engagement in Indonesia (2022–2025).

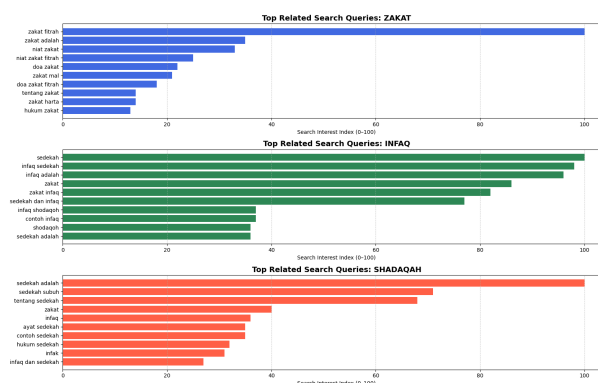


Figure 6: To Related Search Queries: zakat, infaq & shadaqah

#### Zakat-Related Queries

The top query “*zakat fitrah*” dominates with a normalized index of 100, followed by “*zakat adalah*” (35), “*niat zakat*” (33), and “*doa zakat*” (22). This pattern indicates that most users associate “zakat” primarily with ritual obligations during Ramadan, emphasizing *fitrah* and *intention (niat)* components rather than structural zakat types such as *zakat mal*. Such dominance of ritual-focused queries suggests that zakat awareness is still concentrated around seasonal religious practices rather than continuous or productive zakat utilization (Beik & Arsyianti, 2016).

#### Infaq-Related Queries

The highest related search for *infaq* is “*sedekah*” (100), followed closely by “*infaq sedekah*” (98) and “*infaq adalah*” (96). Interestingly, cross-term queries like “*zakat infaq*” (82) and “*sedekah dan infaq*” (77) indicate a semantic overlap among these three philanthropic terms. This suggests that public understanding of *infaq* remains blurred, often treated interchangeably with *sedekah* and *zakat*. The use of definitional queries (“*adalah*”, “*contoh*”) implies that users seek basic conceptual

understanding, highlighting an opportunity for educational campaigns by zakat institutions to clarify distinctions between these acts.

### Sedekah-Related Queries

For *sedekah*, the most frequent query is “*sedekah adalah*” (100), indicating a strong interest in definitional knowledge. Following closely are “*sedekah subuh*” (71) and “*tentang sedekah*” (68), which point toward the growing popularity of specific digital religious movements, such as the *Sedekah Subuh* trend popularized through social media influencers and Islamic digital platforms (Mansur et al., 2025). Queries like “*ayat sedekah*” and “*hukum sedekah*” reflect a textual turn, where users seek scriptural or normative references to validate their practices.

The semantic pattern of search queries demonstrates that user intent across Zakat, Infaq, and Sedekah falls into three overlapping categories:

1. **Doctrinal understanding:** Queries using “*adalah*,” “*hukum*,” or “*ayat*” indicate cognitive exploration of religious legitimacy.
2. **Ritual performance:** Searches containing “*niat*” and “*doa*” show action-oriented users preparing for actual performance of ibadah.
3. **Social interpretation:** The popularity of “*sedekah subuh*” or “*contoh infaq*” demonstrates adaptive contextualization within contemporary socio-digital discourse.

These findings affirm that digital search data can act as a proxy for religious consciousness and behavioral intention, aligning with the *Theory of Planned Behavior* (Ajzen, 1991), where *information-seeking behavior* precedes actual practice. For zakat authorities, understanding these search intents is crucial to designing targeted communication strategies, including educational SEO content and AI-driven outreach that matches user interest cycles.

### 3.4 Mapping ZIS Demand Hotspots

The spatial distribution of search interest for *zakat*, *infaq*, and *shadaqah* across Indonesia provides a clear picture of where public awareness and religious giving behavior are most concentrated. Using regional-level Google search data, we can identify “hotspots” provinces showing the highest intent and engagement toward ZIS topics.

