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Review

Green and Sustainable Life Insurance: A Bibliometric Review

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Abstract: Presently, there is a growing concern about implementing sustainable practices among businesses worldwide. Risk management is observed to contribute to the promotion of exercised business sustainability significantly. The study aims to examine published articles focusing on the role of risk management in promoting business sustainability practices and its advancement in the Cambridge online database to determine the current trend direction of this field. The paper's conducted analysis is based on bibliographic co-word clustering analysis of the collected studies from the database. The research's output disclosed four keyword clusters in the gathered articles' titles and identified the most interested journals, countries, authors, subject areas, and organizations in the said topic and its popular research period. Based on the research output, recommendations regarding future research were provided, including expanding the list of databases for the data collection phase and utilizing the bibliographic coupling relations approach in the bibliometric analysis.

Keywords: insurance; health; sustainability; ethics



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1. Green and Sustainable Life Insurance: A Bibliometric Review

Increasing contradictions between economic growth and environmental issues have become a significant practical problem for governments and businesses worldwide. Nowadays, societal and technological responses to climate change threats are rapidly developing, but there is still a lack of efficient financial strategies to mitigate sustainable risks (Sun et al. 2020). Green insurance is an innovative take on business sustainability practice promotion in the market. Specifically, green insurance, also known as the “environmental pollution liability insurance”, is the reimbursement of a minor party for pollution incidents' caused losses and is theorized to promote corporates' environmental risk controlment performance (Chen et al. 2021). Furthermore, it is utilized to stimulate emission-reducing inventions that adapt to the world's everchanging climates (Wang et al. 2017). Nowadays, green insurance encompasses various insurance products that are available in most green economies, including green building insurance, “global weather insurance”, green car insurance, and renewable energy insurance (Zona et al. 2014). Central banks and global regulators recognize green insurance policies' significant role in mitigating climate change (Ramani 2020). Insurance companies can accelerate global economic transformation and help governments achieve sustainability goals (Muhamat et al. 2017). As Chen et al. (2019) agree, green insurance can be used to strengthen the promotion of environmentally friendly politics and develop efficient inspection, examination, and assessment and approval systems.

Moreover, the development of policies focused on green insurance development will also improve the liquidity of green insurance investment projects and thereby effectively stimulate the internal motivation of insurance. Thus, due to its significant role in risk

management and investment activity, the insurance industry is crucial for the global promotion of environmental, economic, and social sustainability. This aim can be achieved via capital flow and long-term horizon orientation of investments, forcing society to shift to a green and inclusive economy.

1.1. Problem Statement

Over the last decades, researchers have conducted multiple surveys and analyses of the insurance industry's role in promoting corporate sustainability. These investigations provide valuable information to the research area and, thereby, formulate recommendations regarding further improvement of insurance tools utilization to promote sustainability practices. Therefore, a bibliometric analysis of these articles is required to integrate all the studies in the chosen research area.

1.2. Aim of the Paper

The paper aims to analyze articles focused on sustainable life insurance. For this purpose, bibliographic techniques were utilized, which offered the analysis and knowledge about the insurance industry's participation in sustainable development. Using VOSviewer software, global research trends from 1955 to 2020 were summarized and used to guide future research. Therefore, a bibliometric analysis will provide a comprehensive system for investigating the articles on the topic of interest.

1.3. Research Contribution

The paper brings to light an interesting topic that needs appropriate attention from concerned parties. The current trend on insurance products concerns greening conversion and application in existing markets. Contemporary available literature has contributed to life insurance and general green insurance separately. However, this paper aims to determine published documents dedicated to the two topics together and shed light on missing aspects in the literature regarding the topic of interest. Thus, the study becomes a valuable guide to researchers to identify trend topics in green life insurance and indirectly layout both subjects separately. Additionally, it will attract attention to the vitality of greening various operations for the company and the environment's substantiality sakes.

1.4. Paper Structure

The paper consists of the following sections. The first section is introductory and provides a background for the research and its purpose, while the second focuses on the research methodology and literature review. Further, the third section includes a presentation of the results obtained from the bibliometric analysis. The fourth entails a discussion of results, future research agenda, and conclusion to the research.

2. Methodology

A bibliometric analysis is employed to analyze the collected data on the selected subject. This literature review is an essential contribution to the research area of green insurance practice, as it provides a systematic procedure of studies selection (Briones-Bitar et al. 2020; Herrera-Franco et al. 2021; Montalván-Burbano et al. 2021). Therefore, potential biases and errors while choosing research studies for a literature review can be minimized using the provided recommendations. Moreover, the outcomes of the present literature can also be used to highlight the limits of knowledge in the chosen study area and identify the research gap more effectively.

The bibliometric analysis utilized the technique of similarities visualization. Such visualization is called bibliometric mapping, and it allows observing connections in the scientific field structure in terms of authors, countries, documents, keywords, and other scientific production elements (Briones-Bitar et al. 2020; Nobanee et al. 2021). The bibliometric analysis was conducted in three stages: data compilation; software and data cleaning; and analysis, interpretation, and visualization.

2.1. Data Compilation

At the first stage, a search of comprehensive articles was conducted using Cambridge online database. The database includes articles in different fields, such as business, computer science, law, psychology, history, education, philosophy, medicine, and much more, and it contains articles dating back to the 1800s. Articles search was based on several steps that included many utilized keywords. In the article's investigation, documents considered relevant to the study if argument appeared in their title. The search keyword parameters are illustrated in Appendix A, where four trial searches were conducted to obtain an accurate number of published documents relating to the topic of interest. The final search argument was as follows: the search was carried out in October 2020, obtaining 176 document results between 1955 and 2020 with these search parameters.

2.2. Software and Data Cleaning

At the second stage, the collected articles were analyzed using the VOSviewer. Information obtained at the first stage was exported to an Excel spreadsheet for analysis and organization. The developed database had various parameters, including authors' names, cited publications, the titles of journals, sponsor organizations, country of publication, and keywords. In addition, the articles were clustered, and clustering solutions were provided. Clustering is a method of analysis based on setting objects into a group by their similarity or difference (Chen et al. 2016; Nobanee 2021). Thus, the keywords obtained from publications that had a high correlation with each other were included in an appropriate cluster.

To cluster publications, the relatedness of publications was determined. The choice was made between the two most common approaches in the bibliometric analysis, particularly citation or word relations. For the paper's purpose, cluster identification was carried out through the word relations approach, which uses related words in full texts of publications, abstracts, and titles (Van Eck and Waltman 2017; Nobanee 2020). Moreover, the bibliometric approach based on word relations was utilized because of several advantages that this kind of analysis provides to the research purpose. Co-word analysis found linkages between concepts used to investigate the green insurance area to understand the current state of the research concepts to predict where the future research should be conducted. However, the co-word approach to bibliometric analysis involves some difficulties. Certain words may have different meanings depending on the context, leading to an incorrect indication of publications from various fields. Furthermore, some terms are general and can be used in research from entirely different research areas and, thereby, do not provide any helpful information about the relatedness of publications (Van Eck and Waltman 2017). Hence, while evaluating the study results, it should be considered that clusters may contain keywords that do not have a robust semantic similarity.

VOSviewer software was used to analyze clustering solutions at an aggregate level with the help of term-map. In this regard, a term map visualizes topics covered by each cluster (Van Eck and Waltman 2017). This visualization allows highlighting the essential terms occurring in the publications that belong to a cluster and the co-occurrence of relations between these terms. A primary assumption of clustering is that if items are included in the same cluster, they reflect similar topics. In addition to the co-word analysis, which was considered a primary focus of the literature review, cluster analysis was also conducted for other characteristics of publications, including countries of publication, journals, authors, organization, and cited articles. Cluster analysis on word relations provided four clusters of topics that were covered in the chosen papers. Items in different clusters are displayed in different colors, and each point on the term map has a color depending on the density of keywords at that point. Therefore, more prominent points represented a higher weight of neighboring words and vice versa.

