

Analysis of the scientific production on the implementation of knowledge management for supply chain sustainability

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Abstract

This research aims to analyze the scientific production on the implementation of knowledge management for sustainability of supply chain. The study is of a descriptive quantitative type, by performing a bibliometric analysis executed in the Scopus database where only the articles found in open access in the areas of engineering, business, administration and accounting sciences were considered. A total of 43 articles were detected. The authors with the major contributions were Tseng, M.L. and Mangla, S.K. The most productive institutions were Brunel University London and Brunel Business School. The country in which the largest number of research papers were published was The United Kingdom. The articles were published in 29 journals. A bibliometric map of co-authorship was carried out, which showed that these were grouped into four clusters and that of co-occurrence of keywords structured into six clusters, which identified six lines of research.

Keywords: knowledge management; sustainability; supply chain; bibliometric analysis.

Análisis de la producción científica sobre la implementación de la gestión del conocimiento para la sostenibilidad de la cadena de suministro

Resumen

El objetivo de la investigación es analizar la producción científica sobre la implementación de la gestión del conocimiento para la sostenibilidad de la cadena de suministro. El estudio es de tipo cuantitativo descriptivo, mediante la realización de un análisis bibliométrico ejecutado en la base de datos Scopus donde solo se consideraron los artículos que se encontraron en acceso abierto en las áreas de ingeniería, negocio, administración y ciencias contables. Se detectaron un total de 43 artículos. Los autores que más aportaron fueron Tseng, M.L. y Mangla, S.K. Las instituciones con más contribuciones fueron Brunel University London y Brunel Business School. El país en el que se publicó el mayor número de investigaciones fue el Reino Unido. Los artículos se publicaron en 29 revistas. Se realizó el mapa bibliométrico de coautoría que evidenció que estos se agruparon en cuatro clústeres y el de coocurrencia de palabras clave estructurado en seis clústeres que de su estudio se identificaron seis líneas de investigación.

Palabras clave: gestión del conocimiento; sostenibilidad; cadena de suministro; análisis bibliométrico.

1 Introduction

In today's increasingly competitive environment, organizations are exploring variants that help them face the challenges that arise in the supply chain sector [1]. In this scenario, organizations need to be more flexible and be able

to adjust their processes to market requirements, where the exchange of information to manage suppliers, production and marketing of products prevails [2].

The supply chain is composed of all the elements involved in the fulfillment of a customer order [3]. Understanding its composition is essential for organizations,

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since it facilitates the implementation of strategies that make it possible to distinguish it from competitors [4], hence the need to study its structure in order to develop and enhance the production and marketing of goods and services [5].

The area of supply chain management emerged to manage the products, services and information generated along the supply chain [6]. Its implementation expanded worldwide to combat the high levels of insecurity in the business sector [7].

The benefit of preserving proper supply chain management is manifested on organization performance [8], its readiness to face the environment, designing products more dynamically and supplying them consistently to the market [9].

The appearance of a supply chain is closely linked to ecological parameters and sustainable development [10,11], because sustainability in the supply chain is a management variant for achieving more sustainable processes and products and contributing to economic, social and environmental development [12,13], so its practice should be encouraged in organizations [14].

Entities are currently exploring the use of strategies that benefit the integration of the supply chain with the aim of producing long-term links with their suppliers and customers, allowing them to remain in the market for a longer period of time [15].

Knowledge management has been considered as a fundamental aspect for supply chain management and as a precedent for sustainability practices in the supply chain [16; 17], because managing knowledge favors the distribution of external knowledge and coordination among the members that make up the chain to increase efficiency [18,19].

Knowledge management can be defined as organizational planning based on an innovative environment and the use of ICTs, with the aim of creating the conditions for the storage, transfer, application and protection of the knowledge generated in an organization to contribute to increasing the sustainability and competitiveness of a supply chain and all the companies that make it up [20].

Based on the above, it is essential to determine the knowledge of each of the parts that make up a supply chain in order to determine their characteristics and functions, so that this knowledge can be preserved and used for the benefit of organizations and to achieve competitive advantages [21].

The link between knowledge management and supply chain sustainability offers an alternative to contribute positively to the development of society and care for the environment [22].

The project “Improvement of supply chain processes”, which belongs to the University of Matanzas and is associated with a national program in Cuba, among its objectives, it studied 42 supply chains in different strategic sectors of the country, and identified seven (7) main deficiencies associated with the management of the supply chain due to the lack of adequate knowledge management:

1. Inadequacies in the recording of information from the different links in the chain.
2. Incipient implementation of ERP systems in companies and chains.
3. Insufficient integration of knowledge generated throughout the chain, which leads to a lack of knowledge

of customer needs, deficient information from suppliers, and failure to meet delivery and payment dates.