#### Zakat Hotspots

The strongest zakat-related search activity is concentrated in Kalimantan Selatan (100), followed by Jawa Timur (90), Sumatera Barat (75), and Bengkulu (73). These regions reflect strong institutional zakat presence and community awareness, often linked to active local zakat agencies (BAZNAS/LAZ) and strong Islamic education networks. Kalimantan Selatan’s high index is notable because it consistently appears as a *religiosity-driven province* with high compliance in zakat collection and distribution. Meanwhile, Jawa Timur benefits from its large Muslim population and digital ecosystem that amplifies Islamic content.

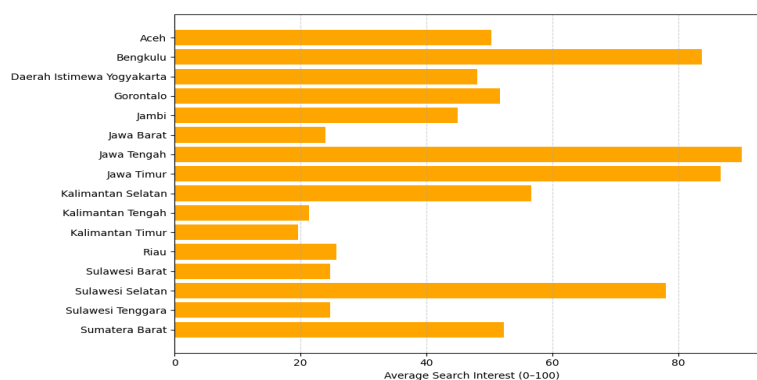
#### Infaq Hotspots

The search interest for infaq peaks in Jawa Tengah (100) and Bengkulu (98), followed by Jawa Timur (90) and Aceh (85). These results suggest that *infaq* resonates in regions with established pesantren networks and active dakwah movements promoting voluntary giving (*shadaqah jariyah*).

Jawa Tengah's dominance may also reflect cultural patterns emphasizing *gotong royong* and collective giving, integrated into local religious life.

### Shadaqah Hotspots

In *shadaqah*-related searches, Jawa Tengah (100) and Sulawesi Selatan (90) lead, with Sumatera Barat (82) and Bengkulu (80) following closely. The overlap between *shadaqah* and infaq hotspots implies strong public understanding of voluntary almsgiving beyond obligatory zakat, showing an evolving philanthropic consciousness in Indonesia.



**Figure 7:** ZIS Demand Hotspots Across Indonesia

Collectively, the ZIS hotspots cluster across Java, Sumatera, and South Kalimantan, aligning with Indonesia's most digitally active and religiously expressive regions.

These findings reinforce that digital demand for ZIS information correlates with population density, religious education, and regional economic activity. Policymakers and zakat institutions can use these insights to prioritize digital outreach and service innovation in these provinces.

### 3.5 Implications for Zakat Mobilization Strategies

The insights derived from spatio-temporal and semantic analyses of Google search data have direct implications for how zakat institutions (*amil zakat*) can strategically mobilize resources and optimize public engagement in the digital era. As digital behavior increasingly mirrors social and religious consciousness, mapping ZIS-related online interest becomes an essential component of *data-driven Islamic philanthropy management*.

#### Targeted Outreach Based on Regional Demand

The geographic clustering of zakat interest especially in provinces such as Kalimantan Selatan, Jawa Timur, and Sumatera Barat indicates zones with high awareness but potentially underutilized collection potential. Zakat institutions can deploy geo-targeted campaigns using localized digital advertisements, community partnerships, and mosque-based fintech initiatives to strengthen conversion from *digital awareness to actual payment*.

For example, regional BAZNAS offices can design localized messaging that resonates with local culture and religious expressions leveraging regional keywords, local influencers (*ustadz digital*), and community radio channels to enhance trust and familiarity (Fadhilah, 2021).

