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Research Article

Service innovation research: A comprehensive bibliometric analysis based on the Scopus database (1970-2020)

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ABSTRACT

Purpose: The study aims to determine the evolution of research production in the field of "Service Innovation" between 1970 and 2020. This paper analysed the publications' characteristics in connection with the innovation in service. The focus of academic research on the subject of "Service Innovation" has been identified using bibliometric analysis. **Data Source:** The investigations were done in the Scopus database to determine the main topics, authors, fields, types, sources, titles, publishing years, institutions, countries and their languages. **Method:** The research articles related to service innovation were evaluated by software's MS Excel and VOSviewer. The trend in publications has been analysed using the Scopus database from 1970 to 2020. There were 3,915 reported items collected and analysed. Authors, Co-authorship and analysis of co-occurrence were carried out. **Findings:** The results of the co-authorship and co-occurrence analyses show that the UK and the US lead the publications on service innovation. Also, the keywords service innovation, innovation, services, value co-creation, open innovation, service design, new service development, and business model innovation were found to be most prominent in the literature. "Service Innovation" research witnessed the emerging use of the Kano model. The current analysis discovered a publication tendency that was increasing and will continue to increase in the future. The top author of this study is Lars Witell, affiliated with Linkopings Universitet, Linkoping, Sweden, and the top second author of the study, Faiz Gallouj, is affiliated with the University of Lille, Lille, France. Karlstads Universitet, Karlsland, Sweden and Aalto University, Espoo, Finland took first and second places respectively producing articles on service innovation. Moreover, funding on service innovation research is also limited.

Keywords: *Service Innovation; Bibliometric Analysis; Scopus Database; VOSviewer*

1. INTRODUCTION

More than 70% of the global gross domestic product is generated by the service sector (OECD, 2005). Furthermore, certain increasingly emerging innovations, such as artificial intelligence and the digital revolution, promote new services in a variety of fields and improve the performance of business models (Mao et al., 2020; Palo et al., 2019). According to this ongoing trend, recognizing how to achieve new service success in over-competitive and constantly evolving modern marketplaces is a subject of considerable interest for management within many companies (Frank et al., 2019; Gallouj et al., 2015; Klarin, 2019;

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Sakata et al., 2013; Teece et al., 2016). As a result, to properly address service innovation in this new context, a clear roadmap is required (Santos-Vijande et al., 2021).

The phrase "service innovation" has been used to describe innovation in a number of different contexts, such as the creation of new services or the enhancement of existing services. Service innovation does not necessarily occur in service sector. Non-service industries, such as manufacturing companies that are aimed to broaden their supply portfolio through value-added services, can also deliver new and improved services. Moreover, service innovation differs from "product" innovation because the tangible nature of product innovation is generally absent in it. Services can be substantially customised to meet the needs of consumers and involve various stakeholders. In a knowledge-intensive firm, where service innovation is essential, the concept of service innovation is significantly different from that of product innovation. The focus on technology advances and the focus on innovative activities around research and development departments, for example, doesn't fully explain service innovation (Miles, 2008; Sundbo, 2009).

Furthermore, service innovation is a vague concept in the literature because it is regarded as both an intangible product and a process. (Grönroos, 2007). Several definitions of service innovation have been proposed. Hertog, (2000) developed the "four-dimensional model of service innovation," which incorporates the concept of service innovation into a knowledge-based society. The model's dimensions are as follows (pp. 494–498):

1. Service concept: It is a new service in the marketplace.
2. Client interface: applies to innovative ways for customers to contribute to service development.
3. Technology: which is responsible for ensuring that service is provided successfully.
4. Service delivery system: a creative method of providing actual services to clients.

Droege et al., (2009) examined service innovation and offered findings as well as potential directions for new service development. They highlighted that there is little research on organisational innovations and that the factors for major and gradual innovations are different.

Despite the fact that service innovation has received more attention than ever before, the studies that applies bibliometric analysis to service innovation studies are scant but there are few literature reviews. As a result, one of the bibliometric methodologies we employed to determine the research focus of the field of service innovation was complex network analysis (Zhu & Guan, 2013).

However, few researchers (Chuan & Goudarzlou, 2010; Sakata et al., 2013) have examined the research and productivity of Service Innovation. Chuan & Goudarzlou, (2010) examined service innovation research during a 14-year period from 1995 to 2008 and evaluated the geographical, institutional, and individual research output of the five most important service research journals.

