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Organizational Resilience and Construction Materials: Technological Strategies to Enhance Sustainability in Construction Companies

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Abstract

A documentary review was carried out on the production and publication of research works related to the study of the variables Construction Companies, Innovation and Business Sustainability. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2018-2023, achieving the identification of 53 publications. The information provided by this platform was organized through graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors regarding the proposed theme is referenced through a qualitative analysis. Among the main findings made through this research, it is found that the United States with 8 publications was the country with the highest scientific production registered in the name of authors affiliated with institutions in that nation. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material related to the study of the variables Marketing, Organizational Development and Times of Change was Administration, Business and Accounting with 18 published documents, and the most used Type of Publication during the period indicated above were Journal Articles with 50% of the total scientific production.

Keywords: *Marketing, Organizational Development, Times of Change.*

INTRODUCTION

Nowadays, there are countless reasons why companies in the construction sector and the construction materials industry can implement innovation in all their processes, which includes the use of new construction technologies, development and use of optimized materials, new control methods, application of technologies, equipment and management models towards innovation.

The construction sector is represented as one of the most polluting sectors and with the greatest negative effects on ecosystems. Firstly, this economic activity contributes approximately 40% of greenhouse gas emissions, in addition, the production of raw materials for the works always involves polluting processes in the air and water sources. (Quimbaya, 2018).

In short, for construction companies, sustainability has become a topic of interest for these organizations. On a daily basis, companies are committing to adopt these practices in terms of sustainable construction, with this seeking to reduce the environmental impact and improve the efficiency of these companies. According to (Giménez Sánchez, 2015) (Sexton, 2003) (Horta, 2012) which confirm that innovation and sustainability processes in the construction industry allow us to meet customer demands, meet quality, performance and safety objectives which ensure success.

In addition to sustainability, organizational resilience has become the central axis for companies dedicated to construction. This objective seeks to enable companies to be adaptable and to be able to face obstacles

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and significant changes, which are crucial elements for long-term success. Sustainable construction is presented as a response to socio-environmental criteria. That is, to think about infrastructure from the harmonization with the environment, responsibly mitigating its effects on ecosystems, without losing sight of the social objectives of the construction sector.

Some alternative examples such as bioclimatic architecture, which seeks to take advantage of natural resources such as the sun, rain, vegetation and wind, can also be annexed the 3Rs (reduce, reuse and recycle), strategies for the management of waste that is produced every day within our environment, seeking to be more sustainable with the ecosystem. This seeks to develop projects that are responsible for carrying out processes that allow the recovery and use of construction waste, as well as the use of ecological materials.

Finally, sustainable construction has taken on a transformative force in construction companies. Technological innovations provide companies with the opportunity to adopt sustainable building practices and achieve sustainability goals. From the use of recycled materials to the utilization of dry construction technologies, use of bioclimatic architecture, sustainable construction is becoming an environmentally friendly alternative and a reality around the world. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables Construction Companies, Innovation and Business Sustainability, as well. Such as the description of the position of certain authors affiliated with institutions, during the period between 2013-2023.

GENERAL OBJETIVE

To analyze, from a bibliometric and bibliographic perspective, the preparation and publication of research papers in high-impact journals indexed in the Scopus database on the variables Marketing, Organizational Development and Times of Change during the period 2018-2023.

METHODOLOGY

This article is carried out through a mixed orientation research that combines the quantitative and qualitative method.

On the one hand, a quantitative analysis of the information selected in Scopus is carried out under a bibliometric approach of the scientific production corresponding to the study of the variables Marketing, Organizational Development and Times of Change. On the other hand, examples of some research works published in the area of study indicated above are analyzed from a qualitative perspective, based on a bibliographic approach that allows describing the position of different authors regarding the proposed topic. It is important to note that the entire search was carried out through Scopus, managing to establish the parameters referenced in *Figure 1*.

Methodological Design

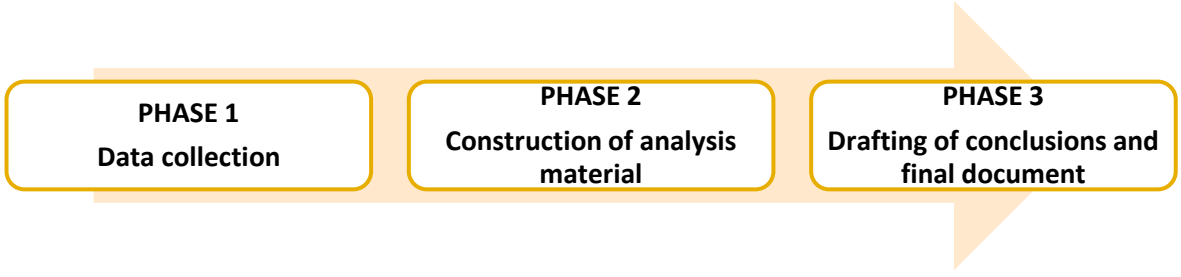

Figure 1. *Methodological design*
Source: Own elaboration

Phase 1: Data Gathering

Data collection was carried out from the Search tool on the Scopus website, where 38 publications were obtained from the choice of the following filters:

