

A BIBLIOMETRIC ANALYSIS OF ISLAMIC REGTECH RESEARCH INDEXED BY DIMENSION.AI

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Abstract

Currently, the issuance of Paper on Islamic Regtech published by a journal equipped with title and abstract identifiers is registered in Dimension.ai from 2019 to 2023 explored in this bibliometric study. The focus of the investigation is on the keyword and author's pattern. The data was examined from the 15 Dimension research article (<https://dimension.ai>). 'Islamic Regtech' is a search keyword. On February 23, 2023, the search used to make a collection of study data was updated. The bibliometric map was found using a descriptive statistical approach and bibliometric analysis using a VOS viewer. The quantity of paper on Islamic Regtech, as well as the growth of Islamic digital regulations, has increased dramatically in recent years. This topic is covered by a number of journals, one of the best is Ethical Concerns in Artificial Intelligence (AI): The Role of Regtech and Islamic Finance. Research, Disruption, and Islamic Financial Institution are the most commonly used terms. This study provides an overview of the most popular keywords and writers in the publication with the topic of Islamic Regtech, with the hope that it can be useful information for academics who work in this field. Thus, this concept will potentially be further developed in the future.

Keywords: Islamic Regtech, Bibliometric, Regtech, Islamic Finance.

Introduction

Similar to conventional finances, start-up aims to disrupt Islamic financial institutions by dismissing the value chain. The common challenge for fintech is that they operate in a developing regulatory environment. Participating in Sandbox regulations is sometimes the only way to anticipate how regulators will limit innovation to protect consumers and investors (Nilson & Jovanovic, 2019).

The IFSB highlights legal, regulatory, and Sharia issues with Islamic fintech products that appear that require the attention of regulators and Islamic scholars. (Islamic Financial Services Industry Stability Report 2017).

RegTech is a new term and scientific study in the field is still in the early stages. Very few studies, surveys, and publications published on the impact of Regtech on the prevention of money laundering at the bank (Turki, Hamdan, Cummings, Sarea, Karolak, & Anasweh, 2020).

Regulatory Technology developed to normalize the rules of cross-jurisdiction, format, and language can help bring transparency to Islamic finance. Conventional regtech generally applies to Islamic financial institutions, except for the need to recognize restrictions based on sharia and apply Islamic contracts, while Islamic regtech consists of two different dimensions of conventional regtech, i.e.: intelligence and insight it is necessary to enter additional data sources, taking into account the flow of thought Different and a fatwa by various scholars, to provide an effective foundation to predict where the regulation is. Then, sustainable monitoring of Islamic compliance is needed during the duration of investment, because the income generated from investment or activities that are not appropriate are not allowed. (Douglas, Janos, & Ross, 2016).

In this bibliometric analysis, the development of Islamic Regtech is interesting to explore. Thus, the purpose of this study was to see the mapping of bibliometrics and the development of trends during the 4 years of Islamic Regtech research was taken based on metadata dimension.ai which included keywords and authors published between 2019 and 2023.

Literature Review

Bibliometric comes from the word biblio or bibliography which means book or bibliography, then the word metrics which has a connection by measuring. Thus, the term bibliometric (bibliometrics) can be interpreted as measuring or analyzing books or literature with mathematical and statistical approaches. However, until now bibliometrics are more widely used to measure periodic publications, such as scientific magazines or journals.

(Himawanto, 2015).

Bibliometric mapping is an important research topic in the field of bibliometrics (Börner, Chen, & Boyack, 2003). Two aspects of the bibliometric that can be distinguished are the construction of the bibliometric map and the map graph representation. In the bibliometric literature, the biggest attention is the construction of the bibliometric map. Research related to the effect of differences in the measurement of similarities (Ahlgren et al., 2003; Klavans & Boyack, 2006; Van Eck & Waltman, 2009), And they test with different mapping techniques (Boyack et al., 2005; Van Eck & Waltman, 2007; White, 2003). Representation of bibliometric map graphs receives less attention. Although some researchers seriously study issues related to graph representation (Chen, 2003; Skupin, 2004), Most articles published in bibliometric literature rely on simple graphic representations provided by computer programs such as SPSS and Pajek.

For small maps that contain no more than, say, 100 items, simple graphics representations usually produce satisfying results. However, it seems that there is a tendency towards a larger map, and for such maps, simple graphics representations are inadequate. Graphic representation of the large bibliometric map can be further enhanced by, for example, zoom function, special labeling algorithm, and metaphor of density. This kind of functionality is not included in a computer program commonly used by bibliometric researchers. In this paper, we introduce a new computer program for bibliometric mapping. This program gives special attention to graphic representation from the bibliometric map. This section discusses the use of the VOS, which is to build a bibliometric map.

