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A Bibliometric Analysis of Foreign Workers and Construction Development in the Current Era

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Abstract: *This study aims to examine the trends of research on Foreign Workers and Construction Development in the Current Era from 2012 to 2022. This research used qualitative research methodology with a bibliometric analysis approach. The primary data of this research was collected through the Scopus database with identifying articles/journals related to the topics of Foreign Workers and Construction Development. This study also uses VOS Viewer to visualize and analyze the primary data with network and density calculation. The result of this study is Russia became the first country to produce many articles from 2012 to 2022. Furthermore, the Engineering is the highest source of publication. Then, most researchers used quantitative methods with online surveys dominantly in the publications related to the topic. Topics about Construction Development, Construction Industry, and Foreigner Worker have the most frequent occurrences and the highest total link strength in the network. Besides, construction development, construction activities, construction industry, etc., have a big opportunity for conducting in the future in terms of foreign workers and construction development in the current era. This study successfully explained global research trends related to foreign workers and construction development in the current era from 2012 to 2022. However, this study has limitations in terms of data sources because the Scopus database is a closed access resource.*

Keyword: *Bibliometric Analysis, Foreign Workers, Construction Development.*

INTRODUCTION

The role of foreign labor in construction development has become more important and discussed. Foreign labor has become more important in construction companies, particularly in areas undergoing fast urbanization and infrastructural growth (Mihi-Ramirez et al., 2020). These people frequently cover labor gaps, helping complete initiatives supporting economic growth and societal advancement (Chia et al., 2014). The reliance on foreign labor has resulted in a complex interplay of benefits and constraints that have profoundly shaped the terrain of building growth (Son et al., 2013).

Foreign workers contribute significantly to the economic development of the building industry (Travnicek et al., 2020). As Mattila et al., (2021) investigated, they provide cost-effective labor options, allowing projects to move effectively and under budget. Furthermore, foreign employees offer a wide range of skill sets and experience from a variety of backgrounds, providing the sector with specialized knowledge and novel ideas (Najib et al., 2020). This variety helps to enhance building processes and encourages a culture of learning and cooperation. The impact of foreign workers extends to the realm of infrastructure development. Their participation often accelerates the pace of project completion, as noted by Subramaniam et al., (2021). This speed is particularly crucial in meeting pressing societal needs, such as the creation of essential facilities and housing. By facilitating swift project execution, foreign workers contribute to the enhancement of public services and the overall quality of life within a community.

However, the flood of foreign employees raises socioeconomic and cultural concerns. The integration of workers from various origins might result in social dynamics that must be carefully managed. Language obstacles, cultural incompatibilities, and possible exploitation, as highlighted by Mohd Amin et al., (2017), must be addressed to promote equal treatment and peaceful cohabitation among all members of the construction crew. While their contributions are undeniable, the integration of a large number of foreign workers can have implications on local economies and labor markets. Additionally, cultural clashes and differences in work norms may lead to tensions within the construction workforce. It becomes imperative for regulatory bodies and organizations to implement measures that ensure fair treatment, equitable opportunities, and harmonious interactions among local and foreign workers.

Finally, the participation of foreign labor in building growth has resulted in both advantages and problems. Their economic contributions, talent variety, and involvement in expediting project completion are indisputable benefits that contribute to society's growth and advancement. However, considerable consideration must be given to the potential social and cultural consequences of their incorporation. As the conversation progresses, a more in-depth examination of these effects will give a thorough understanding of the role that foreign workers play in defining the construction scene. Therefore, it is interesting to examine a trend of global scientific publications on the topic of foreign workers and construction development in the current era. This study aims to determine the development of research with the theme of foreign workers and construction development from 2012 to 2022. This study uses bibliometric analysis utilizing the V.O.S. Viewers application to explain the research questions that have been made.

METHOD

This study uses the bibliometric analysis method. This study used qualitative research with a focus on a bibliometric analysis method. The use of literature study processes in qualitative research methods is a data-gathering strategy that relies on the finding of written material such as notes, books, papers or articles, journals, and so on. Data from a main, secondary, or tertiary journal spanning a specific time can be gathered and evaluated from multiple aspects in bibliometric research to identify. The primary data was collected from the Scopus database to identify research related to foreign workers and construction development from 2012 to 2022. Publication of research related to Foreign Workers And Construction Development from 2012 to 2022 found 100 documents before filing and reduction. After filing and reduction with several categorizations, the primary data was 100 publications. In the filing and reduction process, we used keywords TITLE-ABS-KEY ("Foreign Workers" AND "Construction Development") AND PUBYEAR > 2012 AND PUBYEAR < 2022 AND (LIMIT-TO (O.A.)) AND (LIMIT-TO (SUBJAREA "ENGINEERING")) AND (LIMIT-TO (LANGUAGE, "ENGLISH")). The Scopus database has become a popular primary source of studies to evaluate scientific research. As one of the largest data centers in the world, Scopus

can index scientific literature to provide accurate information about the metadata of each scientific article, including publication date, abstracts, references, and others.

