

Systematic Literature Review Of Blood Supply Chain Using Bibliometric Visualization Techniques

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Abstract: Bibliometric methods are proved as scientific specialties and are an part of scientific and applied fields as a research evaluation methodology. The methods are popular in using the citation and term analysis in the literature survey for a given topic of interest. It is also used to understand the corpus of the literature. For this aspect, in this journal we make use of VOS viewer to visualize the Bibliometric technique (Bibliometric mapping). In Bibliometric literature attention is paid to two aspects, First one is Bibliometric map construction and the second aspect is graphical representation of Bibliometric map. This map will help to find out the global patterns in the literature including distribution of institutions, authors, journal, keywords and Citations. Here in this paper, 127 journals on Blood Supply chain was extracted and mapped using different key words. Thus help to understand the gaps in the research already published so as to help the researcher do a meaningful research in the topic of Blood Supply chain.

Keywords: Blood Supply chain, Bibliometric Analysis, VOS Viewer, Publication Analysis, Publication Map, Term Analysis, Term Map

1. INTRODUCTION

The information pertaining to research is available in abundant to the researchers through various databases worldwide [7]. The challenge is in retrieving the information in a structured manner. There are various databases like Web of Science, EBSCO and Scopus Databases available to the researchers based on their area of research. Scopus and EBSCO are the preferred databases in research. With the help of these databases a systematic review structure on an area of research can be obtained. The another drawback of directly reviewing using these databases is that there is no scientific proof that the researcher has reviewed all the papers and the chances of the researcher leaving out the important research papers pertaining to his area of research. The researcher in general has to look at different research papers, development of research over time, relevance of the papers to his area of interest and how each stream is different to one another. Hence the use of Bibliometric techniques helps to identify the literature when the range is huge and the recent trends are not identified. The combination of different tools, frameworks and methods to analyze publication is Bibliometric techniques [6]. The quality of research outputs is evaluated by using bibliometric analysis [1]. Here in this research, Blood supply chain is a multidisciplinary topic indexed in social sciences, Engineering, medical and Management journals. The presence of systematic literature is few as not many studies is done in this area since the topic is new.

The analysis of systematic literature review is done using

Microsoft Excel spreadsheet and Vos Viewer Software using Scopus database. Here all the articles that have been appeared in the systematic review is used for the review as the authors feel that since the topic is new and not many development in this area of research has been taken place. The aim of the systematic review is to determine the research clusters and the recent development of blood supply chain. The researchers also intend to find out the gaps so as to foster future research in the field of Blood supply chain. The publication and literature has been systematically searched, structured and visualized in the scientific manner.

2. METHODOLOGY

The methods used in the study are explored from Bibliometrics, text mining and Information Visualization. The relations from the Bibliometrics are borrowed in order to establish links between citation relations and publications [2]. NLP (Natural language processing) is used to extract terms and perform text analysis. The authors intend to discuss the data used in the study and then review the analysis based on blood supply chain. Here in this paper, the author uses Scopus data since the major literature pertaining to Blood supply chain is in Scopus data. The another reason of not using Pub Med is due to the Expertise of the researcher (Engineering Management) in Engineering and Management area. Elsevier produces Scopus ID and is an organization that indexes journals in all disciplines. Scopus indexed journals are more authentic than the journals indexed in other sources and direct access to Scopus database produces reference data in large quantities.

3. BLOOD SUPPLY CHAIN LITERATURE

The result of 127 journal papers are produced by inserting key word 'TITLE-ABS-KEY ("Blood Supply Chain" OR "Supply Chain of Blood")'. There are no other keywords as the title is straight forward and has no other similar meanings. The result is obtained from Scopus database. These include the journal of Medicine, Management and Engineering journals.

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4. PUBLICATION LEVEL ANALYSIS

Publication level analysis analyzes the Co-relation of the publication. The CCA (Co-Citation Analysis) and BCA (Bibliographic Coupling Analysis) are the two concepts used to analyze the relatedness of the publication [3]. CCA is not used to find the current trends in the literature but used to find the theoretical pillars. CCA is based on the assumption that two units are closer with similar school of thoughts if they are Co-cited. CCA has been less considered than BCA because of the large datasets involvement. In BCA, the underlying assumption states that the two documents have shared the same references in common. i.e., the two documents are likely to share the same research theme if they cite more of the same literatures [4]. In order to recognize the cluster of publication that is closely related, the clustering method is used after analyzing the relatedness of the publication. Thus the literature is obtained after broken down into different research area and topics. A total of 41 publications are obtained in the field of blood supply chain management and since there is no citation relationship with other publications it cannot be allocated to a cluster. Using VOS viewer software, a publication map is created of the publications that are cited 10 times. Hence a total of 26 publications is used to create a publication map. This computer program is called Visualization of Similarities (VOS), where the publication location is determined in the map using mapping and Visualization techniques. VOS viewer supports the function called as exploration of the map.