Innovation in service is crucial to both innovation and economic strategies. Furthermore, because the concept "service innovation" is used in such a broad sense, even experts do not agree on what constitutes service innovation (Sakata et al., 2013). Future research could

include examining literature from various time frames to determine the period of evolution in relevant literature (Zhu & Guan, 2013).

The study's goal is to examine the evolution of literature in service innovation from 1970 to 2020 using the Scopus database. Moreover, this paper is aimed at analysing the different bibliometric aspects of publications, such as the number of publications; the number of citations; the diversity of subjects; the most productive authors; frequently used journals; and international research collaborations. The study will be valuable for academics, policymakers, and individuals looking at relevant literature in service innovation and discussing present and future research prospects.

2. 2. STUDY METHOD

2.1. STUDY TYPE

An important methodology, bibliometric analysis, is being employed to analyse the papers published in an area in order to determine the body of knowledge about that topic. Different scholars have attempted to determine the evolution of a scientific topic using bibliometric data. They used online literature databases to look at the distribution of publication dates, author countries, researcher overviews, and the amount of citations to discover the past developments in the literature (Sheeraz et al., 2021; Zainab et al., 2021; Zhu & Guan, 2013).

The goal of this study, which was based on bibliometric research, is to gain a better understanding of publications connected to the theme of Service Innovation. According to Silva, (2004), bibliometrics is the quantitative study of publications with the goal of analysing scientific or technical activities. To add to this, according to Rostaing, (1996) bibliometric research involves the use of statistical or mathematical approaches to a set of references. As per Macedo et al., (2007), bibliometrics aids in determining the pattern of past literature in a specific field (Boyack et al., 2005; Zupic & Čater, 2015).

The quantitative analysis of publications is known as bibliometrics, the application has been applied on the published work of the author(s), group(s), institutes, country, region and world as a whole for targeted period or a subject etc. It is a combination of mathematics and statistics. The method also study helps to find the publication tendency, preferred areas of research, and frequently used journals and other citational metrics. (Haq, 2017; Latif, 2015). This study takes a quantitative approach, with the goal of quantifying some variables connected to scientific production in the area of "Service Innovation."

2.2. SAMPLE DEFINITION

The methodology was based on a systematic search of journal papers derived from a bibliometric study of data gathered from the Scopus database. Scopus is one of the largest database of abstract and citation literature, and covers journals, books and conference proceedings both globally and regionally (Sikandar et al., 2021). Scopus has been utilised for two main purposes. First, it has a broader scope than SSCI, making it beneficial for delving further into narrower research areas. As a field of inquiry, Scopus has 20 per cent more

articles indexed than Web of Science for social sciences and management studies (Martín-Martín et al., 2018; Singh et al., 2020). Second, Scopus offers more fields of data, particularly information relating to all authors (Singh et al., 2020). We therefore concentrated mostly on the Bibliometric data collection Scopus database.

Different databases have been used to measure the publications trends and bibliometric parameters. Web of Science of Institute of Scientific Information, Scopus of Elsevier and PubMed are frequently used for this purpose. For the present study the Scopus Elsevier has been used because it is a multidisciplinary commercial database with comprehensive coverage of worldwide research publications (Bakri et al., 2017). It provides bibliographical information, abstracts and various bibliometric parameters (Haq et al., 2020).

We utilised SCOPUS as a source of data because of its multidisciplinary scope, as done (Leydesdorff et al., 2010) to conduct a comparison analysis between Journal Citations Reports and SCOPUS and later to assess SCOPUS' interdisciplinary (Leydesdorff et al., 2015).

2.3. Data Collection

The goal of this research was to conduct bibliometric analysis on the following variables: total number of publications, year of publication, theme areas, authors, source titles, author countries funding agencies, types of documents, institutions, and author citations.

The search process was carried out during last week of July 2021 using the Scopus database. Initially, the keywords “Service Innovation” were inserted up for searching at Scopus database. From 1970 and 2020, all publications were examined. Following query string was used for our search; “TITLE-ABS-KEY (“service innovation”) AND PUBYEAR > 1969 AND PUBYEAR < 2021”. Based on the suggested time period, 3,915 publications associated with the theme "Service Innovation" were discovered. The number of articles, year of publication, theme areas, types of documents, details of authors, countries, titles of sources, institutes, research funding bodies, and languages were then retrieved.