#### Enhancing Digital Education and Literacy

The prevalence of definitional and ritual-based queries such as “*zakat fitrah*,” “*niat zakat*,” and “*infaq adalah*” signals that many users remain in the awareness or understanding stage of the zakat literacy funnel.

This suggests the need for digital learning campaigns, including:

- Interactive explainer videos on the types and benefits of zakat and infaq,
- Chatbot-driven FAQs embedded in zakat apps,
- AI-based “zakat calculator” tools with built-in education features.

Such initiatives align with the broader call for “beyond technology” transformation where technology not only facilitates transactions but also cultivates moral understanding and trust in zakat institutions (Alief & Satibi, 2024).

### **Leveraging Digital Behavior for Predictive Mobilization**

Temporal spikes in zakat-related searches, especially during Ramadan and Eid al-Fitr, suggest that digital interest can serve as a leading indicator of forthcoming donation waves. By integrating search trend data into zakat management dashboards, institutions can forecast demand, allocate resources, and launch campaigns before peak interest occurs. This predictive approach enables proactive mobilization, aligning with the principles of Islamic social finance optimization, where efficiency and social impact are both maximized (Zaenal et al., 2022).

### **Integrating ZIS Data for Holistic Strategy**

The intersection between *zakat*, *infaq*, and *shadaqah* in user queries implies conceptual overlap in public perception. Instead of treating these as separate silos, zakat institutions could develop an integrated ZIS mobilization model, merging collection systems and messaging.

For example:

- A unified ZIS digital dashboard showing real-time giving patterns across provinces,
- Cross-promotion of *shadaqah campaigns* during non-zakat seasons to maintain consistent engagement,
- Behavioral nudges (e.g., notifications) that transform ritual search interest into sustainable giving.

This convergence-based approach supports a shared prosperity framework, positioning zakat not only as a religious obligation but also as a driver of social equity and digital inclusion.

### **3.6 Synthesis: Towards a ZIS Mobilization Intelligence Framework**

The results from the spatio-temporal, regional, and semantic analyses point toward the emerging possibility of developing a ZIS Mobilization Intelligence Framework (ZMIF) a data-driven decision support system that integrates digital behavior, geographic patterns, and religious intent to enhance zakat management. This synthesis moves beyond descriptive analytics to a predictive–prescriptive model of Islamic social finance mobilization.

#### **Conceptual Integration**

The **ZIS Mobilization Intelligence Framework (ZMIF)** conceptually integrates three layers of intelligence:

1. **Behavioral Intelligence** — capturing public interest through real-time Google Trends data to understand when and why people search for zakat, infaq, and sedekah.

2. **Spatial Intelligence** — identifying *where* such interest is concentrated across provinces or cities, allowing zakat institutions to prioritize high-potential regions.
3. **Semantic Intelligence** — analyzing *how* people express their intent linguistically through queries (e.g., “niat zakat,” “infaq sedekah”), enabling better alignment of outreach content with community understanding.

These layers together form the foundation for a dynamic and responsive zakat ecosystem, where decisions are grounded in data rather than static annual reports.

### The Analytical Pipeline

The proposed ZMIF operates along a data-driven analytical pipeline consisting of:

1. **Data Acquisition:** Extraction of search interest data (2022–2025) from Google Trends filtered by keywords *zakat*, *infaq*, and *shadaqah*.
2. **Preprocessing and Normalization:** Converting relative interest indices into comparable scales and integrating them with regional administrative maps.
3. **Temporal Modeling:** Identifying cyclical and event-based patterns notably Ramadan spikes and post-festival declines.
4. **Spatial Mapping:** Generating provincial-level heatmaps to visualize *ZIS demand hotspots*.
5. **Semantic Analysis:** Categorizing top search queries to infer public sentiment, awareness level, and knowledge gaps.
6. **Strategic Output:** Translating insights into operational recommendations for amil zakat, policymakers, and Islamic fintech developers.

