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## Mapping and Global Research Trends in Sharia Insurance (Takaful) Using the Scopus Database (An Analysis of Bibliometrics)

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# Mapping and Global Research Trends in Sharia Insurance (Takaful) Using the Scopus Database (An Analysis of Bibliometrics)

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## A. Introduction.

In Indonesia, the sharia insurance industry is growing, marked by the growing number of sharia insurance companies. Since the establishment of the first Syariah insurance in 1994, namely Takaful Family Insurance and General Takaful Insurance until now the number of sharia insurance has increased by 52 companies. Globally, Indonesia is located in the World Position (Mysharing.co, 2015).

The development of the Islamic insurance industry, also followed by the development of the amount of research on the field. From the results of Scopus data, the number of studies on sharia insurance has increased from 2007. If in 2007 there were only 19 research titles on sharia insurance, then in 2017 it would increase to 243 titles.

Although studies on sharia or takaful insurance are developing, very little research has been undertaken to measure and analyze scientific publications from a global perspective. From various articles published in various journal databases, more discusses the development of sharia insurance (Jobst, Hesse, Sole, 2008). But no one has mapped and analyzed the trends of research in the field of takaful mined from the Web of Science (WoS) or Scopus.

The WoS and Scopus databases have a high and overlapping relationship in journal indexing, but this citation database indexes different journals (Chadegani et.al, 2013; Vieira & Gomes, 2009). Scopus expects as the basis of the greatest abstracts and citations from the peer-reviewed literature covering a wide variety of subjects. Thus, the use of Scopus is used for more topics that might not be available on WoS (Juan et al, 2015) and Mercuri, Kumata, Amaral (2016).

To map and analyze the structure of knowledge in the field of Islamic insurance, we need an analytical tool that has been widely used by many researchers in various fields of research. Zou, Yue, Vu, (2018) mapped and analyzed the results of research on road safety using bibliometric analysis. By diverting ACA, keyword co-event analysis, and burst detection analysis, they can be accessed visually, topic knowledge, topic distribution, and research trends on road safety studies. Castillo-Vergara, Alvarez-Marin, Placencio-Hidalgo (2018) used bibliometrics analysis to build scientific maps, analyze the most relevant research in the field of creativity, and develop research in that field.

## B. Research problem.

What is the development and trend of research on Islamic insurance indexed in the Scopus database? Does the knowledge structure displayed in the form of maps show contributions from prominent authors, countries and academic institutions in the field of Islamic insurance?

## C. Research Objective.

The research objectives are: 1) to analyze the pattern of temporal distribution of journal articles about sharia insurance; 2) to show the contributions of authors, leading countries and the most productive academic institutions; 3) to map research topics; 4) to map state domination based on its application, and 5) to provide insight into the potential for collaboration and future directions.

## D. Theory

### 1. Scientific Communication

Whitley (2000) argues that communication is a key element of research and the importance of communication is demonstrated through other researchers (eg Meadows, 1998; Paisley, 1984). Garvey (1979: 9) emphasizes that "communication is the essence of science" and "science is [...] a social system where interactive communication is the main feature". Griffith (1990: 31) argues that scientific communication is a means of investigating the social and cognitive processes that underlie science. Cronin (2003: 1) states that:

Understanding how scientists work, how they interact with peers and the public, is not only intrinsically attractive to ethnographers, science sociologists, and many others but influences the development of effective scientific information resources and information support systems.

The characteristics of science identified by Whitley from an organizational perspective are in line with the majority of definitions of scientific communication which all focus on communication among

scientists. However, there is another approach. Scientific communication is not necessarily limited to peer communication. Jankowsky (2009: 7) says: Scientific communication is seen as presenting research findings to the community, government, and research institutions, to share and contribute to knowledge.

The study of scientific communication, including the growth of scientific information, the relationship between research fields and disciplines, information needs and their use, both groups and individuals, and the relationship between formal and informal communication methods (Mukherjee, 2009). Scientific communication can be seen as a process of providing research results through publication and preservation

## 2. Bibliometrics

The term "bibliometrics" was coined by Pritchard in 1969 and was defined as "the application of mathematics and statistical methods to books and other communication media" (Pritchard, 1969: 348). The aim is "to explain the process of written communication in science. In its development, many scientists made their definition of the term bibliometrics. Bibliometrics is a mathematical and statistical analysis to detect homogeneous areas in research networks and assess developments and interactions within and between fields of science (Small, 1973; White and Griffith, 1981).

Bibliometrics can be explained as collecting, tracking, and monitoring data about publications, or frequency of citations. The Bibliometrics (2016) defines it as a "quantitative analysis of a collection of bibliographic units such as books, journal articles, and the like." In that sense, citation analysis is perceived as an application of bibliometrics. Bibliometrics analysis provides insight into intellectual developments in the field of science by conducting a quantitative analysis of published literature data sets and studying patterns in a field of science. The assumption underlying this method is that the research article represents the knowledge generated by scientific research (Okubo, 1997).

Most bibliometrics studies provide a citation analysis of an area of research, usually in the form of a top-N list of the most cited studies, authors, or journals in a particular field. Quotations are used as a measure of influence. If an article is quoted frequently, then the article is considered important. This proposition is based on the assumption that the authors cite documents that they consider important for their work. Citation analysis can provide information about the relative influence of publications, but it is not strong enough to identify interconnection networks among scientists (Usdiken & Pasadeos, 1995).

Counting publications is one way of measuring and comparing production from various groups, such as institutions, regions, and countries. This method can also be used to evaluate outputs in certain fields of science and to track trends in research, collaborative research and many other aspects of research results. The indicators used in bibliometrics, according to Archambault & Gagné (2004) consist of three types, namely the number of articles published in a time span, the number of citations that can be used to evaluate the scientific impact of research (citations and impact factors), and mapping the field of science through analysis co-citation, co-word, and bibliographic coupling.

## 3. Co-citation

Co-citation is a measure of the semantic similarity of documents which utilizes citation relations (Small, 1973). Further explained, co-citation is defined as the frequency of two documents cited together by another document. If at least one other document cites the same two documents, these documents are said to be a citation, as shown in Figure 1. If the two documents are often cited together, then they tend to share similar or related concepts (White and Griffith, 1981). By calculating and analyzing the frequency of two documents cited in the same study, and identifying groups of documents that discuss the same research topic (Acedo et al., 2006; Upham and Small, 2010).