2.4. Data Processing and Tools

To meet the objectives of the proposed study, the data obtained from the Scopus database was converted into CSV file format. All of this data and files were exported to Microsoft Excel 2019 for the purpose of creating graphs and tables. According to the publication frequencies and citations, the most productive writers, prominent journals, research contributions from each country, funding agencies, and so on were rated.

In order to achieve the purposes of the present study, the analysis of data generated from the Scopus database was exported in CSV format. All these files and data were Save as in Microsoft Excel 2019 for the formation of graphs and tables. As per publication statistics and citations, the most prolific writers, top journals, research achievements of each country, funding bodies, and other entities were evaluated. Moreover, in order to conduct co-authorship analysis, author keywords co-occurrence, and researcher collaboration analysis, all the citations, bibliographical, and keyword details of all 3,915 published papers were transferred to VOSviewer software (1.6.13), which is very appropriate for evaluating and

visualising big bibliometric databases, as well as complicated networks for graphical presentation (van Eck & Waltman, 2010). We used VOSviewer (version 1.6.13), a software application for constructing and visualising bibliometric maps, to export author information, affiliated country data, and information about author keywords from 2160 articles. In our research, maps developed with VOSviewer contain items that are relevant to the topic being investigated, such as keywords or associated countries (Salam et al., 2020).

2.5. Examination of co-Authorship and Co-Occurrence

We used VOSviewer to compile a list of all authors from 99 nations throughout the world, totalling 3,915 research publications. Furthermore, while conducting analysis of the cooccurrence of an author's keywords, only 11,380 keywords from 2968 research articles were included and the remaining 227 articles were eliminated because they lacked keyword information. In addition, before putting the author's keywords into VOSviewer, unnecessary data and synonyms for the keywords were thoroughly analysed and changed. Additionally, for keyword analysis, the threshold value for a keyword's minimum occurrence was set at 5. Finally, a network visualisation and overlay visualisation mode were used to examine the (i) "average publication year", (ii) "the number of occurrences", and (iii) "link strength of the keywords", and a keyword's colour represents the average publication year of the research papers in which it appears.

3. RESULTS OF THE STUDY

3.1. Publications Per Year

Fig. 1 depicts the annual evolution of publications on the topic of Service Innovation. Between 1970 and 2020, 3,915 research articles were published. We have discovered that the notion of service innovation has gained less consideration in recent years, with only 111 documents published in the first thirty years from 1970 to 2000. According to the results, the number of publications expanded significantly from 2008 to 2020. When comparing the number of publications related to the research topic from 2001 to 2007, it is clear that the number of publications related to the research topic increased significantly, indicating the emergence of studies that address this issue in the hopes of finding solutions that will aid service innovation through the development of new methods. More than 300 papers were published in each of the years 2015, 2016, 2018, and 2020. It indicates that this tendency will continue to increase at an increasing rate, demonstrating the global importance of the topic of service innovation.

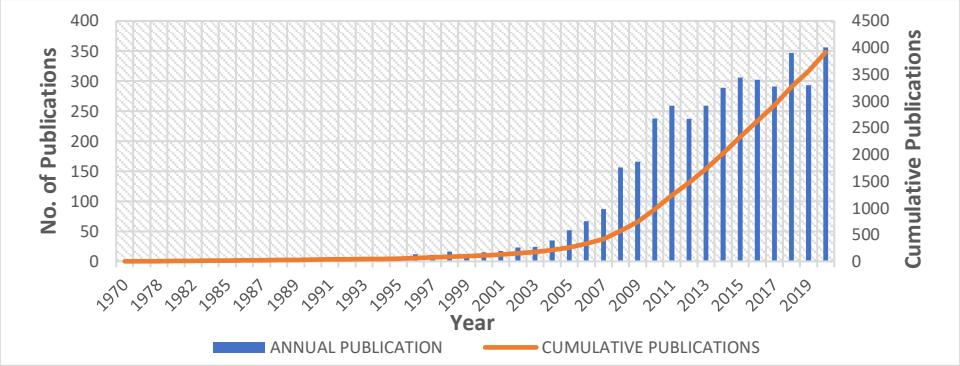

Fig. 1. Research on Service Innovation (1970 to 2020)

