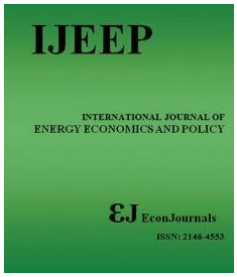

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Islamic Financing Mechanisms for Renewable Energy Projects: Mapping Research Trends and Future Directions

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ABSTRACT

This paper discusses the emergent trends in Islamic financing mechanisms for renewable energy projects, highlights their role in promoting economic growth, and discusses sustainability. By applying bibliometric analysis, cluster analysis (VOSviewer), and co-citation analysis, this study explores literature between 2008 and 2024 on the impact of Islamic finance on renewable energy projects. Data is collected from two major databases; Scopus and Web of Science Core Collection; key trends; influential publications; and future research directions. Findings show that Islamic financing mechanisms; including green sukuk and impact investing; are essential in supporting renewable energy investments. The study identifies key contributors such as Saudi Arabia; Malaysia; UAE; and Malaysia; with research focusing on the relationship between Islamic finance; ESG performance; renewable energy; and climate change mitigation. Future research may explore the integration of digital technologies; green innovation; and technological advancements in Islamic financing for renewable energy projects. The limitations include the reliance on Scopus and Web of Science databases, with further suggestions for incorporating additional databases and expanding keyword searches. This paper contributes to a better understanding of the intersection between Islamic finance and renewable energy, hence providing a good foundation for further research and practical applications in the field.

Keywords: Islamic Financing Mechanisms, Renewable Energy, Green Sukuk, ESG, Bibliometric Analysis
JEL Classifications: O13, Q2, Q4

1. INTRODUCTION

In fact, the integration of Islamic finance mechanisms into renewable energy initiatives has so far proved a key factor for achieving sustainable financial performance in Islamic countries (Yousaf et al., 2022). Recent studies indicate that such mechanisms substantially improve the feasibility and sustainability of such projects, especially for emerging markets (Walkshäusl and Lobe, 2012). Robust Islamic finance instruments, including Sukuk and Mudarabah, improve the value of projects in particular when Sharia-compatible schemes boost green energy ventures (Morea and Poggi, 2017). Various high-profile worldwide projects involving renewable energy projects from Islamic finance make them flexible over different kinds of initiatives easily, as observed (Campisi et al., 2018).

However, due to different institutional frameworks and regulatory settings, the implications of Islamic finance vary across MENA (Hamoudi, 2008). According to Alam et al. (2023), Sharia-compliant board composition and organizational structure are decisive to attract investment in projects for renewable energy while ensuring adherence to Islamic values. Additionally, sector-specific dynamics underscore the role of Islamic financing in improving operational performance (Mongi, 2019). For instance, Islamic financial instruments have been contributing positively towards solar and wind energy projects. There exists a close linkage between governance structures and environmental responsibility with corporate performance across various energy sectors such as Iskandar et al. 2020.

Unique cultural; religious; and economic contexts influence the MENA region's transition toward Islamic financing for renewable

energy projects (Ab Manan et al., 2011). Cultural norms and ethical frameworks; such as those promoting environmental stewardship in Islamic finance; are central to shaping sustainable energy practices (Khan and Haneef, 2022). Renewable energy projects can't always be carried out because of a lack of institutions in the area. The use of Islamic financing is also affected by the region's political and social situations (Naifar, 2018). In the MENA region; governments and regulatory bodies have started to use Islamic financing for renewable energy projects. However; it is still hard to get financial models to work together and deal with issues like greenwashing and lack of transparency (Saba et al., 2021).

Corporate governance is a major mediating variable in the implementation of Islamic financing for renewable energy projects (Iqbal, 2008). A stringent governance framework ensures that such financial mechanisms not only meet shareholder expectations but also Islamic precepts (Rashid and Siddique, 2021). Recently, board diversity and stakeholder engagement have gained importance, more so in industries such as renewable energy, where the balancing act between financial payback and environmental responsibility is critical (Aassouli et al., 2018). Sustainable projects are becoming more and more tied to the success of new financing models like Islamic green Sukuk. This shows how these models can help local communities and encourage economic diversification (Faizi et al., 2024). Even with these improvements; there are still problems with integrating Islamic financing; mainly in big renewable energy projects where there are still big problems with institutions and rules (Umar et al., 2023).

Education and awareness are still considered to be the key drivers of Islamic financing towards renewable energy projects (Ulfah et al., 2024). Equally important is that institutions in Islamic countries also foster the use of renewable energy, with especial emphasis on the inclusion of Islamic finance in their curricula (Young, 2018). According to Dorsman et al. (2016), enhanced knowledge dissemination and capacity-building initiatives are needed to overcome the challenges in financing renewable energy projects through Islamic finance mechanisms. On the other hand, governance, regulatory, and cultural factors remain significant influences in the complex process of integrating Islamic financing into renewable energy development (Karim, 2023).

Although a lot of progress has been made in making Islamic financing structures that can last; policymakers and practitioners need to focus on promoting regional collaboration; and educational programs; and making sure that financing strategies are tailored to local situations (Razali et al., 2024). There needs to be more research into how institutional frameworks; cultural norms; and Islamic financing mechanisms work together in the MENA region's energy and economic development in the future (Smolo et al., 2024) to get a full picture of sustainability.

1.1. Purpose of the Study

The primary objective of this study is to provide a comprehensive analysis of the emerging trends in Islamic financing mechanisms for renewable energy projects in Islamic countries while identifying current developments; potential research areas; and future directions. An important part of the study is looking at the annual growth of publications; distribution by country; publication patterns; intellectual structure; and cluster analysis of scientific production in the area of Islamic financing mechanisms and renewable energy projects in Islamic countries.

1.2. Study Originality

To confirm the study's originality; we are the first to combine bibliometric and cluster analyses in examining Islamic financing mechanisms for renewable energy projects in Islamic countries. The study provides a unique comparison of things that happen; processes that happen; and phenomena that happen in the modern economic and social realities of developing renewable energy in Islamic countries. It focuses on policies and strategies for financing that are in line with sustainability goals and Islamic finance principles.

1.3. Study Questions

This study addresses the following research questions:

RQ1. What is the current publication trend in Islamic financing mechanisms for renewable energy projects in Islamic countries?

RQ2. How are publications related to Islamic financing and renewable energy distributed across Islamic countries; and which countries lead in terms of citations?

RQ3. Which journals are most relevant in the area of Islamic financing for renewable energy projects?

RQ4. Who are the most influential authors in the field of Islamic financing mechanisms for renewable energy projects in Islamic countries?

RQ5. Which are the most influential articles in this domain?

RQ6. What is the intellectual structure of current research on Islamic financing mechanisms for renewable energy projects in Islamic countries?

RQ7. Which themes involving Islamic financing for renewable energy are the most popular among scholars in the Islamic context?

RQ8. What areas involving Islamic financing mechanisms for renewable energy projects require further investigation?

2. RESEARCH METHOD

We identified two studies as closely related to our research on Islamic financing mechanisms for renewable energy projects in Islamic countries after a comprehensive review of existing literature. The first; by Hermala et al. (2025); investigates green financing using Islamic finance instruments in Indonesia; focusing on the role of Islamic finance in supporting energy transition and emission reduction targets. This research uses bibliometric analysis and a literature review to look at how green finance and Islamic finance instruments can be used together in the energy transition. However; it focuses primarily on Indonesia and green financing; rather than specifically on Islamic financing for renewable energy projects across Islamic countries. Our study; on the other hand; looks at Islamic countries in a broader sense and the changes in Islamic financing methods for renewable energy projects. We do this by using bibliometric and cluster analysis to find new trends; important articles; and intellectual structures from 2008 to 2024. The second is the study by Laila et al. (2021), which has provided a

bibliometric review on energy economics in Islamic countries. This paper has mapped the development of energy economics research and identifies key clusters such as renewable energy and CO_2 emissions within the wider context of energy economics. While this study makes an important contribution to insights into the development of energy economics research in Islamic countries, it does not actually discuss Islamic financing mechanisms for renewable energy projects. Our study integrates Islamic financing mechanisms as one of the main themes and hence is more focused on renewable energy financing models and their implications for sustainable development in Islamic countries. Table 1 presents our research development of insights by Hermala et al. (2025) and Laila et al. (2021) with a more focused analysis of Islamic financing mechanisms related to renewable energy projects. The use of bibliometric and cluster analysis in the paper allows us to address the greater context of Islamic financing instruments in renewable energy while highlighting trends, influential themes, and key areas for future research. The methodology, therefore, contributes a great deal to the literature on financing renewable energy projects in Islamic countries.

2.1. Approaches to Research Methods

This study used performance analysis; text mining; and evaluative techniques to find patterns and correlations and figure out how authors; citations; and scientific production affect the field of Islamic financing mechanisms for renewable energy projects in Islamic countries. Moreover, the bibliometric mapping approach has been used to visualize the structural features of scientific output, based on the descriptions of Cobo et al. (2011) and Van Eck and Waltman (2011). The main design of the study is to determine the hotspots of research through indexed keyword occurrence, productive researchers, and journals between the periods of 2008 and 2024. This agrees with methods adopted by Qudah et al. (2023) and Alqudah et al. (2023) in their bibliometric reviews.