S.L.R. has become popular in recent years. Many journals have started to publish literature reviews and even present them as independent articles. A systematic Literature Review (S.L.R.) is a literature review that follows clear and reproducible research methods, identifies, reviews, and evaluates their quality, and summarizes them with high objectivity (Kraus et al., 2020). The main objective of the S.L.R. method is to analyze the data collected both quantitatively and qualitatively represented in the literature to answer previous research questions (Pauceanu et al., 2021). This process begins with information searching, followed by researching and analyzing the topic matter to obtain the essential keywords leading to the appropriate research articles (Zafar et al., 2021). Then, a literature search is carried out according to the topic to be studied systematically in databases such as Scopus, Google Scholar, etc. The results of the article search are filtered according to predetermined criteria objectively (Weißer et al., 2020). This study uses V.O.S. Viewer tools to visualize co-occurrence analysis. The V.O.S. Viewer program places specific emphasis on the graphical display of bibliometric maps. V.O.S. Viewer is a software application for building and viewing bibliometric networks (van Eck & Waltman, 2017).

RESULTS AND DISCUSSION

Analyzing 100 publications from the Scopus database in the Engineering area produces many results. Scientific publications related to Foreign Workers And Construction Development from 2012 to 2022 have various points of view. This study analyzes data in several parts, starting with the country that contributes the most to scientific publications, the year of the document, the source of the field, and the research method. Besides, this research will also explain the highest author's citations in the publications relating to foreign workers and construction development.

Geographical Scope

Of the 100 articles that met the criteria, it was dominated by ten countries. Russia, China, Malaysia, and the United Kingdom are dominant publications on Foreign Workers And Construction Development themes. The first country, Russia, dominates 40 % included in this study. Furthermore, the second country, China, reaches 12 % of the total publications. In the third position, Malaysia reaches 11 % of the publications. Other countries whose articles contributed to this research include the United Kingdom, Indonesia, Finland, Iran, Poland, Ukraine, and Brazil.

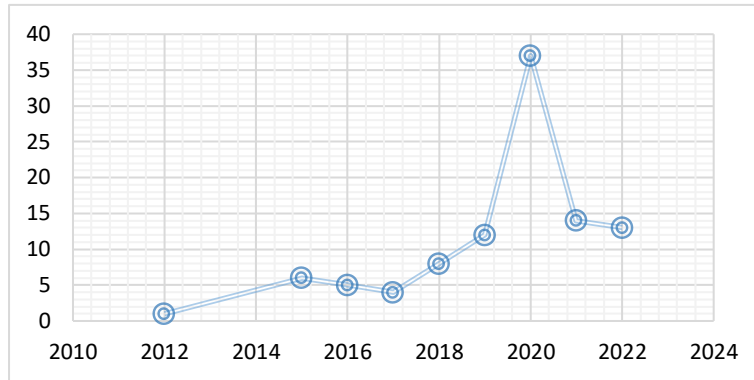
Table 1. Countries of Articles/Journals are Based Foreign Workers and Construction Development

Countries	Research Locations	
	N	%
Russia	40	40%
China	24	24%
Malaysia	13	13%
United Kingdom	5	5%
Indonesia	4	4%
Finland	3	3%
Iran	3	3%
Poland	3	3%
Ukraine	3	3%
Brazil	2	2%
	100	100%

Source: Research Data

Scope by Year

The articles that were collected were 100 articles published from 2012 to 2022. In 2022, there will be thirteen articles that meet the criteria for this study. Then, there were increased publications from previous years from 2019 to 2020. In 2020, the publications reached a peak with 37 articles. In those years, those discussing foreign worker and construction development were dominated due to increasing an issue about the impact of foreign worker on the construction industry.