5. TERM LEVEL ANALYSIS

Term level analysis will form a group of different clusters by showing the linkage of different terms. This is due to co occurrence of terms in the publication title and abstracts. The relatedness of the terms is determined by its distance with the other terms. In the Blood supply chain literature, the abstract and title field selected from VOS Viewer has given 52 terms having high relatedness.

6. RESULTS

6.1 Publication Map

The figure1 shows the publication map. This publication map is extracted from VOS viewer from 127 publications and has 26 most cited and most frequent publications. The publication map shows the cluster of publications of the most cited publications and their relationship. They also show how they are clustered together in the field of blood supply chain in this context. Here in this figure there are 6 clusters differentiated according to their colors. They are grouped into three categories. Category 1: Maximization Function, Category 2: Solution Methods Used and Category 3: Components in the blood used for research.

6.2 Term Map

The Co occurrence of words in the topic of Blood Supply chain helps in evaluating and grouping of the research sub areas. The research area of Blood supply chain in the keywords or in the abstract or title from the Scopus database gave a total of 127 publications. Based on the repeatability of words, the terms were extracted. The

repeatability count was 10 within bibliographic descriptions. In this case, 52 terms occurred at least 10 times from the criteria above out of the total 3344 terms obtained. This is obtained from the binary method of counting in the VOS viewer software and the scores for each of the 52 terms were calculated. Next out of the 52 terms obtained, the number is reduced to 31 because of the default selection of 60% relevancy of terms. Next, the irrelevant terms are omitted for instance the terms like paper, use, time, type etc. Hence 27 terms which are relevant are obtained and the map is plotted below (Fig 2). From the 27 terms that occurred 10 times or more in the research paper, three clusters have emerged as shown in figure 2. These 27 terms are the words that co occur several number of times. The outcome of 27 terms has following sub areas) Application and Solution method (marked in blue), ii) Blood Bank Study and Blood Components (marked in green),iii) Type of approach and Modeling(marked in red) . The first research sub area is concerned with applications and simulation method (marked in blue). The second research sub area is with respect to Blood Bank study and the third research sub area is with respect to Supply chain Modeling, Markov chain and Game theory.

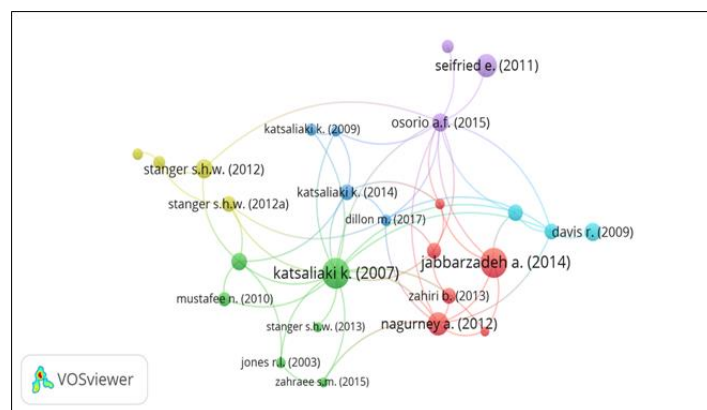


Fig 1:Publication map of frequently cited publications showing their citation relations (N=26)

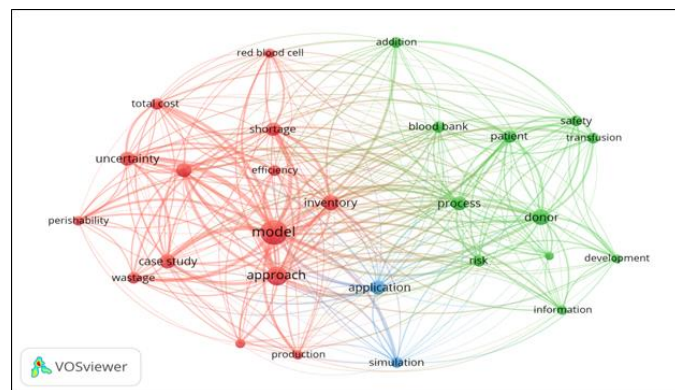


Figure2: Term Map with colors indicating three clusters

7 DISCUSSION

The research paper intends to throw light on to scientific and structured method of literature review as the

conventional method using the keywords is unsuccessful. The Bibliometric methods are more useful with research topics of more keywords. This paper reflects that the systematic review is useful with topics of more keywords unlike the topic Blood supply chain with less number of keywords and significantly small amount of publication and still there is a chance that the researcher will miss an important paper in his area. This method proves successful for a researcher. The publication map was considered with 26 most cited research publications. The VOS viewer eliminated the papers with less than one citation and hence in the publication map 41 papers were not considered. Vos Viewer is used to analyze complex literature reviews with many key words in a short duration and gives the overall structure of the literature. The research gaps are identified after performing Bibliometric analysis in the field of Blood Supply chain. The author plans to adopt the best method to reduce the wastage of Blood and bridge gap between supply and demand in their future research by implementing an effective model of Blood bank inventory and distribution system.

8 REFERENCES

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