Bibliometric analysis plays a critical role in the social sciences; quantitatively assessing patterns in academic literature such as journals; books; conference proceedings; and articles. It gives useful information about "global trends and the knowledge structure of a research domain;" which is something that Qudah et al. (2023) and Alqudah et al. (2023) talked about in their works on Islamic finance and the long-term viability of renewable energy. The bibliometric analysis method used by Momani et al. (2023) and Alqudah et al. (2024) was also very helpful in figuring out how research has changed over time in areas like digital learning and green economic literature. This technique is integral for comprehending the broader landscape of Islamic financing mechanisms for renewable energy projects in Islamic countries.

Using cluster analysis with VOSviewer; we looked at how Islamic financing mechanisms for renewable energy projects in Islamic countries are changing now and where they might go in the future. This was based on work done by Al Karabsheh et al. (2024) and Qabajeh et al. (2024). Co-citation analysis was applied to explore relationships between authors; journals; or documents based on citation data; while bibliographic coupling analyzed citing documents. In this regard, the co-word analysis method, with regard to keywords for the articles, also enables one to make judgments regarding the conceptual nature of the structural area of investigation under consideration-as found in Abu Anzeh et al. (2024) and Abu Orabi et al. (2024). This agrees with the works of Qudah et al. (2024) and Samara et al. (2024); it also placed great emphasis on emergent trends in algorithmic finance and digital technologies influencing Islamic finance. The results from AlQudah et al. (2024) also elaborately set how financial technology can develop social responsibility and identify such trends as of importance in setting the future research agenda. These also align with the insights into artificial intelligence and machine learning in corporate governance discussed by Samara et al. (2024).

2.2. Approach to Search Strategy

We formulated a search strategy incorporating several parameters and restrictions (Table 2). The Scopus and Web of Science Core Collection databases were selected as the primary data sources; as they are comprehensive and widely used databases for evaluating scientific research in the field of Islamic financing mechanisms for renewable energy projects in Islamic countries. We established a data query using the keywords "Islamic financing mechanisms" and "renewable energy projects" for Islamic countries over the past 16 years; with the aim of exploring emerging trends in this area. After establishing the query; we applied the first filter to select English articles; resulting in an initial retrieval of 184 articles from Scopus and 168 articles from the Web of Science Core Collection. Subject areas were the focus of the second filter; which used categories like Environmental Sciences; Green and Sustainable Science and Technology; Management; Economics; Econometrics; Accounting; and Finance. This found 53 articles from Scopus and 50 articles from the Web of Science Core Collection that fit the subject areas.

Table 1: Comparison of prior research and our study

Basis of comparison	Study 1: Hermala et al. (2025)	Study 2: Laila et al. (2021)	Our study
Purpose	To explore green financing using Islamic finance instruments in Indonesia	To review energy economics research in Islamic countries	To examine Islamic financing mechanisms for renewable energy projects in Islamic countries
Focus of the study	Islamic finance in energy transition and green finance	Energy economics in Islamic countries; focusing on renewable energy and CO_2 emissions	Islamic financing mechanisms for renewable energy projects; publication trends; and cluster analysis
Keywords	Green financing; Islamic finance; energy transition	Energy economics; renewable energy; CO_2 emissions	Islamic financing; renewable energy; bibliometric analysis
Time period	2014-2024	2011-2021	Scopus: 2008-2024 Web of Science Core Collection: 2014-2024

*Source: Authors' own creations

We looked at the number of citations; the number of publications broken down by country; the intellectual structure of research on Islamic financing mechanisms for renewable energy projects in Islamic countries; the number of publications by author; the number of publications in different journals; and the growth of publications year-over-year. The study focused exclusively on articles within the subject areas of social science; economics; econometrics; finance; and energy; as shown in Table 3. After applying Table 2's search strategy and cleaning the dataset; we selected a total of 114 articles from Scopus and Web of Science Core Collection; published between 2008 and 2024. As shown in Table 3; these articles involved 300 authors from 89 different sources. The average number of citations per article is 9.53. In the Scopus database; there were 53 documents from 49 sources; with an annual growth rate of 13.88%. The average age of the documents was 4.5 years; and the average citations per document was 6.688. The authorship network includes 159 authors; with 16 single-authored documents and an average of 2.61 co-authors per document. International collaboration accounted for 28.12% of the total co-authorships. The document types in the Scopus database included articles (34); books (2); book chapters (5); conference papers (5); conference reviews (1); editorials (1); retracted articles (1); and reviews (4). In the Web of Science Core Collection database; there were 50 documents from 40 sources; with an annual growth rate of 17.46%. The average age of the documents was 3.12 years; and the average citations per document was 12.38. The authorship network in this database involved 141 authors; with 5 single-authored documents and an average of 3.42 co-authors per document. International co-authorships made up 64% of the total collaborations. The document types in the Web of Science Core Collection included articles (41); book chapters (2); early access articles (3); proceedings papers (1); and reviews (3).

3. DATA AND RESULTS

3.1. Annual Trend of Publications

To address RQ1; we analyzed the annual growth in publications based on the Web of Science Core Collection and Scopus databases regarding Islamic financing mechanisms for renewable energy projects in Islamic countries. The first article on this topic was published in 2008; with 2 publications in that year. From 2008 to 2016; the number of articles published increased steadily; with 1 article in 2008; 2 in 2011; and 9 in 2016 (Figure 1). After 2016; there was a marked surge in the annual growth of publications; with the number rising from 3 articles in 2018 to 5 in 2019; further increasing to 8 in 2020. This upward trend continued with 15 publications in 2022; 19 in 2023; and 19 publications in 2024. This growing interest in Islamic financing mechanisms for renewable

Table 2: Data collection process and search strategy

Date	Database	Search query	First stage filters	Initial results	Second stage filters	Filtered results
31st December 2024	Scopus	Islamic financing mechanisms and renewable energy projects	Document Type: Article; Language: English	184 journal articles in English	Subject area filters applied: Environmental Sciences; Green and Sustainable Science and Technology; Management; Economics; Econometrics; Accounting; Finance; Energy	53 articles from relevant subject areas
31st December 2024	Web of Science Core Collection	Islamic financing mechanisms and renewable energy projects	Document Type: Article; Language: English	168 journal articles in English	Subject area filters applied: Environmental Sciences; Green and Sustainable Science and Technology; Management; Economics; Econometrics; Accounting; Finance; Energy	50 articles from relevant subject areas

*Source: Authors' own creations

Table 3: Metadata of the dataset

Database	Scopus	Web of science core collection
Timespan	2008-2024	2014-2024
Sources	49	40
Documents	53	50
Annual growth rate (%)	13.88	17.46
Document average age	3.11 years	3.12 years
Average citations per doc	6.688	12.38
References	2408	2500
Keywords plus	89	170
Author's keywords	179	214
Authors	159	141
Single-authored docs	16	5
Co-authors per doc	2.61	3.42
International Co-authorships (%)	28.12	53
Document types	Articles (34); Books (2); Book Chapters (5); Conference Papers (5); Conference Reviews (1); Editorials (1); Retracted (1); Reviews (4)	Articles (41); Book Chapters (2); Early Access Articles (3); Proceedings Paper (1); Reviews (3)

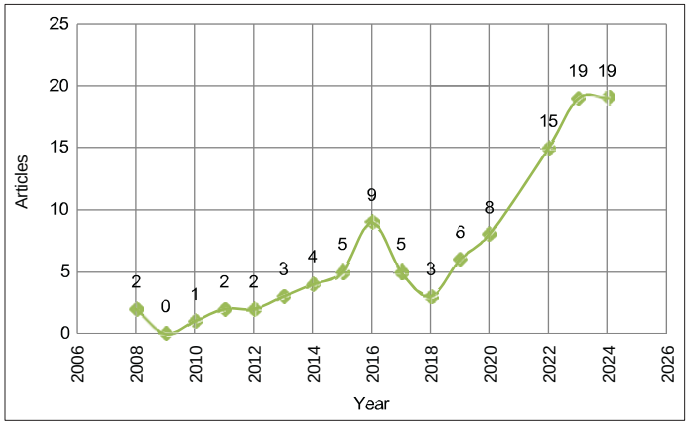
*Source: Calculated by the author using Biblioshiny in R

energy projects in Islamic countries highlights the increasing importance of this area of research in the scientific community.

3.2. Geographical Distribution of Publications by Country

Tables 4-6 address RQ2. Results from Table 4 indicate that Indonesia contributed the most publications (43); followed by Malaysia (20); Pakistan (8); and Italy and the UAE (7 each). Countries with fewer publications include Uzbekistan (5); India (4); Japan (4); Kazakhstan (4); and Tunisia (4). Table 4 highlights the top ten countries in terms of the total number of publications; while Table 5 will focus on the top ten countries in terms of influential publications based on citations.

Figure 1. Yearly trends in publications from the web of science core collection and scopus databases



*Source: Calculated by the author using Biblioshiny in R

Table 4: Publications by country

Serial no.	Country	Total publication
1.	Indonesia	43
2.	Malaysia	20
3.	Pakistan	8
4.	Italy	7
5.	UAE	7
6.	Uzbekistan	5
7.	India	4
8.	Japan	4
9.	Kazakhstan	4
10.	Tunisia	4

*Source: Authors' own creations

In terms of citations; Malaysia ranks first with 186 total citations; followed by Brunei with 61 citations; and Pakistan in third place with 44 citations (Table 5). Although Indonesia produced the highest number of publications; it ranks lower in terms of citations; with only 7 total citations. This would mean that while Indonesia contributes a lot in terms of volume, its research is not as highly cited or influential as that of Malaysia or Brunei. Table 5 also shows some interesting trends in the international collaboration of the countries. Qatar has the highest MCP ratio of 0.833, which indicates very high international collaboration, whereas Malaysia and Saudi Arabia have low MCP ratios, which means their research output is more domestically oriented.