Source: Research Data

Figure 1. Article Frequency Per Year

Scope by Field

Scopus-indexed articles are one of the requirements for articles to be used in this research. Based on the articles collected, (47,7 %) articles were in the fields of Engineering, Materials Science (19,8 %), Computer Science (7,3 %), Environmental Science (6,8 %), Chemistry (4,7 %), Social Science (4,2 %), Business and Management (2,1 %), Energy (2,1 %), Mathematics (2,1 %), Chemical Engineering (1,6 %), and Other (7,8 %).

Source: Research Data

Documents by subject area

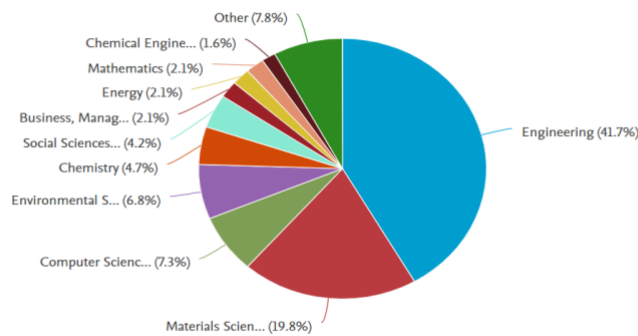


Figure 2. Scope by Field of Articles/Journals are Based on Foreign Workers And Construction Development

Various Research Methods and Samples in Publications

Various methods were used in the 100 articles used in this study. These methods include online surveys (35=35%), onsite surveys (30=30%), interviews (10=10%), focus groups (6=6%), analysis of press coverage (5=5%), and observation (14=14%).

Table 2. Countries of Articles/Journals are Based Foreign Workers and Construction Development

Category	N	%
Methods used		
Detail of the methods		
Online survey	35	35%
Onsite survey	30	30%
Interview	10	10%
Focus group	6	6%
Analysis of press coverage	5	5%
Observation	14	14%
	100	100%
Type of data		
Quantitative	70	70%
Qualitative	15	15%
Both	15	15%
	100	100%
Sample		
Leader	70	70%
Non-Leader	30	30%
	100	100%

Source: Research Data

Mapping visualization networking, visualization overlay, and visualization density

This study limited the minimum number of keyword occurrences by four times scale in research publications. It means the keywords that occur less than two times will be deleted. Figure 3 shows 100 identified keywords that can be classified into five clusters.

Source: Research Data

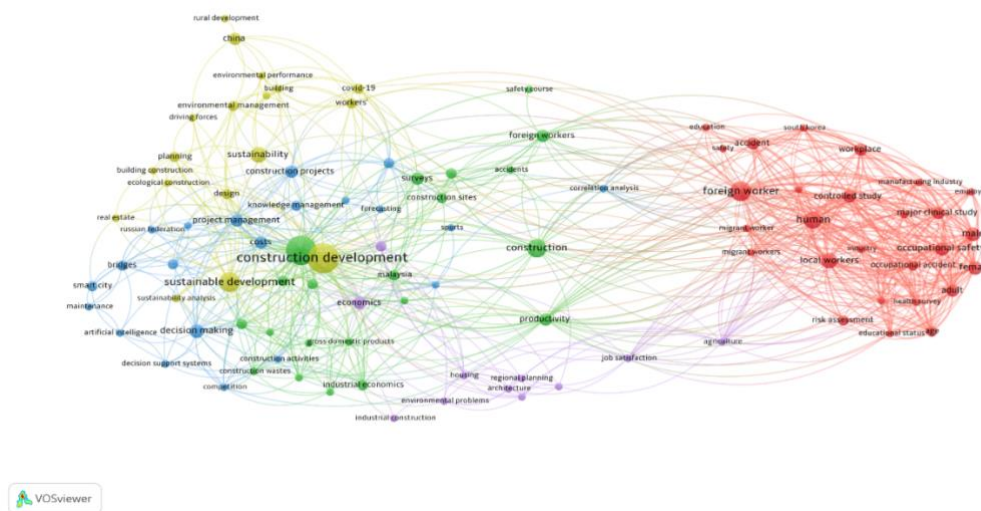


Figure 3. Mapping networking of 100 keywords in Foreign Workers And Construction Development

The colors in the network indicate clusters. The labels will connect to each other to show the cluster. Clustering is used to acquire insight or description of bibliometric grouping, whereas image mapping is used to get a thorough picture of a bibliometric network. Figure 3 shows five clusters that are matched with various colors.