2.3. Analysis, Interpretation, and Visualization

At the third stage, a close examination of highlighted clusters was conducted. All qualitative data for each article was extracted to the excel file and further combined into ad hoc

pivot tables. The total link strength for the characteristics of each publication was calculated, indicating several publications in which two items occur together (Guo et al. 2019). Based on the generated tables and visualization maps, the literature review was conducted.

3. Results and Literature Review

The results of the bibliometric analysis were divided into two sections. The first section included scientific production analysis, which covered the following characteristics of articles: time distribution, countries of publication, journals, authors, organizations, and cited articles. The literature review's second section is fixated on the cluster analysis and current streams identification based on the determined keywords.

3.1. Scientific Production Analysis

3.1.1. Time Distribution

Figure 1 represents the time distribution of articles over the observed period, which covered years from 1955 to 2020. The observed period was divided by three depending on the volume and volatility of the number of publications. The first period covered the years from 1955 to 2001, during which 25.3% of analyzed publications were published 44 articles represent that. The average number of studies published annually is 1.83, while the maximum number of publications was published in 1992 and counted for 5. Further, the second period covered the 2002–2013 years, during which 32.2% of the total chosen articles were published, including 57 articles. On average, 4.67 documents were published per year, and the year of the highest number of publications is 2005, when nine studies were published. The third period covered the period from 2014 to 2020. In total, 74 articles were published during this phase, representing 42.5% of the total articles. On average, 10.57 articles were published per year, and the publication peak was reached in 2017 when 18 articles were published. Thus, it can be concluded that the number of publications is increasing rapidly during the third period (2014–2020). Although the first article was written in 1955, most studies were published after 2001 and peaked in 2017.

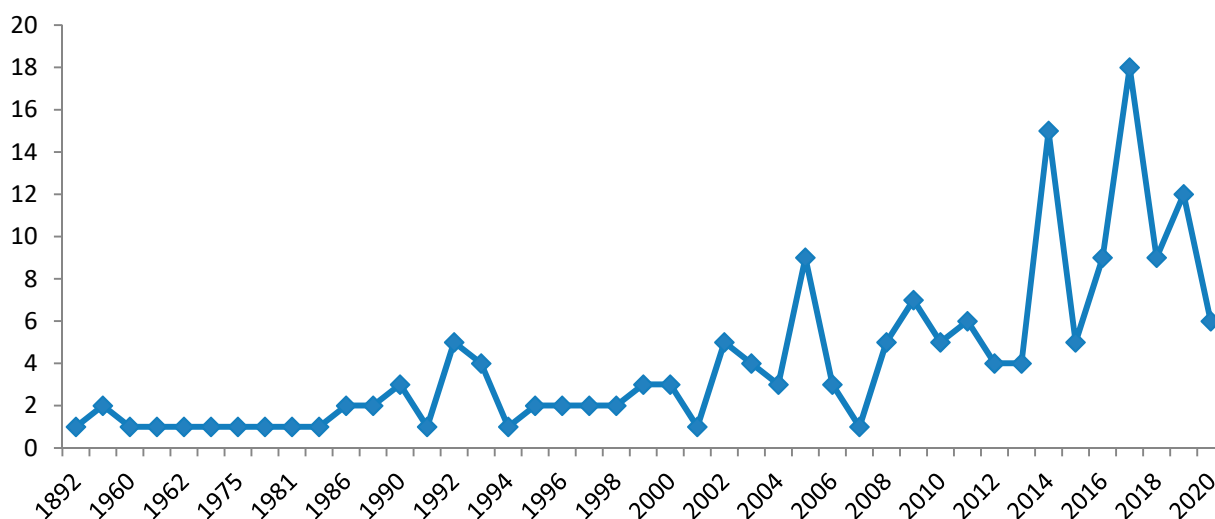


Figure 1. Distribution of Articles over Time. Note: made by the authors.

The reason behind this growth is the current interest in ethical applications of life insurance and the greening of few insurance products. Most of the studies on green insurance are dedicated to a general purpose and not specific to certain products, such as green life insurance. On the other hand, the ethical implications of life insurance are mainly concerned with the salespersons' ethical daily operation, the insurers' patient discrimination, etc. This growth is primarily credited to few countries in Europe and Asia.

Therefore, the results obtained from time distribution analysis confirm a growing interest of scholars in green insurance and the novelty of this topic.

3.1.2. Countries

The contributions to the topic are made by 43 countries. Since there are multiple countries interested in life insurance, Table 1 summarizes the list based on the top ten contributing countries, i.e., the number of publications each country has made to the subject area during the analyzed period. This was obtained by restricting the analysis to a single country occurrence per document and no limitation on contributions between countries. As observed, these top ten countries contributed a total of 115 articles, equating to 67.3% of the total collected articles. Moreover, 1,083 citations were provided to papers of these countries, which is 77.2% of the citations included in the dataset. As Table 1 illustrates, the countries that produced the most articles in the study area were the United States (41 publications), Taiwan (17 publications), and the United Kingdom (11 publications). The remaining countries include India, Malaysia, Australia, Canada, Italy, and Japan, represented by five publications (see Table 1). Additionally, Figure 2 illustrates a visual base of the countries that the collected studies were published.

Table 1. Top 10 countries by publications.

Country	Publication	Citations	Total Link Strength	Rank
United States	41	487	679	1
Taiwan	17	120	790	2
United Kingdom	11	135	550	3
India	9	29	143	4
Malaysia	9	54	173	5
Australia	7	105	448	6
Canada	6	56	575	7
Italy	5	6	0	8
Japan	5	31	75	9
Netherlands	5	60	540	10

Note: made by the authors.

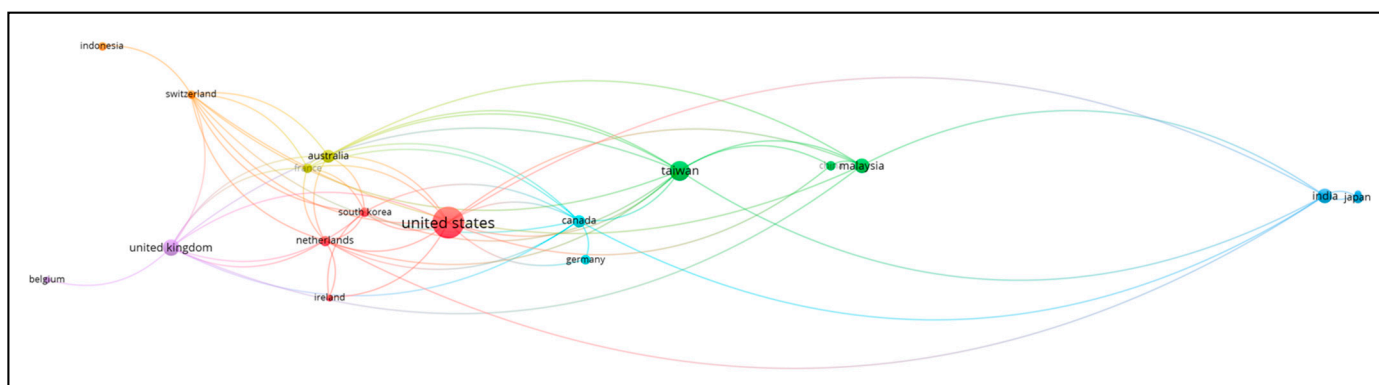


Figure 2. Cluster distribution of countries that published at least 2 documents. Note: made by the authors.