TITLE-ABS-KEY (marketing, AND organizational AND development, AND times AND of AND change) AND PUBYEAR > 2017 AND PUBYEAR < 2024

- Published documents whose study variables are related to the study of the variables Marketing, Organizational Development and Times of Change.
- Limited to the period 2018-2023.
- Without distinction of country of origin.
- Without distinction of area of knowledge.
- Without distinction of type of publication.

Phase 2: Construction of analysis material

The information collected in Scopus during the previous phase is organized and then classified by graphs, figures and tables as follows:

- Co-occurrence of words.
- Country of origin of the publication.
- Area of knowledge.
- Type of publication.

Phase 3: Drafting of the conclusions and final document

In this phase, the analysis of the results previously yielded is carried out, resulting in the determination of conclusions and, consequently, the obtaining of the final document.

RESULTS

Word co-occurrence

Figure 2 shows the co-occurrence of keywords found in the publications identified in the Scopus database.

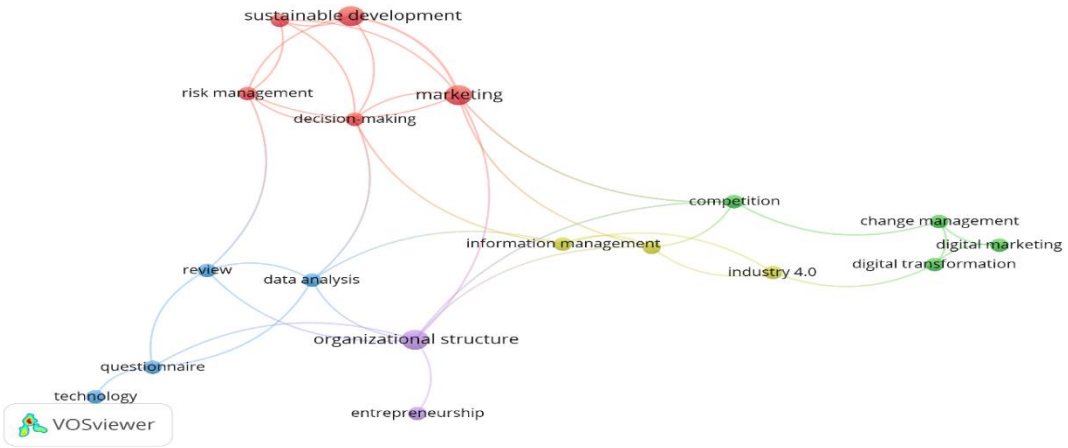

Figure 2. *Word co-occurrence*
Source: Own elaboration (2024); based on data exported from Scopus.

Sustainable Development was the keyword most frequently used within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. Organizational Structure is among the most frequently used variables, associated with variables such as Data Analysis, Competitiveness, Digital Transformation, Technology, Construction, Industry 4.0. From the above, it is noteworthy that the introduction of innovation in construction companies generates a competitive advantage in them in an increasingly demanding and globalized market requires the construction of infrastructures capable of increasingly satisfying all interested parties, which is annexed to the environmental environment and future generations. The incorporation of innovation in the introduction sector is not an easy task, despite the importance of this sector in the development of any country. (Correa, 2007)

4.2 Distribution of scientific production by year of publication

Figure 3 shows how scientific production is distributed according to the year of publication.