McCain (1990) uses the number of shared citations to establish measures of similarity between documents, authors, or journals. Different types of citation can be used, depending on the unit of analysis: document citation analysis (DCA), author citation analysis (ACA) (McCain, 1990; White & Griffith, 1981; White & McCain, 1998), and analysis Journal citation (JCA) (McCain, 1991). Co-citation links documents, authors, or journals according to the way the authors use them. The principle of grouping is carried out rigorously and repeatedly by scientists who cite publications that are considered valuable and / or interesting. Because the publication process is time-consuming, the description of the co-citation can reflect the state of the field sometime before. Also, co-citation helps in detecting paradigm shifts and schools of thought (Pasadeos, Phelps, & Kim, 1998).

Document citation analysis (DCA) is used to link published documents (research articles, books, editorials, or other published material). The author citation analysis (ACA) is used to link the writings of one person and other writers who first produced them (White & Griffith, 1981). The ACA can identify important authors and relate them through citation listings (White & McCain, 1998). Journal citation analysis (JCA) aims to connect related scientific journals.

#### 4. Citation Database

Scopus covers various fields of science by providing how many citations received by authors or articles, major journals published in certain disciplines, and citation information for specific journals. The focus of Scopus coverage is the primary document types from journals. Primary documents mean that the writer is identical to the researcher who is responsible for the findings presented in his writing. Scopus currently has more than 69 million core records, with the oldest records dating from 1788. Every year, around 3 million new items (5,500 daily) are added to the database.

As of August 2017, Scopus has added more than 195 million pre-1996 references citing references from 11.5 million articles. These additions were achieved in two ways: (1) by adding pre-1996 references to existing articles, and (2) by adding back article files, returning to Volume1 / issue1 and including references cited back to 1970. Content obtained from 60 large publishers. Like Springer Nature, Wiley Blackwell, Taylor & Francis, IEEE, American Physical Science, and Elsevier.

The most well-known quantitative metric applied in peer-reviewed journals is the Impact Factor (IF). According to Krell (2012) that IF is published annually for journals indexed by the Thomson Reuters Journal Citations Report (JCR) and is based on an average calculation of the number of citations for articles published in the previous two years and quoted by indexed journals. In addition to the famous IF, several other trusted journal publication metrics are: (1) JCR Eigenfactor Score (EFS) (available from <http://www.eigenfactor.org/>), (2) JCR Article Influence Score (AIS) (available from [Http : //wokinfo.com/](http://wokinfo.com/)), (3) Scopus Source Normalized Impact per Paper (SNIP) (available from [www.scopus.com](http://www.scopus.com)), (4) Scopus CiteScore (available at [www.scopus.com](http://www.scopus.com)), and (5) SCImago Journal Rank (SJR) (available from [www.scimagojr.com/](http://www.scimagojr.com/)) (Teixeira & Memo, 2017). SNIP and SJR are available free on the web. EFS measures the impact and prestige of scientific journals by using citation weights on each of the same citations; citation weights can differ depending on the influence of the journal that cites them (Bergstrom, 2008). Besides, EFS does not count self-citations (for example citations from the same journal). AIS determines the average influence of journal articles during the first five years after being published and is calculated by dividing the EFS by the number of articles published in the journal (Arendt, 2010).

#### 5. Mapping Science

Visualizing the entire body of scientific knowledge and tracking the latest developments in science and technology has attracted the attention of scientists, philosophers, government officials, librarians, and publishers. Advances in information visualization are increasingly promising to present knowledge structures and developments in increasingly intuitive ways (Chen, 1999). Scientific literature provides information to visualize knowledge. Researchers usually focus on structural patterns in knowledge discovery, information retrieval, and other disciplines that can provide mutual insight between authors of scientific publications, documents, and journals (White & McCain, 1998; Wise et al, 1995).

Mapping science, or mapping bibliometrics, is an important research topic in the field of bibliometrics (Morris & Van Der Veer Martens, 2008; van Eck & Waltman, 2010). The aim is to find a representation of intellectual connections in dynamically changing scientific knowledge systems (Small, 1997). In other words, science mapping aims to display the structural and dynamic aspects of scientific research (Börner, Chen, & Boyack, 2003; Morris & Van Der Veer Martens; Noyons, Moed, & Luwel, 1999).

General workflows in science mapping analysis have different steps but generally consist of data collection, preprocessing, network extraction, normalization, mapping, analysis, and visualization. At the end of the process, the researcher must interpret and obtain several conclusions from the results (Cobo et.al, 2011). Some of the systems developed are intended to overcome the problem of knowledge visualization, such as selecting suitable similarity metrics and displaying high dimensional structures. SemNet, introduced in the 1980s, is one system that can produce 3D graphical

representations of a knowledge base to help users understand complex relationships (Fairchild, Poltrock, and Furnas, 1988).

In its development more and more application systems have been developed to visualize knowledge. Specifically, Cobo et.al (2011) have analyzed nine science mapping software, namely Bibexcel, CiteSpace II, CoPalRed, IN-SPIRE, Leydesdorff Software, Network Workbench Tools, Sci2 Tools, VantagePoint, and VOSViewer. The results of the study show that all the software has different characteristics, and has limitations in mapping knowledge. From the results of this research, Cobo et.al (2011) suggested building software that can extract all bibliometrics (intellectual, social, or conceptual) networks.

In this digital age, changing the collection of printed articles to electronic collections in libraries has a big impact on researchers, because electronic collections are easier and save time (Zhang et al., 2011). Many libraries began to subscribe to various databases to further help researchers conduct their research. Specifically, citation databases do not only assist universities, research institutions, publishers, editors, writers, and librarians in analyzing citations to subscribe, obtain research funding, make reviews and evaluate journals (Meho and Yang, 2007; Riahinia et al., 2011; Yuan and Hua, 2011), but also provide information for researchers on the intellectual structure of knowledge or fields of science through citation analysis (Small, 1973) ; Griface et al., 1974; White and Griffin, 1981; McCain, 1986, 1990).

#### E. Research Methods

The bibliometrics method has been widely applied in quantitative analysis in many fields of knowledge (Chen, 2006). The method comprehensively uses professional knowledge and mathematical methods, statistics, information science, philology, and other disciplines to analyze the regularity of distribution, intellectual base, research trends, and evolutionary paths. Commonly used bibliometric methods include co-word analysis (Callon et.al, 1983), document citation analysis (Small, 1973), author citation analysis (White & McCain, 1998) and many other variations (Chen, 2017). Also, information visualization, proposed by Robertson in 1989, focuses on interactive visual representations of abstract data to strengthen human cognition. Visualization techniques include hierarchical or tree visualization (Johnson & Shneiderman, 1998), graphs or network structures (Arwendria, 2002), temporal structures (Morris et.al, 2003), geospatial visualization, and coordinated from several types of visualizations (Chen, 2017).