The purpose of the VOS is to put items in a low dimension in such a way that the distance between two items reflects uniformity or linkages from these items accurately. For each pair of items, I and J, the VOS require SIJ's similarity input ($SIJ \geq 0$). VOS treats the SIJ equation as a measurement on the ratio scale. The SIJ equation is usually calculated using the association strength defined in Equation 1. VOS determines the location of the item on the map by minimizing it.

$$V(x_i, \dots, x_n) = \sum_{i < j} s_{ij} \|x_i - x_j\|^2 \quad (1)$$

to:

$$\frac{2}{n(n-1)} \sum_{i < j} \|x_i - x_j\| = 1 \quad (2)$$

Therefore, the idea of the VOS is to minimize the number of weightings from the square of the distance between all items. The square of the distance between the item pair is weighted with the equation between the items. To avoid valuable solutions, where all items

have the same location, the limits are applied so that the average distance between two items must be the same as one.

Two computer programs have implemented VOS mapping techniques. Both are available for free. Simple open-source programs are available at www.neesjanvaneck.nl/vos/, and a more advanced program is called VOS Viewer (Van Eck et al., 2010) available at www.vosviewer.com. Both programs use the Smacof algorithm variant mentioned above to minimize equation 1 to equation 2.

This study uses Paper publication data equipped with Digital-Object-Identifier (DOI) sourced from various indexed Google Scholar journals with keywords, namely research on Islamic Regtech themes. Data collection through paper search in the period 2019 to February 23, 2023. From the search results obtained as many as 15 publications articles. Data on the development of a publication of the theme of Islamic Regtech was analyzed using VOS Viewer software.

The introduced computer program is called VOS Viewer. VOS Viewer is a program developed to build and look at the bibliometric map. This program is available freely for the Bibliometric Research Community (see www.vosviewer.com). VOS Viewer, for example, can be used to create a map of the author or journal based on data cocitation or to build keyword maps based on joint events data. This program offers a performer that allows bibliometric maps to be checked in detail.

VOS viewers can display maps in various ways, each emphasizing different map aspects. It has a function to enlarge, scroll, and search, which facilitates detailed map examinations. The ability to display by VOS Viewer is very useful for maps that contain at least a large number of items (for example 100 items). Most of the computer programs used for bibliometric mapping do not display such maps in a satisfying way.

To build a map, VOS Viewer uses a VOS mapping technique, where VOS is an abbreviation of visualization of similarities. For previous studies where VOS mapping techniques are used. VosViewer can display a map built using the appropriate mapping technique. Therefore, this program can be used not only to display maps built using VOS mapping techniques but also to display maps that are built using techniques such as multidimensional scaling. VOS viewer runs on a large number of hardware and operating system platforms and can be started directly from the internet.

Research Methods

This study uses paper publication data sourced from various research journals with the theme of Islamic Regtech. Data was collected in the last 4 years, precisely, from 2019 - 2023. The term search is 'Islamic Regtech' in complete data. As a result, there

were 15 publications on February 23, 2023.

In addition, the trend of the development of the Publication of Islamic Regtech Publication was analyzed using VOS Viewer software. The introduced computer program is called VOS Performer. VOS Viewer was developed to build and see bibliometric maps and is freely available for the Bibliometric Research Community (see www.vosviewer.com).

VOS Viewer can create a writer map or journal map based on co-authorship data and Co-Occurrence keywords, namely building the author map and also keywords based on joint incident data. This program offers the reader that the map allows the bibliometric to be checked in detail. This research is descriptive research based on library data based on bibliometric analysis. This study uses publication data related to Islamic Regtech which is sourced from the Dimensions.ai database (<https://Dimensions.ai>). The alternative indexation dimension used is the criteria that all articles have titles and abstracts.

VOS Viewer Using VOS Mapping Techniques (Van Eck dan Waltman 2007a), where the VOS means the similarity of visualization. Previous studies in which the mapping of VOS techniques was used refer to Van Eck and Waltman (2007B) and Van Eck et al. (in the press). VOS Viewer can display a map that has been built using the ones that are compatible.