Figure 2 shows the countries represented by multiple clusters. The United States is a central cluster, around which most of the European and Canadian clusters are located. The Taiwan cluster represents the second-largest cluster, which relates to low-numbered small clusters of Asian-Pacific clusters. The figure also demonstrates Belgium, Indonesia, India, and Japan to be the countries with the least strength to the main contributing country, i.e., the United States (US). Indonesia is connected to Switzerland and from there, from afar, it is connected to the US; similarly with India and Japan, but a much greater distance is present. Belgium is connected to the United Kingdom, and the UK connects to the US at a similar distance to that of Switzerland and the US. Therefore, we could assume there is a

weaker link between India and Japan to the US rather the Belgium and Indonesia to the US. On the other hand, the countries with a strongest links to the US, as observed from Figure 2, are the Netherlands, South Korea, Ireland, Canada, and Germany. The second largest contributing country is Taiwan as stated earlier, where the countries strongly linked to it are Malaysia, Canada, and Germany.

3.1.3. Journals

The analysis of journals obtained an overview of the research topic under various academic fields. Table 2 represents the top 10 journals in the dataset by the number of citations received per publication, representing 51.6% of total citations with 1297 citations and 12.1% of all published documents with 21 articles. The following journals provided the most significant number of publications on the research subject: *Journal of Business Ethics* (114 documents); *American Journal of Sociology* (114 citations); *European Journal of Marketing* (76 citations); and *Journal of Personal Selling and Sales Management* (70 citations) (see Table 2). Finally, the total link strength was the most significant for the *Journal of Business Ethics* (101) and *European Journal of Marketing* (71) (see Table 2). The visualization of the results of similarities is provided in Figure 3.

Table 2. Top 10 journals in the dataset by the number of citations received per publication.

Source	Documents	Citations	Total Link Strength	Rank
Journal Of Business Ethics	9	114	101	1
American Journal Of Sociology	2	114	12	2
European Journal Of Marketing	1	76	71	3
Journal Of Personal Selling And Sales Management	1	70	15	4
North American Actuarial Journal	3	59	7	5
Australasian Psychiatry	1	54	0	6
European Journal Of Personality	1	48	0	7
Journal Of International Economic Law	1	48	0	8
Genetics In Medicine	1	45	0	9
Current Opinion In Lipidology	1	41	0	10

Note: made by the authors.

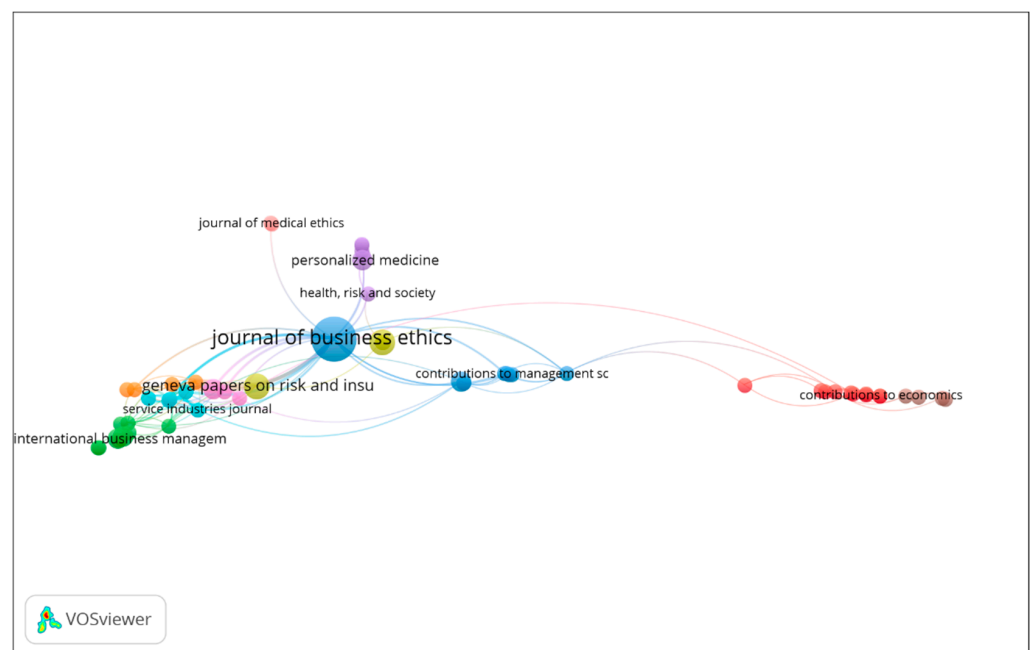


Figure 3. Cluster distribution of sources that published at least a document. Note: made by the authors.

As Figure 3 illustrates, journals are divided into numerous clusters. These clusters are mainly connected with the central cluster of the *Journal of Business Ethics*. A group of small clusters in red and purple colors is poorly correlated with other journals.

3.1.4. Authors

In total, 343 authors were covered by the literature review. Table 3 represents the authors with at least two publications in the dataset. Thus, the highest number of publications was provided by Tseng L.-M. (6 papers), and the remaining authors in the list were the authors of two research (see Table 3). In total, this group of authors represents 8.5% of all publications (from 402, as for many publications, more than one author was stated) and 9% of the citations (from 3315) (see Table 3). The visualization of cluster distribution of the authors by the number of publications is provided in Figure 4.

Table 3. Authors with a minimum of two articles in the dataset.

Author	Publications	Citations	Total Link Strength	Rank
Tseng and Chung (2017)	6	18	523	1
Barlow-Stewart et al. (2009)	2	48	366	2
Otlowski et al. (2019)	2	48	366	3
Chen and Mau (2009)	2	34	283	4
Kweh et al. (2014)	2	31	376	5
(Van Hoyweghen and Rebert 2012)	2	30	618	6
Cooper and Frank (2005)	2	21	57	7
Cooper and Frank (2005)	2	21	57	8
Oakley (1999)	2	16	44	9
Ibrahim et al. (2017)	2	10	38	10
Ngataman et al. (2016)	2	10	38	11
Nurnberg and Lackey (2010)	2	6	67	12
Nurnberg and Lackey (2010)	2	6	67	13
Gignoux (1955)	2	0	0	14
Kraus (1996)	2	0	0	15

Note: made by the authors.

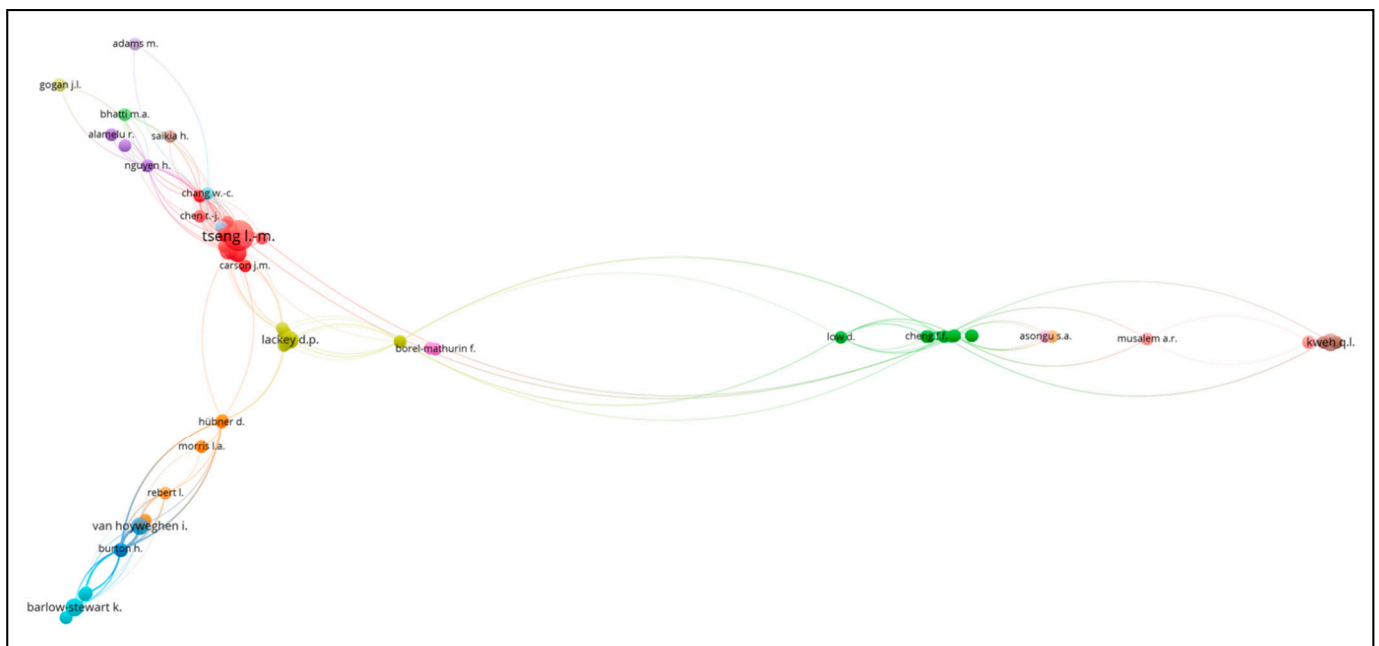


Figure 4. Cluster distribution of authors that published at least a document. Note: made by the authors.