3.2. Thematic Areas of Publications

The thematical areas under which most publications have been made are as follows; Business, Management and Accounting (2019 articles), Computer Science (1178 articles), Engineering (889 articles), Social Sciences (692 articles), Decision Sciences (475 articles), Economics, Econometrics and Finance (457 articles), Medicine (286 articles), Mathematics (246 articles), Environmental Science (127 articles), Energy (85 articles), Nursing (63 articles), Arts and Humanities (59 articles), Psychology (58 articles), Materials Science (34 articles), Earth and Planetary Sciences (31 articles), Agricultural and Biological Sciences (28 articles), Physics and Astronomy (26 articles), Biochemistry, Genetics and Molecular Biology (25 articles) , Health Professions (22 articles), Chemical Engineering (19 articles), Pharmacology, Toxicology and Pharmaceutics (16 articles), Multidisciplinary (13 articles), Chemistry (12 articles), Neuroscience (4 articles), Dentistry (2 articles) and Immunology and Microbiology (1 article). Indeed, service innovation has attracted the interest of academics from a variety of disciplines, resulting in a multidisciplinary research topic.

3.3. Type of Documents

Table 1 shows the types of documents found in our search string. The majority of these documents were papers published in journals or conference proceedings, highlighting their scientific nature.

Table 1. Classification of publications by type

Type of Publication	Frequency	Percentage
Articles	2190	55.9
Conference Papers	1123	28.68
Book Chapter	289	7.38
Review	136	3.47
Conference Review	78	1.99
Book	34	0.86
Editorial	24	0.61
Note	13	0.33
Retracted	12	0.30
Short Survey	11	0.28
Erratum	3	0.07
Undefined	2	0.05

3.4. MOST INFLUENTIAL AUTHORS

The top ten authors who have published in the field of "Service Innovation" are shown in Fig. 2.

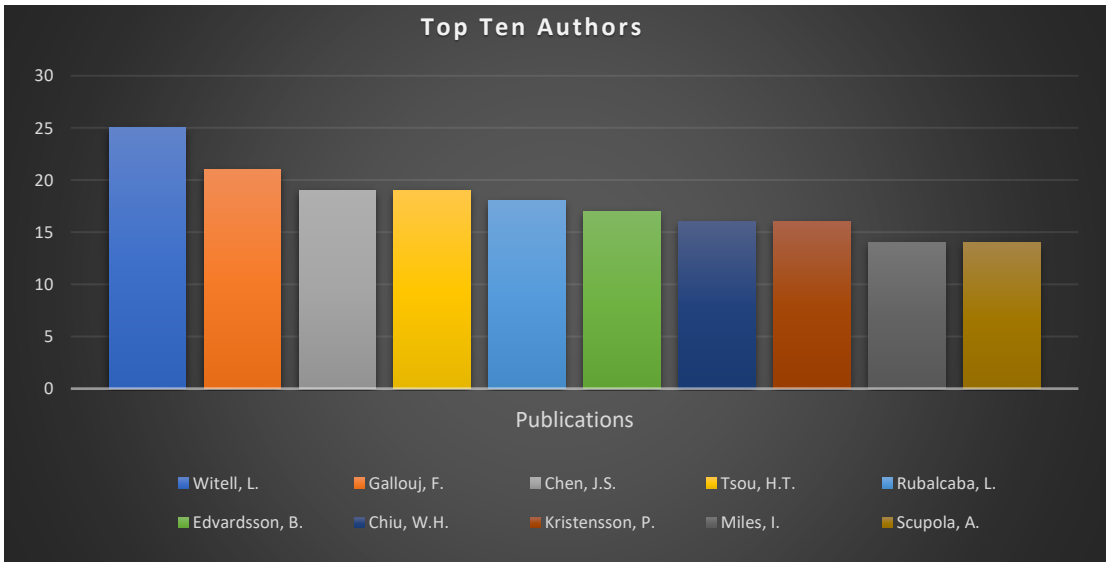

Fig. 2. Top Ten Authors

The top author of this study is Lars Witell, affiliated with Linkopings Universitet, Linkoping, Sweden, who has published 25 documents related to service innovation. The top second author of the study, Faiz Gallouj, affiliated with Univeriste de Lille, Lille, France, has published 21 documents related to service innovation. Both are experts in the field of service innovation. Lars Witell has a total of 3019 citations with an overall 30 h-index and Faiz Gallouj has a total of 3244 citations with an overall 26 h-index.