Therefore, this program can display maps made using techniques and display maps that are built using multidimensional scaling techniques. VosViewer runs on many hardware and platform operating systems and can be started directly from the internet. (Rusydiana, Antonio, & Assalafiyah, Hajj Investment Fund: A Bibliographic Study of The Hajj Economy, 2021)

Finding and Analysis

Table 1. Annual Publication (2019-2023)

Year	Publication
2019	1
2020	2
2021	2
2022	9
2023	1
Amount	15

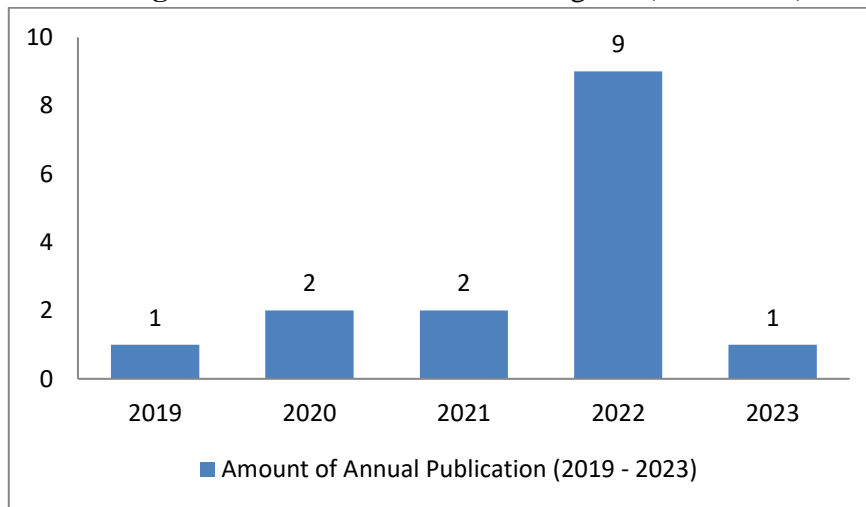
This section discusses the paper that has been published with the theme of Islamic Regtech. As a result, there are 15 papers issued in the observation period of 4 from 2019 to 2023. Table 1 presents the distribution of paper per year, which varies over the past 4 years with a range of 1 to 9 papers. The highest number of papers was issued in 2022 with a total of 9 papers and the least, namely one paper issued, occurred in 2019.

Based on Table 1 and Diagram 1, there are fluctuations accompanied by an overall increase trend in the number of papers published by various journals with the theme of

Islamic Regtech, in 2019 there was only one paper, then increased to 2 papers in 2020. From 2021 to 2022 it occurred a constant increase from 2 papers to 9 papers. For 2023 the number of papers does not cover the whole publication because data collection for this research was conducted in February 2023.

Of the 15 papers published with the theme of Islamic Regtech in the last 4 years, the title of an extensive paper that was most quoted was 'Ethical Concerns in Artificial Intelligence (AI): The Role of Regtech and Islamic Finance' which is a comprehensive review by Mustafa Raza Rabbani, ADEL Sarea, Shahnawaz Khan, Yomna Abdullah (2022). This paper discusses how ethics in AI or Big Data programming in its used in the Regtech and Islamic Finance section.

Diagram 1. Annual Publication Diagram (2019-2023)



3.1. Top Authors

Table 2. List of Top Authors

Author	Number of Paper
Mustafa Raza Rabbani (University of Bahrain, Bahrain)	4
Mohammad Kabir Hassan (University of New Orleans, United States)	3
Ammar Jreisat (University of Bahrain, Bahrain)	2
Adel Mohammed Sarea (Ahlia University, Bahrain)	2

Table 2 shows the four most productive authors of the paper published with the theme of *Islamic Regtech* in the last 4 years. As shown, three writers who wrote a lot of papers published about *Islamic Regtech* came from Bahrain, namely Mustafa Raza Rabbani, Mohammad Kabir Hassan, and Adel Mohammed Sarea. One writer who wrote three papers published about *Islamic Regtech* and came from the United States, namely Ammar Jreisat.

