FOREIGN DIRECT INVESTMENT AND SUSTAINABLE HUMAN CAPITAL DEVELOPMENT: A BIBLIOMETRIC ANALYSIS APPROACH

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Abstract:

The growing discourse on the role of Foreign Direct Investment (FDI) in promoting sustainable human capital development has attracted significant scholarly attention, yet there remains a lack of systematic mapping of research patterns in this domain. This study addresses this gap by conducting a bibliometric analysis to examine global research trends, thematic structures, and collaboration networks on FDI and sustainable human capital development. Using the Scopus database, we applied an advanced search strategy, which retrieved a total of 385 documents published between 2021 and 2025. The data were first cleaned and harmonized using OpenRefine to ensure consistency and reliability, after which the Scopus Analyzer was employed to generate descriptive statistics and publication trends across years, countries, and subject areas. VOSviewer software was then used to construct and visualize co-occurrence networks of author keywords, citation relationships, and international collaborations. The analysis revealed a notable increase in publications during 2023–2025, reflecting growing scholarly and policy interest in aligning investment flows with

sustainable human capital outcomes. Economics, Social Sciences, and Environmental Studies emerged as the dominant subject areas, indicating the multidimensional nature of this research field. Co-occurrence mapping identified four main clusters centered around FDI, human capital, economic growth, and sustainable development, highlighting the thematic interconnectedness between investment policies, labor productivity, and long-term development goals. China, the United States, and Malaysia were among the most influential contributors in terms of both output and citation impact, suggesting strong research leadership in both developed and emerging economies. Overall, this study not only provides a comprehensive overview of the intellectual structure and global collaboration in this field but also contributes to the body of knowledge by identifying emerging themes and gaps for future research on the nexus between FDI and sustainable human capital development.

Introduction

Foreign Direct Investment (FDI) plays a significant role in sustainable human capital development, particularly in developing countries. The relationship between FDI and sustainable development is complex and multifaceted. On one hand, FDI can promote sustainable development by enhancing economic growth, creating job opportunities, and reducing poverty. On the other hand, the activities of Transnational Corporations (TNCs) involved in FDI can sometimes hinder sustainable development goals if not properly managed (Gehring & Kent, 2012) . Therefore, integrating sustainable development policies with FDI strategies is crucial for maximizing the positive impacts while minimizing the negative ones (Gehring & Kent, 2012). This integration requires careful consideration of international investment agreements and the tools available to policymakers to align FDI with sustainable development objectives (Gehring & Kent, 2012).

Empirical studies have shown a significant bi-directional relationship between FDI and human capital development. For instance, research using panel data from 55 developing countries over the period 1980–2011 revealed that FDI and human capital development influence each other (Kheng et al., 2017). This suggests that policies aimed at promoting FDI should also focus on enhancing human capital through education and training to replicate the economic success seen in countries like Brazil and China (Kheng et al., 2017). Additionally, studies have found that human capital development, measured by educational attainment, fosters economic expansion, employment opportunities, and poverty reduction, which are essential components of sustainable development (Onatunji, 2024) . However, the impact of health human capital on

sustainable development can be negative, indicating the need for balanced and targeted human capital policies (Onatunji, 2024).

The role of human capital in attracting FDI is also significant. In the ASEAN region, for example, FDI has been found to positively impact human capital, with public investment in education further enhancing this effect (Nguyen et al., 2020). This underscores the importance of investing in education to improve human capital and attract sustainable FDI (Nguyen et al., 2020). Moreover, the interaction between FDI and human capital development has been shown to have positive effects on economic growth in both the short and long term (Park, 2018). This interaction is particularly robust when considering factors like research and development (R&D) and technology gaps, which mediate the relationship between FDI and sustainable productive capacity (Peng et al., 2023). Therefore, policies that promote FDI should also focus on improving human capital through education and R&D to achieve sustainable development goals.

In sub-Saharan Africa (SSA), the empirical analysis of the relationship between FDI, human capital, and sustainable development has highlighted the importance of directing FDI flows to priority sectors to enhance human capital and stimulate economic performance (Onatunji, 2024). This approach can lead to significant improvements in job opportunities and poverty alleviation, contributing to sustainable development (Onatunji, 2024). Additionally, studies have shown that foreign capital inflows, including FDI, have a significant positive effect on economic growth in the ECOWAS region, provided that human capital development is prioritized (Musibau et al., 2019). This indicates that sound economic policies targeting FDI and human capital development are essential for achieving sustainable development in developing countries (Musibau et al., 2019). Furthermore, the interaction between FDI and human capital has been found to deepen the impact of FDI on reducing income inequality, suggesting that a policy mix of FDI and human capital development could be effective in promoting equality (Yuldashev et al., 2023).