From Figure 4, there are three interconnected series of clusters. These clusters are centered at the Lackey cluster and further connected in sub-series with other clusters.

3.1.5. Organization

The visualization of interconnections between the organizations that funded the chosen studies is provided in Figure 5. As per the results of VOSviewer, the highest number of publications was funded by the following organizations: Department of Risk Management and Insurance, Feng Chia University, Taichung, Taiwan; School of Business, Monmouth College, West Long Branch, United States; Department of Training and Placement, Sastra University, Thanjavur, India; Department of Banking and Finance, Kainan University, Taiwan; Association of British Insurers, London, United Kingdom; and Business School of Beijing Technology and Business University, Beijing, China (see Figure 5).

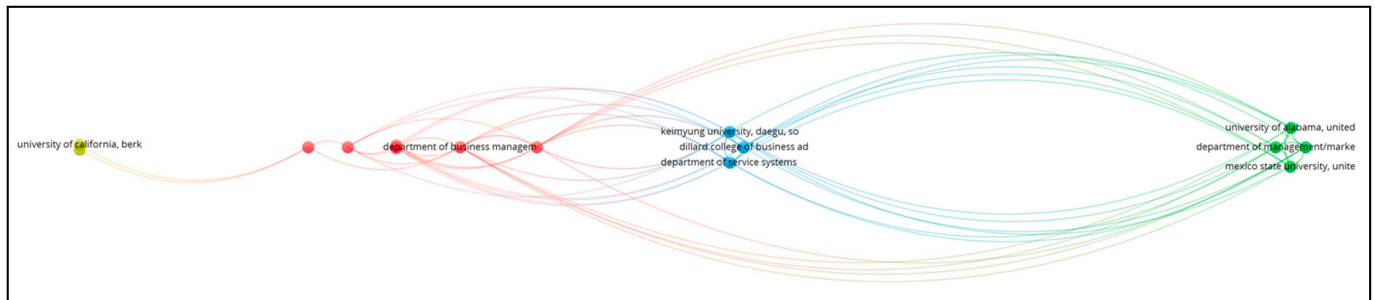


Figure 5. Cluster distribution of organizations publishing a document with at least 20 citations. Note: made by the authors.

3.1.6. The Cited Articles

The bibliometric analysis also created a list of ten most cited articles by total citations representing 41.9% of total citations with 543 citations (see Table 4). As Table 4 illustrates, the most widely cited documents are Román and Munuera (2005) (76 citations, Quinn (2008) (71 citations), and Tansey et al. (1994) (70 citations) (see Table 4). The visualization of the articles’ interconnection by citations is provided in Figure 6.

Table 4. Ten most cited articles by total citations.

Document	Citations	Total Link Strength	Rank
(Román and Munuera 2005)	76	71	1
Quinn (2008)	71	3	2
Tansey et al. (1994)	70	15	3
Hickie (2004)	54	0	4
Mattoo (2003)	48	0	5
Mlonzi and Strümpfer (1998)	48	0	6
Wong-Fupuy and Haberman (2004)	47	3	7
Barlow-Stewart et al. (2009)	45	0	8
Chan (2009)	43	13	9
Hadfield and Humphries (2005)	41	0	10

Note: made by the authors.

According to Figure 6, documents clusters can be divided into three cluster series. These series are interconnected at the Quinn (2008) cluster, representing a center cluster for all.

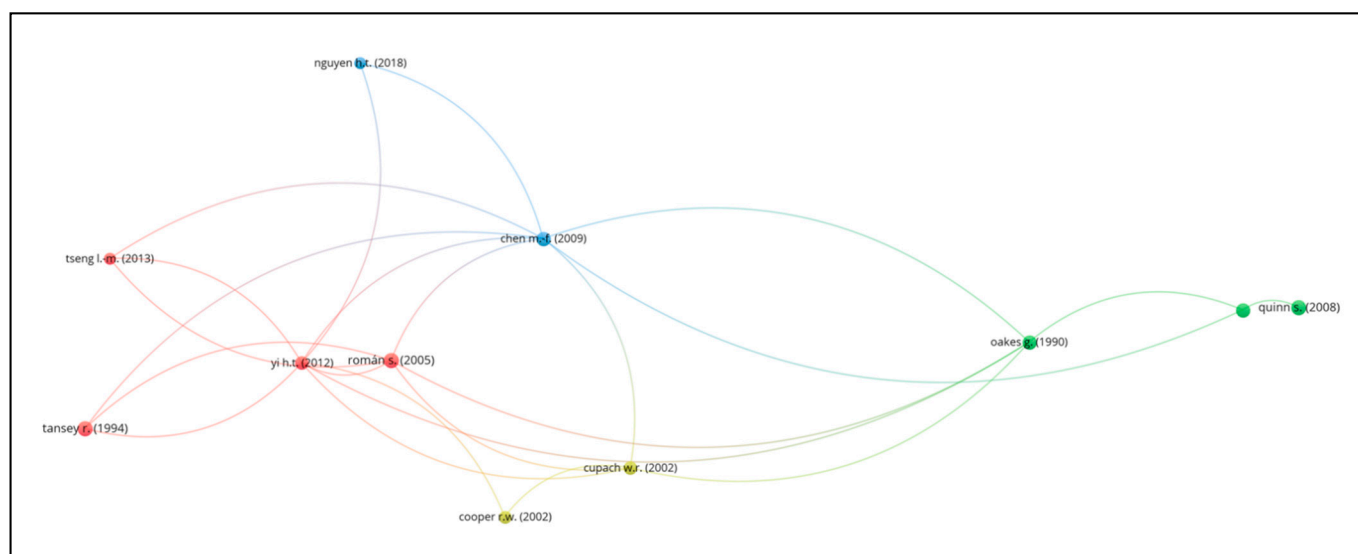


Figure 6. Cluster Distribution the dataset’s documents that has at least 10 citations. Note: made by the authors.

3.1.7. Subject Area

The subject area of articles was also analyzed to discover the subject orientation of the studies included in the research database. As Table 5 illustrates, most of the collected papers are related to medicine (63 articles, counting for 21.2% of total publications); business, management, and accounting (56 research, counting for 18.9% of all publications); social sciences (40 articles, counting for 13.5% of total publications); economics, econometrics, and finance (37 studies, counting for 12.5% of all publications).

Table 5. Subject area distribution among the articles.