##### 1. Data Collection

There are three steps in building a database for analysis using the CiteSpace V application. The first step is to build a database on sharia insurance (takaful), at journals and conferences indexed by Scopus (<http://scopus.com>). Because the purpose of this study is to map the results of research on Islamic insurance (takaful), the keywords contained in the abstract of documents contained in the Scopus database are used.

The next step is to export and download the data in CSV format. The CSV file is a bibliographic citation file that contains a series of lines bounded by a two-character code and an appropriate value. After that, the database is expanded. The database must contain the most complete literature coverage, as suggested by Chen et al. (2010), the citation network as indicated by the article reference must be entered in the database. References cited by articles provide valuable information about intellectual networks between various concepts and theories (Small, 1973).

##### 2. Data Processing

The main objective of co-citation analysis is to identify the intellectual structure of the domain of scientific knowledge in terms of groupings formed by the accumulation of citations in the scientific literature. The traditional co-sensitivity analysis procedure for DCA and ACA consists of the following steps:

- a. quote data from Scopus.
- b. create a downloaded reference matrix (DCA) or author (ACA).
- c. identify co-citation matrices as node-and-link graphs or as multidimensional scale configurations (MDS) with possible link trimming using Pathfinder network scales or minimum tree span algorithms.
- d. identify specialization of co-citation groups, multivariate factors, components, or semantic space dimensions using various algorithms for grouping, factor analysis, component analysis, or semantic indexing.

e. Interpret the nature of the citation group.

### 3. Data Analysis

Data were analyzed using content analysis techniques based on maps produced by the CiteSpace V. application. Content analysis is a systematic test that can be replicated from communication symbols, where these symbols are given numerical values based on valid measurements, and analysis uses statistical methods. to describe the content of the communication, conclude and provide context, both production, and consumption (Riffe, Lacy and Fico, 2014). The quantitative content analysis describes or explains a problem whose results can be generalized. In general quantitative content, analysis is a scientific research technique aimed at knowing the characteristics of contents and drawing inference from the content. Content analysis is intended to systematically identify visible communication (manifest), and is carried out objectively, validly, reliably and can be replicated (Eriyanto, 2011).

## F. Results and Discussion

### 1. Data Description

Scopus is an abstracts database and peer-reviewed literature quotations from scientific journals, books, and conferences in the fields of science, technology, medicine, social sciences, and the arts and humanities. To find a specific field of study from the Scopus database a search strategy is needed. Search strategies are approaches and plans that are carefully thought out about how to find relevant information. To develop a search strategy, it is necessary to define and write research questions; identify keywords, terms, and phrases; identify keyword synonyms, using a Thesauri database or Subject Title.

The search term used to trace the concept of Islamic finance is to use the vocabulary contained in the STW Thesaurus for Economics (<http://zbw.eu/>). The thesaurus is the most comprehensive bilingual thesaurus in the world for representing and searching economic-related content used by universities, research institutes, public institutions and companies for knowledge organizations and research. With nearly 6,000 subject titles in English and German and more than 20,000 synonyms covering all fields of study related to economics. STW is published and continues to be further developed by the German National Library of Economics under the latest changes in economic terminology.

STW standardizes the documentation language for subject indexing and shows the semantic network between these concepts that conforms to the latest ISO 25964 thesaurus standards. The STW consists of seven main subject groups, which form the highest level of thesaurus subject categories. In more detail, each concept note contains a selection label, in some cases scope notes, synonyms and quasi-synonyms in "used for", one or more subject categories, and hierarchical and linking with other concepts.

The first step in an information retrieval strategy is to determine the right terms to represent the search for information that can be recognized by the Scopus database. This research collects citations in the field of Islamic finance, specifically Islamic insurance. The term sharia insurance is used in a variety of terms (synonyms) in the Scopus database. The terms "sharia" are used interchangeably for the words "shari'ah", "sharia" and "shari'a". Other terms identified are "insurance" (insurance), and "takaful." From these terms, the building blocks of search terms are made using Boole logic, so that they become:

**(Insurance) AND (Syariah OR Syari'ah OR Sharia OR Shari'a)ANDTakaful**

From the search results using the building block, only 57 listings were obtained. If it is restricted again to the type of journal article documents and conference papers, only 12 listings are found. The search results are then downloaded using two formats, namely \*.csv, and \*.ris. Furthermore, the download results are processed using the Vosviewer application, but cannot be further processed. Then the processing is done using the CiteSpace V application, the results also cannot be read properly. Based on these findings, a discussion was held with 2 (two) Islamic Economics experts from the Faculty of Islamic Economics and Business, UIN Imam Bonjol Padang. From the results of the discussion, it was suggested that the field of Sharia Insurance was discussed in the field of Islamic Finance or Islamic Finance. Thus, the search term was developed to:

**(Finance OR Insurance) AND Islam AND (Sharia OR Shari'ah OR Sharia OR Shari'a)**

The term building blocks are used as search terms in the Scopus database. Before a search is carried out, the limitation of the documents traced is carried out, i.e. only documents originating from

journals and conference papers; documents published in the last 15 years (2006 - 2019), both open access and commercial (paid). The search results obtained 795 titles consisting of 83 of open access, and 712 of others (commercial), as shown in Figure 2