In conclusion, the relationship between FDI and sustainable human capital development is complex and requires a coordinated approach to policy-making. Empirical evidence suggests that FDI can significantly enhance human capital development, which in turn fosters economic growth and sustainable development. However, the impact of FDI on sustainable development can vary depending on the sector and the type of human capital being developed. Therefore, policymakers should focus on integrating FDI strategies with human capital development policies, particularly in education and R&D, to maximize the positive impacts on sustainable development. This approach will ensure that FDI contributes to economic growth, job creation, poverty reduction, and overall sustainable development in developing countries.

Research Question

RQ 1: What are the trend / What are the research trends in online learning studies according to the year of publication?
RQ 2: What are the popular area subect are related to the study and how much percentages for the subjet
RQ 3: What are the most cited articles?
RQ 4: Where is the top 10 country based on number of publication?
RQ 5: what are the popular keywords related to the study?
RQ 6: what are co-authorship countries collaboration ?

Methodology

Bibliometric analysis involves the systematic collection, organization, and evaluation of bibliographic data drawn from scientific publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002).Beyond descriptive statistics, such as identifying key journals, publication years, and leading authors(Wu & Wu, 2017),bibliometrics also incorporates advanced techniques like document co-citation analysis. A rigorous literature review requires an iterative process of selecting appropriate keywords, retrieving relevant documents, and carrying out detailed evaluations. This structured approach enables the construction of a comprehensive bibliography and ensures the reliability of results (Fahimnia et al., 2015)In this study, emphasis was placed on high-impact publications, as they provide critical insights into the theoretical foundations shaping the field. To enhance data reliability, SCOPUS was employed as the primary database for data collection (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste & Paithankar, 2017) Moreover, to ensure quality, only peer-reviewed journal articles were included, while books and lecture notes were deliberately excluded (Gu et al., 2019) Following data retrieval, OpenRefine was used as a supplementary tool to clean, standardize, and refine the bibliographic datasets, thereby minimizing errors and improving accuracy before subsequent analysis. Finally, publications indexed in Elsevier's Scopus recognized for its extensive coverage were collected from 2020 through December 2023 for bibliometric mapping and interpretation.

Data Search Strategy

For this bibliometric study, data were collected from the Scopus database, which is widely recognized for its extensive coverage of peer-reviewed literature across disciplines. To ensure that the retrieved publications were highly relevant to the topic, a structured search string was applied: TITLE-ABS-KEY ((Foreign Direct Investment OR "FDI") AND Human Capital Development). This search string was specifically designed to capture studies that explicitly discussed the relationship between foreign direct investment and human capital development in either the title, abstract, or keywords. To maintain a contemporary focus, the search was restricted to the period between 2021 and 2025, while also limiting the results to articles written in English. These filters ensured both the relevance and accessibility of the literature for analysis.

The search process stated in the table 1, conducted in **September 2025**, yielded a total of **384 documents**. This dataset reflects a robust body of scholarship produced in recent years, highlighting the growing academic interest in the intersection of FDI and human capital development. By narrowing the scope to a five-year period, the study was able to capture the most current debates, methodologies, and empirical findings that shape the field. The emphasis on peer-reviewed journal articles further guaranteed the inclusion of high-quality and reliable research outputs, making the dataset suitable for subsequent bibliometric mapping and analytical procedures.

Table 1: The Search String

Scopus	**TITLE-ABS-KEY ((Foreign Direct Investment OR "FDI") AND Human Capital Development) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023) OR LIMIT-TO (PUBYEAR , 2024) OR LIMIT-TO (PUBYEAR , 2025)) AND (LIMIT-TO (LANGUAGE , "English"))** **Access Date: September 2025**