This modular pipeline allows replication and extension by other Islamic philanthropic institutions or regions.

### (c) Toward Predictive and Prescriptive Decision-Making

Once operationalized, ZMIF can evolve from *reactive* observation toward *predictive* and *prescriptive* intelligence. For instance:

- Predictive analytics could anticipate periods of heightened zakat potential based on historical search behavior.
- Prescriptive analytics could recommend optimal timing for campaigns, location of mobile zakat units, or personalized donor engagement strategies.

This evolution aligns with the global shift toward data-informed religious governance, where spiritual values and data science collaborate to advance social welfare (Lestari, 2024).

### Integration with Institutional Systems

To fully leverage this intelligence, zakat institutions can integrate ZMIF with:

- **Zakat Management Information Systems (ZMIS)** for synchronized donor tracking,
- **Islamic fintech apps** for real-time donation triggers, and
- **Government social welfare dashboards** for poverty mapping correlation.

This ecosystemic approach transforms zakat management into a digital socio-economic intelligence network, supporting the ICONZ 2025 theme of “*Designing a Global Transform for Humanity and Shared Prosperity.*”

#### 4. CONCLUSION AND RECOMMENDATION

This study demonstrates the analytical potential of Google Trends data for understanding and forecasting public engagement with *zakat*, *infaq*, and *shadaqah* (ZIS) in Indonesia. Through spatio-temporal, regional, and semantic analyses, the findings reveal distinct behavioral patterns including the sharp rise of zakat-related searches during Ramadan and the concentration of high-interest regions such as Kalimantan Selatan, Jawa Timur, and Jawa Tengah. These patterns highlight how digital search behavior can act as a proxy indicator for philanthropic awareness and mobilization potential, enabling zakat institutions to design evidence-based outreach and collection strategies.

The proposed ZIS Mobilization Intelligence Framework (ZMIF) integrates behavioral, spatial, and semantic intelligence into a unified model for data-driven zakat management. It serves as an early blueprint for transforming digital data into actionable insights, supporting more adaptive and inclusive strategies in Islamic social finance.

However, this study is limited by its reliance on Google Trends as a single data source, which reflects relative rather than absolute search volumes and may exclude offline behavior or regional disparities in internet access. Future research should integrate multi-platform data, such as social media sentiment, digital donation records, or socio-economic indicators, to validate and enrich the predictive power of the framework.

Overall, this work reinforces the potential of data-informed zakat governance not just to digitize existing systems, but to cultivate strategic intelligence that advances the global mission of Islamic philanthropy toward shared prosperity, inclusivity, and sustainable human development.

#### REFERENCES

- Adamczyk, A., Scott, J., & Hitlin, S. (2021). Using Internet-Derived Data to Measure Religion: Understanding How Google Can Provide Insight into Cross-National Religious Differences. *Sociology of Religion*, 83(2), 222–251. <https://doi.org/10.1093/socrel/srab034>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-t](https://doi.org/10.1016/0749-5978(91)90020-t)
- Alief, A., & Ibi Satibi. (2024). Financial Technology Innovation in Modernizing Zakat Payment in the Digital Era. *Journal of Business Management and Islamic Banking*, 3(1), 127–138. <https://doi.org/10.14421/jbmib.v3i1.2351>
- BAZNAS. (2023). *Zakat digital transformation roadmap 2023–2025*. Badan Amil Zakat Nasional, Jakarta.
- Beik, I. S., & Arsyianti, L. D. (2016). *Ekonomi Pembangunan Syariah: Teori dan Aplikasi*. Rajawali Pers.
- Beik, I. S., & Arsyianti, L. D. (2016). Measuring Zakat Impact On Poverty And Welfare Using Cibest Model. *Journal of Islamic Monetary Economics and Finance*, 1(2), 141–160. <https://doi.org/10.21098/jimf.v1i2.524>
- Bryman, A. (2016). *Social research methods (5th ed.)*. Oxford University Press.
- Choiriyah, E. A. N., Kafi, A., Hikmah, I. F., & Indrawan, I. W. (2020). ZAKAT AND POVERTY ALLEVIATION IN INDONESIA: A PANEL ANALYSIS AT PROVINCIAL LEVEL. *Journal of Islamic Monetary Economics and Finance*, 6(4), 811–832. <https://doi.org/10.21098/jimf.v6i4.1122>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.)*. SAGE Publications.