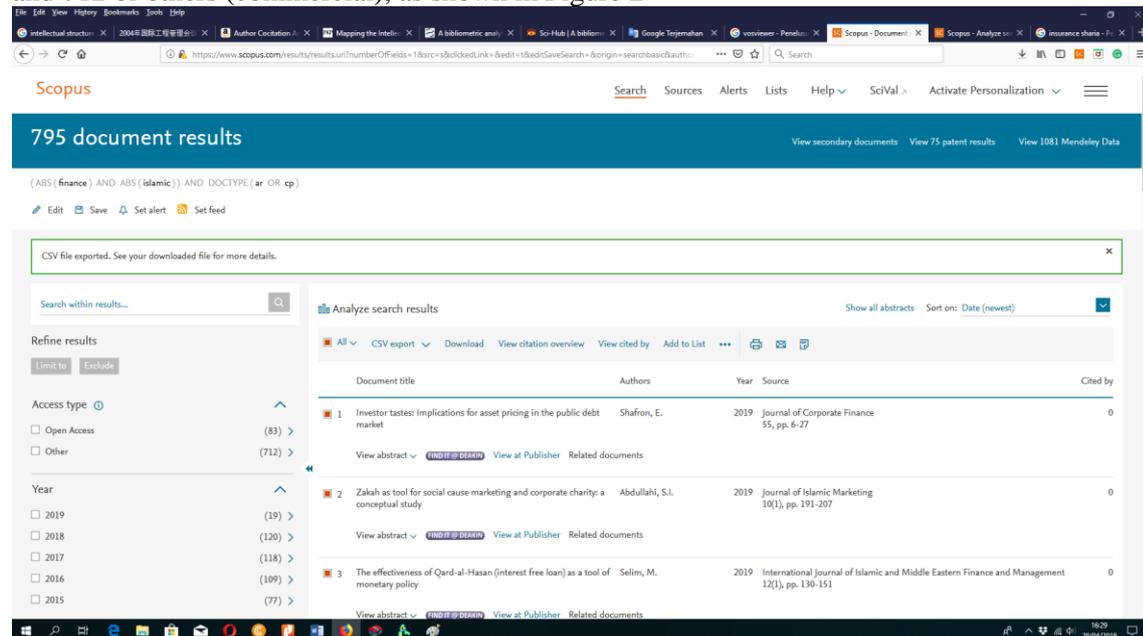


Figure 1. Search Results

a. Document Distribution by Year

Sources of documents on Islamic Finance come from 795 journals and conference papers. The development of research on Islamic Finance when around the 1950s Pakistan began to develop an experimental bank for savings and loans and interest-free. The bank only flourished during the 1970s when oil money flowed into the Gulf States. In 1979, Pakistan became the first country to "Islamize" banking practices at the country level. From 2004 to 2008, investor interest in Islamic financial products grew strongly amid rising oil and petrodollar prices that continued to flow through oil-producing countries. At that time, research began to develop about Islamic finance, which was pioneered by the International Islamic University of Malaysia. The trend continues to increase until 2018.

Documents by year

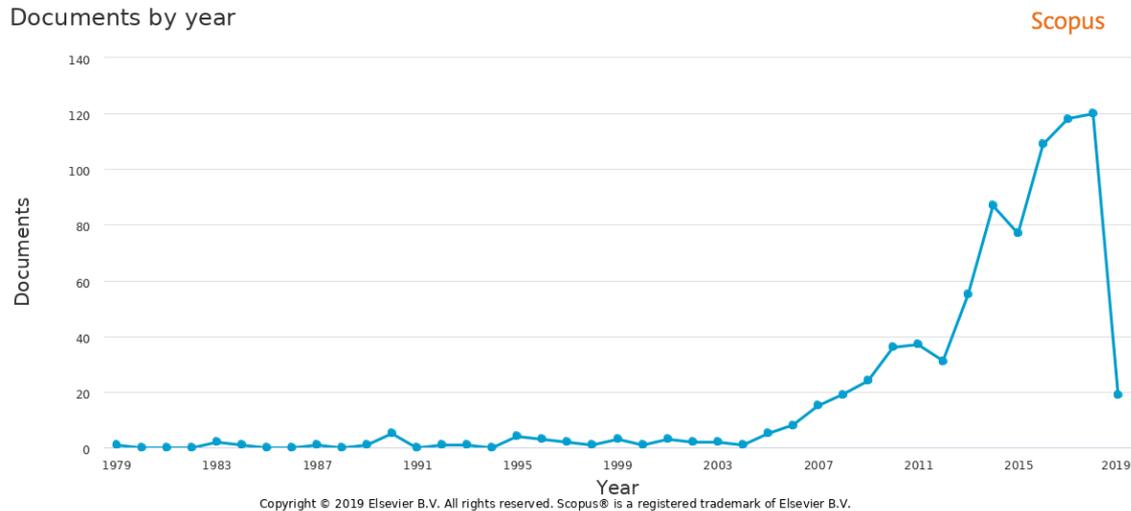


Figure 2. Distribution of Documents in Sharia Finance by Year

b. Document Distribution by Subject

Documents based on the subjects most widely used in research on Islamic Finance are Economic (30.7%), Business Management (22.6%), Social Science (20.5%), and other fields as shown in Figure 3

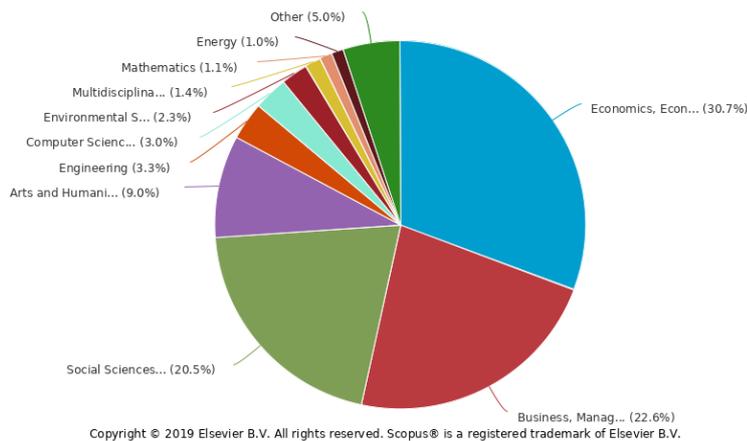


Figure 3. Distribution of Documents in the field of Islamic Finance based on Subjects

2. Collaborative Network Analysis

Citespace provides three levels of study: co-authors, co-institutions, co-countries; node size represents the number of articles/papers published by each author, institution, country (Wang & Cai, 2010). This study analyzes the cooperation network in the field of Islamic insurance.

a. Co-Authorship Network

To show the level of collaboration of the most productive researchers in the dataset CiteSpace software was used to create a network map of co-authorship. Two researchers have joint authorship if they have co-authored at least one article/paper. CiteSpace generates networks by measuring intermediate score scores. In a network, inter-node centrality measures the role of the node to all nodes in a collaboration network. The higher the centrality of a node, the more important the strategic node (Chen et al., 2009: 236).