Table 2: The Selection Criterion Is Searching

Criterion	Inclusion	Exclusion
Language	English	Non-English

Data Analysis

VOSviewer is a widely used bibliometric software developed by Nees Jan van Eck and Ludo Waltman at Leiden University in the Netherlands (van Eck & Waltman, 2010, 2017). Renowned for its user-friendly interface, the tool is designed to visualize and analyze scientific literature, particularly by creating network visualizations, clustering related items, and generating density maps. Its strength lies in the ability to map complex bibliometric relationships such as co-authorship, co-citation, and keyword co-occurrence networks into clear and interpretable forms. This makes it an invaluable resource for researchers who seek to explore and understand the intellectual structure and emerging trends of a research field. Continuous updates to the software, alongside its interactive features and flexibility, further enhance its value for both novice and experienced scholars.
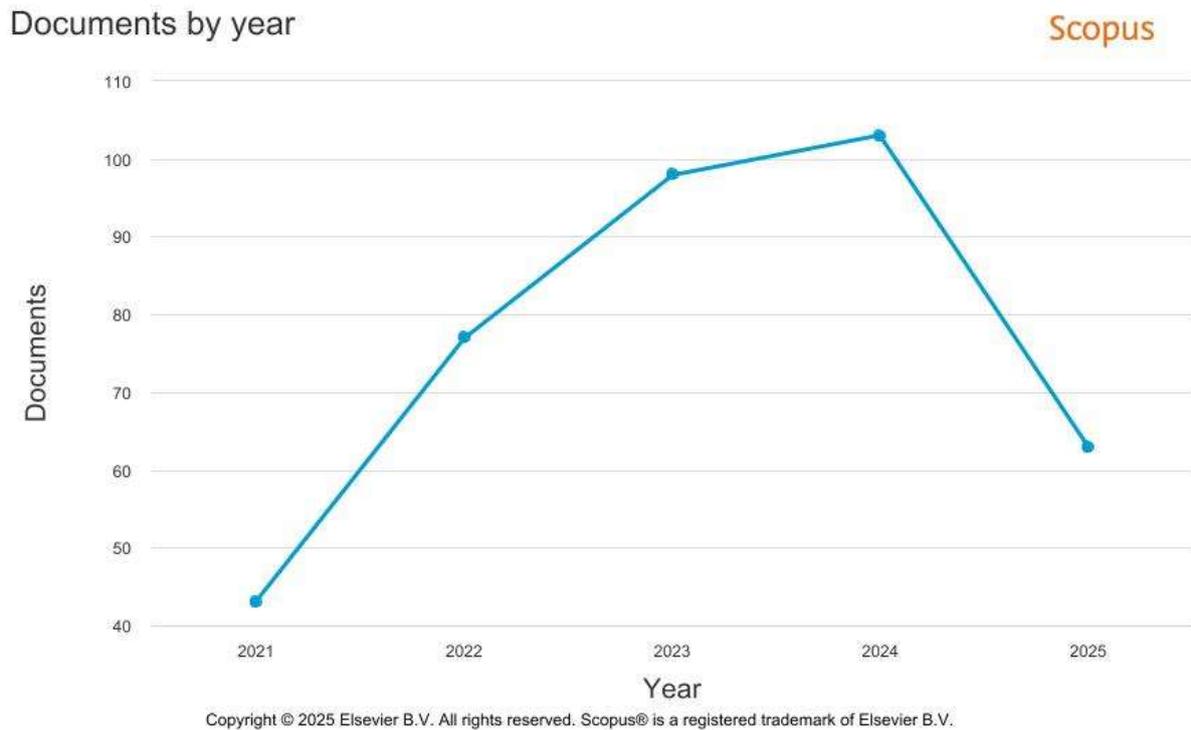
A distinctive advantage of VOSviewer is its capacity to convert large and intricate bibliometric datasets into visually intuitive maps and charts. Emphasizing network visualization, it effectively clusters related items, detects keyword co-occurrence patterns, and presents density-based insights. For this study, datasets containing publication year, titles, author names, journal outlets, citation counts, and keywords were retrieved from the Scopus database covering the years 2021 to September 2025 and subsequently processed using VOSviewer version 1.6.20. By employing VOS clustering and mapping techniques, the software facilitated the construction of bibliometric maps that accurately represented relationships within the data. Unlike traditional Multidimensional Scaling (MDS), which relies mainly on similarity indices such as cosine or Jaccard measures (Appio et al., 2014), VOSviewer applies a more appropriate normalization approach for co-occurrence frequencies association strength (ASij) which has been shown to better capture the proximity and similarity of items (Van Eck & Waltman, 2007):. This methodological refinement ensures more robust and meaningful interpretations of research landscapes.

$$AS_{ij} = \frac{C_{ij}}{w_i w_j}$$

which is "proportional to the ratio between on the one hand the observed number of cooccurrences of i and j and on the other hand the expected number of co-occurrences of i and j under the assumption that co-occurrences of i and j are statistically independent" (Van Eck & Waltman, 2007).

Result and Discussion

What Are The Trend / What Are The Research Trends In Online Learning Studies According To The Year Of Publication?
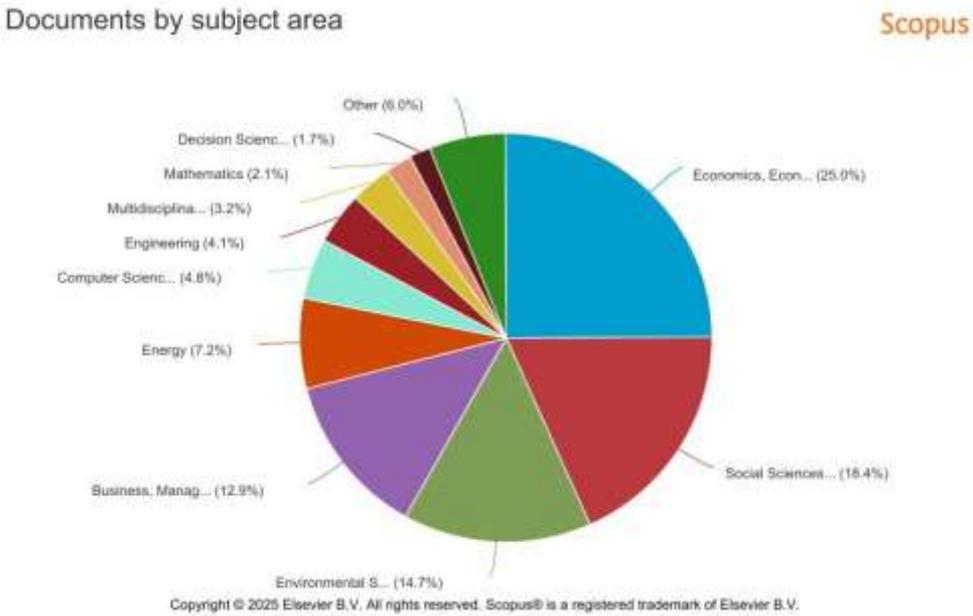
Figure 1: Trend Of Research In Scopus By Years