Next; we investigate the leading institutions across Islamic countries that have contributed to the body of work on Islamic financing mechanisms for renewable energy projects. Table 6 presents the top ten institutions in terms of publication volume. IPB University (Indonesia) leads with 8 publications; followed by Tashkent State University of Economics (Uzbekistan) with 5 and Airlangga University (Indonesia) and Universiti Teknologi MARA (Malaysia); each contributing 4 publications. Most importantly, while the number of publications is led by Indonesia and Malaysia, it does not always come from their leading institutions as well in terms of citation counts. For example, even with the highest number of citations, as seen in Table 5 with a total of 186 from Malaysia, leading institutions like Universiti Teknologi MARA and the International Islamic University (IIU) do not reach the same influential level in terms of citation impact. This means that only high volume itself does not ensure high impact on research work. Further, Qatar has good international collaboration: with Hamad Bin Khalifa University contributing 3 publications to a high MCP ratio of Qatar of 0.833. Institutions such as the IPB University in Indonesia may hold the leading position by volume but then stand for more domestically oriented portfolios, as in its MCP ratio of 0.267. These findings point to variations in institutional and countrywide impact of research output and their collaborative trends.

3.3. Sources

The RQ3 was answered by bibliometric analysis carried out on the publications related to Islamic mechanisms of financing for renewable energy projects in Islamic countries. Some of the leading journals in this field have been listed in Table 7. The

Table 5: Key publications by country based on citation count

Serial no.	Country	Citations	Average article per citations	Single country publications	Multiple country publications	MCP ratio
1.	Malaysia	186	14.3	4	0	0.444
2.	Brunei	61	0	1	0	0.800
3.	Pakistan	44	0	2	0	0.548
4.	France	18	4.5	0	1	0.667
5.	Germany	14	1.4	1	0	0.571
6.	Qatar	9	3	0	2	0.833
7.	Indonesia	7	2.3	5	0	0.267
8.	Iran	7	1	0	1	0.000
9.	Saudi Arabia	3	3	2	0	0.591
10.	UAE	0	0	0	2	0.688

*Source: Created by the authors ** "Average Citations per Article" refers to the mean number of citations per publication; while "Single-Country Publications" and "Multiple-Country Publications" indicate the share of research produced solely by authors from one country versus collaborative international efforts

Table 6: Leading institutions by article count

Serial No.	Affiliation (country)	Total publications
1.	IPB University (Indonesia)	8
2.	Tashkent State University of Economics (Uzbekistan)	5
3.	Airlangga University (Indonesia)	4
4.	Universiti Teknologi MARA (Malaysia)	4
5.	Hamad Bin Khalifa University (Qatar)	3
6.	Institute of Business Administration (IBA) (Pakistan)	3
7.	Universitas Pembangunan Nasional Veteran Jakarta (Indonesia)	3
8.	University of Brunei Darussalam (Brunei)	3
9.	International Islamic University (IIU) (Malaysia)	2
10.	Monash University (Australia)	2

*Source: Authors' own creations

Table 7: Key journals of publication

Serial no.	Journals	H index	G index	M index	TC	TP	Publication starts
1.	International Journal of Energy Economics and Policy	2	5	0.25	35	5	2017
2.	Journal of Islamic Monetary Economics and Finance	3	4	0.6	19	4	2020
3.	Energy and Finance: Sustainability in The Energy Industry	2	2	0.222	6	2	2016
4.	Environmental Economics	2	2	0.667	21	2	2022
5.	American Journal of Comparative Law	1	1	0.059	17	1	2008
6.	Aptisi Transactions on Technopreneurship	1	1	0.333	5	1	2022
7.	Borsa Istanbul Review	1	1	1	2	1	2024
8.	Contemporary Studies in Economic and Financial Analysis	1	1	0.091	1	1	2014
9.	Energy Economics	1	1	0.333	96	1	2022
10.	European Journal of Comparative Economics	1	1	0.2	5	1	2020

**The "H index" evaluates an author's productivity and citation impact; the "G index" assesses the productivity of highly cited articles; the "M index" adjusts the h-index based on the number of years since publication; TC: Total citations, TP: Total publications

International Journal of Energy Economics and Policy had the highest total number, 5; highest total citations, 35; and h-index, 2. Therefore, this journal stands as the biggest contributor in this particular arena. Similarly, the Journal of Islamic Monetary Economics and Finance has an h-index of 3 and a total number of 19 citations, establishing it as important in the area of study due to its contribution, which only started in the year 2020. A second observation in Table 7 is the type of journals contributing, such as Energy Economics and Environmental Economics; though they had only one contribution each, their citation counts are relatively high, with Energy Economics receiving 96 citations. This attests to the journal's impact despite low volume.

This agrees with earlier results; though Indonesia and Malaysia are leading in terms of volume, as indicated in Tables 4 and 5, other regions host journals which, although with fewer articles, present quality works, such as the American Journal of Comparative Law and European Journal of Comparative Economics. These journals reflect the interdisciplinary nature of the subject matter, including economics, law, and environmental policy. All such results would then show that a few high-impact journals had driven discussions on Islamic mechanisms of financing renewable energy. In contrast, journals like Borsa Istanbul Review and Aptisi Transactions on Technopreneurship have each published just one paper in the area and may reflect potential wider journal coverage and international collaboration.

Thirdly; journals based in countries such as Malaysia and Indonesia; like the *Journal of Islamic Monetary Economics and Finance* (4 publications) and *International Journal of Energy Economics and Policy* (5 publications); are prominent in terms of publication quantity; as seen in Table 7. However; despite their relatively high publication counts; their h-index and citation metrics suggest a moderate level of influence in the context of Islamic financing mechanisms for renewable energy projects in Islamic countries. For instance; while the *Journal of Islamic Monetary Economics and Finance* has an h-index of 3 and 19 total citations; it lags behind in comparison to journals with fewer publications but higher impact; such as *Energy Economics;* which has 96 total citations from a single publication.

In other words, from Tables 5 to 7 above, it is clear that Malaysia and Qatar are indeed leading in impactful research in this domain, considering the publication and collaboration metrics. Other countries with impressive contributions in the region include Indonesia and Pakistan, while the top institutions such as IPB University and Institute of Business Administration lead in the number of publications. However, in other countries, for example, Qatar, the impact of publications is emphasized: Journals and institutions demonstrate a high citation-to-publication ratio, hence reflecting their influence in research. The research landscape for Islamic financing mechanisms of renewable energy projects in Islamic countries is growing yet segmented, with certain regions and journals playing an influential role in the field, such as Energy and Finance: Sustainability in the Energy Industry. This therefore means that an even more diversified set of contributions with international collaborations might be needed to strengthen this emerging research arena.

3.4. Authors and Writers

To answer RQ4; "Who are the most influential authors in the field of Islamic Financing Mechanisms for Renewable Energy Projects

in Islamic countries?"; we analyzed the most cited authors and their h-index. Table 8 presents the leading authors in this area by citation count. The most relevant authors, based on the citation count, include Morea D with 79 citations, followed by Poggi La at 59, and Al-Silefanee Rr at 18 citations. While on the other hand, most influential author by h-index is Morea D with 3, followed by several authors with 2 each, namely Arslan-Ayaydin Ö;, Dorsman A;, and Karan Mb; as shown in Table 8.

The others include the emerging contributors to the field. Examples are Aassouli D and Ab Manan Sk, with modest citation counts of 7 and 9 respectively, reflecting early contributions to an emergent body of literature that is growing on Islamic financing for renewable energy. Recently, the list of newer contributing authors includes Abduh M and Ahmed E. First promising publications are in 2022 and 2023. This points toward a more bottom-up development where interest is slowly growing. With this, there is still room for much improvement in order for the scientific landscape to present grounds for strong recognition of this academic discipline by leading authors. Consequently, influential authors like Morea D and Poggi La provide a vital starting point for future research initiatives toward understanding how Islamic financing mechanisms can be gainfully leveraged for renewable energy projects.

Bibliographic coupling in Figure 2 was analyzed to establish the importance of the relationships between leading authors in the field of Islamic Financing Mechanisms for Renewable Energy Projects in Islamic countries. Figure 2 map indicates five well-defined clusters; lines in the figure show the relationships between the various authors' research. The largest cluster is Cluster 1, comprised of authors like Nagayev R;, Mukhtarov S;, and Aliyev J;, out of which Nagayev R; has the highest Normalized Local Citation Score, 51.5. It identifies key relationships among authors that have contributed immensely to the development of Islamic financing mechanisms. Of interest was also the fact that the other central nodes in Cluster 1 included Morea D, with a citation score of 15, because this too indicates the extensive number of contributions regarding the integration between renewable energy and Islamic financing principles. Cluster 2 also includes highly influential authors such as Disli M and Ng A, with a citation score of 82, underlining critical developments on the pragmatic implementation of Islamic financial tools. Other emergent contributions by, among others, Muneeza A and Bin-Nashwan SA provide a good starting point for further research in the field.

Figure 2: Collaboration network among top authors

*Source: Generated by the author using Biblioshiny in R

Table 9 summarises a few of the influential publications in this field related to Islamic mechanisms for financing renewable energy. Works such as Ahmed D and Hafeez M's are ranked among the most influential works with regard to the subjects of innovative Sharia-compliant strategies of financing of sustainable energy projects, both obtaining a citation score of 27.5 points.This is one of the innumerable addition of knowledge in Islamic finance, sustainability, and renewable energy. The number of relations and contributions these authors create, along with their published works, invokes immense understanding in the state-of-the-art Islamic financing mechanisms of today. Their works have kept shaping discourse leveraging principles in Islamic finance to drive renewable energy initiatives; they have placed collaboration and innovation at the center of achieving sustainable energy goals in Islamic nations.