As shown in Figure 5, there is no dominant co-authorization pattern in Sharia Finance research. The density obtained for the co-author network and the average grouping coefficients are 0.00 and 0.04. The average total density of the network indicates the very minimum joint authorship network. The grouping coefficient shows that the tendency of network members to form different groups is relatively low. There is no significant relationship between the collaboration index and the amount of production as well as the collaboration index and citation impact.

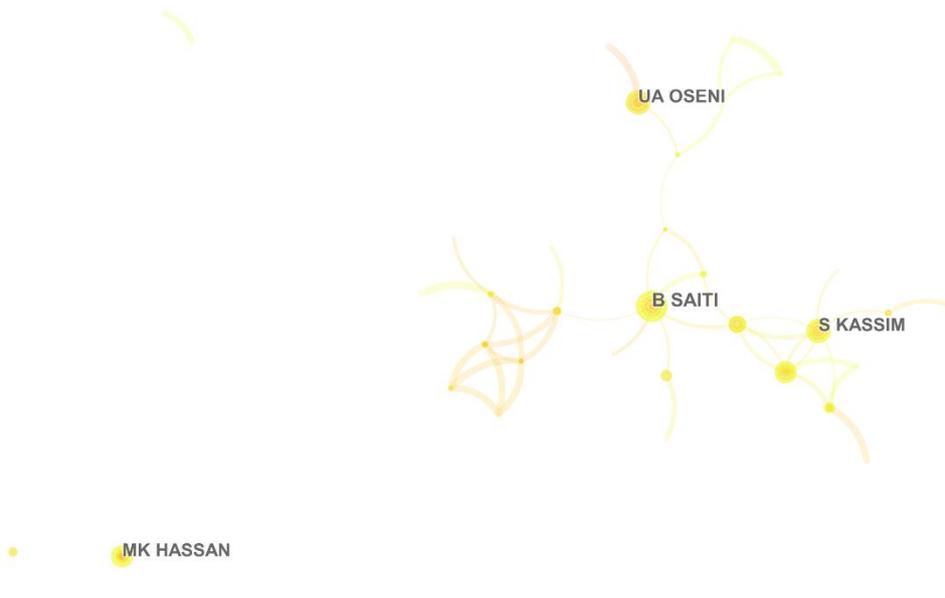


Figure 4. Co-Authorship Network

However, if highlighted more closely, 3 groups are collaborating, but they are not related to each other. Writer B Saiti who obtained 20 citations collaborated with 6 other writers, namely A Abdullah, R Ahmad, M Ariff, M, Masih, M Hasan, and NH Noordin. Although UA Oseni received 16 citations, it only collaborated with MN Haron and AH Ansari. On the other hand, the writer S Kassim who obtained 15 citations collaborated with NZ Harun, SA Salman, R Hassan, A Abdullah, and AA Adeyemi.

From the results of data processing displayed the top 10 authors who collaborate with other authors in the field of Islamic Finance, as in Table 1.

Table 1. Ranking of Co-Authorship

Rank	References	Counts	Centrality
1	B SAITI	20	0.04
2	MK HASSAN	17	0.00
3	UA OSENI	16	0.00
4	S KASSIM	15	0.02
5	R HASSAN	13	0.01
6	A ABDULLAH	12	0.03
7	MA CHOUDHURY	9	0.00
8	N NAIFAR	8	0.00
9	SA SALMAN	8	0.01
10	M MASIH	7	0.03

b. Co-Institutions Network

This study also analyzes research institutes that examine Islamic Finance. From Figure 5, it can be seen that the Department of Economics and Finance, International Islamic University of Malaysia ranks top. Also, the Department of Economics and Finance, International Islamic University of Malaysia is the center of attention of Islamic Finance researchers in the world.



Figure 5. Sharia Finance Co-Institutions Network

c. Co-Countries Network (Country)

The analysis of co-country countries in Figure 8 shows the co-country network of related articles in the field of Islamic Finance, presenting an analysis of the spread of research on Islamic Finance between various countries. Seventeen countries are distributed on five continents, two countries in the Americas (United States, and Canada), eight in Asia (Malaysia, Saudi Arabia, Indonesia, Tunisia, Pakistan, Qatar, Bahrain and United Arab Emirates), three in Europe ( England, Russia and France), and one in Oceania (Australia), three in Africa (Tunisia, Morocco and Egypt). As shown in Figure 8, the cooperation network covers 17 countries that are relatively centralized and

work closely. There are five knots with purple rings, including Malaysia, Britain, the United States, Saudi Arabia, and Indonesia; meaning the five countries play a key role in cooperation among 17 countries in Sharia Finance research.



Figure 6. Co-Countries Network for Islamic Finance

Table 2 shows the top ten productive countries sorted by the number of articles published in descending order in the field of Islamic Finance. Malaysia contributed 430 articles / papers, followed by Britain (112), United States (103), Saudi Arabia (82), Indonesia (68), Australia (52), Tunisia (41), Pakistan (40), Turkey (33), and France (32), as shown in Table 2.

Table 2. Productivity Ranking by Country

Rank	Counts	References	Year
1	430	MALAYSIA	2007
2	112	UNITED KINGDOM	2003
3	103	UNITED STATES	2000
4	82	SAUDI ARABIA	2001
5	68	INDONESIA	2010
6	52	AUSTRALIA	2006
7	41	TUNISIA	2011
8	40	PAKISTAN	2007
9	33	TURKEY	2015
10	32	FRANCE	2012

### 3. Development of Sharia Financial Research

#### a. Document Co-citation Analysis Network

CiteSpace analyzes bibliographic listings of Islamic finance collected from Scopus and produces 834 listings, and 35351 visualized bibliographic networks (Figure 9). Ten articles were highlighted and labeled. There are 380 unique nodes and 1139 links in the network that are analyzed per year (time slice). The number of clusters produced was as many as 63 clusters. Nodes and links represent the quoted and coordinated relationships within each network. The color of the link represents different time slices to indicate the time the citation relationship occurred for the first time.

The sequential time slice color scheme follows a gradual change from blue to orange. For example, a green link shows the co-citation relationship that first occurred around 1998. Nodes with a larger size indicate the article was quoted more often. Nodes with several rings and different colors are articles cited over several time slices thus implying that the article is potentially important. The nodes highlighted in the purple circle are documents with high centrality in the Islamic financial network.