4. Poor knowledge and information transfer of among links in the chain and within the company.
5. Poor recording of information on the end client and their needs in the rest of the chain, which means that the product does not reach the client with the requested requirements.
6. There is no platform for exchanging information in the chain.
7. Insufficient application of ICTs to knowledge management in the supply chain.

The objective of the research is to analyze the scientific production on the implementation of knowledge management for the supply chain sustainability.

2 Methodology

A descriptive quantitative type study was carried out by performing a bibliometric analysis with the intention of examining the scientific production linked to the implementation of knowledge management for the supply chain sustainability; it was carried out in the Scopus database in the period 2009-2024. This period was selected in order to visualize how the scientific production on the implementation of knowledge management for supply chain sustainability has behaved in the last 15 years and in the different stages that have occurred in that period such as pre-pandemic, pandemic and post-pandemic.

The search strategy was: TITLE-ABS-KEY (“supply chain” AND “sustainability” AND “knowledge management”) AND PUBYEAR > 2009 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA, “BUSI”) OR LIMIT-TO (SUBJAREA, “ENGI”) OR LIMIT-TO (SUBJAREA, “DECI”)) AND (LIMIT-TO (DOCTYPE, “ar”)).

Only research articles found in open access in the areas of engineering, decision sciences, accounting, business and management were considered. The search was executed on December 5, 2023, a sum of 43 publications was reached. The preliminary scan was performed by one of the researchers, who checked the title, abstract and the document as a whole. A set of indicators were analyzed as shown in Fig. 1.

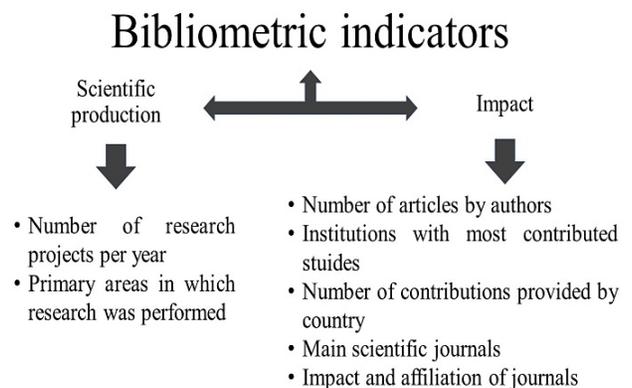


Figure 1. Bibliometric indicators analyzed. Source: own design.

3 Bibliometric indicators studied

Indicators were considered to analyze scientific production in the selected stage:

- Trend indicator to study the number of researchers carried out per year.
 - Determination of the primary areas of knowledge in which research was carried out, considering the quantity.
- Impact indicators were evaluated at the stage:
- Authors who contributed the most articles in the period.
 - Institutions with more studies contributed to the area of knowledge.
 - Number of contributions provided by country.
 - Main scientific journals: where the total number of citations received, the h-index and the SCImago SJR Rank (SJR indicator) and the quartile were considered.
- Bibliometric maps were prepared for the analysis of word co-occurrence and for the identification of lines of research.
- For quantitative analysis of indicators, the .CSV format files were downloaded from Scopus database (<https://www.scopus.com/>), while the components linked to the impact and affiliation of the journals were acquired from SCImago Journal Rank, Sci Journal (<https://www.scijournal.org/>).

Bibliometric maps were prepared to analyze word co-occurrence and detect lines of research and author co-authorship.

4 Results and discussion

Fig. 2 shows the behavior of scientific production by year. It is evident that the number of works carried out from the year 2010 to 2015 was very irregular (in the years 2012 and 2015 no research was carried out) while from 2016 there is a tendency to increase until the year 2021 in which there is only one (1) article; in the years 2022 and 2023 have the highest number of publications with eight (8) and nine (9) respectively, representing 39.53 % of the total (43) where all are articles.

It was recognized that 149 authors have carried out research in the years analyzed, with only two (2) of them having more than one publication (Fig. 3), which represents 1.34 % of the total.