Subject Area	Number of Articles	Share in the Total Number of Articles
Medicine	63	21.2%
Business, Management, and Accounting	56	18.9%
Social Sciences	40	13.5%
Economics, Econometrics, and Finance	37	12.5%
Arts and Humanities	16	5.4%
Biochemistry, Genetics, and Molecular Biology	12	4.0%
Decision Sciences	12	4.0%
Energy	8	2.7%
Environmental Science	8	2.7%
Computer Science	6	2.0%
Mathematics	6	2.0%
Nursing	5	1.7%
Earth and Planetary Sciences	4	1.3%
Engineering	4	1.3%
Psychology	4	1.3%
Multidisciplinary	2	0.7%
Pharmacology, Toxicology, and Pharmaceutics	2	0.7%
Physics and Astronomy	2	0.7%
Undefined	2	0.7%
Agricultural and Biological Sciences	1	0.3%
Chemical Engineering	1	0.3%
Chemistry	1	0.3%
Health Professions	1	0.3%
Immunology and Microbiology	1	0.3%
Materials Science	1	0.3%
Neuroscience	1	0.3%
Veterinary	1	0.3%

Note: made by the authors.

3.2. Cluster Analysis and Current Streams

The cluster analysis of keywords was conducted to represent and compare the content of the leading articles; they include both the index and author keywords. Appendix B displays the method of keyword collection and analysis from the dataset's documents via VOS viewer (Figures A1–A4). In addition, the frequency of the occurrence of keywords was used to determine the current streams and themes that were utilized in the chosen research field. On this basis, the top 15 keywords with the highest frequency of occurrence were highlighted in Table 6 and (Figure A5). Thus, the following keywords were the most frequently mentioned in the titles of the articles: insurance (73 occurrences), human (56 occurrences), article (42 occurrences), ethics (30 occurrences), and life insurance (30). The VOSviewer software also prepared a theme map, where words with density were mentioned. The high density of keywords in the cluster analysis illustrates a strong relationship with other keywords mentioned in the titles of the articles.

Table 6. Top 15 Key Words Mentioned in the Articles.

Keyword	Occurrences	Total Link Strength	Rank
Insurance	73	419	1
Human	56	439	2
Article	42	328	3
Insurance, Life	34	302	4
Humans	33	277	5
Ethics	30	220	6
Life Insurance	30	104	7
Medical Ethics	25	170	8
Ethics, Medical	20	145	9
Genetic Screening	19	204	10
United States	19	151	11
Priority Journal	16	123	12
Economics	14	99	13
Health Insurance	14	117	14
Legal Aspect	13	120	15

Note: made by the authors.

The visualization of the similarities results is provided in Figure 7, which shows that the clusters are all interconnected. Thereby, the effectiveness of the search string was met, as the boundaries of interconnections are blurred, and borderline articles represent themes of more than one cluster. As seen in Figure 7, in total, four clusters of keywords were highlighted.

The first cluster is highlighted in red and includes 14 items. As supported by the VOSviewer output provided in Figure 7, these keywords received the most extensive attention from the researchers investigating green insurance practice. Cluster 1 includes the following keywords: insurance, life insurance, economics, risk, profitability, the insurance industry, commerce, Canada. Further, the second cluster is highlighted in green and includes 12 items. The most corresponding keywords in this cluster are human, humans, health insurance, genetic testing, adult, mortality, risk assessment, and life. The third cluster is highlighted in blue and includes 12 items. The words with the highest occurrence entail ethics, genetic screening, review, insurance selection bias, genetic diseases, and inborn. Finally, the fourth cluster is highlighted in yellow and includes 12 items. The critical keywords in this cluster are insurance life, article, the United States, medical ethics, ethics medical, confidentiality, human immunodeficiency virus. Four current streams of the research area were detected using the indicated clusters (see Table 7). Hence, considering keywords included in each cluster, the following current streams were displayed: insurance and economics, health and human, genetics, and ethics and insurance.

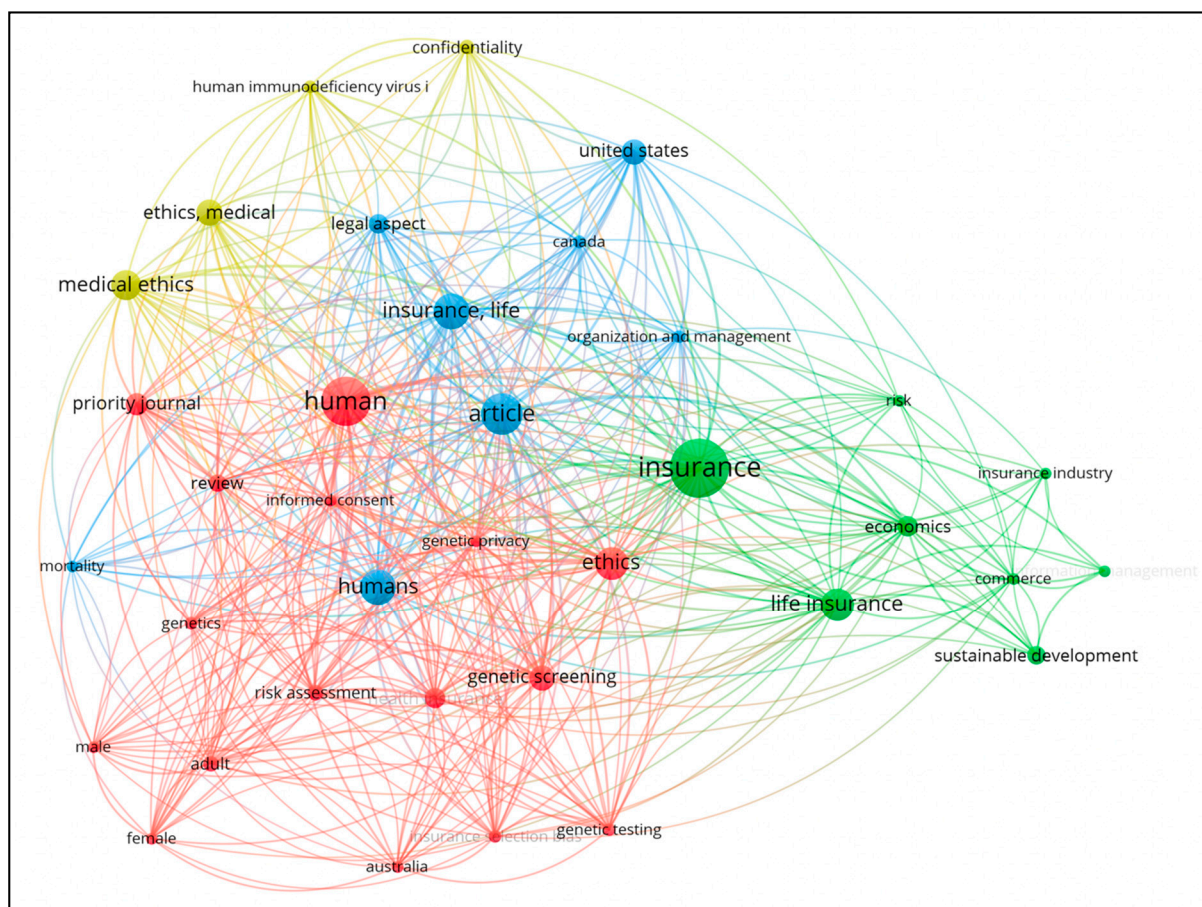


Figure 7. Clusters of keywords with at least 6 occurrences.

Table 7. Current streams.

Stream	Keywords
Insurance and economics	Economics, information management, insurance, insurance carriers, the insurance industry, life insurance, organization and management, profitability, questionnaire, risk, sustainable development
Health and human	Adult, female, genetic testing, health insurance, human, humans, informed consent, male, mortality, neoplasms, priority journal, risk assessment
Genetics	Australia, disclosure, ethics, genetic diseases, inborn, genetic disorder, genetic privacy, genetic screening, genetics, genetics and reproduction, insurance selection bias, interpersonal communication, review
Ethics and insurance	The acquired immune deficit, article, confidentiality, ethics, medical, Germany, human immune-deficit, insurance, life, legal aspects, medical ethics, psychological aspect, United Kingdom, United States

Note: made by the authors.

4. Content Analysis

The content analysis covers critical articles that were highlighted by the literature review. Appendix C represents the analysis of these papers, including their purpose, findings, and suggestions for future research. Thereby, a summary of crucial documents was provided.