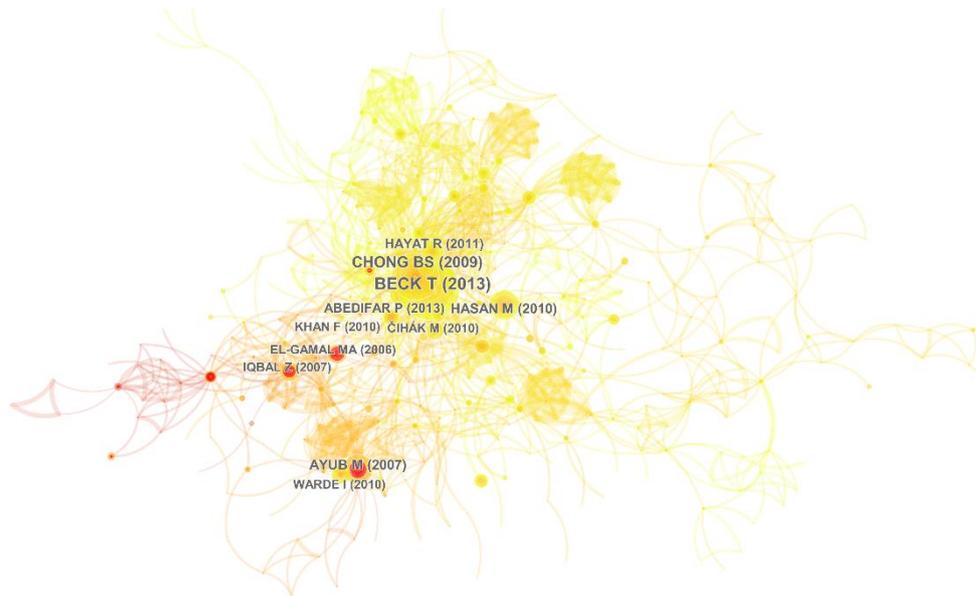


Figure 7 Document Citation Network in Sharia Finance

To see the emergence of the concept or field of Islamic finance is influenced by science or other fields. From the Pennant diagram, it can be seen the development of the concept of Islamic finance, or specifically takaful influenced by 3 fields. The first area, namely the financial system, international trade. The second area, namely planning, and risk-sharing. The third area, namely investment, and sharia compliance. The third area, namely products and services, insurance, sustainable development, economic and social effects, and information management. From the countryside, the term takaful appears at the beginning of Saudi Arabia, India, Pakistan, Turkey, Yemen, and Malaysia.

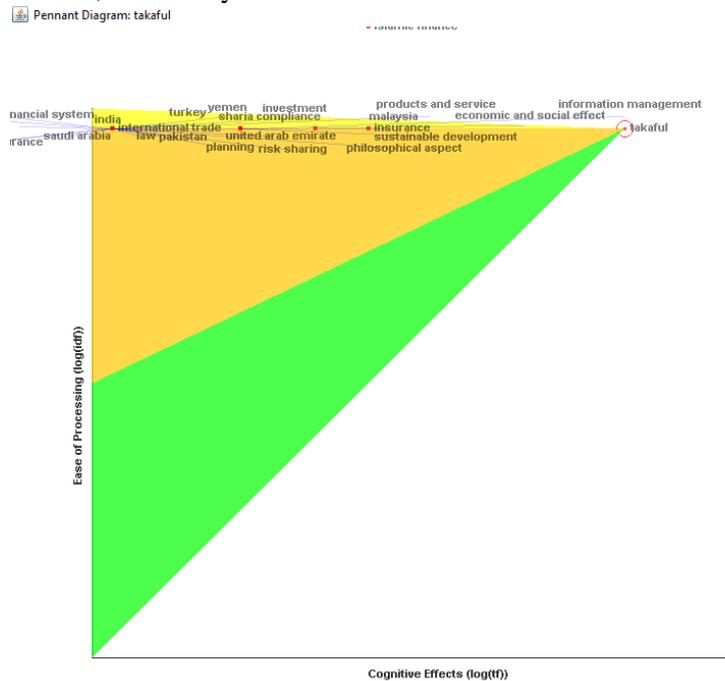


Figure 8. Diagram Pennant in the field of Takaful

b. Author Co-citation Analysis Network

Not only can the author's co-authorization analysis obtain the distribution of writers who are frequently cited in a particular field and identify influential authors in the field of Islamic Finance, but also understand the topic of similar research conducted by the author in the field of Islamic Finance. In CiteSpace, each node represents one author, the relationship between the two authors represents the connection relationship. Besides, the size of each node represents the number of author citations, the

distance between two nodes represents the two frequencies of author citation. The bigger the knot, the more important the writer; the smaller the distance between the two nodes, the higher the frequency of the authors' co-citation, and the closer the direction of the research.



Figure 9. Writer's Co-citation Network in Islamic Finance

As shown in Figure 11, the largest node, Wilson R, is cited together with Iqbal Z and Job M, which focus on choice criteria, Islamic finance, and political development. The second big node is represented by Beck T, with the relations between Chong BS, Khan F, and Hasan M, which focus on credit risk, Sukuk and political development. In addition, there are two groups of co-citation, each represented by Hasan MK and Dusuki AW, but the direction of the research cannot be displayed. Some sub-networks are isolated, which means the research area is from far different sub-networks, even though there is the same research direction in each sub-network.

Table 3 lists the ten authors cited in descending order. As shown in Table 3, the most quoted authors are Givoni M (171), the top nine other writers cited are Beck T (95), Hassan MK (62), Wilson R (58), Iqbal Z (56), Chong BS (48), Dusuki AW (46), Khan F (43), El-Gamal MA (41), Hasan M (41) and Ayub M (40). These results indicate that the authors' research plays an important role in contributing to Sharia Finance research and its future development, and they are influential writers.

Table 3. Top Author Ranking concerning Islamic Finance

Rank	Counts	Centrality	References	Cluster #
1	95	00.11	Beck T, 2001	1
2	62	00.16	Hassan MK, 2002	2
3	58	00.00	Wilson R, 2008	0
4	56	00.19	Iqbal Z, 2006	0
5	48	00.00	Chong BS, 2009	1
6	46	00.00	Dusuki AW, 2005	2
7	43	00.00	Khan F, 2010	1
8	41	00.11	El-Gamal MA, 2006	4
9	41	00.00	Hasan M, 2010	1
10	40	00.11	Ayub M, 2002	0

Citation burst is the most active indicator of research. Citation burst detects an event that can last for several years and also one year. Citation bursts provide evidence that certain publications are closely related to citation spikes. In other words, the publication turned out to have attracted tremendous attention from the scientific community. Additionally, if a cluster contains many nodes with strong bursts of quotes, then the cluster as a whole captures the area of active research or trends that emerge.