Based on figure 1, the publication trend from 2021 to 2025 shows a clear upward trajectory in research interest on Foreign Direct Investment (FDI) and Sustainable Human Capital Development. Starting with 43 publications in 2021, the output almost doubled in 2022 with 77 papers, reflecting growing scholarly attention to the nexus between investment flows and human capital formation. This surge can be attributed to the post-pandemic period, when policymakers and academics increasingly emphasized sustainable recovery strategies, particularly in relation to economic growth, labor market resilience, and skills development. The momentum continued into 2023, which recorded 98 publications, indicating that the topic was becoming more central within the broader debates on globalization, sustainable development, and inclusive growth.

In 2024, the number of publications peaked at 103, suggesting that the intersection of FDI and sustainable human capital had matured into a significant research domain. This could be linked to global initiatives such as the United Nations' Sustainable Development Goals (SDGs), which place strong emphasis on quality education, decent work, and sustainable economic growth, all of which align closely with the themes of FDI and human capital. However, in 2025, a slight

decline is observed with 63 publications as of September. This drop is not necessarily indicative of waning interest but can be explained by the incomplete data for the year, since the dataset only covers part of 2025. Overall, the trend reflects a rising scholarly engagement with the subject, driven by global economic shifts, policy relevance, and the increasing recognition of human capital as a cornerstone for sustainable development.

What Are The Popular Area Subect Are Related To The Study And How Much Percentages For The Subjet?

Figure 2: Document By Subjects

By referring figure 2, the subject area distribution of publications from 2021 to 2025 highlights the dominance of Economics, Econometrics, and Finance (1.78%), followed by Social Sciences (1.31%), Environmental Science (1.05%), and Business, Management, and Accounting (0.92%). This pattern reflects the inherently interdisciplinary nature of research on Foreign Direct Investment (FDI) and Sustainable Human Capital Development, which sits at the intersection of economics, development studies, and sustainability. The prominence of economics-related publications is expected, as FDI and human capital are core themes in economic growth models, investment flows, and labor market studies. Meanwhile, the substantial representation of social sciences underscores the importance of analyzing human capital from a societal and developmental perspective, including issues of education, inequality, and workforce participation. Environmental science's strong share indicates an increasing alignment of FDI and human capital research with the global sustainability agenda, where investment is often linked to green development and environmentally responsible practices.

The presence of other subject areas, such as Energy (0.51%), Engineering (0.29%), and Computer Science (0.34%), though relatively smaller, highlights the cross-cutting influence of technology, infrastructure, and energy transitions in shaping sustainable human capital development. For instance, FDI in renewable energy and digital infrastructure often generates

demand for new skills and knowledge, thereby contributing to human capital formation. The contributions from Mathematics (0.15%) and Decision Sciences (0.12%) suggest a methodological dimension, where quantitative modeling, econometrics, and decision-making frameworks are applied to study investment and human capital linkages. The multidisciplinary category (0.23%) further reinforces the idea that this field draws from diverse knowledge bases to capture the complexity of sustainable development. Overall, the distribution reflects a balanced but economically anchored research landscape, where the interaction between FDI, human capital, and sustainability increasingly requires input from multiple disciplines to address global policy challenges.

What Are The Most Cited Articles?