Fig. 3. Top first author publications records in Scopus database

Fig. 4. Top second author publications records in Scopus database

3.5. Main Sources

The following journals published the majority of the papers on the topic; (i) “Service Industries Journal”, (ii) “Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics”, and (iii) “Lecture Notes in Business Information Processing”._The top ten sources of publications on the topic of "Service Innovation" are listed in Table 2.

Table 2. Top 10 Journals

Title of source	Number of publications
Service Industries Journal	62
Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics	53
Lecture Notes in Business Information Processing	48
Journal of Service Management	46
Psychiatric Bulletin	44
Journal of Business Research	43
International Journal of Services Technology and Management	41
Journal of Services Marketing	41
Journal of Service Research	32
Health Informatics Journal	26

3.6. Best Institutions

Fig. 5 highlights institutions that produce more articles on the "Service Innovation" theme. The following institutions stand out in terms of “Service Innovation” publications: Karlstads Universitet, Karlsland, based in Sweden, is the top one, and the second top institution is Aalto University, Espoo, based in Finland. It has been observed that our top third institution, Linkoping Universitet, Linkoping, is also based in Sweden. Therefore, the top one and third institutions in this study belong to Sweden. On further examination, it has been noticed that the top fourth, fifth and sixth institutions of study belong to Taiwan. The top second and seventh institutions belong to Finland.

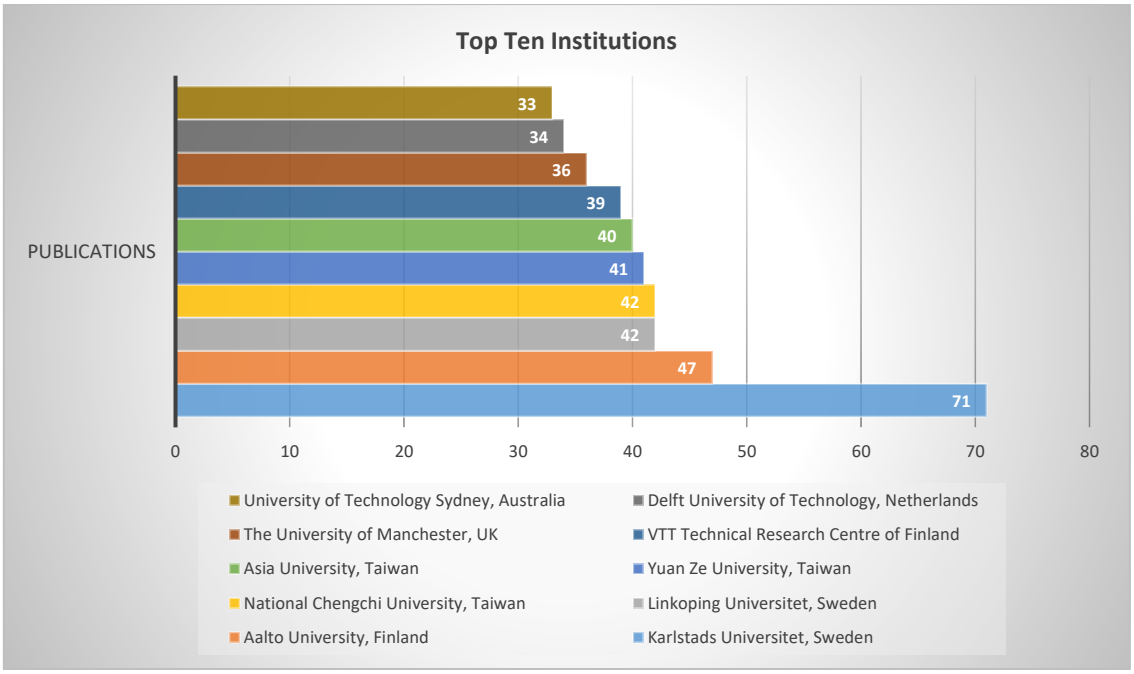

Fig. 5. Top Ten Institutions

3.7. Top Countries

The United States has led the ranking of publications on the number of publications by country, followed by China and the United Kingdom. The top 10 countries on service innovation are shown in Fig. 6. Thus, it can be concluded that the majority of institutions which have research on service innovation are located in these countries. It is worth noting that Sweden ranks 8th in the classification of publications on the issue studied (Table 3).