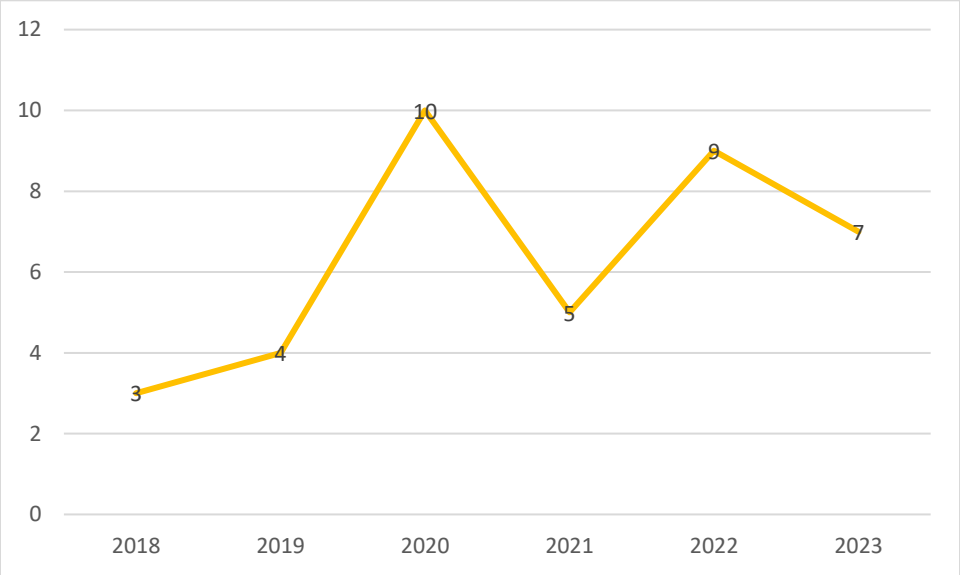

Figure 3. *Distribution of scientific production by year of publication.*
Source: Own elaboration (2024); based on data exported from Scopus

Among the main characteristics evidenced by the distribution of scientific production by year of publication, an increase in the number of publications registered in Scopus during the years 2020 is notorious, reaching a total of 10 documents published in journals indexed on this platform. This can be explained by articles such as "Explaining sustainability performance and maturity in SMEs: learnings from a sustainability innovation project with 100 participants" The aim of this paper is to assess which aspects of SME activities, including their linkages with stakeholders in their supply chains, explain a company's sustainability performance. Using a literature-based theoretical framework to assess the sustainability performance and maturity of SMEs, the study conducts a survey with participants in a sustainability innovation project of 100 companies conducted in the Greater Copenhagen region. The sample of companies spans various industries, including construction, hotels/conferences, information technology, and manufacturing. The study analyzes survey data using paired sample t-tests and regression analysis. The results show that the following factors help explain the sustainability performance and maturity of the SMEs in the sample: the degree of customer involvement in product and process development; engage, communicate, and partner with customers; customer segmentation, technology and innovation as constituent parts of the business strategy; and the amount of time spent specifically on business and marketing efforts and process development.(Salvador, 2023)

Distribution of scientific production by country of origin.

Figure 4 shows how scientific production is distributed according to the nationality of the authors.