Table 3: Most Cited Author

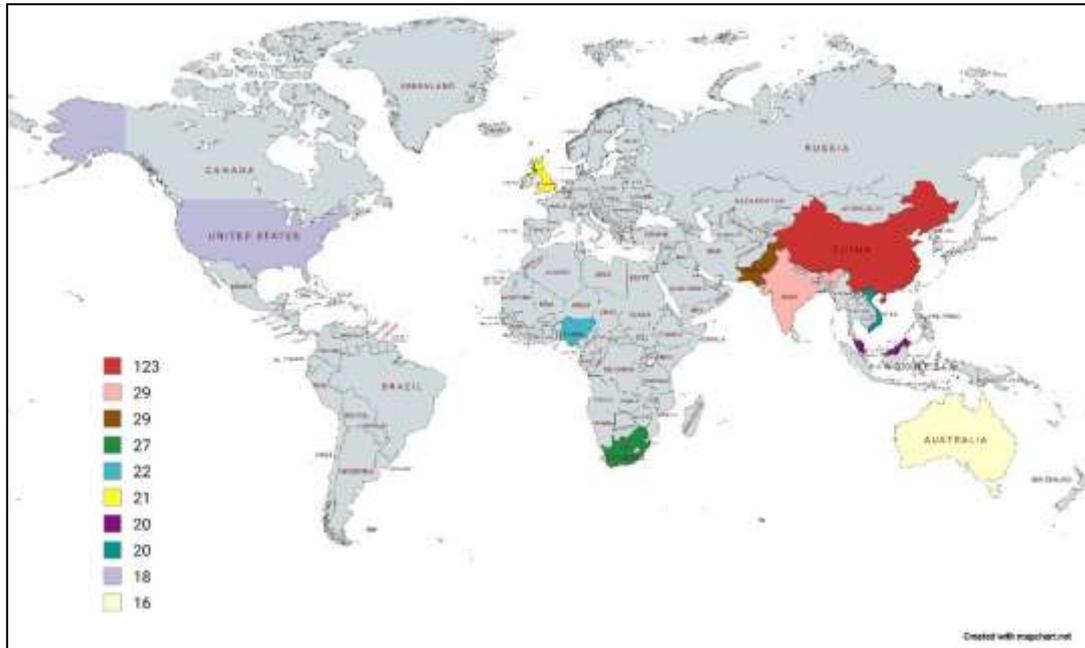| Authors	Title	Year	Source title	Cited by
S., Qiu, Shilei; Z., Wang, Zilong; S., Geng, Shuaishuai(Qiu et al., 2021)	How do environmental regulation and foreign investment behavior affect green productivity growth in the industrial sector? An empirical test based on Chinese provincial panel data	2021	Journal of Environmental Management	250
M.N., Khan, Muhammad Nadeem; I.T., Ozturk, Ilhan Tekin(Khan & Ozturk, 2021)	Examining the direct and indirect effects of financial development on CO2 emissions for 88 developing countries	2021	Journal of Environmental Management	240
R., Xie, Rui; W., Fu, Wei; S., Yao, Siling; Q., Zhang, Qi(Xie et al., 2021)	Effects of financial agglomeration on green total factor productivity in Chinese cities: Insights from an empirical spatial Durbin model	2021	Energy Economics	186
Q., Xu, Qiong; M., Zhong, Meirui; M., Cao, Mengyuan(Acheampong et al., 2021)	Does digital investment affect carbon efficiency? Spatial effect and mechanism discussion	2022	Science of the Total Environment	156
A.O., Acheampong, Alex O.; M.O., Erdiaw-Kwasie, Michael Odei; M., Abunyewah, Matthew(Acheampong et al., 2021)	Does energy accessibility improve human development? Evidence from energy-poor regions	2021	Energy Economics	136
X., Wei, Xiaobo; M., Mohsin, Muhammad; Q., Zhang,	Role of foreign direct investment and economic growth in renewable energy development	2022	Renewable Energy	123

Qiongxin(Wei et al., 2022)				
C., Lee, Chien-Chiang; Y., Zhao, Yanan(Lee & Zhao, 2023)	Heterogeneity analysis of factors influencing CO2 emissions: The role of human capital, urbanization, and FDI	2023	Renewable and Sustainable Energy Reviews	117
J., Chai, Jingxia; Y., Hao, Yu; H., Wu, Haitao; Y., Yang, Yuemiao(Chai et al., 2021)	Do constraints created by economic growth targets benefit sustainable development? Evidence from China	2021	Business Strategy and the Environment	115
G., Hu, Ganggao(Hu, 2021)	Is knowledge spillover from human capital investment a catalyst for technological innovation? The curious case of fourth industrial revolution in BRICS economies	2021	Technological Forecasting and Social Change	92
N., Kanval, Nazish; H., Ihsan, Hajra; S., Irum, Saba; I., Ambreen, Iffat(Kanval et al., 2024)	Human Capital Formation, Foreign Direct Investment Inflows, and Economic Growth: A Way Forward to Achieve Sustainable Development	2024	Journal of Management Practices, Humanities and Social Sciences (JMPHSS)	83

Table 4: Top Publisher

Cites	Authors	Title	Publisher
5210	S Dhawan	Online learning: A panacea in the time of COVID-19 crisis	journals.sagepub.com
2502	M Adnan, K Anwar	Online Learning amid the COVID-19 Pandemic: Students' Perspectives.	ERIC
1297	K Mukhtar, K Javed, M Arooj, A Sethi	Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era	ncbi.nlm.nih.gov
1252	AP Aguilera-Hermida	College students' use and acceptance of emergency online learning due to COVID-19	Elsevier