Table 3. Top 10 Countries

Countries	Publications
United States	576
China	517
United Kingdom	494
Taiwan	368
Australia	223
Germany	223
Finland	209
Sweden	179
Italy	126
Netherlands	126

Fig. 6. Top ten countries that have published on "Service Innovation".

3.8. Co-Authorship Analysis

Co-authorship with respect to countries was analysed. The overlay visualization of data is shown in (Fig. 7). The minimum number of papers for a country remained at five, and the minimum number of citations remained at zero. There was one item that was not the name of country and hence was excluded from the data. All 56 countries met the criteria and the largest set of connected countries was 368. Data revealed that most of the research articles were published in the United Kingdom followed by United States, Finland, Australia, Italy, China, France, Germany, Netherlands, Spain and Sweden. Authors from the United Kingdom have published 492 documents with authors of other countries having 44 links and total link strength of 286. They have co-authored most papers with United States which has link strength of 33, and with China which has link strength of 21.

Malaysia has also contributed to the field of service innovation with 60 publications. It has 14 links with other countries with a total link strength of 22. Authors from Malaysia have co-authored most papers with Australia (4 link strength), the United Kingdom (3 link strength), and Bangladesh (3 link strength).

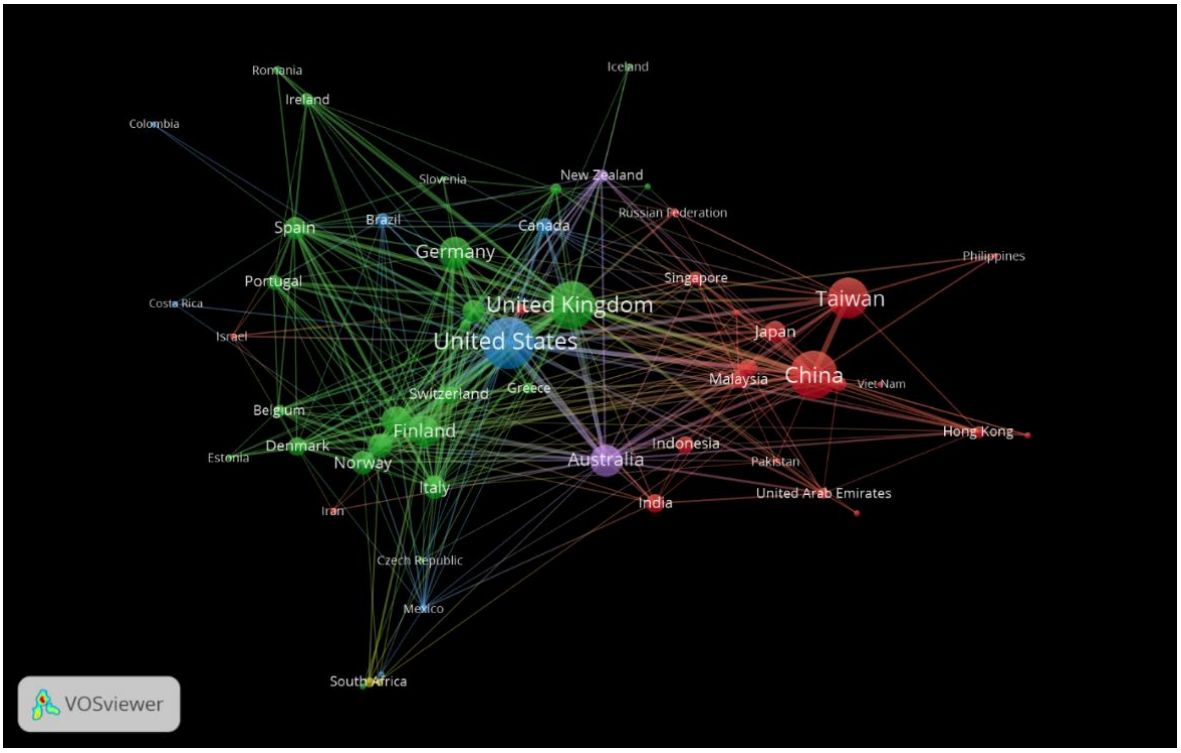

Fig. 7. In network visualisation mode, a snapshot of the bibliometric map displays co-authorships.