3.2. Top Citations

Table 3. List of Top Citations

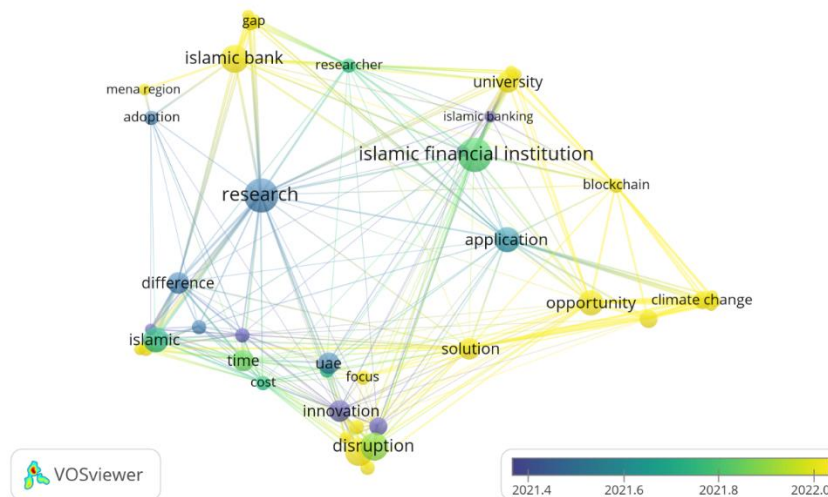
Citations	Title	Author
14	Ethical Concerns in Artificial Intelligence (AI): The Role of RegTech and Islamic Finance	Mustafa Raza Rabbani, Adel Sarea, Shahnawaz Khan, Yomna Abdullah.
13	The regulatory technology “RegTech” and money laundering prevention in the Islamic and conventional banking industry	Meaad Turki, Allam Hamdan, Richard Thomas Cummings, Adel Sarea, Magdalena Karolak, Mohammad Anasweh.

Table 3 shows the top 2 papers that are ranked based on the total quote from the time of publication until the time this study was conducted (February 2023). Of the 15 papers published on the theme of *Islamic Regtech* in the last 4 years, from 2019 to 2023. The highest ranking, with a total of 14 citations, is a paper with the title '*Ethical Concerns in Artificial Intelligence (AI): The Role of Regtech and Islamic Finance*' By Mustafa Raza Rabbani, Adel Sarea, Shahnawaz Khan, Yomna Abdullah (2022). In second place with a total of 13 citations is a paper with the title '*The Regulatory Technology "Regtech" and Money Laundering Prevention in the Islamic and Conventional Banking Industry*' by the Turkish MEAAD, Allam Hamdan, Richard Thomas Cummings, Adel Sarea, Magdalena Karolak, Mohammad Anasweh (2020). From this presentation, it can be concluded that the writings that refer to the theme of *Islamic Regtech* have begun to be widely discussed since 2020 and works in 2022 have been quoted in recent studies in line with the development of the topic of *Islamic Regtech* deeper.

- **Cluster 4** in yellow color consists of 8 keywords, i.e. *adoption, gap, Islamic bank, mena region, reason, research, researcher, and sharia standard.*
- **Cluster 5** in purple color consists of 6 keywords, i.e. *banking, challenge, economics, Islamic banking, Islamic financial institution, and university.*

The keywords divided into 5 clusters above are arranged in colored circles that show clusters. This data can be used to determine the trend of keywords in the past year. Bibliometric analysis shows some keywords that are widely used in papers, which are objects of study. The more keywords that appear, the wider the circle shown. Meanwhile, the line relationship between keywords shows how much the relationship with the other keywords (Laila, Rusydiana, & Assalafiyah, 2021).