991	R Rasmitadila, RR Aliyyah, R Rachmadtullah…	The perceptions of primary school teachers of online learning during the COVID-19 pandemic period	JSTOR
719	R Khalil, AE Mansour, WA Fadda, K Almisnid…	The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: a qualitative study exploring medical students' …	Springer
648	H Baber	Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID-19	papers.ssrn.com
608	D Nambiar	The impact of online learning during COVID-19: students' and teachers' perspective	academia.edu
578	M Bączek, M Zagańczyk-Bączek, M Szpringer…	Students' perception of online learning during the COVID-19 pandemic: a survey study of Polish medical students	ncbi.nlm.nih.gov
556	I Fauzi, IHS Khusuma	Teachers' elementary school in online learning of COVID-19 pandemic conditions	journal.iaimnumetrolampung.ac.id
543	E Chung, G Subramaniam…	Online learning readiness among university students in Malaysia amidst COVID-19	myjms.mohe.gov.my
521	RE Baticulon, JJ Sy, NRI Alberto, MBC Baron…	Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines	Springer

Where Is The Top 10 Countries Based On The Number Of Publications?
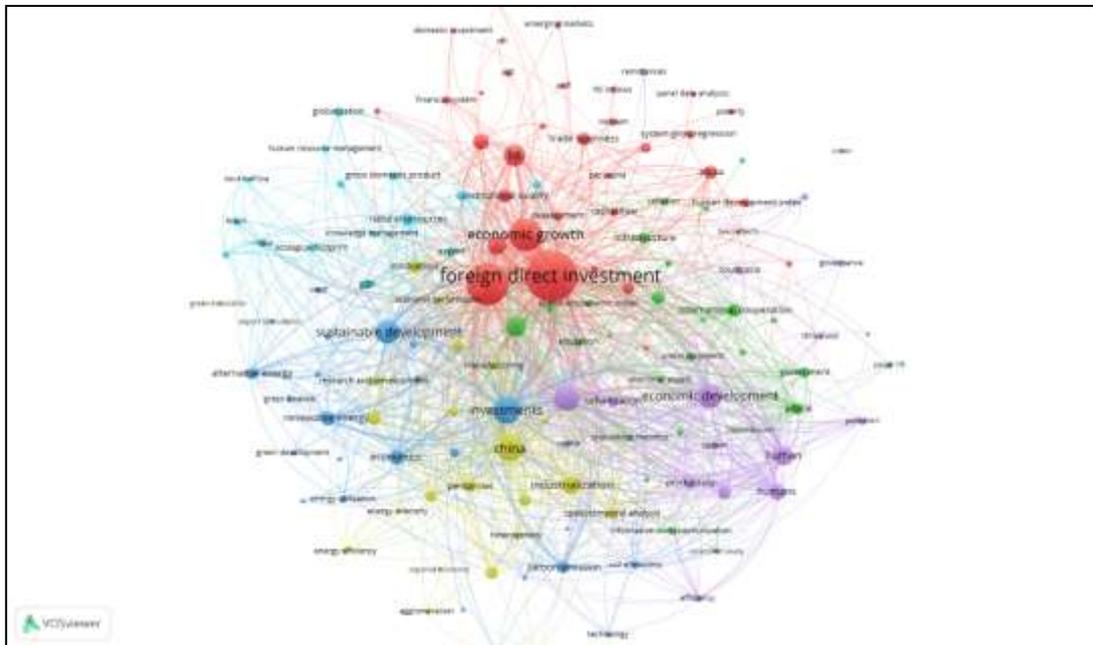

Figure 3: Publications Based On Countries

As shows in figure 3, the country-wise distribution of publications demonstrates a clear **geographic concentration of research output** on Foreign Direct Investment (FDI) and Sustainable Human Capital Development. **China dominates the field with 123 publications (32%),** far surpassing other nations. This is unsurprising, as China has been both a major recipient and source of FDI in recent decades, while simultaneously prioritizing human capital development as part of its long-term growth strategy. Following at a distance are **India and Pakistan (8% each),** and **South Africa (7%),** all of which represent developing economies where human capital challenges intersect strongly with the role of FDI in national development agendas. Sub-Saharan countries like **Nigeria (6%)** and **Ghana (3%)** also appear prominently, reflecting the region's increasing reliance on foreign investment for growth, job creation, and capacity building. Interestingly, advanced economies such as the **United Kingdom (5%),** **United States (5%),** and **Australia (4%)** also contribute significantly, which may be linked to their strong academic communities and interest in examining FDI-human capital dynamics globally, rather than domestically.