3.5. Key Publications of Significance

To answer RQ5; To identify the most influential studies in the area of Islamic Financing Mechanisms for Renewable Energy Projects in Islamic countries; we first consider the most cited articles on this topic, as shown in Table 9. The most highly cited article is by Yousaf et al. (2022), which researched green investments and the financial need for sustainable energy, with 96 citations. This paper has had a high impact; there is a need to integrate Islamic finance concepts into renewable energy investment, and such renewable energy is considered vital in many Islamic countries. The second most cited paper belongs to Walkshäusl and Lobe (2012); that investigates Islamic investing; with 73 citations. This research is relevant to the Islamic financing context in renewable energy, as it lays a foundation toward understanding the importance of Islamic finance in supporting such sustainable investments-including energy.

Table 8: Top authors by citation count

Serial no.	Authors	H index	G index	M index	TC	TP	Publication starts
1.	Morea D	3	3	0.333	79	3	2016
2.	Arslan-Ayaydin Ö	2	2	0.222	6	2	2016
3.	Dorsman A	2	2	0.222	6	2	2016
4.	Karan Mb	2	2	0.222	6	2	2016
5.	Poggi La	2	2	0.222	59	2	2016
6.	Aassouli D	1	1	0.143	7	1	2018
7.	Ab Manan Sk	1	1	0.071	9	1	2011
8.	Abduh M	1	1	0.333	4	1	2022
9.	Ahmed E	1	1	0.5	1	1	2023
10.	Al-Silefanee Rr	1	1	0.333	18	1	2022

Source: Authors' own creations* The "H index" evaluates an author's productivity and citation impact; while the "G index" reflects the productivity of highly cited articles. The "M index" is the h-index adjusted for the number of years since publication. TC: Total citations, TP: Total publications

Table 9: Significant influential publications

Serial no.	Authors	Title	TC	Year	Source title
1.	Yousaf et al.	Green investments: A luxury good or a financial necessity?	96	2022	Energy Economics
2.	Walkshäusl et al.	Islamic investing	73	2012	Review of Financial Economics
3.	Morea and Poggi	An innovative model for the sustainability of investments in the wind energy sector: The use of green sukuk in an Italian case study	31	2017	International Journal of Energy Economics and Policy
4.	Morea and Poggi	Islamic finance and renewable energy: An innovative model for the sustainability of investments	28	2016	AEIT 2016 - International Annual Conference
5.	Campisi et al.	Shari'ah-compliant finance: A possible novel paradigm for green economy investments in Italy	20	2018	Sustainability (Switzerland)
6.	Hamoudi	The muezzin's call and the Dow Jones bell: On the necessity of realism in the study of Islamic law	17	2008	American Journal of Comparative Law
7.	Alam et al.	Development and evaluation of Islamic green financing: A systematic review of green sukuk	13	2023	Environmental Economics
8.	Mongi	The global influence of oil futures-prices on Dow Jones Islamic stock indexes: Do energy-volatility's structural breaks matter?	11	2019	International Journal of Emerging Markets
9.	Ab Manan et al.	Descriptive analysis on the pattern of SME financing in Malaysia	9	2011	3rd ISESEE 2011 - International Symposium
10.	Khan and Haneef	Religious responses to sustainable development goals: An Islamic perspective	8	2022	Journal of Islamic Monetary Economics and Finance

*Source: Authors' own creations

The third most cited is Morea and Poggi (2017), which describes a new model of sustainability for investments in the Italian wind energy sector through green sukuk. This paper represents 31 citations, showing that green sukuk has a lot of potential to become one of the financing tools for renewable energy projects, and this concept has been explored in Islamic countries. Among others in the realm are Morea and Poggi (2016), analyzing the area where Islamic finance meets renewable energy; hence, this has attracted a fair number of citations so far-28. This work develops pioneering financing schemes oriented toward sustainable investment and shows that Islamic finance might play an increasingly important role in the future regarding renewable energy projects. Other contributions include Morea and Poggi (2016), who discuss the relation between Islamic finance and renewable energy; this work has received 28 citations. Their contribution pointed out new financing models for sustainable investments and focused on Islamic finance as facilitator in the development of renewable energy projects. Campisi et al. (2018) examine Shari'ah-compliant finance as a framework for green economy investments in Italy, receiving 20 citations. Their study indicates an increasing interest in Shari'ah-compliant funding methods to assist sustainable energy efforts, showcasing the potential for these models to simultaneously meet environmental and financial goals.

3.6. Keywords Co-Occurrences

To answer RQ6; The intellectual structure of the current research on Islamic Financing Mechanisms for Renewable Energy Projects in Islamic countries was studied using keyword analysis through VOS viewer. The process mainly entails key phrase identification; selection of important phrases using the algorithms used by VOSviewer; and mapping and clustering based on identified keywords/authors; visualization of map and cluster. Van Eck and Waltman, 2011. Table 10 presents the frequency of keyword occurrence in scientific literature on Islamic financing for renewable energy projects. This table gives an insight into the fact that there are numerous studies on the topics of Islamic finance and renewable energy, with high interest in sukuk as a financing instrument in energy projects. Islamic finance and renewable energy appeared frequently; reflecting the growing interest in combining Shari'ah-compliant financial mechanisms with the global push for sustainable energy solutions. Keywords such as economic growth; CO_2 emissions; and energy consumption underscore the environmental and economic motivations for integrating renewable energy projects in Islamic countries. Keyword analysis maps the key areas of interest in research on Islamic financing for renewable energy, outlining the most discussed topics, methodologies, and author collaborations. The persistence of sukuk, for instance, with 4 occurrences, underlines how predominant this instrument is within project financing related to renewable energy in the sphere of Islamic finance.

Table 10: Keywords appearing at least 5 times

No.	Keyword	Frequency
1.	Islamic finance	12
2.	Economic-growth	9
3.	Renewable energy	9
4.	Co2 Emissions	6
5.	Energy-consumption	5
6.	Performance	5
7.	Sustainable development	5
8.	Cointegration	4
9.	Energy	4
10.	Indexes	4
11	Sukuk	4
12	Volatility	4
13	Banking	3
14	Carbon emissions	3
15	Crude-oil	3

*Source: Authors' own creations

Other catchy themes that were reviewed are energy use, sustainable development, and carbon emission, representing the broad areas of environment and economy, which are a concern to such projects. Mapping such trends, therefore, has helped this study not only in the establishment of an intellectual structure but also the nature

and intensity in which mechanisms of Islamic finance have been deployed towards the realization of renewable energy projects in Islamic countries. The research in this area increasingly focuses on the role that Islamic finance could play in sustainable development, with special reference to the reduction of CO_2 emissions and supporting the transition towards renewable energy sources.

3.7. Keyword Trend Analysis

Figure 3: Keyword analysis flow of WoCC and Scopus databases: Research trend highlighting Islamic financing mechanisms for renewable energy projects in Islamic countries. One striking thing is that all works focus on traditional economic growth and trade relationships; most of the research was carried out between the years 2010 and 2024. Between 2020 and 2024, there is an obvious shift to research emphasis on growth in openness to trade with technology, innovation, and sustainable development. This evolution of the research direction indicates an increase in interest to explore the interface between Islamic finance, renewable energy, and sustainable development within an Islamic country perspective. Future studies could delve more into the precise mechanisms and challenges of using Islamic finance to underpin renewable energy projects in countries with such systems, given that there is still a gap regarding comprehensive studies about this topic.

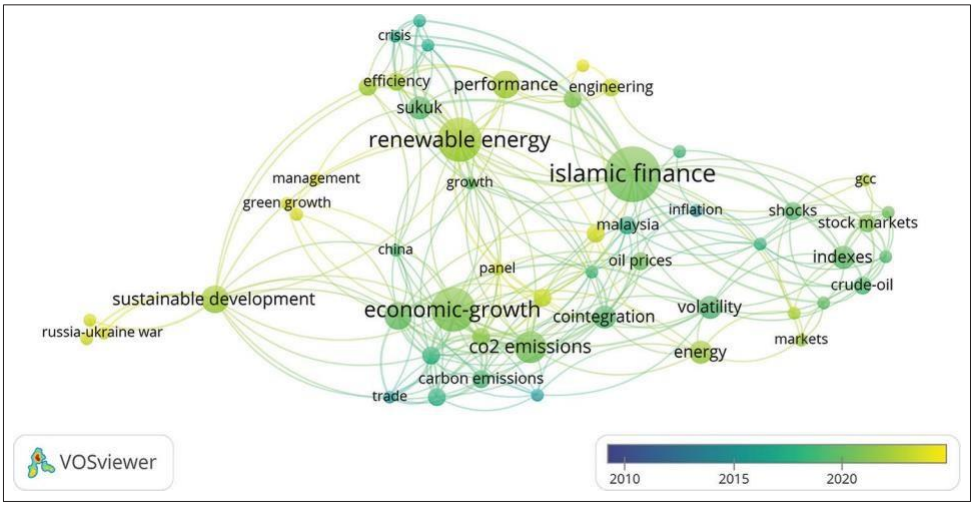
4. ANALYSIS OF CURRENT TRENDS AND FUTURE DIRECTIONS: CLUSTER ANALYSIS

To address RQ7; Cluster analysis is performed to identify key themes related to Islamic financing mechanisms for renewable energy projects in Islamic countries. Vosviewer software has created a total of seven clusters to highlight the most popular themes among scholars.