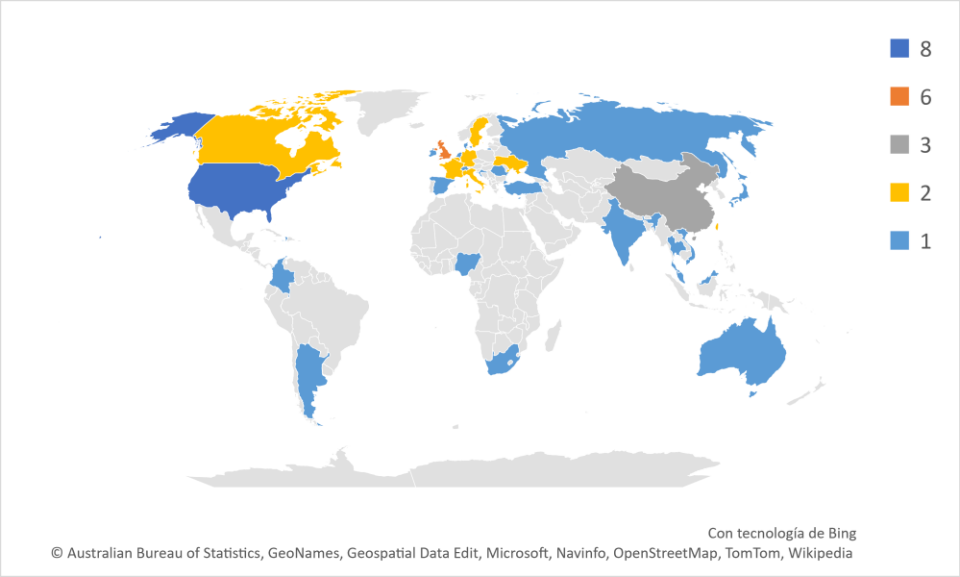

Figure 4. *Distribution of scientific production by country of origin.*
Source: Authors' elaboration (2024); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing the United States, as the country of that community, with the highest number of publications indexed in Scopus during the period 2018-2023, with a total of 8 publications in total. In second place, the United Kingdom with 6 scientific documents, and China occupying the third place presenting to the scientific community, with a total of 3 documents among which is the article entitled "Study on the global sustainability of the Korean construction industry based on GRI standards" this study focuses on evaluating the sustainability strategies and directions of the construction industry from an ESG perspective. To this end, sustainability issues and knowledge were discussed, as well as global issues in Korea and the global construction sector. The analysis showed that global construction companies were very interested in business management approaches, such as health and safety, as critical issues in the construction industry's sustainability strategy. In contrast, South Korean construction companies prioritize business values such as value creation, fair trade, and mutual benefit. Both global and South Korean construction companies have been working on greenhouse gas reduction and energy sustainability. On other issues, cultivating construction specialists, improving the job training system, and limiting serious accidents and safety mishaps were socially important among South Korean construction companies. By contrast, global construction companies seemed to focus on issues related to ethical and environmental management from an organizational point of view.(Park, 2023)

Distribution of scientific production by area of knowledge

Figure 5 shows the distribution of the preparation of scientific publications based on the area of knowledge through which the different research methodologies are implemented.

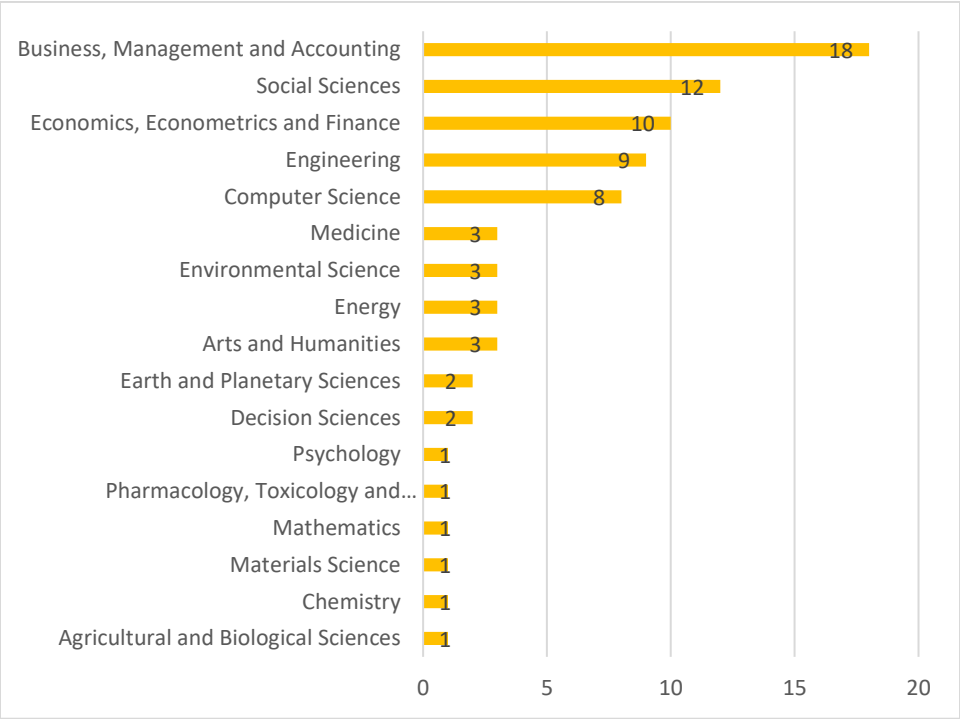

Figure 5. *Distribution of scientific production by area of knowledge.*
Source: Authors' elaboration (2024); based on data provided by Scopus.

Business, Management and Accounting was the area of knowledge with the highest number of publications registered in Scopus with a total of 18 documents that have based its methodology Construction Companies, Innovation and Business Sustainability. In second place, Social Sciences with 12 articles and Economics, Econometrics and Finance in third place with 10. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by Business, Management and Accounting entitled "Strategic sustainability in the construction industry: Impacts on the performance and brand of sustainability" This study focuses on the connection between strategic sustainability and the performance of the company. Specifically, it investigates the effects of four strategic dimensions of sustainability (namely marketing, business strategy, management, and eco-innovation) on sustainability and brand performance. The study is based on a quantitative approach with data collected through a web-based survey conducted in the construction sector in Finland. The results reveal that the greater the marketing efforts and actions, the better the sustainability performance; In addition, the greater the capacity for eco-innovation, the better the sustainability performance. In addition, the results show that the better a company's eco-innovation capacity, the more likely it is to have a higher brand value. The study is the first to conduct a comprehensive investigation of the connection between strategic sustainability and intangible value in terms of sustainability and brand performance(Kinnunen, 2022)

Type of Publication

In the following graph, you will see the distribution of the bibliographic find according to the type of publication made by each of the authors found in Scopus.