As the data impose, a portion of the contributed life insurance articles is dedicated to its ethical element and its application in the industry. Research suggests that interested parties investigate the morality of life insurance salespeople and identify the predictors of their ethical behavior (Tansey et al. 1994; Román and Munuera 2005). Moreover, some

studies were committed to identifying the influence of ethics institutionalization on newly employed workers' perceptions of the employing company and if it promotes internal trust (Tseng and Chung 2017). Further, few documents were devoted to underlining that some insurers do not take ethical mishaps as seriously as they should nowadays (Cooper and Frank 2005). Additionally, the studies highlighted the vital role the "insurance marketplace standards association" plays in motivating corporate managers to practice ethical market behavior (Cooper and Frank 2005). As observed, the topic of ethics in life insurance is a growing trend and will continue until the market's majority responds to stakeholders' concerns.

The genetics cluster suggests the studies' primary focus regarding life insurance has been on the existing patients' genetic discrimination (Joly et al. 2014). It restricts cost coverage to individuals prone to inherit a genetic disease (Oakley 1999). The health and human cluster signify a need for morality forecasting as it has a critical impression on life insurance industry among other communal aspects, such as the "populations size" and "social security systems" (Wong-Fupuy and Haberman 2004). Lastly, the information suggested by the insurance and economics cluster highlight how different marketing tactics have vast impressions on insurers' reputation and profitability and how effective risk management implantation and evaluation is a growing trend in the insurance industry (Chen 2019; Kuo et al. 2017).

Evidently, the existing literature is not sufficient to cover the green life insurance topic since most articles focus on genetics discrimination and ethical application in the life insurance industry; in addition, the availability of articles generally discussing green insurance is scarce. However, there are literally no green life insurance articles on the database to establish a concept of its diffusion in the current market and what aspects are yet to be addressed. Hence, there is a lack of works in the existing literature regarding the topic as it insufficiently supports the insurance industry greening movement in developed and sustainable economies.

5. Discussion of Results

The utilization of bibliographic cluster analysis conducted a literature review of the articles focused on risk management, business sustainability, green insurance, and life insurance. As the scientific production analysis showed, the collected articles have experienced a publication growth inclination mainly during 2014–2020. Hence, it proves a growing concern among researchers regarding the green insurance practice in recent years. The analysis also showed that most of the articles were published in the United States, Taiwan, and the United Kingdom, illustrating a deep focus on the study area in these countries.

During the recent publication growth, the States primarily focused on the following regarding life insurance: genetic testing and the healthcare system, firm sustainability, and unethical operations, and their research did not concentrate on the greening aspect in their life insurances. For example, Golinghorst and Prince (2019) observed that people undergoing genetic testing fear the life insurers' misuse of their genetic information. Additionally, Tenenbaum and Goodman (2017) highlighted how the US's "Genetic Information Nondiscrimination Act (GINA)" is not employed in life insurance, among few other insurance products. Tenenbaum and Goodman's (2017) study focused on the ethical perspective of genetic discrimination in few insurance products and how GINA does not fully protect the patients. On the other hand, there are few papers published in the US that focus on the sustainability of life insurance firms, such as that of Read and Sanderford (2018) which focused on the examination of management's decisions that are responsible for the sustainability of a company, including life insurance firms.

Similarly, Taiwan's most studies don't relate to green life insurance, but instead, it heavily focuses on ethics, corporate reputation, and corporate social responsibility on life insurance firms. For example, in Tseng's (2019) study, he investigated the impression that ethical institutionalization has on life insurance sellers' ethical selling practices. Later in Tseng's (2020) article, he observes that institutionalization influences representative's

ethical performance during customer and life insurance company disagreements. To add on, [Chen \(2019\)](#) aims to uncover the effects of bancassurance marketing channels on life insurers' reputation and profits. Lastly, [Lai and Hsu \(2015\)](#) set out to determine the level to which life insurance companies' ethical principles and CSR operation can be leveraged for "internal branding" purposes.

As observed from the data, the UK only contributed a single document relating to life insurance but not to green life insurance, and its focus was on genetic discrimination in the setting of life insurance as did few of the US's studies ([Joly et al. 2014](#)).

Further, more than half of the citations were provided by ten journals. The first four journals by the number of citations involve *Journal of Business Ethics*, *American Journal of Sociology*, *European Journal of Marketing*, and *Journal of Personal Selling and Sales Management*. The only top cited journal that participated in the publication growth with at least a document is the *Journal of Business Ethics*. One of its articles examined the influence ethical institutionalization has on life insurance agents' ethical selling of their product ([Tseng 2019](#)). The remaining articles from the journal of business ethics are before the publication rise and mainly focus on ethical concepts in life insurance and not greening applications. *The Journal of Personal Selling and Sales Management* published a single article on the topic of interest that aims at uncovering how life insurance salespeople with diverse morals have distinct perceptions of ethically dubious activities ([Tansey et al. 1994](#)). The *European Journal of Marketing* produced an article that investigated the predictors of life insurance agents', among others, unethical performances and discovered "compensation and control system" to be critical factors ([Román and Munuera 2005](#)). Lastly, the *American Journal of Sociology* contributed two articles, where the first concentrated on analyzing in china the impact degree of socially embedded ties on economic trades such that of life insurance transactions ([Chan 2009](#)). The second article was dedicated to describing the secondary market's morality and conceptions, where investors purchase clients' life insurance contracts ([Quinn 2008](#)). Evidently, none of the top cited journals have dedicated their published research to green life insurance, but instead, they focused on other high trending aspects of life insurance, such as ethics.

In addition, the most frequently covered research areas were medicine, business, management and accounting, social sciences, economics, econometrics, and finance. Keywords clustering highlighted four critical clusters of the most related words mentioned in the publication title, including insurance and economics, health and human, genetics, and ethics and insurance. From the data, it is apparent that minority of the papers revolving around the identified keywords bunch add to green insurance but not specifically green life insurance. It was discovered that the boundaries of interconnections are blurred, and borderline articles represent themes of more than one cluster.

6. Future Research Agenda

The future research plan is based on the present research outcomes and provides recommendations regarding further research in risk management, corporate sustainability, and green life insurance. A significant proposal for future research is to expand a list of the databases for the utilized articles. It is assumed that using a more comprehensive range of databases will allow researchers to diversify results. In particular, the present research showed that most of the articles were provided by a limited number of journals and countries, which requires further extinction of the publication database. In addition, bibliometric mapping based on word relations allowed researchers to determine the keywords to find relevant articles. However, the analysis of study areas showed that studies were delivered from diverse study areas, and, thereby, a bias of data collection could occur. This bias is because some words may have different meanings depending on the context, leading to an incorrect indication of publications from various fields. Therefore, for future literature reviews, it is recommended to utilize bibliographic coupling relations, which will help to avoid limitations of co-words relations clustering.

Furthermore, based on the conducted study, it is recommended to apply the bibliometric analysis to various green insurance products, such as car, building, and renewable energy green insurances. Such studies will expand the investigation throughout the insurance industry to determine which insurances have been greened and which remain, whether the insurance greening has been applied to all countries or a select group, and how such products have benefited societies and the environment. In addition, researchers might be interested in determining the long-term impacts of green insurance products application. They can identify past trends and hypothesize future trends that hint at their impression over a long period through bibliometric analysis.

It is suggested that scholars investigate green and non-green countries' insurance industries to determine if they have adopted green products. From there, they could create a cross-sectional analysis to compare the adoption costs, its current outcomes, etc. Lastly, to ensure insurers' value profitability from non-green insurers' perspectives, they need to determine if the green products' adoption will guarantee profitability and reputation sustainability based on similar economies' implementation and experiences. This need is due to the rising fear of climate change's impacts on the insurers' risk management tactics and the growing pressure to adopt green products that benefit the environment (Mills 2009).