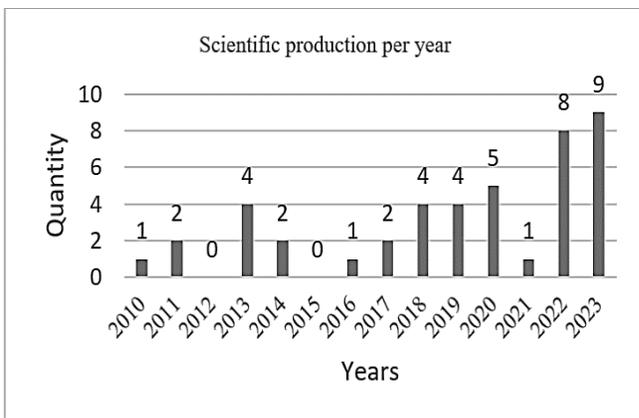


Figure 2. Scientific production per year. Source: own design.

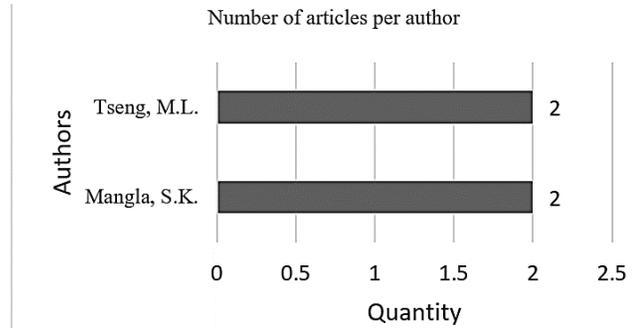


Figure 3. Number of articles per author. Source: own design.

The bibliometric map was made to check levels of co-authorship among researchers (Fig. 4), where the maximum number of authors per document was 25, and 16 items were obtained, linked in three (3) clusters.

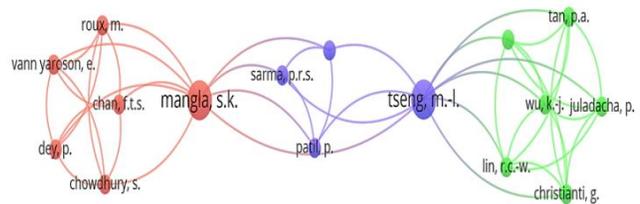


Figure 4. Bibliometric map of author co-authorship. Source: own design.

Table 1 shows an analysis of the three (3) clusters in order to detect the most related authors (items).

Clusters	Items	Color	Authors
1	6	Red	Chan, F.T.S. Chowdhury, S. Dey, P. Mangla, S.K. Roux, M. Vann Yaroson, E.
2	6	Green	Christiani, G. Juladacha, P. Lin, R.C.W. Tan, P.A. Todumrongkul, N. Wu, K.J.
3	4	Blue	Patil, P. Sarma, P.R.S. Tseng, M.L. Uniyal, S.

Source: own design.

The research works were carried out in 128 affiliations; only 4.68 % have more than two (2) affiliations (Fig. 5).

There were carried out studies according to authors 'country of origin in 34 countries. An analysis of countries with more than three (3) publications (Fig. 6) showed that the most relevant was the United Kingdom with 10 articles, followed by the United States, Australia and Spain with seven (7), five (5) and five (5), respectively.

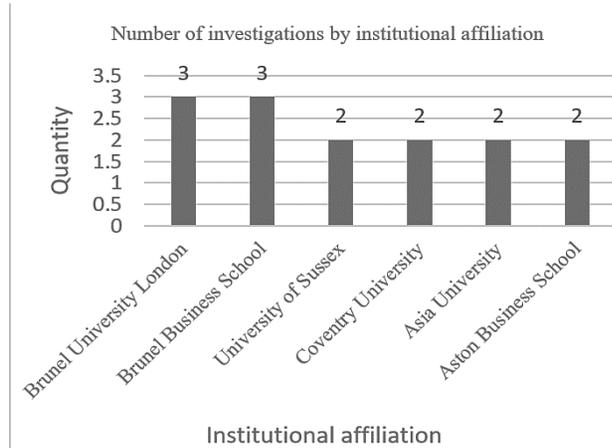


Figure 5. Number of investigations by institutional affiliation. Source: own design.

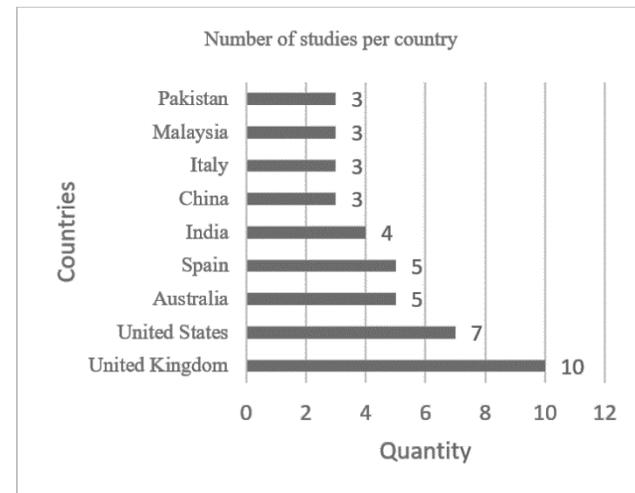


Figure 6. Number of studies per country. Source: own design.