4.1. Cluster 1 (Green Color: Islamic Finance)

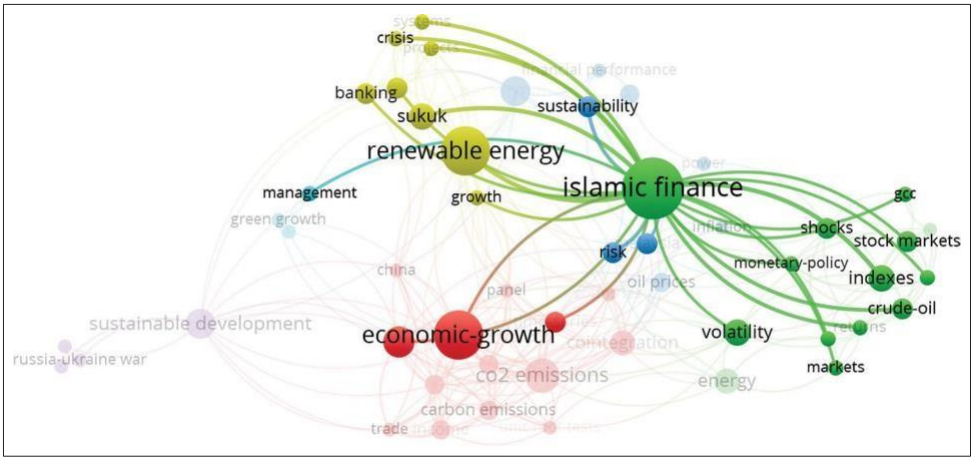
Islamic finance also has complex interplays with different economic and financial aspects; both opportunities and challenges as shown in figure 4. The major positive association is the one that exists between Sukuk, a Sharia-compliant link to Islamic finance. Sukuk has nowadays become a vital tool for mobilizing resources

Figure 3: Keyword evolution over time



*Source: Calculated by the author using VOSviwer

Figure 4: Cluster 1: Islamic finance



*Source: Calculated by the author using VOSviwer

for development projects and fostering growth in developing markets (Walkshäusl and Lobe, 2012; Alam et al., 2023). Adding financing for renewable energy to Islamic finance has also become more popular. For example; Indonesia and Italy have come up with creative ways to use green Sukuk to pay for wind energy projects (Morea and Poggi, 2016; Morea and Poggi, 2017). These changes are about sustainability and taking care of the environment hence making Islamic financial instruments more attractive in global markets today, Campisi et al. (2018) Islamic finance also has a positive impact on economic development through alternative financial structures that suit companies observing Islamic values. Such activities in Islamic banks with regard to renewable energy projects demonstrate the potentiality of financial systems in enabling sustainability while advancing broader economic goals. Alnsour, 2024 states that Islamic finance has thus been able to enable several OIC countries to reduce carbon emission and enhance environmental quality, indicating its capacity to serve as a catalyst for long-term economic growth (Mu'min et al., 2023; Abduh et al., 2022).

Notwithstanding these developments, Islamic finance is no exception to problems, especially at a time of high economic fluctuation. The 2008 global financial crisis demonstrated weaknesses in Islamic financial systems and showed that there is a need to devise resilience mechanisms (Iqbal, 2008). Additionally, volatility in energy markets, particularly fluctuations in crude oil prices, significantly impacts Islamic stock markets and Sukuk returns, illustrating the interconnectedness of the energy sector and Islamic financial instruments (Mansour et al., 2020; Naifar, 2018). Furthermore, Islamic financial institutions grapple with credit and liquidity risks, necessitating robust risk management frameworks to ensure stability and sustainability (Hamoudi, 2008). On the neutral relationships, Islamic finance operates within the larger banking system that is subject to regulatory and supervisory frameworks. Most of these frameworks overlap with conventional systems, resulting in peculiar compliance challenges (Beseiso, 2014). While this area has gained significant attention, sustainability remains a core focus for not all Islamic financial institutions. Good progress is demonstrated by the taxonomy of Islamic green financing, but scaling these efforts universally requires more. Musari (2022); Razali et al. (2024) Other studies have also focused on an increasing role of Fintech to enhance operations in Islamic banking. This includes strategic models designed to better efficiency and access. Iskandar et al. (2022).

There is a need for the interlinkage of Islamic finance and sustainability through policies adopted by governments and institutions in the attraction of green investments that target low-carbon transitions in energy. Putting together Islamic finance and renewable energy can prove to be one of the most workable legal and financial frameworks in relation to climate change and attaining SDGs, argues Karim (2023) and Rashid and Siddique (2021). Though fiscal prudence remains, Islamic finance certainly brings a different but better platform for funding renewable energy projects, hence becoming one of the major players in the global green economy. Young (2018); Dorsman et al., (2016) Islamic finance comes with multivariate relationships that can ensure sustainable economic growth with environmental protection. However, systemic risks, market volatility, and limited focus on sustainability remain important concerns that need the attention of policymakers, financial institutions, and researchers (Yousaf et al., 2022; Ulfah et al., 2024). Islamic finance can reinforce its role as a sustainable and inclusive financial system by aligning its principles with contemporary economic and environmental needs.

4.2. Cluster 2 (Yellow Color: Renewable Energy)

The increasing attention given to renewable energy investment, in particular, by Islamic financial tools such as Sukuk, well illustrates how the objectives of economic growth and sustainable development are closely intertwined as shown figure 5. According to Walkshäusl and Lobe (2012), Sukuk provides an investment platform that wholly adheres to Shariah principles, hence qualifying it as an excellent avenue through which renewable energy projects can be financed. Morea and Poggi (2016) underscore that green Sukuk are pivotal in ensuring the sustainability of renewable energy investments; especially in countries like Malaysia and Indonesia; where Islamic finance is robust. Their shared potential to drive economic growth further strengthens the relationship between renewable energy and Sukuk. Yousaf et al. (2022) highlight that green investments contribute to long-term financial stability; positioning them as both a necessity and a catalyst for economic expansion. Alam et al. (2023) used panel data analysis of countries like Malaysia and Indonesia to show that this is true. They found that issuing green Sukuk greatly increases the funding for sustainable energy projects. Similarly; Campisi et al. (2018) argue that Shariah-compliant finance offers a unique paradigm for promoting green economies; enabling countries to meet energy needs while adhering to sustainability goals.

Of the lot, however, China's contribution to renewable energy investment, by virtue of leading manufacture and global diffusion, takes center stage. According to Ibrahim et al. (2021), its influence extends to the regions where Islamic finance dominance exists. An illustration can be cited in Malaysia, where often enough, the place of Chinese technologies is assured within Shariah-compliant energy projects. Such collaborations, in this regard, signal how technological rise is coupled with Sukuk-financed projects as a function of synergies between technological innovation and Islamic financial mechanisms. In this respect, Mukhtasor et al. (2023), Irfany et al. (2024), and Abduh et al. (2022) emphasize that renewable energy investments are a few of the socioeconomically important ones that reduce energy intensity and further improve environmental quality.

Islamic finance also links to renewable energy because such a form of finance coincides with the SDGs. According to Khan and Haneef (2022), Islamic finance has the same kind of principles that promote ethics and sustainability for investment, thus inherently supporting environmental sustainability. For example, in Malaysia, green Sukuk has emerged as a key financing mechanism for large-scale renewable energy projects that enable the transition to a low-carbon economy. To complement this, Karim (2023) argues that Islamic financial instruments have high potential to serve the cause of energy justice-entailing an idea where clean energy sources will be equally distributed, reducing unequal access to energies across the globe. These instances point out Islamic finance's prospective

contribution toward achieving sustainable development: transition to renewable energy sources, inclusive growth.

Panel data analysis, as pointed out by Morea and Poggi 2017, allows an insight in-depth of the performance and impact of the investment in renewable energy across the board of multi-countries. The inclusion of countries like Malaysia in such a study underpins their strategic positions in leveraging Islamic finance for projects on renewable energy. Mansour et al. (2020) show that there is volatility between crude oil and Islamic markets regarding green investments; this, for market stability and sustainability, would necessitate strong financial tools to be applied-like the Sukuk that goes for green investments. In particular, the convergence of renewable energy and Islamic finance via Sukuk opens a new route toward growth that also sustains the environment. This interlinking is further elaborated by a series of case studies coming from China, Malaysia, and other regions that reflect the potentiality of Islamic finance to respond to world energy challenges.

Razali et al. (2024) go on to say that most of these models need further research on the issue of scalability and application in the emerging markets of a broader scope. This also needs an improved regulatory framework for better use of green Sukuk, supplemented with proper deployment of new technology. Furthermore, the role that Islamic finance can play in dampening volatility in energy markets for all-inclusive growth needs further review. These in turn will be fundamental in ensuring that Islamic finance remains a driver of sustainable development and equitable energy solutions globally.