However, different economies react differently to green innovations' adoption. For example, Hsu and Chao (2020) mentioned a statement on investment in green urban infrastructure in Taiwan, where the cost of such an investment suffered an additional USD 9.2 million. However, the communal and environmental benefits experienced an increase of USD 1.2 million than the non-green investments yield (Hsu and Chao 2020). In addition to the environmental benefits, when green insurance firms offer a green building insurance product that provides added value, such as discounts on insurance costs, investors will be keen to lead with this approach. Ultimately, it is crucial to examine different economies and their potential responses to such an industrial change. Thus, this topic would intrigue numerous stakeholders nowadays and in the future.

7. Conclusions

A bibliometric analysis provided a comprehensive system for investigating articles that concentrate on insurers' sustainability and sustainable life insurance. The Cambridge Online Database was used to collect research for the bibliometric approach based on co-word analysis. In total, 176 papers were obtained for the period from 1955 to 2020.

According to the frequency of scientific production analysis, critical countries of publication, journals, authors, organization, cited articles, and study subjects were highlighted. This step developed a description of essential key characteristics in the gathered articles. Further, the cluster analysis of co-words relations highlighted 50 items that were the most frequently used in the titles of the articles and developing a map of their interconnection. These items were divided into four clusters, which in turn were highly interconnected.

The study developed an overall description of the participation of the insurance industry in sustainable development. However, the evolution trends show that this study area is still immature, and further research should be conducted. Future research should use a more comprehensive list of databases for articles collection to mitigate the limitations of the present study. In addition, a bibliographic coupling approach is recommended to find interrelations between documents. This step is expected to advance the overall efficiency of future literature reviews in the insurance practice.

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draft, G.B.A., A.A., H.A., N.A., S.A.A. and N.W.; Writing—review and editing H.N. All authors have read and agreed to the published version of the manuscript.

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Appendix A

Cambridge online database keyword search trials parameters:

- Search #1: (“sustain*” and “insurance”) or (“green” and “insurance”) or (“ethic*” and “insurance”).
- Search #2: (TITLE (“sustain*” AND “insurance”) OR (“green” AND “insurance”) OR (“ethic*” AND “insurance”)) OR KEY (“sustain*” AND “insurance”) OR (“green” AND “insurance”) OR (“ethic*” AND “insurance”)).
- Search #3: (TITLE (“sustain*” and “life insurance”) or (“green” and “life insurance”) or (“ethic*” and “life insurance”) or (“sustain*” and “key person insurance”) or (“green” and “key person insurance”) or (“ethic*” and “key person insurance”) or (“sustain*” and “key man insurance”) or (“green” and “key man insurance”) or (“ethic*” and “key man insurance”) or (“sustain*” and “key woman insurance”) or (“green” and “key woman insurance”) or (“ethic*” and “key woman insurance”) or (“sustain*” and “bottom Line insurance”) or (“green” and “bottom Line insurance”) or (“ethic*” and “bottom Line insurance”) or (“sustain*” and “final expense insurance”) or (“green” and “final expense insurance”) or (“ethic*” and “final expense insurance”)) OR KEY (“sustain*” and “life insurance”) or (“green” and “life insurance”) or (“ethic*” and “life insurance”) or (“sustain*” and “key person insurance”) or (“green” and “key person insurance”) or (“ethic*” and “key person insurance”) or (“sustain*” and “key man insurance”) or (“green” and “key man insurance”) or (“ethic*” and “key man insurance”) or (“sustain*” and “key woman insurance”) or (“green” and “key woman insurance”) or (“ethic*” and “key woman insurance”) or (“sustain*” and “bottom Line insurance”) or (“green” and “bottom Line insurance”) or (“ethic*” and “bottom Line insurance”) or (“sustain*” and “final expense insurance”) or (“green” and “final expense insurance”) or (“ethic*” and “final expense insurance”)).
- Search #4: TITLE-ABS-KEY (“sustain*” and “life insurance”) or (“green” and “life insurance”) or (“ethic*” and “life insurance”) or (“sustain*” and “key person insurance”) or (“green” and “key person insurance”) or (“ethic*” and “key person insurance”) or (“sustain*” and “key man insurance”) or (“green” and “key man insurance”) or (“ethic*” and “key man insurance”) or (“sustain*” and “key woman insurance”) or (“green” and “key woman insurance”) or (“ethic*” and “key woman insurance”) or (“sustain*” and “bottom Line insurance”) or (“green” and “bottom Line insurance”) or (“ethic*” and “bottom Line insurance”) or (“sustain*” and “final expense insurance”) or (“green” and “final expense insurance”) or (“ethic*” and “final expense insurance”)).

Appendix B

Keyword stream collection and analysis process via VOS viewer:

- Selected “create a map based on bibliographic data.
- Selected “read data from bibliographic database file.
- Selected “co-occurrence” on the left first then select “all keywords” on the right.
- Raised the number of keyword occurrences to a minimum of “6”.
- Exported all selected keywords.

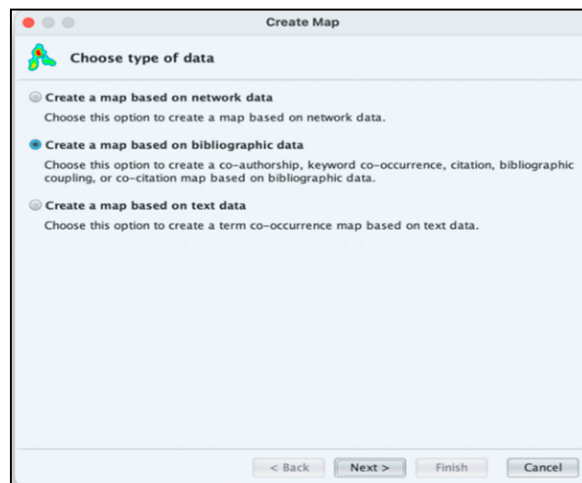


Figure A1. Selected "create a map based on bibliographic data."

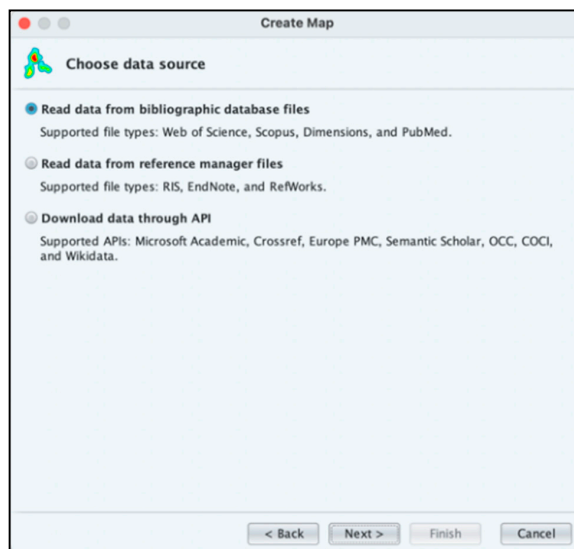


Figure A2. Selected "read data from bibliographic database file."

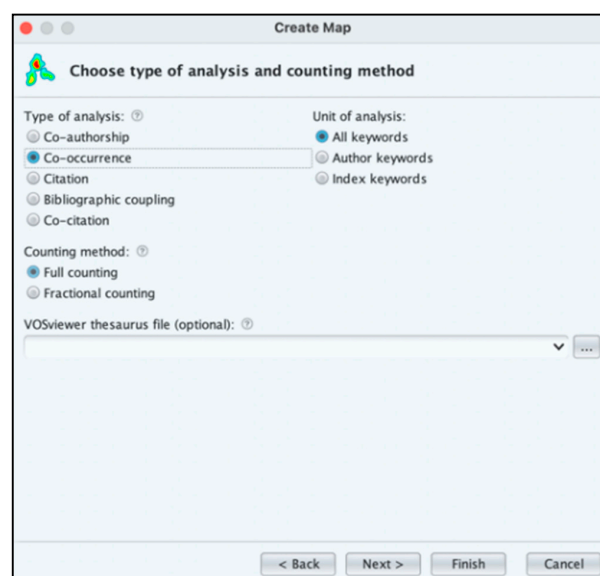


Figure A3. Selected "co-occurrence" on the left first then select "all keywords" on the right.