Research was conducted in 11 thematic areas with a total of 123 research projects (Fig. 7). The area with the highest number is Business, Management and Accounting with 35 representing 28.45 % of the total; it is followed by Engineering, Decision Sciences and Computer Science with 23, 19 and 16 respectively.

The bibliometric network map (Fig. 8) aimed to examine the co-occurrence of keywords from the n=2 level onwards, 62 items were found united in six (6) clusters.

Table 2 shows an analysis of the six (6) clusters in order to find the most frequent keywords (items).

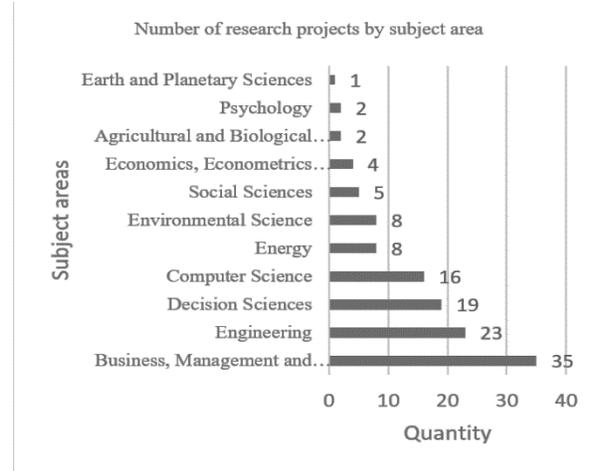


Figure 7. Number of research projects by subject area. Source: own design.

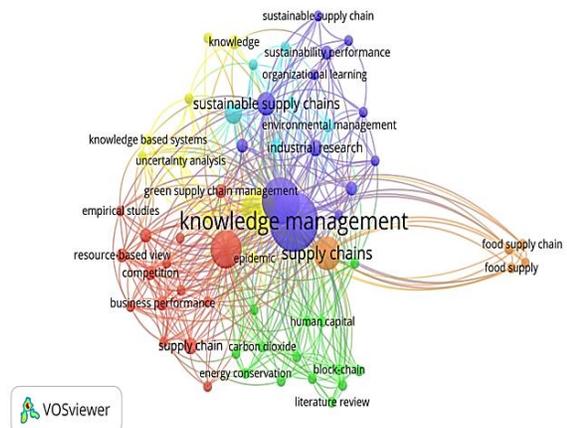


Figure 8. Network map of keyword co-occurrence. Source: own design.

Table 2. Cluster analysis of keywords with the highest frequency of occurrence.

Clusters	Items	Color	Keywords
1	15	Red	Business performance, competition, competitive advantage, corporate social responsibility, empirical studies, energy utilization, environmental knowledge, green supply chain management, information systems, information technology, resource-based view, supply chain, sustainability, systematic literature review, triple bottom line.
2	14	Green	Block-chain, blockchain, carbon dioxide, cost reduction, energy conservation, human capital, literature review, mapping, planning, supply chain collaboration, supply chain visibility, sustainable production.
3	13	Blue	Buyer-supplier relationships, industrial research, knowledge management, least squares approximations, manufacture, operational performance, organizational learning, structural equation modeling, sustainability knowledge, sustainability performance, sustainable development,

			sustainable supply chain, sustainable supply chains.
4	9	Yellow	Conceptual framework, construction industry, epidemic, innovation, knowledge, knowledge-based systems, supply chain management, sustainable supply chain management, uncertainty analysis.
5	6	Celeste	Artificial intelligence, decision making, environmental impact, environmental management, environmental performance, information management.
6	5	orange	Food supply, food supply chain, multiple-case study, supply chains, waste management.

Source: own design.

There were defined Six (6) lines of research linked to the implementation of knowledge management for supply chain sustainability derived from the cluster analysis (a line of research per cluster was defined on the basis of the keywords of which it consisted):

1. The impact of green supply chain management on business performance.
2. Impact of blockchain technology [24] on supply chain sustainability.
3. Impact of knowledge management on sustainable supply chain performance [25].
4. Sustainable supply chain management in the construction industry [26] in times of uncertainty and epidemics.
5. Application of artificial intelligence [27] in decision making to improve environmental performance and information management in enterprises.
6. Optimizing waste management in food supply chains [28].