4.3. Cluster 3 (Red Color: Economic Growth)

The clustering of keywords shows the intricate linkage between various environmental and economic factors and economic growth as shown figure 6. The relationship between economic growth and CO_2 emissions is well-established; with the increase in industrialization, energy consumption, and transportation activities along with economic growth (Iskandar et al., 2020). This leads to questions about environmental sustainability in developing countries, which are trying to balance growth with environmental preservation (Alam et al., 2023). Islamic finance, of which green sukuk is a part, represents a greener alternative to finance projects connected with renewable energy, hence addressing growth and environmental objectives. Morea and Poggi, 2017. Integration is another significant driver of economic growth. Economic integration; such as through free trade agreements; facilitates market expansion; boosts investment; and promotes technological

Figure 5: Cluster 2: Renewable energy

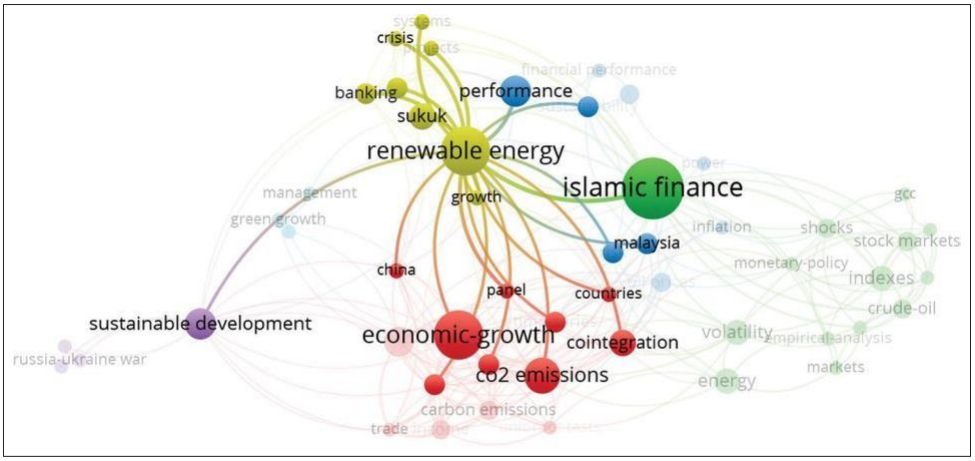


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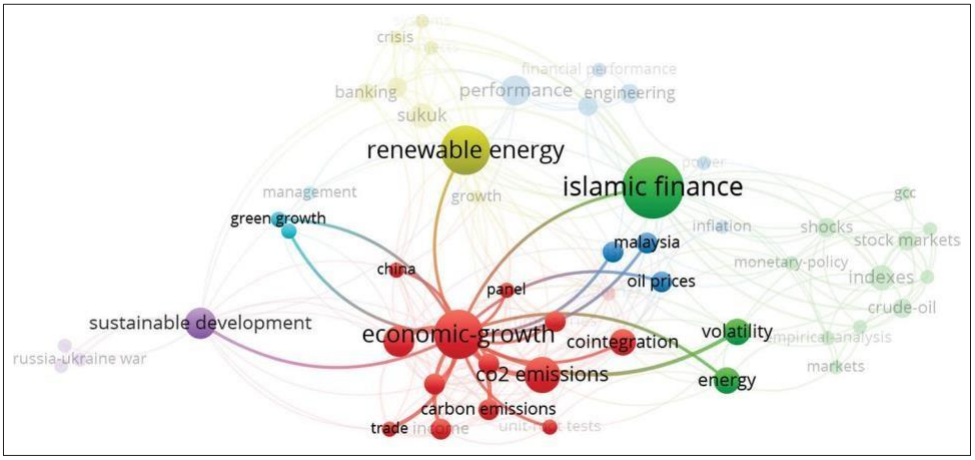
Figure 6: Cluster 3: Economic-growth



*Source: Calculated by the author using VOSviwer

advancements (Benamraoui, 2021). Islamic finance plays a big part in promoting this kind of integration because it helps with long-term growth through investments that are beneficial for the environment (Campisi et al., 2018). Green Sukuk; for instance; demonstrates a novel approach to integrating sustainability and financial performance; ensuring that growth does not come at the cost of environmental degradation (Endri et al., 2022).

Trade enhances economic development to a certain extent through increased specialization and access to international markets (Walkshäusl and Lobe, 2012). Islamic finance significantly helps in ethical, sustainable, and eco-friendly trade (Kismawadi et al., 2024). Trade and renewable energy finance play a vital role in addressing climate change as sound and inclusive financial systems are called for in sustainable development (Mukhtasor et al., 2023). From an econometric perspective; tools like panel data; cointegration; and unit root tests help analyze these dynamics. Panel data makes it easier to compare two or more countries; and cointegration techniques find long-term links between environmental factors like emissions and economic growth (Iskandar et al., 2022). The application of such methods is essential in understanding how Islamic green finance can mitigate the adverse effects of economic expansion on the environment (Rashid and Siddique, 2021). Unit root tests also make sure that time series data is accurate; which is necessary for strong economic analysis (Yousaf et al., 2022).

The amalgamation of Islamic finance with econometric studies brings out the potential for achieving sustainable growth. For example, research on renewable energy financing in the Gulf states points to green sukuk as a key financing instrument for facilitating energy transitions (Karim, 2023). These instruments align economic activities with environmental sustainability, thus offering a framework for future growth to include ethical consideration (Saba et al., 2021). The interlinkage of environmental and economic objectives is reflected in the way economic growth clusters with CO_2 emissions, integration, trade, and econometric tools. In particular, Islamic finance appears to be an important instrument to answer these challenges, especially green sukuk. Through the financing of renewable energy projects, Islamic finance contributes to fostering sustainable trade practices, long-term growth, and limited environmental risks. Therefore, future research studies should investigate Islamic green finance with a view toward wider applicability to make certain that economic growth is compatible with global sustainability goals. (Musari, 2022).

4.4. Cluster 4 (Purple Color: Sustainable Development)

The multifaceted framework of SD will have to focus on economic growth and ensure that such growth is environmentally and socially sustainable as shown figure 7. In this regard, there is already an established nexus between SD and economic growth; in most occasions, sustainable initiatives balance short-term economic gains against long-term ecological and societal benefits (Avazkhodjaev et al., 2024; Yousaf et al., 2022). For instance, green investments are not a luxury anymore, but rather a financial necessity; especially in the context of acceleration of transition to green economy (Walkshäusl and Lobe, 2012). Besides; green sukuk, Islamic financial instrument, has been used to finance renewable energy projects; for instance, wind energy, against the back drop of SD goals (Morea and Poggi, 2017). This relation of SD with renewable energy underlines the necessity of reduced CO_2 and carbon emissions. In fact, projects in renewable energy, made viable by innovative financial models such as Islamic green finance, have the potential to substantially influence climate change, as indicated by Morea and Poggi, 2016 and Alam et al., 2023. The consideration is more relevant in contexts where energy-intensive industry is a large contributor to the economy, such as the GCC. For instance, Islamic banking models increasingly adopt sustainable financing so as not to cause any damage to the environment (Mongi, 2019). Other studies showed that Islamic financial development would affect environmental quality and energy efficiency. This can signify the important contribution of Sharia-compliant tools toward the SDGs (Abduh et al., 2022).

Geopolitical events; such as the Russia-Ukraine War; have introduced both challenges and opportunities for sustainable development. The conflict has disrupted global energy markets; emphasizing the need for energy security and diversification; which aligns with SD objectives (Iskandar et al., 2020). For instance; the heightened volatility in energy markets has reinforced the urgency of transitioning to renewable energy sources; supported by Islamic finance mechanisms (Karim, 2023). Moreover, economic shocks from the war have crippled advancements in several targets of the SD, especially for developing economies which rely highly on energy imports (Young, 2018). In any case, these very problems have been invaluable lessons as regards the relevance and resilience of the financial systems for adapting flexibly to maintain unabated flows of investments in eco-friendly projects - such green sukuk (Endri et al., 2022).

While rapid urbanization might exacerbate environmental degradation, this critical driver of economic growth, with its concomitant challenges and opportunities, has been considered crucial for integrating Islamic green financing into urban projects to mitigate the adverse effects (Iskandar et al., 2022). This agrees with the environmental Kuznets curve hypothesis, which stipulated that at a lower level of economic growth, environmental degradation worsens, but once higher income levels are attained, there is an improvement. Shariah-compliant finance, through Sukuk issuance especially, encourages investment in low-carbon technologies by aligning economic development with environmental sustainability. The same view has been reiterated by scholars such as (Rashid and Siddique, 2021; Kasri et al., 2024).

The path of sustainable development is being configured by a complex interplay of economic, environmental, and geopolitical factors. Such Islamic instruments as green Sukuk and Shariah-compliant investment portfolios address these issues in an innovative way as the response to global disruptions, among which is the Russia-Ukraine War. These financial mechanisms will facilitate not only switching to renewable energy but also build resilience against economic and environmental uncertainties. Campisi et al. (2018) and Shukla et al. (2024) reported that these kinds of innovations accelerate green growth and ensure inclusive development.

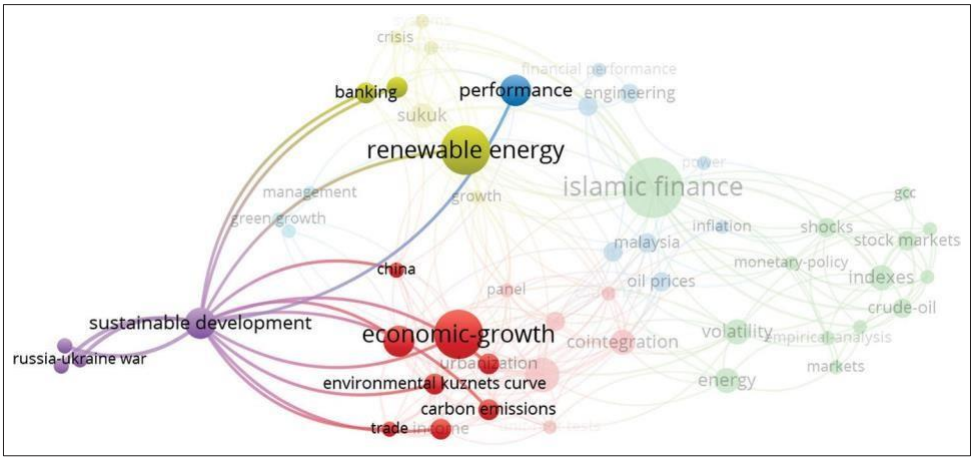
This would, therefore, mean that future research is informed by the need to address how these models, in their variants, could have scalability across socio-economic contexts. By so doing, their value to sustainable and inclusive growth could be meaningfully appraised to allow Islamic finance to continue playing a transformative role in addressing global environmental and economic challenges.