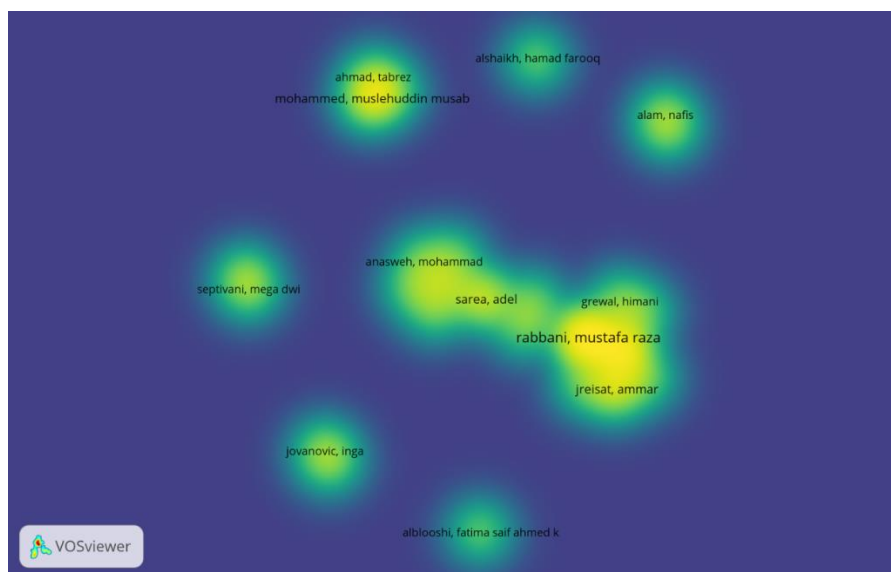
Figure 2. Annual Bibliometrics Keywords



Keywords are arranged in the shape of a colored circle in each set, which shows the cluster. If the keyword is classified based on the year of publication, the mapping results can be seen in Figure 2. The key of this chart is as follows: purple, green, and yellow intervals. The darker (purple) shows, the year of older publications, and the brighter (yellow) shows a newer year of publication. This data can be useful in determining the trend of keywords over the past 4 years. The analysis showed several keywords that were widely used since 2021, specifically *Research*. Conversely, the most recent and widely used keywords that have been used since the beginning of 2022 are *Islamic Banks*.

3.5. Authors

Figure 3. Bibliometric Author



The meta-analysis of the top writer's name has been mentioned earlier. The top writer of the Paper with the theme Islamic Regtech is further examined using VOS Viewer software - Bibliometric mapping This writer can be seen in Figure 3. The greater and brighter the circle of light around the author's name, the more paper they publish in the Paper with the theme *Islamic Regtech* for 4 last year. The appearance of the cluster density presents items (labels), marked as visible items. Each point of the item has a color depending on the density of the item at that time. The color of the map point depends on the number of items associated with items (ie in this case each writer). This procedure is useful for obtaining a general picture of the general structure of the bibliometric map. Through this worksheet, we can interpret the writer who writes the most publications. There are many clusters if sorted by author. The two most productive *Islamic Regtech* writers based on the bibliometric mapping are Mustafa Raza Rabbani and Muslehuddin Musab Mohammed, this mapping does not only display the top-ranking authors from a meta-analysis. In addition, VOS Viewer also considers the number of links between each writer and places fellow writers who are close to each other.

Conclusion and Recommendation

The results showed that the number of *Islamic Regtech* -themed articles published with the title of the journal and equipped with abstracts was quite large and had the potential to increase along with the development of the number of *Regulatory Technology* (Regtech) around the world. The results of the study show that some popular topics and keywords are used in this theme and have the potential to be developed further. In addition, some of the most productive

journals and authors can be used as a reference consideration for researchers who will develop research with this theme. This research has several limitations. This research only focuses on knowing the trend of the development of keywords, authors, and journals published with the theme of *Islamic Regtech*, thematic evolution that describes the development of keywords, then the growth of words, and then the top of the author from time to time that shows the authors' productivity. Of course, there are still many parts that can be explored. It should also be noted that the number of collections of articles studied is only obtained from dimensions.ai and is limited until February 23, 2023, so it is still possible to continue to experience changes and developments in the future. Suggestions for further research are to conduct a complete bibliometric analysis with more elements of study or more diverse software to produce more comprehensive results, the results presented here are still dynamic and can change over time with new trends that appear or increasing variables in *Islamic Regtech* theme in the future.

References

- [1] Arner, Douglas W., Janos Barberis., & Ross Buckley. 2016. "FinTech, RegTech and the Reconceptualization of Financial Regulation". *Northwestern Journal of International Law & Business Vol. 37 Issue 3*.
- [2] Börner, K., Chen, C., & Boyack, K. (2003). "Visualizing Knowledge Domains". *Annual Review of Information Science and Technology*, 179255. <https://doi.org/10.21427/df98-qn26>.
- [3] Himawanto. 2015. "Bibliometric Study of The Oil and Gas Technology". *Jurnal Dokumentasi dan Informasi, 11-30*. <https://doi.org/10.1002/aris.1440370106>.
- [4] Institute of International Finance. 2016. "RegTech in Financial Services: Technology Solutions for Compliance and Reporting".
- [5] Laila, N., Rusydiana, A. S., & Assalafiyah, A. 2021. "The Impact of Covid-19 on The Halal Economy: A Bibliometric Approach". *Library Philosophy and Practice - Electronic Journal, 5417*.
- [6] Nilson, N., & Jovanovic, I. 2019. "Islamic RegTech". *The RegTech Book*.
- [7] Rusydiana, A., Antonio, M. S., & Assalafiyah, A. 2021. "Hajj Investment Fund: A Bibliographic Study of The Hajj Economy". *International Journal of Religious Tourism and Pilgrimage, Vol. 9: Iss. 1, Article 12*.
- [8] Turki, M., Hamdan, A., Cummings, R. T., Sarea, A., Karolak, M., & Anasweh, M. 2020. "The regulatory technology "RegTech" and money laundering prevention in the Islamic and conventional banking industry". *Heliyon, 6(10), e04949*.