3.9. Co-Occurrence (Author Keywords)

We conducted co-occurrence analysis to know the keywords authors have used in their studies so far. Our results after running co-occurrence analysis of author keywords revealed 7371 keywords used in the papers related to service innovation. The minimum number of keyword occurrences was set at 5 to be included in the analysis. Keywords such as innovations and innovativeness were replaced by 'innovation'. Similarly, other similar keywords were merged into common keywords such as business model innovation, business services, customer service, digital service innovation, dynamic capability and hotel industry. The most keywords occurred were service innovation, innovation, services, value co-creation, open innovation, service design, new service development and business model innovation with the occurrence of 1138,450, 92, 88,70, 118, 80 and 79 respectively. The overlay visualization of data is shown in (Fig. 6).

The largest set of connected items consisted of 314 items out of 393 items. Our results showed 16 clusters of all keywords having 3,016 links, and total link strength was 5,824. Among all the keywords, "Service Innovation" was the prominent one because of the theme of the current paper. Results showed that service innovation had 291 links to other keywords with the total link strength of 1,749. Service innovation had major links with service design, value co-creation, new service development, innovation and business model innovation (Link strength: 62,46,45,43 and 39 respectively). Interestingly service innovation had low link strength with industrial services (02), service innovation capability (02), technology adoption (03), supply change management (03), professional services (04), customer interaction (06), hospitality industry (07), hotel industry (07), customer loyalty (07) and business services (08).

Other interesting avenue in service quality was the use of Kano Model. The occurrence of 'Kano Model' keyword was 5. It had 6 links with total link strength of 7 with other variables. Kano (1984) developed the Kano Model to identify the quality attributes and suggested a non-linear relationship between service quality and customer satisfaction which was perceived as linear relationship before.