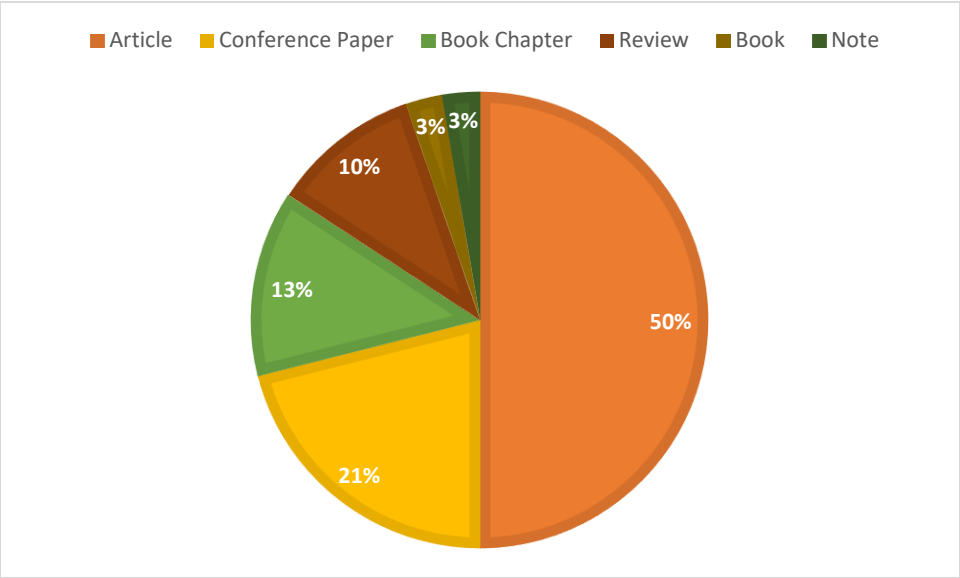

Figure 6. *Type of publication.*
Fountain: Own elaboration (2024); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was the Journal Article with 50% of the total production identified for analysis, followed by the Session Paper with 21%. Book Chapter are part of this classification, representing 13% of the research papers published during the period 2018-2023, in journals indexed in Scopus. In this last category, the one entitled "Business model innovation for sustainable value creation in construction companies" stands out. This article aimed to analyze how business model innovations contribute to the creation of sustainable value in construction companies. The results revealed that the companies analyzed implement practices that improve their reputation and contribute to the environment while obtaining economic benefits. These practices include the reuse of materials and the replacement of traditional processes with renewable ones (installation of photovoltaic panels and rainwater harvesting). Companies have also tried to integrate with the community through sponsorships, mainly at sporting and cultural events, and assistance to nursing homes and educational institutions in need. Companies need to implement processes that contribute to the rational use of water and the reduction of waste during construction projects despite the results. In addition, this study has the importance of identifying actions that are aimed at generating benefits for society and the environment and analyzing them from the perspective of sustainable value creation from innovations in the business model(Treptow, 2022)

CONCLUSIONS

Through the bibliometric analysis carried out in this research work, it was possible to establish that the United States was the country with the highest number of published records for the variables Construction Companies, Innovation and Business Sustainability. With a total of 8 publications in the Scopus database. In the same way, it was established that the application of theories framed in the area of Business, Management and Accounting, the construction industry is known for its high pollution, which is why they are choosing to implement measures that mitigate their environmental impact with actions focused on energy efficiency, the use of environmentally friendly materials, minimising the consumption of natural resources, reducing waste generation and promoting the use of renewable energies.

For this reason, the implementation of an innovation management system would allow companies in the construction sector to obtain competitive advantages; reducing technological gaps; improve productivity and finally obtain sustainable growth in the short, medium and long term.

With respect to the application of sustainability in companies in this sector, it is stated that organizations are making great efforts reflected in a good responsible implementation in sustainable construction, changing construction processes, implementing alternative ecological strategies and obtaining a panorama of adaptability. Similarly, the behavior of the eco-efficiency indicator reflects a great opportunity to continue working on the contribution of reducing the negative impact generated by human activity on the environment.

The implementation of these innovation management models and the development of sustainable strategies depends on the company being able to develop key competencies, such as the vision of strategies, innovation-oriented organizational cultures, the introduction of technological factors and knowledge management. It is advisable for companies in the construction sector to develop such strategies to successfully ensure the implementation of their innovation management systems.

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