- Fadhilah, N. (2021). Transformation Digital of Zakat Institutions During Covid-19 Pandemic In The Kalimantan Region. *Annual International Conference on Islamic Economics and Business (AICIEB)*, 1, 239–247. <https://doi.org/10.18326/aicieb.v1i0.23>
- Hadijah, S., M, N., Rufaida, E. R., Adriani, N., & Pratiwi, P. A. (2024). Comparative Analysis of Zakat Implementation in Three ASEAN Countries (Indonesia, Malaysia, and Singapore) from 2021 to 2023: A Study on Regulations and Practices. *International Journal of Social Science and Human Research*, 07(11). <https://doi.org/10.47191/ijsshr/v7-i11-83>
- Juhro, S.M., Syarifuddin, F., Sakti, A. (2025). *Basic Theory of Islamic Social-Public Finance*. In: *Inclusive Welfare*. Springer, Singapore. [https://doi.org/10.1007/978-981-96-0051-9\\_4](https://doi.org/10.1007/978-981-96-0051-9_4)
- Lestari, E. (2024). Navigating the New Normal: Digital Transformation and Islamic Social Finance Strategies. *Indonesian Conference of Zakat - Proceedings*, 187-196. <https://doi.org/https://doi.org/10.37706/iconz.2023.685>
- Li, W., & Arundel, S. (2024). *GeoAI and the Future of Spatial Analytics*. California Digital Library (CDL). <https://doi.org/10.31223/x5dt3j>
- Mansur, M., Addiarrahman, A., Ismail, D., Rasyidi, A., & Deni Putra, M. (2025). Islamic Philanthropy in the Digital Era: The Role of Media and Culture in Spreading the Teachings of Generosity. *Asian Journal of Media and Culture*, 1(1), 74–92. <https://doi.org/10.63919/ajmc.v1i1.20>
- Palys, T., & Atchison, C. (2023). *Research methods in the social and health sciences: Research decisions (2nd ed.)*. SAGE Publications.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students (8th ed.)*. Pearson Education.
- Sheppard, V. (2020). *Research methods for the social sciences: An introduction*. BCcampus Pressbooks.
- Soleh, M. (2019). Zakat Fundraising Strategy: Opportunities and Challenges in Digital Era. *Journal of Nahdlatul Ulama Studies*, 1(1), 1–16. <https://doi.org/10.35672/jnus.v1i1.4>
- Triantoro, D. A., Wahyuni, T., & Purna, F. P. (2021). Digital Philanthropy: The Practice of Giving Among Middle to Upper-Class Muslim in Indonesia and Soft Capitalism. *QIJIS (Qudus International Journal of Islamic Studies)*, 9(2), 315. <https://doi.org/10.21043/qijis.v9i2.7814>
- Ulfahadi, R. (2023). Islamic Philanthropy on Social Media in Youth Volunteering Movements. *Dialog*, 46(2), 135–144. <https://doi.org/10.47655/dialog.v46i2.737>
- Zaenal, M. H., Noor, Z., Hartono, N., Choirin, M., & Salihovic, E. (2022). Mapping Zakat Potential at the City Level in Indonesia and Strategies for Optimizing Zakat Collection. *Economica: Jurnal Ekonomi Islam*, 13(1), 25–48. <https://doi.org/10.21580/economica.2022.13.1.12323>