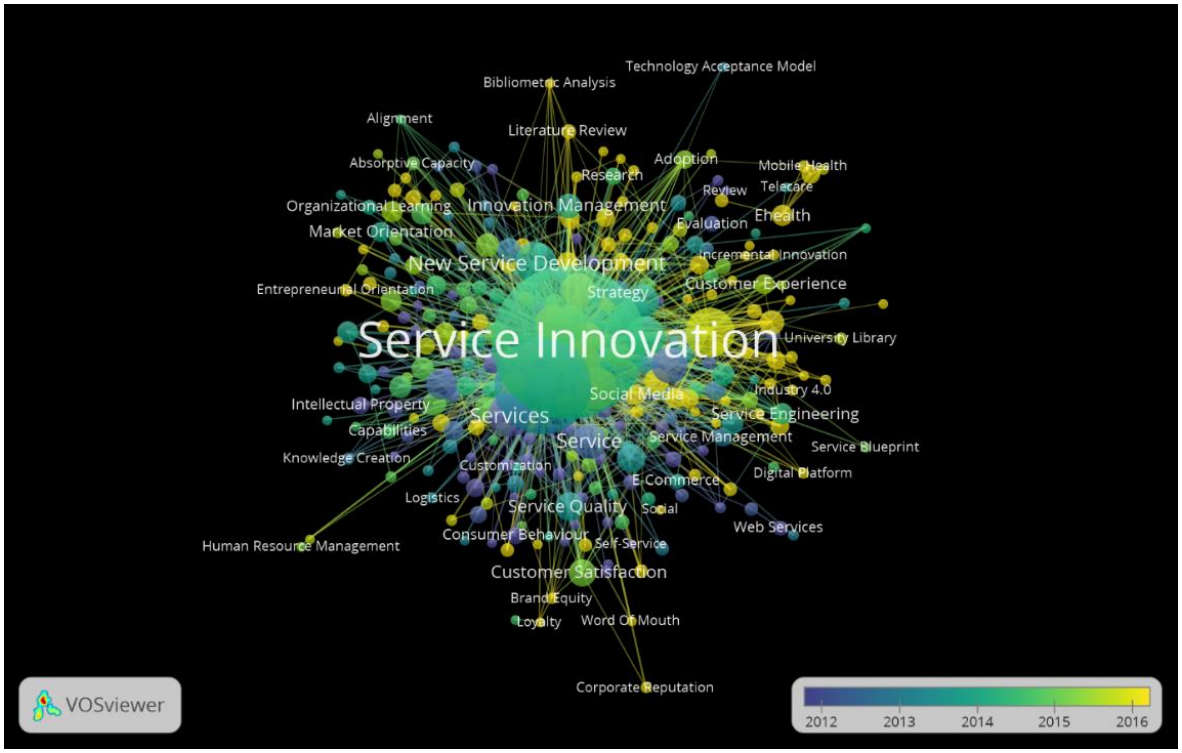

Fig. 8. Snapshot of bibliometric map showing co-occurrences of authors' keywords (n=5) in overlay visualization mode.

3.10. Main Funding Agencies

The study's funding also revealed that only 19% (730/3915) of the publications have funding, while the majority 81% (3185/3915) do not. The top 15 research funding agencies are as follows; European Commission (66 publications), National Natural Science Foundation of China (66 publications), UK Research and Innovation (24 publications), Bundesministerium fur Bildung und Forschung (21 publications), Ministry of Science and Technology, Taiwan (20 publications), U.S. Department of Health and Human Services (19 publications), National Science Council (18 publications), Engineering and Physical Sciences Research Council (17 publications), Horizon 2020 Framework Programme (17 publications), National Research Foundation of Korea (17 publications), Seventh Framework Programme (17 publications), Economic and Social Research Council (15 publications), National Institutes of Health (15 publications), Ministry of Education of the People's Republic of China (14 publications) and National Science Foundation (14 publications).

3.11. Main Languages

The analysis showed that the articles related to service innovation were written in 20 different languages. English was the most prevalent language, contributing to n=3851

publications and representing 98% of all publications, followed by Chinese (n=30, 0.76%), Portuguese (n=8; 0.20%), French (n=6; 0.15%), Spanish (n=6; 0.15%), German (n=4; 0.10%), Japanese (n=4; 0.10%), Finnish (n=3; 0.07%), and Russian (n=3; 0.07%). The rest 11 languages just only contributed (n=11; 0.28%) in the total publication of service innovation research.

4. CLOSING REMARKS

4.1. Conclusion

The purpose of the current paper was to conduct a bibliometric analysis of “service innovation” literature. As a result, the Scopus database was used to examine 3915 documents from 1970 to 2020. There was an increasing rate of publications per year in the area of service innovation research. The current paper identified the most productive and influential authors in “service innovation”. The top author of this study is Lars Witell, affiliated with Linkopings Universitet, Linkoping, Sweden, and the top second author of the study, Faiz Gallouj, is affiliated with the University of Lille, Lille, France. Karlstads Universitet, Karlsland, based in Sweden, is the top one, and the second top institution is Aalto University, Espoo, based in Finland. Both stand best in terms of "Service Innovation" publications. The analysis showed that the articles related to "service innovation" were written in 20 different languages. English was the most prevalent language, representing 98% of all publications. Co-authorship analysis of countries was performed to investigate the links between authors and countries where service innovation documents were written. Also, we carried out co-occurrence analysis of author keywords in order to identify and examine the keywords used and connected to "service innovation" research.

“Service Innovation” research witnessed the emerging use of the Kano model. Therefore, it is suggested to use this model to measure “service innovation” in service industry. The majority of the studies of “service innovation” were linked with saturated outcomes such as service design and value co-creation. Therefore, it is suggested to include some new outcome variables in relation to service innovation. Interestingly “service innovation” had low link strength with industrial services, service innovation capability, technology adoption, supply change management, professional services, customer interaction, hospitality industry, hotel industry, customer loyalty and business services. There is a need to study the relationship between “service innovation” and these variables in future research.

4.2. Limitations and Recommendations for Future Research

This study is limited to the journals only indexed in Scopus database, therefore, publications published in other journals indexed on other sources are not included in this study. The year 2021 was still going on, so the publications of this year were also excluded. The top authors work on other topics also not included because it was not in the scope of this study. Future researcher may also consider comparing Scopus database with Web of Science database or other indexing agencies for service innovation or may present an analysis of service innovation research within a particular field.

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