It was performed an evaluation of scientific production related to the implementation of knowledge management for supply chain sustainability from 2009 to 2024, and it showed there are studies in different thematic areas, mostly in Business, Management and Accounting.

The centers that contributed the most are Brunel University London and Brunel Business School with three (3) each, while United Kingdom represents the major country's contributions.

The articles were published in 29 journals, where Journal of Cleaner Production stands out with four (4) researches, International Journal of Production Economics and Production Planning and Control with three (3) each. A list of the 10 journals with the most citations (Table 3) is led by Journal of Strategic Information Systems.

The article with the highest number of citations is: "From green to sustainability: Information Technology and an integrated sustainability framework" with 496.

The journal with the highest h-index is the Journal of Cleaner Production with a value of 268. On the other hand, the journal with the highest SJR is the Journal of Strategic Information Systems with 4.011.

Bibliometric studies have been used in different contexts [29-31], in the area of supply chain management, to identify its challenges [1], in all cases to organize different science indicators and identify lines of research.

Table 3. Journals with the most citations.

Journals	Number of cites	h-index	SJR	Quartiles
Journal of Strategic Information Systems	496	104	4,011	Q1
International Journal of Production Economics	325	214	3,028	Q1
Journal of Knowledge Management	185	134	2,22	Q1
Business Strategy and the Environment	148	131	2,87	Q1
Production Planning and Control	105	92	1,719	Q1
Technological Forecasting and Social Change	75	155	2,644	Q1
Journal of Cleaner Production	58	268	1,981	Q1
Journal of Manufacturing Technology Management	40	84	2,083	Q1
Journal of Enterprise Information Management	31	75	1,242	Q1
Journal of Innovation and Knowledge	30	39	2,649	Q1

Source: own design.

Although a link between the terms knowledge management and supply chain can be seen, it is weak [14], it is considered that there is little research that associates knowledge management with supply chain sustainability.

The country with the most research conducted was the United Kingdom (as shown in Fig. 6), a criterion that agrees with other research [32], which highlights this country as one of the most prominent in scientific production internationally. The affiliated institutions with the most articles were Brunel University London and Brunel Business School (as shown in Fig. 5), both in the United Kingdom, an aspect that is consistent with the most productive country according to the origin declared by the author and that agrees with other studies [33].

One of the restrictions of the research is that it has only been carried out in the Scopus database, however, its choice by the researchers was due to the fact that it is one of the main stream databases with the highest impact at international level (element that enhances its generalizability in other impact databases such as web of science, ScienceDirect, PubMed, Scielo, among others; and to carry out comparative analyses among them). In addition to considering other indicators not used in this research, such as the journals where they were published, as well as their country of origin, Prince's index, analysis of collaboration between institutions or countries, number of journals discontinued in the database due to lower quality standards.

Among the positive aspects of the research is the analysis of the scientific production on the implementation of knowledge management for supply chain sustainability through the use of different bibliometric indicators and the identification of lines of research that will serve as a basis for future research.

5 Conclusions

The number of researches in the period behaved irregularly, with a tendency to increase from the year 2016, with the exception of 2021 in which there was a decrease, the highest value was obtained in the year 2023 with nine (9). The country with the highest number of publications was the United Kingdom with a total of 10.

Only two (2) authors had more than one (1) publication in the period analyzed, while the institutions with the most research were Brunel University London and Brunel Business School, both with a total of three (3). The subject area with the most studies was Business, Management and Accounting with 35.

The most cited journal was Journal of Strategic Information Systems with 496 citations, the one with the highest h-index was Journal of Cleaner Production with a value of 268 and the one with the highest SJR was Journal of Strategic Information Systems with 4.011.

A cluster analysis on author co-authorship was conducted to identify the main authors who have done research on the implementation of knowledge management for supply chain sustainability and the interrelations or collaborations between them.

Based on the analysis of the bibliometric network map of the co-occurrence of keywords, six (6) lines of research were detected (a line of research per cluster was defined on the basis of the keywords of which it consisted).

For future studies, it is recommended to analyze scientific production in other databases that have a high impact such as web of science, ScienceDirect, PubMed, Scielo, as well as to use other indicators such as Prince's index, analysis of collaboration between institutions or countries, number of journals discontinued in the database due to lower quality standards.

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