From the results of citation burst data processing, obtained 10 writers in the field of Islamic Finance who are most active or attract extraordinary attention from the Islamic Finance community is Lewis MK who received a strength value of 7,4482, starting in 2007 and ending in 2013 as shown in Table 4.

Table 4. The Most Active Writers in the Field of Islamic Finance

Cited Authors	Year	Strength	Begin	End	1990 - 2018
LEWIS MK	1990	<b>74.482</b>	2007	2013	
KHAN M	1990	<b>52.695</b>	2007	2012	
CHOU DHURY MA	1990	<b>4.668</b>	2001	2006	
PARKER M	1990	<b>41.298</b>	2010	2013	
VOGEL FE	1990	<b>4.089</b>	2009	2011	
SIDDIQI MN	1990	<b>40.548</b>	2001	2007	
KHAN MF	1990	<b>40.491</b>	2007	2012	
LA PR	1990	<b>38.548</b>	2010	2014	
KHAN MS	1990	<b>38.173</b>	2009	2013	
RICE G	1990	<b>3.795</b>	2010	2011	

c. Journal Co-citation Analysis Network

Unlike the analysis of the distribution of scientific fields, analysis of journal citation is carried out to identify the journals cited in the field of Islamic Finance research. Therefore, through analysis of journal citations, important insights can be obtained on journals which are the knowledge base of the research field (Liu et al., 2015). Table 5 lists 10 journals cited in the field of Islamic Finance research. Through a careful analysis of the list, it was found that the Islamic Banking journal is the most frequently cited journal for articles in the field of Sharia Finance research and has the highest centrality of 0.19 which indicates that the journal is the most important source of articles cited in the field of Sharia Finance research. Also, although the Islamic Finance Journal is often cited in the field of Islamic finance, it is not an important source in that field.

Table 5. Citation Ranking

Rank	counts	Centrality	references	Year
1	229	00.19	Islamic banking	2006
2	186	00.00	Islamic Finance	2008
3	93	00.19	An Introduction to Islamic Finance	2006
4	85	00.14	Islamic Banking and Finance	2008
5	73	00.14	Islamic vs conventional banking	2013
6	63	00.15	Islamic Finance in the Global Economy	2007
7	53	00.07	Understanding Islamic Finance	2010
8	46	00.00	Islamic Banks and Financial Stability	2013
9	41	00.07	The Effects of the Global Crisis on Islamic and Conventional ...	2014
10	41	00.15	A comparative literature survey of Islamic finance ...	2007

Using CiteSpace V, a journal citation network was developed consisting of 110 nodes and 183 links (see Figure 15). As shown in Figure 15, there is no relationship between one journal with

another journal. The inter-cluster node also does not appear dominant. From this picture, it can be concluded that there is no dominant source in the field of Islamic Finance.



Figure 10. Journal Co-citation Network in Islamic Finance

d. Network Map and Co-occurrence Analysis Key Word

Because of the close relationship between the keywords and the core of the document, the analysis of the same keywords can help identify the core of Sharia Finance research. Keywords indicate the content of an article and are the essence of an article. The existence of various terms in the literature influences the accuracy of the results to some degree. As shown in Table 6, between keywords related to Islamic Finance, the keyword "Islamic Finance" appears with the highest frequency, around 396 times. The keyword "Takaful" first appeared in 2014 with a frequency of 16 times.

Table 6. Keyword Ranking

Rank	Keyword	Frequency	Year
1	Islamic Finance	396	2007
2	Islamic Banking	108	1990
3	Malaysia	78	2008
4	Banking	62	2013
5	Sukuk	34	2009
6	Shariah	29	2010
7	Sustainable Development	22	2011
8	Shariah Compliance	16	2013
9	Takaful	16	2014
10	Islamic Microfinance	14	2011

In this study, the co-occurrence network keywords are arranged according to an analysis that contains 329 nodes (keywords) and 1461 links. The knowledge map shown in Figs. 4 includes keywords with a threshold frequency of 50 or higher. The relationship between keywords looks tight and stable and forms a complex co-occurrence map. "Islamic Banking" and "Finance" are the main research objects.

Sustainable Development is important to research with a frequency of joint events 22 times. According to the official definition of the United Nations, sustainable development is defined as development that meets current needs without compromising the ability of future generations to meet their needs. Lately, the term SDGs has emerged. The SDGs was originally an initiative of the United Nations (UN) which began in 2012. The United Nations recommends that all countries adopt SDGs consisting of 17 (seventeen) achievements. Regarding SDGs, the Governor of Bank Indonesia once expressed the view that SDGs are in line with the spirit of Islamic finance based on Islamic ethical values derived from sharia objectives (maqasid al-Shariah).

Shariah compliance is also an important research focus of Islamic Finance with a frequency of appearing together 16 times. Shariah compliance is the compliance of sharia banks to sharia principles because their principles and laws are based on the Qur'an, hadith, ijma, and ijtihad. According to Nurhisam (2016) that the demand to improve the regulatory framework for sharia compliance is a juridical challenge faced by every country that wishes to develop an Islamic-based financial business (sharia). Also, the focus of other studies that also obtained the frequency of appearing together 16 times is takaful. According to Antonio (2001) that takaful is a concept of protection (insurance) that is carried out following Islamic sharia, which is essentially an agreement of mutual agreement between a group of people to guarantee each other in the face of possible disasters or disasters. Even according to Qusthoniah (2017) that takaful can function as an institution that unites the interests of society.