Cluster 1 is red, Cluster 2 is green, Cluster 3 is blue, Cluster 4 is yellow, and Cluster 5 is purple. Based on five clusters, each cluster consists of keywords that are connected and sequenced by the occurrence level. Cluster 1 (red): foreign worker, human, local workers, occupational safety, manufacturing industry, building industry, South Korea, work environment, migrant worker, etc. Cluster 2 (green): construction industry, productivity, surveys, economic development, industrial economics, Malaysia, manufacture, etc. Cluster 3

(blue): construction projects, costs, project management, bridges, construction companies, human resource management, knowledge management, smart city, artificial intelligence, competition, etc. Cluster 4 (yellow): construction development, sustainable development, sustainability, China, environmental management, planning, building construction, etc. Cluster 5 (purple): economics, investments, architecture, housing, industrial construction, job satisfaction, regional planning, spatial development, urban planning, etc.

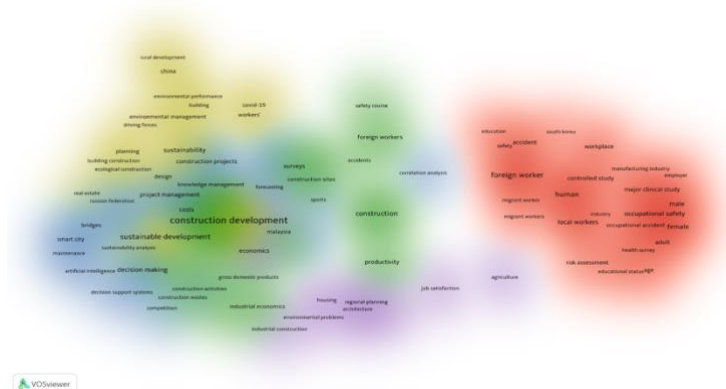
Table 3. Countries of Articles/Journals are Based Foreign Workers and Construction Development

Keywords	Occurrences	Total Link Strength
Construction Development	18	60
Construction Industry	17	82
Foreign Worker	9	90
Sustainable Development	9	40
Local Workers	6	75
Decision Making	5	30
Productivity	4	39
Construction Projects	4	20
Costs	4	18
China	4	8

Source: Research Data

Regarding link strength, the keyword construction development ranked in the first position in occurrence, with total link strength reaching 60. This was followed by the word construction industry, which is ranked in the second position with a total link strength of 82. Then, third place is ranked by the word foreigner worker with a total link strength of 90. Many appearances and the high total link strength show that the publication of scientific research with the theme of foreign worker and construction development from 2012 to 2022, which Scopus index has a strong and direct relationship with the keywords of “construction development”, “construction industry” and “Foreign Worker”.

Furthermore, Figure 4 shows the keyword densities in the publications relating to Foreign Workers and Construction Development. Density visualization is used in publications to illustrate an investigated subject's density level or amount. The keywords are involved in the reddish node, which indicates that research has been conducted by many researchers on this issue. On the contrary, the greener node indicates less research on that topic has been done. Figure 3 shows the density mapping regarding the theme of Foreign Workers and Construction Development from 2012 to 2022, indexed by Scopus.



Source: Research Data

Figure 4. Mapping density of 100 Keywords in Foreign Worker and Construction Development

Figure 4 shows the level of density indicated in the reddish surrounding the labels foreign worker, local workers, and manufacturing industry, etc. Then, the yellowish color surrounding building construction, ecological construction, etc. Both areas are topics that have been widely researched. This area is a topic that has been frequently researched. On the contrary with both areas, the greenish color surrounding such as construction development, construction activities, construction industry, etc. This green label shows the topic has not been frequently researched. Therefore, the opportunity to study the latter topic is still comprehensive.

The discussion on the favorable effects of foreign workers on construction development emphasizes the important role they play in promoting advancement and expansion within the sector. Foreign employees provide a variety of benefits that help to project efficiency, economic progress, and overall improvement in building development (Mihi-Ramirez et al., 2020). One of the most significant benefits of foreign workers in building development is their capacity to cover labor shortages and skill gaps (A. R. Ahmad et al., 2019). Industries sometimes encounter difficulties in attracting a sufficient number of competent people on a local level, which can impede project timeframes (Korkmaz & Park, 2018). The influx of foreign workers provides a practical answer by supplying a workforce capable of completing activities requiring specialized skills, assuring the continuity and quality of building projects (S.-C. Wang et al., 2020).