4.5. Cluster 5 (Blue Color: Sustainability in Malysia)

Sustainability has turned to be one of the main concerns in Malaysia either in respect of its impact on financial performance, as well as under Islamic finance principles as shown figure 8. Being one of the leading countries in Islamic finance, Malaysia can be a good example of how sustainability initiatives may affect financial performance. For instance, Yousaf et al. (2022) claim that green investments, which are usually considered luxury goods, contribute much to improving financial performance when embedded in sustainable practices. This is evidently reflected in the groundbreaking initiatives of Malaysia in infusing sustainability into Islamic financial instruments, such as green sukuk. Another critical issue of sustainability is economic development in Malaysia. Khan and Haneef (2022) opine that there is a need for Islamic-value-based sustainable economic growth coupled with the United Nations' SDGs. Thus, Malaysia works on economic development with environmental and social concerns. Morea and Poggi (2017) also present a new model of sustainability by highlighting how green sukuk can be used to finance renewable energy projects. Similarly, Campisi et al. (2018) underline that Shari'ah-compliant financing has peculiar potentialities in granting green economy initiatives; this seems to go in the right direction, considering the Malaysian targets for renewable energy. This is within the bigger regional trend of investments in renewable energy. This is in agreement with Alam et al. (2023), explaining the growth and assessment of Islamic green financing instruments like the green sukuk.

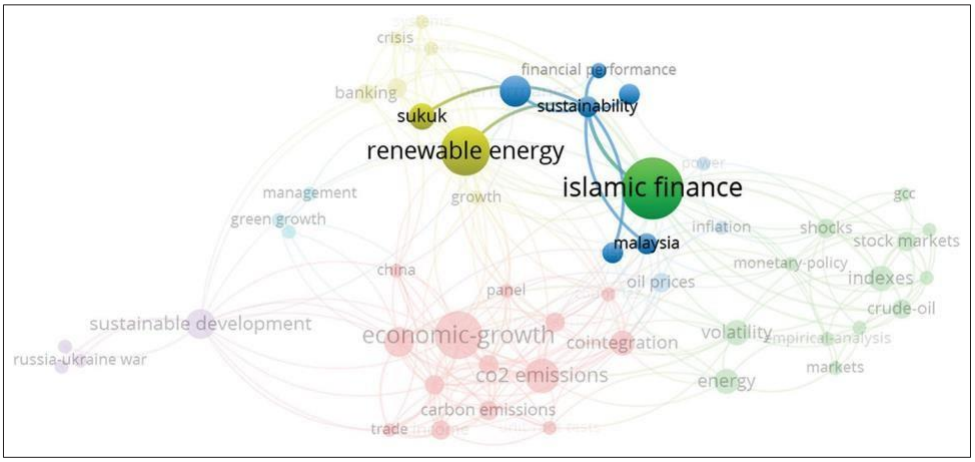
Oil prices are a delicate balance in Malaysia's tale of sustainability. An oil-producing nation, Malaysia juggles between a reliance on the revenues of oil and a commitment to sustainable practices. Mongi (2019) has mentioned how changes in oil prices shape economic policy and investment decisions on renewable energy. Higher oil prices would encourage renewable energy, while low prices could dampen those efforts. Mansour et al. (2020) review the impact of oil price fluctuations on the stability of Islamic markets. They state that such volatility may have a significant effect on markets like Malaysia. This therefore, calls for a need

Figure 7: Cluster 4: Sustainable development



*Source: Calculated by the author using VOSviwer

Figure 8: Cluster 5: Sustainability in Malysia



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to develop sustainable financial mechanisms that would cushion such risks.

The other important aspect to look at, in the discourse of sustainability, is the case of economic growth in Malaysia. Khan and Haneef (2022) discussed how Islamic principles link with the UN's SDGs by arguing for models of sustainable economic development. Thus, Malaysia approaches economic growth on the basis of environmental and social considerations for all policies. Faizi et al. (2024) examine the contribution of Islamic green finance frameworks to climate funding. This evidences how Islamic financial institutions are important in achieving sustainability goals. Further, Musari (2022) elaborates on how the ASEAN region is forging ahead toward a circular economy, impelled by Islamic green financing initiatives acting as a model for Malaysia's sustainable development. The interaction between financial performance, Islamic finance, and sustainability in the context of Malaysia forms a strong framework that can realize long-term economic and environmental goals. By using innovative financial instruments like green sukuk, Malaysia can push for more investments in renewable energy and reduce economic vulnerabilities linked to volatile oil market prices. Moreover, a number of studies, such as Morea and Poggi (2016) and Abduh et al. (2022), indicate embedded principles of sustainability within Islamic finance, hence placing Malaysia at the frontier of sustainable development globally. It integrates the holistic approach of enhancing financial performance, critical environmental challenges, and social issues for a resilient and inclusive economy.

4.6. Cluster 6 (Light Blue Color: Green Growth)

Green growth is one of the strategic ways to achieve economic development with the least damage to the environment. It, therefore, needs effective management and coordination in multiple sectors as shown figure 9. Effective management practices remain core for the implementation of green growth initiatives. According to Yousaf et al. (2022), in the strategic plan of any organization, the adoption of green investment requires top allocation; hence, placing it as a financial need and driver toward sustainable development. In that direction, Walkshäusl and Lobe (2012) underline the importance of risk management and stakeholder integration in combining Islamic investing principles with sustainability goals. This therefore, highlights how management can balance financial growth with environmental goals. Transitioning into renewable energy is considered a cornerstone in green growth due to the reduced reliance on fossil fuels and the mitigation of climate change. The other innovative financial instrument to support the projects on renewable energy, particularly in the wind energy sector, is green sukuk, according to Morea and Poggi (2017). In fact, as Morea and Poggi (2016) found, Shari'ah-compliant models can be used by Islamic finance to make investments in renewable energy more stable. Moreover, Campisi et al. (2018) investigate how green sukuk can increase the financial sustainability of renewable energy projects, especially in Italy, by showing their potential to contribute to green growth worldwide.

Financial growth and green growth are related, and on the other hand, green growth balances financial growth with environmental concerns. Khan and Haneef, 2022, demonstrated that Islamic worldview of sustainability strongly relates to the principles underlying green growth since they are centered on morality in economic undertakings. This concept is further elaborated on by Endri et al. (2022), who explain that green sukuk issuance from the corporate side helps ensure sustainable financing in Indonesia. It fosters economic growth while prioritizing environmental sustainability. On a similar note, Abduh et al. (2022) examine the interplay of Islamic financial development, energy use, and environmental quality. Their findings show that there is an opportunity for green growth to realize dual benefits-economic and environmental alike.

Other contextual factors believed to influence the green growth approach include environmental crises and measurement frameworks of performance. For instance, Hamoudi (2008) proposed the pragmatic approach of the Islamic law in tackling high-priority, modern-day environmental issues. In the same way, crises can give opportunities to carry out policies in green growth, he said. On the other hand, Alam et al. (2023) put forward an integrated framework that can determine how well Islamic green finance is performing. They even suggest that such a framework may be instrumental in testing and enhancing the potential of green Sukuk toward the achievement of sustainability goals.

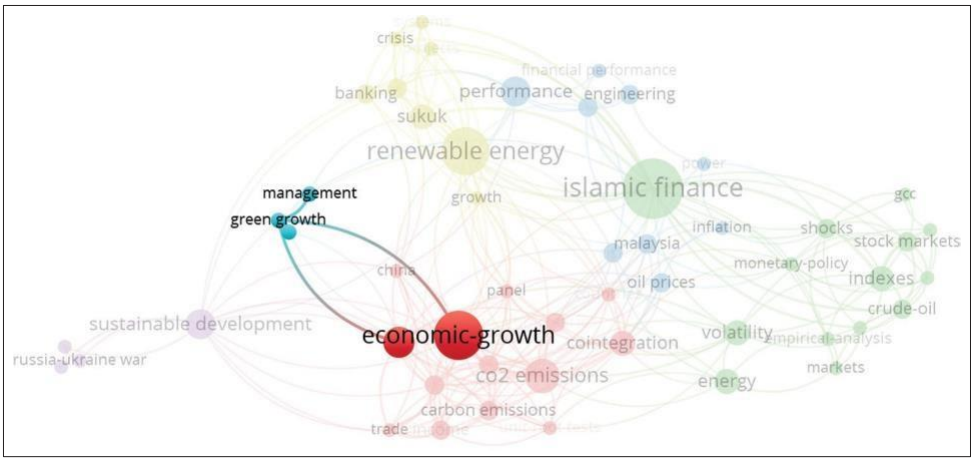
The analysis by Mansour et al. (2020) further discusses how the spillover volatility of crude oil and Islamic financial markets works and how, rather clearly, this might be susceptible to external causes that could alter the dynamics of green growth and sustainable investment. This indicates the multidimensional approach toward sustainable development, keeping in view efficient management practices, renewable energy transition, and even innovative financial instruments like green Sukuk. From this respect, Ibrahim et al. (2021) underlines the development of Islamic finance playing an important role in reducing energy intensity and friendly environmental investment stimulation. The discussed tools would then support attuning economic growth to the aspect of environmental sustainability towards providing a future that is both balanced and resilient.