Beyond the leading contributors, the dataset highlights the **diverse and global spread of research activity,** with publications recorded across Asia, Africa, Europe, and the Middle East. Countries such as **Malaysia and Vietnam (5% each)** illustrate the growing role of Southeast Asia in academic discourse on FDI and sustainable development, likely due to the region's strategic importance in global investment flows. Similarly, the presence of smaller contributions from countries like **Bangladesh, Ethiopia, Lebanon, and Tunisia (2% each)** suggests a rising research interest in emerging economies where human capital formation is crucial for development. The broad participation of nations, even those with minimal representation (1% or less), underscores the universal relevance of the topic. However, the stark dominance of China indicates both its academic capacity and its practical significance as a case study, while the diversity across other regions suggests that the debate on FDI and sustainable

human capital is truly global, shaped by varied local contexts, policy priorities, and development challenges.

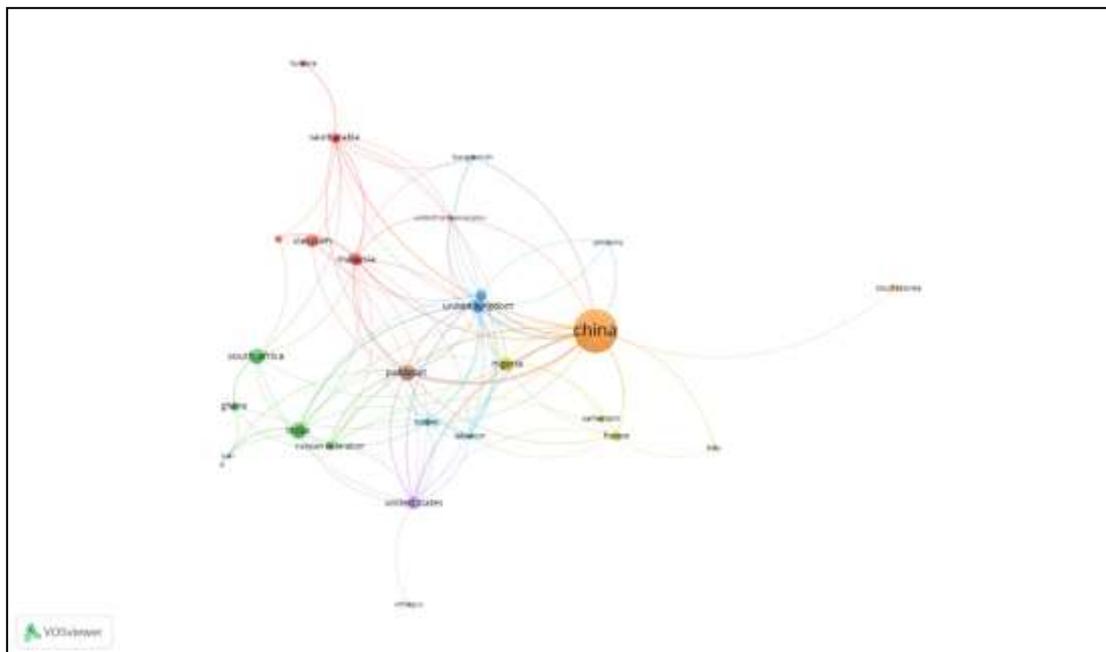*What Are The Popular Keywords Related To The Study?*

Figure 4: Popular Keywords

Figure 4 is about the co-occurrence analysis of author keywords is a widely used bibliometric technique to identify the intellectual structure of a research field. In the context of **VOSviewer,** co-occurrence refers to how frequently two or more keywords appear together within the same set of publications. The assumption is that keywords that co-occur frequently are conceptually related and therefore represent thematic linkages within the literature. By mapping these relationships, VOSviewer creates a **network visualization** where keywords are represented as nodes and their connections (or co-occurrences) as links, allowing researchers to detect clusters of related topics. This approach is especially valuable for understanding how different themes such as foreign direct investment (FDI), human capital, and sustainable development interact and evolve within academic discourse.

In this study, the **full counting method** was applied, which means that each occurrence of a keyword is given equal weight regardless of how many times it appears in a single publication. To refine the analysis, a **minimum threshold of 20 occurrences** was set, which reduced the dataset from 1,060 to 140 keywords, ensuring that only frequently used and thus more significant terms were included. Additionally, the **minimum cluster size was set to 1,** which allowed VOSviewer to generate **four distinct clusters** from the data. This clustering technique groups related keywords together, with each cluster representing a thematic domain in the field. For example, terms like *foreign direct investment, economic growth, and developing countries* may fall into one cluster, while *carbon dioxide, renewable energy, and environmental economics* may form another, reflecting the growing intersection between FDI research and sustainability concerns.