Furthermore, the inclusion of foreign labor improves project efficiency and timeliness greatly. Their efforts helped to ease labor shortages, allowing building projects to begin on time. The presence of foreign employees is directly related to increased labor productivity, which leads to speedier project completion (Thangavelu, 2016). This speed is especially important in reaching essential deadlines for infrastructure projects that benefit social well-being. Besides, foreign employees have a favorable influence on talent transfer and technical improvement in the construction business (Ismail, 2015). Foreign workers frequently bring various skill sets and unique building practices from their native countries with them. This cross-cultural interchange promotes a learning environment that stimulates the adoption of new practices, eventually improving the local workforce's overall competency and capacities (Samsi et al., 2020).

Through cost-effective labor solutions, foreign workers make significant economic contributions to building growth. Their willingness to labor at lower salaries than local workers enables firms to control expenses effectively without sacrificing project quality. This economic advantage leads to higher profitability for firms and, on a broader scale, adds to the region's economic growth (Lestari & Caroline, 2021). Hence, foreign workers contribute to economic diversification and national growth by assisting in the execution of various construction projects. Their presence in numerous areas enables industries to expand beyond traditional boundaries. As a consequence, economies become more robust and less reliant on certain sectors, supporting a more balanced growth path that benefits both the industry and the nation as a whole (Alsamara, 2022).

However, it is undeniable that foreign workers also have negative impacts in the context of local labor markets. One of the biggest negative effects of foreign employees is increased competition for job possibilities in domestic labor markets (Khatleli, 2015). Foreign employees might undercut local workers in terms of pay expectations because they accept lower compensation owing to differing cost-of-living concerns (S.-C. Wang et al., 2019). This dynamic produces a scenario in which local employees may experience difficulties getting jobs or negotiating reasonable salaries, potentially leading to job displacement and income inequities (Green & Ayalon, 2018). Then, foreign labor can occasionally cause cultural and social problems among local communities. Language, culture, and work standards differences can all lead to misunderstandings and disputes between local and immigrant workers (Ong, 2014). Furthermore, perceived rivalry for employment and resources can increase these

tensions, potentially harming the community's social fabric and causing divides (Abood & Al Ibrahim, 2019).

Unlike with the previous statement that explains foreign workers will increase local worker's skills. Arain et al., (2020) argue foreign employees, particularly in areas needing specialized skills, might contribute unwittingly to skill loss within the local workforce. Because firms prefer foreign labor for economic reasons, domestic workers may miss out on possibilities for skill development and career advancement (Hopkins, 2017; Nguyen, 2021). This situation might result in a smaller pool of highly skilled local workers, thus affecting the local workforce's overall competitiveness (Abdul-Rahman et al., 2012; Dewar, 2013; Hopkins, 2017; Tajuddin et al., 2021).

The surge of foreign employees has the potential to drive down wages in several industries (R. Ahmad et al., 2016). Businesses may prefer to hire foreign employees because of their willingness to work for cheaper salaries, which may result in a general fall in wage levels throughout the industry (Chih & Lin, 2019). Wage suppression has an impact on both local employees and broader economic stability by leading to income disparity and decreased buying power (Hof & Tseng, 2020).

CONCLUSION

In conclusion, this study concludes that Russia became the country that contributed most to the publication of this research relating to the theme of Foreign Workers and Construction Development. Further, 2020 has the most scientific research publications with the theme of Foreign Workers and Construction Development from 2012 to 2022, indexed by Scopus. Engineering have been the highest source of publication with 41,7 percent of the total of articles. Then, the researcher used quantitative methods with online surveys commonly on the theme of Foreign Workers and Construction Development.

In addition, the results of V.O.S. Viewer show five clusters that have networks based on keywords, with Construction Development, Construction Industry, and Foreigner Worker being the most frequent occurrences and the highest total link strength in the network. Furthermore, topics construction development, construction activities, construction industry, etc., have a big opportunity for conducting in the future in theme. On the contrary, topics of foreign worker, local workers, and manufacturing industry, etc have less opportunity for conducting in the future because many researchers have conducted this research.

Although this study successfully explained global research trends related to foreign workers and construction development from 2012 to 2022. However, this study has limitations in terms of data sources because the Scopus database is closed accessed. Besides, the limitation of this research also because the data source used only carry out from the Scopus database. Therefore, recommendations for further research need to use data sources from the Web of Science as a source of other global research databases.

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