On the other hand, Rashid and Siddique (2021) postulate that the connections between the circular economy principles, the green economy, and sustainable development go deeper and require more consideration if the promise of green growth initiatives is ever to be fully achieved. How these connections are made will be fundamental to the development of integrated approaches that encompass economic, environmental, and social dimensions of sustainability.

5. THEORETICAL INSIGHTS AND PRACTICAL APPLICATIONS

To answer RQ8; The integration of Islamic financing mechanisms with renewable energy projects has become a critical area of recent academic inquiry. It highlights the transformative potential of Islamic finance in driving sustainability across a wide array of industries and global economies. There are several themes

Figure 9: Cluster 6: Green growth



*Source: Calculated by the author using VOSviwer

intertwined from the literature; including those concerning Islamic finance; renewable energy; sustainability; and shariah-compliant investment structures. The different themes discussed; in putting them all together; remind one of Islamic financial instruments in the form of green sukuk; principles underlying mudarabah; or profit-sharing; and ijarah; or leasing. Islamic finance is increasingly understood to play a very instrumental role in the development of renewable energy through shariah-compliant means. Green sukuk; for example; and mudarabah contracts are structures that mobilize resources toward renewable energy projects but remain within Islamic ethical bounds. The mechanisms would not only assure resource optimization but also contribute to eco-friendly investments for the future with the SDGs of the world. Further; this amalgamation of such instruments with sound governance frameworks ensures reduced environmental impacts that increase financial sustainability. Some practical examples in Malaysia; Indonesia; and the UAE provide examples of Islamic finance in funding solar and wind energy projects. These cases draw on how highly relevant and; in fact; basic the collaboration is between financial institutions; governments; and the private sector for the renewable energy growth paradigm; especially in underdeveloped areas like Pakistan and Morocco.

The conceptualization of sustainability in Islamic finance underlines an inherent match with renewable energy goals. The instruments further enhance compatibility by employing instruments such as murabahah; a cost-plus financing mode of operation; and ijarah or leasing; which offer interest-free alternatives that are better understood than conventional financing. Such instruments have been used rather effectively in transitional economies like Saudi Arabia; Turkey; and Indonesia to align their renewable energy investments in line with global SDGs. Besides this; Islamic financing mechanisms have been instrumental in fostering innovation by facilitating partnerships among investors; developers; and governments. These partnerships; in turn; continue to accelerate the acceptability of greener energy options. The final frontier now becomes the future research needed into the possible applications of shariah-compliant mechanisms for extending the sustainability efforts in accelerating an energy transition on a global scale. Within such a platform; one has to highlight that of green sukuk-a major financial innovation related to Islamic renewable energy. Shariah-compliant bonds open all avenues to cover environmentally viable projects while giving a fairly good yield to investors. For instance; green sukuk issued in Malaysia; Indonesia; and the UAE have been able to mobilize resources for hydro and solar renewable energy projects. This is important because such bonds improve the transparency and governance of specific environmental projects; thereby attracting investors to their issuance. Yet; regulatory inconsistency and a lack of investor awareness in some regions remain as potential stumbling blocks. Removing these barriers will enable more green sukuk to sink deeper and have deeper contributions toward changing energy across the globe.

The integration of Corporate Social Responsibility within Islamic finance shows commitment to certain renewable energy goals. It means the incorporation of CSR practices into Islamic finance in such a way that its financial investments will lead to good environmental governance and sustainability. Empirical evidence from GCC countries has shown how Islamic banks use CSR as a tool for financing renewable energy projects, enhancing governance structures, and attracting investment toward sustainability. These efforts further diversify economies and simultaneously build resilience in key sectors like energy and manufacturing. By integrating CSR into their operations, Islamic finance institutions have ensured that the projects they invested in related to renewable energy are related not only to Shariah prescriptions but also meet international standards on sustainability. Such duality in alignment enhances both the credibility of these initiatives and increases their impacts; being more attractive to ethical investors widens their diffusion for renewable energy solutions.

Digitalization gives further impetus to Islamic finance in renewable energy projects. Primarily, operational efficiencies have immensely improved in Fintech platforms, blockchain technology, and artificial intelligence funding mechanisms, especially with the issuance of green Sukuk. For example, digital innovation in Malaysia and Saudi Arabia uses real-time monitoring of renewable energy projects, bringing in Shariah principles in addition to sustainability performance. These advances will create

process automation and expanded access to ethical investment opportunities, further accelerating the rate of renewable energy uptake across emerging markets. The combination of CSR and Islamic finance with digital technologies provides, in perspective, a strong enabling platform to achieve renewable energy projects. This will not only contribute to the care of the environment and ensure economic development but also attract a large pool of ethical investors towards changing the sustainable and resilient global outlook on energy.

Finally; green innovation within Islamic finance reflects the resonance of its principles with those of sustainability. Instruments like Istisna'; or manufacturing finance; and Musharakah; or equity participation; avail the necessary financing for renewable technologies to develop while fostering resilience economically and environmentally. Examples from Indonesia and Turkey illustrate that Islamic governance structures support green innovation through investment in environmental risk. However; low institutional capacity and a lack of policy support are some of the challenges facing further efforts to better position green innovation within Islamic finance. This has become the complement of other efforts in bringing Islamic finance's growing importance in the promotion of renewable energy through the inculcation of Environmental; Social; and Governance principles. ESG frameworks correspond to shariah principles to bring in more transparency and responsible governance; driving thereby investments in renewable energy. This has been one of the major reasons why many countries like Malaysia and Saudi Arabia have applied ESG principles in Islamic financial strategies; which have gone a long way in enhancing renewable energy. In the future; Islamic finance will be more capable of supporting global energy transitions and progressing on sustainable development goals by embedding in itself the application of ESG principles.

6. CONCLUSION

It has become of the essence that; through more recent awareness; the trend for sustainable business promotes economic growth; takes care of the environment; and ensures social development. In this regard; Islamic financing mechanisms have appeared; especially in the form of green sukuk; as an important means of financing renewable energy projects; furthering the course of market liberalization and integration of sustainability into business operations. As Islamic finance grows in widespread acceptance; it increasingly speaks for sustainable business. Evidence about the empirical relationship of economic growth with initiatives about sustainability has similarly strengthened. A keyword timeline analysis showed; among researchers; that focus on Islamic financing mechanisms would relate to increased speed given to business practices on sustainable business.

In this regard; the bibliometric analysis points to highly active regions in publishing research on Islamic financing mechanisms of renewable energy; such as countries that include Saudi Arabia and the UAE. Researchers from these very regions have presented highly influential publications to outline the integrations of environmental; social; and governance factors into business strategy with a specific focus on corporate sustainability; renewable energy; and resource management. It also reflects the commitment by some nations-like Saudi Arabia's Vision 2030 and the UAE Green Growth Strategy; among others-to the transformation of the economic landscape through sustainable practices supported by Islamic finance. Cluster analysis provides an indication that researchers are exploring aspects that relate to Islamic finance for renewable energy projects in addition to FDI; financial development; labor participation; environmental degradation; and carbon emission. With the economies moving away from oil-based sectors; more emphasis is being given to green technologies and sustainable business models as part of the corporate strategy. Such initiatives also get complemented through governance reforms; where companies implement practices that address social responsibility and environmental sustainability.

On this basis, urgent strengthened research is highly required in Islamic renewable energy finance, with GCC countries like Saudi Arabia and the UAE. The academic world, policymakers, and financial institutions should, therefore, join in this regard by formulating holistic frameworks that consider the specific economic and cultural particularities of the region. Besides, subsequent studies could seek to examine green Sukuk, a category of innovative Sharia-compliant financial instrument to attract investment toward renewable energy projects. Further, the governments should encourage research work by funding various interdisciplinary studies combining environmental sustainability, Islamic finance principles, and renewable energy development. Knowledge creation and practical implementation can be further enhanced through the establishment of dedicated research centers and fostering public-private partnerships. This can unlock the full potential of Islamic finance for sustainable development and environmental stewardship, which, in tandem with national visions such as Saudi Vision 2030 and the UAE Energy Strategy 2050, is setting a global benchmark with regard to the integration of faith-based financings with renewable energy innovation.

There is still ample scope for future research in exploring the role of technology and sustainable development in shaping the design of renewable energy projects financed through Islamic mechanisms. The linkage between sustainability and innovation will be all the more vital as investments in renewable energy; technology-driven solutions; and digital transformation increase. Besides; the integration of the SDGs within corporate governance frameworks is likely to lead to more responsible business practices and enhanced transparency. However; there are a few limitations of this study. The study relied on Scopus for this review; while supplementary sources could have been Google Scholar or similar databases from academic sources. The study uses some specific terms of search; including "Islamic finance" and "renewable energy." A further study should go a step further in covering more literature by considering related terms and synonyms in several languages.

Market liberalization now greatly promotes the evolution of Islamic mechanisms for financing in new trends of renewable energy projects. Moreover; more diversified economies that embark on the newest technologies will result in increasing integration of sustainable practices to pave their ways to the path of economic

prosperity and environmental protection. Future research will therefore be of immense benefit toward continued transformation under Islamic financing in efforts at sustainable business practice; hence securing a more sustainable; resilient global economy.

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