Malaysia is a hot spot with a cumulative frequency of 78 times. International Shari'ah Research Academy for Islamic Finance (ISRA) Executive Director Mohammad Akram Laldin said that Malaysia was a global pioneer in the capital market, having established the first Islamic bank in 1983 and initiated the first Islamic insurance company in 1984. In the 2008 World Takaful Report Ernst & Young commented that the takaful market is growing at an annual rate of 20 percent and, most likely, will reach the US \$ 4.3 billion in 2010. While Malaysia is seen as the most mature takaful market, with a variety of long-established regulations

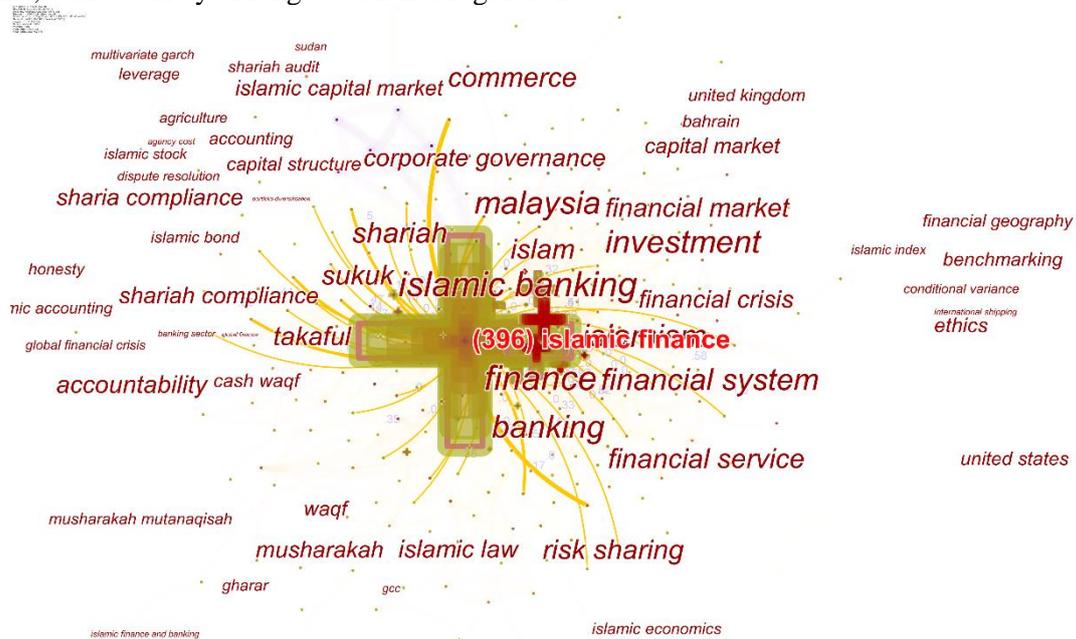


Figure 11. Co-occurrence Network of Islamic Finance

The development of the concept of "Sharia Finance" began in 2007 with three spikes, namely in 2010, 2013, and its peak in 2016 (Figure). The global Islamic financial market is growing moderately, due to strong investment in the Halal Sector, infrastructure and Sukuk bonds, mainly through electronic mode in all products and services. The total industry value is estimated at USD 2.05 trillion in 2017, marking asset growth of 8.3% in USD, and reversing the stagnation of asset growth over the previous two years (2017: USD 1.89 trillion vs. 2016: USD 1.88 trillion).



e. Research Hotspot

CiteSpace groups the quoted network together with the spectrum grouping method. Experts read papers cited in groups to identify and explain groups with the general characteristics of members in them. Tracking hot fronts in Islamic Finance for researchers aims to better understand trends from scientific research on the field. The subject boundaries are determined according to the term mutation extracted from the title of the literature, abstracts and high-frequency words from the article.

i. Hot Research Topics

Hot research topics in the field of Islamic Finance based on the information provided in Table 5 and Figure 18, there are three main research topics, as follows:

(1) Research methods: Until now, scientific research on Islamic finance has only been limited to empirical verification of its performance with the argument that Islamic finance is different from conventional finance. Theoretically and empirically, demonstrations on economic welfare and policies such as economic stability, financial inclusion, economic development, and stabilization policies are needed. One of the most active members is Ibrahim, Mansor H. (2015). Issues in Islamic banking and finance: Islamic banks, Shari'ah-compliant investment and Sukuk, Pacific-Basin Finance Journal, Volume 34, pp. 185-191 DOI: 10.1016 / j.pacfin.2015.06.00

(2) Islamic Finance Network: Research topics, such as Sustainable Development, Shariah Compliance, Takaful, and Islamic Microfinance have received more attention from researchers to explain the growth trends of the Islamic financial industry. One of the most active members is Nawaz, Tasawar (2017). Intellectual capital, financial crisis, and performance of Islamic banks: dose shariah governance matter? International Journal of Business and Society, Vol. 18 No. 1, pp. 211-226

(3) Various impacts: Various influences of Islamic Finance, mainly concentrated in the economic and social fields, especially regarding consumer attitudes towards Islamic banking and consumer motivation to switch to Islamic banking. One of the most active members is Jabeen, F and Shome, A and Rajaguru, R. (2016). What drives the decision to switch to Islamic banking? Evidence from the UAE, 27th IBIMA.The conference, 4-5 May 2016, Milan, Italy ISBN 978-0-9860419-6-9.

ii. Research frontiers

As can be seen in Table 7 that the research terms and their frequency in the field of Islamic Finance are limited from 1990 to 2018. Figure 18 shows the time zone display of the research frontier in the field of Islamic Finance in the last 28 years. This view contains 56 nodes (keywords), node size represents the same keyword frequency, from which we can detect the forefront of research and development trends in the last few years in the field of visual analysis, from 1990-1996, and 1997-2003 constitute a period of research on Islamic banking and finance. From 2004 to 2010, visible developments in research on Islamic Finance. Even in the period 2011 to 2018 research on Islamic Finance became more specific, seen by the emergence of the keywords Musharakah Mutanaqisah, Islamic Accounting, Waqf, and Shariah Audit. From this time zone, it can be seen that the discipline of Islamic Finance has developed rapidly, although contributions from other sciences are still relatively small.

Table 7. Occurrences of Terms

1990 – 1996	1997 – 2003	2004 – 2010	2011 – 2018
<ul style="list-style-type: none"> <li>• Islamic Banking</li> <li>• Financial Sector</li> </ul>	<ul style="list-style-type: none"> <li>• Islamic Finance</li> <li>• Capital Market</li> <li>• Banking</li> </ul>	<ul style="list-style-type: none"> <li>• Financial Service</li> <li>• Portfolio Diversification</li> <li>• Gharar</li> <li>• Sharia Compliance</li> <li>• Islamic Law</li> <li>• Musharakah</li> <li>• Corporate Governance</li> <li>• Financial System</li> </ul>	<ul style="list-style-type: none"> <li>• Islamic Bond</li> <li>• Capital Structure</li> <li>• Islamic Stock</li> <li>• Global Financial Crisis</li> <li>• Risk Sharing</li> <li>• Musharakah Mutanaqisah</li> <li>• Islamic Accounting</li> <li>• Waqf</li> <li>• Shariah Audit</li> </ul>

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