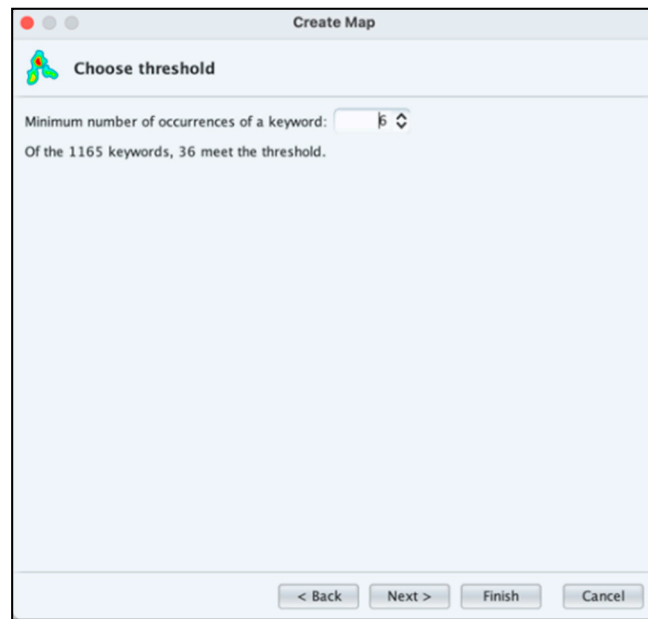


Figure A4. Raised the number of keyword occurrences to a minimum of “6”.

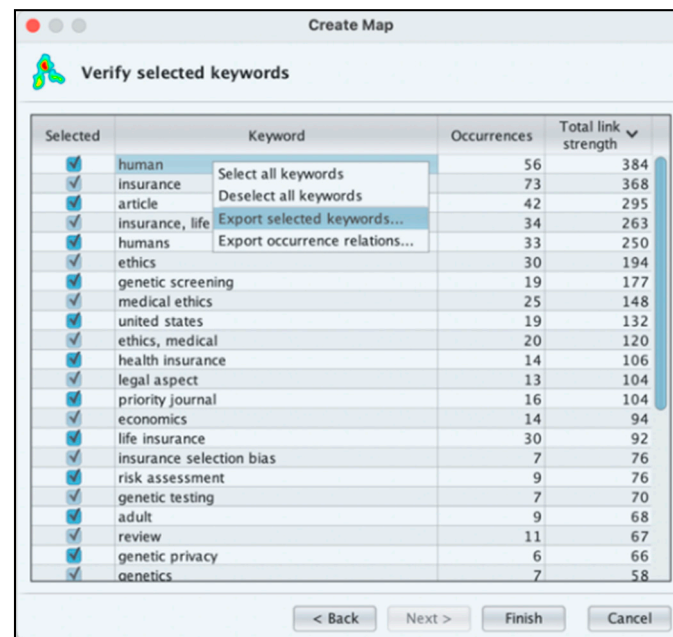


Figure A5. Exported all selected keywords.

Appendix C

Table A1. Summary of key papers.

Stream	Author	Purpose	Findings
Ethics and insurance	Quinn (2008)	Define the everchanging secondary market of United States's life insurance	Recommendations to analyses of morals in markets as provided
Ethics and insurance	Tansey et al. (1994)	Investigate personal moral philosophies and the moral judgments of salespeople	The paper recommends for sales managers and sales researchers to consider Forsyth's taxonomy and the Ethical Position Questionnaire
Ethics and insurance	(Román and Munuera 2005)	Investigate key determinants and consequences of the ethical behavior of salespeople	Age, compensation, and control system are essential determinants of ethical behavior
Ethics and insurance	Tseng and Chung (2017)	Analyze the impacts of explicit ethics institutionalization and management accountability on newcomer trust in manager and company	Newcomers' recognition of explicit ethics institutionalization has a positive correlation with the newcomers' perception of management accountability, which in turn is positively associated with trust in manager and company
Ethics and insurance	Cooper and Frank (2005)	Identify the critical ethical issues faced by professionals working in the life insurance industry and discover the scope that these professionals recognize the industry formed Insurance Marketplace Standards Association	Nowadays, life insurance professionals perceive ethical issues as somewhat less severe than the same problems in the past. Insurance Marketplace Standards Association plays a vital role in influencing senior managers to more strongly encourage and support ethical market conduct,
Ethics and insurance	Nurnberg and Lackey (2010)	Investigate moral questions that can be posed about the social values expressed at the Life Insurance Settlements	Utilitarian and libertarian perspectives were considered to analyze ethical concerns
Genetics	Otlowski et al. (2019)	Implications of genetic testing for risk-rated insurance for the general practice workforce in Australia	Advancements in technology and decreasing costs have resulted in rapid expansion in genetic/genomic testing, which is set to become part of mainstream healthcare
Genetics	Joly et al. (2014)	Conduct genomic stratification and risk classification of life insurance	Discussion of genetic discrimination in the context of life insurance
Genetics	Barlow-Stewart et al. (2009)	Analysis of the impact of consumers' experiences and perceptions of genetic discrimination on utilization of genetic testing	Genetic discrimination was reported in life insurance, underwriting and coercion, applications for worker's compensation, early release from prison, and access to genetic testing
Genetics	Hadfield and Humphries (2005)	Analyze cascade testing as a method of identifying individuals at risk of a genetic condition	Cascade testing for familial hypercholesterolemia was recognized as a feasible and cost-effective method
Genetics	Oakley (1999)	Analyze policy developments in the area of the insurance industry	The insurance industry is suggesting that restrictions based on an "unfair discrimination" standard would permit coverage and cost distinctions based on actuarially sound data, while the health care industry is opposed to any discrimination based on genetic information
Health and human	Mlonzi and Strümpfer (1998)	Measure a disposition that engenders and enhances health	Investigation of a complex mixture of personality domains with the Sense of Coherence scale
Health and human	Hickie (2004)	Describe the development and early achievements of the Australian depression initiative	Beyondblue initiative has a significant impact on depression awareness in Australia
Health and human	Ibrahim et al. (2017)	Investigate the accuracy of the performance of two models: the Lee-Carter model and the Heligman-Pollard model	Both models provide better results for the male population.
Health and human	Wong-Fupuy and Haberman (2004)	Conduct a review of review of techniques used in official population projections, actuarial applications, and the most influential scientific approaches	A systematic approach to approaches was provided

Table A1. Cont.

Stream	Author	Purpose	Findings
Insurance and economics	Chen (2019)	This paper investigates the impact of marketing channels on the corporate reputation and profitability of life insurers based on the evidence of bancassurance in Taiwan	The empirical result indicates that marketing through bancassurance reduces underwriting service quality and thus negatively affects the insurer's reputation. On the other hand, bancassurance shows an advantage in that it cuts business expenses and consequently contributes to its profitability. This paper also finds a positive and sustained relationship between corporate reputation and profitability. Furthermore, the impact of bancassurance on service quality, corporate reputation, and profitability increases with market maturity.
Insurance and economics	(Kuo et al. 2017)	Dynamic network performance evaluation of general insurance companies: an insight into risk management committee structure	Assessment of the risk committee structure and network performance of insurance companies
Insurance and economics	Mattoo (2003)	Investigate issues of China accession to the WTO	Regulation recommendations are provided
Insurance and economics	Kweh et al. (2014)	explore the influence of intellectual capital on the operating efficiency of non-life insurance firms in China	labor, structural, and relational capital are significantly and positively related to operating efficiency.

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