The findings of this co-occurrence analysis make several contributions to the body of knowledge. First, the prominence of keywords such as **"foreign direct investment" (220), "human capital" (154), and "economic growth" (101)** underscores their centrality to the discourse, confirming their role as core concepts in the field. Second, the emergence of sustainability-related terms like **"renewable energy," "carbon dioxide," and "environmental economics"** indicates that research on FDI and human capital is increasingly linked to environmental and green development agendas. Third, the presence of regional identifiers such as **"China" and "Africa"** highlights the geographic focus of much of the scholarship, pointing to case-based studies that enrich comparative perspectives. Together, these clusters provide a comprehensive picture of how FDI and sustainable human capital development are being conceptualized across disciplines, offering scholars valuable insight into both established research directions and emerging trends.

What Are Co-Authorship Countries Collaboration?

Figure 5: Co-authorship by Countries

Based on figure 5, it is about the bibliometric analysis, country collaboration networks examine how research output is interconnected across nations, highlighting patterns of international cooperation in a specific field. Within VOSviewer, this is visualized by mapping the co-authorship of publications where researchers from different countries contribute together. Each country is represented as a node, and the links between nodes reflect the frequency and strength of collaborative publications. The total link strength indicates the intensity of these partnerships, while clusters represent groups of countries that collaborate more closely with one another. This approach allows scholars to see not only which nations are most active in a research domain but also how knowledge flows globally through cross-border partnerships.

In generating this visualization, the full counting method was applied, meaning that each co-authorship occurrence was weighted equally across the dataset. A minimum threshold of five documents per country was set, narrowing the analysis from 83 to 27 active countries. To allow

for maximum inclusivity in detecting collaboration, the minimum cluster size was set at one, which enabled VOSviewer to identify eight clusters of collaborating nations. These clusters represent regional or thematic alliances, for example, countries that tend to publish together due to shared geographic proximity, economic ties, or development agendas related to foreign direct investment and human capital. By applying these parameters, the map provides a structured overview of international research networks and highlights the hubs that drive knowledge creation in this area.

The findings reveal important insights into the body of knowledge on Foreign Direct Investment and Sustainable Human Capital Development. China leads with 122 documents and 2,496 citations, confirming its central role as both a research hub and a practical case study in the field. Other strong contributors such as Pakistan (760 citations), the United States (320), Malaysia (281), and Australia (358) demonstrate the growing global interest in connecting FDI with human capital sustainability. The generation of eight clusters indicates that this is not a regionally confined debate but rather one with broad international engagement, involving both developed and developing economies. The relatively high citation counts for countries like Lebanon and the United Arab Emirates, despite lower document numbers, suggest that smaller research communities are making high-impact contributions. Overall, the network shows that global collaboration is crucial for advancing this research domain, reflecting the transnational nature of investment flows, human capital development, and sustainability challenges.

Conclusion

The purpose of this study was to systematically examine global research patterns on the relationship between foreign direct investment (FDI) and sustainable human capital development through a bibliometric analysis. The analysis sought to address several key questions, including publication trends over time, subject area distribution, most influential works, geographic research distribution, keyword patterns, and international collaboration networks.

The findings reveal that research in this area has grown steadily between 2021 and 2025, with a peak in 2024, reflecting increasing global recognition of the role of FDI in shaping long-term human capital outcomes. Economics, social sciences, and environmental studies emerged as the dominant subject areas, underlining the multidisciplinary nature of the field. Keyword mapping highlighted four central themes FDI, human capital, economic growth, and sustainability illustrating the interconnectedness of investment flows, education, labor productivity, and green development. In terms of research output, China, the United States, and Malaysia were among the most active contributors, while collaboration analysis showed extensive international partnerships that underscore the global relevance of this topic. In addition, this study contributes to the field by providing a comprehensive overview of the intellectual landscape and thematic evolution of research on FDI and sustainable human capital. It identifies the areas where academic inquiry is most concentrated and points to emerging intersections with sustainability, technology, and renewable energy. These insights not only extend existing literature but also create a clearer map for future scholars and practitioners to navigate this growing body of work.

The results carry important implications for practice. Policymakers and development planners can draw from these findings to better align investment policies with human capital strategies, particularly in education, skills development, and research and development (R&D). For

developing economies, the evidence suggests that targeted FDI policies, when integrated with sustainable human capital development, can support inclusive growth and long-term competitiveness. Nonetheless, some limitations must be acknowledged. The analysis was restricted to publications indexed in Scopus and limited to the years 2021–2025, which may exclude relevant works from other sources or earlier periods. Additionally, bibliometric methods emphasize quantity and patterns rather than the depth of theoretical or empirical insights, leaving room for future studies to combine bibliometrics with systematic literature reviews or case studies. Further research could explore sector-specific impacts, comparative regional dynamics, or the role of digital transformation in strengthening the FDI–human capital nexus.

In sum, this study demonstrates the value of bibliometric analysis in uncovering trends, collaborations, and knowledge structures within the intersection of FDI and sustainable human capital development. By highlighting both established themes and emerging directions, it underscores the significance of this research area for advancing sustainable economic growth and offers a foundation for future academic and policy-oriented exploration.

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