

Mapping the human capital development landscape: A bibliometric analysis



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ABSTRACT

This study aims to address a gap in the bibliometric analysis of Human Capital Development (HCD). It seeks to identify patterns, investigate themes, and recognize key sources in this important field. Using data from the Scopus database covering the years 2003 to 2023, the study examines publication trends, thematic clusters, authorship patterns, and international collaboration. The results show a strong annual growth rate of 15.1% and a collaborative research environment, with an average of 2.91 co-authors per document and a significant foreign co-authorship rate of 17.68%. The dataset includes various types of documents, reflecting the diverse nature of HCD research. The main topics in HCD include education, economic growth, innovation, and sustainable development, demonstrating the interdisciplinary nature of these issues. This study provides valuable insights for scholars, policymakers, and practitioners, enhancing their understanding of HCD dynamics and guiding future research. Future research should include qualitative assessments, explore societal impacts, and further study key researchers and publications.

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1. Introduction

In a time characterized by rapid globalization and technological progress, Human Capital Development (HCD) plays a crucial role in promoting sustainable economic growth and societal advancement. As researchers and policymakers aim to understand and navigate this changing environment, bibliometric analysis becomes a valuable method for identifying trends and patterns in HCD research.

Several studies have examined HCD from different viewpoints (dos Santos et al., 2019). For example, Omar et al. (2021) emphasized the growing significance of HCD in both organizational and research contexts (Ogunade, 2011). Sairmaly et al. (2023) focused on HCD's contribution to economic development, while Ogunade (2011) pointed out the need for a thoughtful approach in developing countries. Sairmaly et al. (2023) also highlighted the importance of education, information technology,

skills, and productive labor (Zula and Chermack, 2007). Additionally, Bakir et al. (2015) explored how HCD impacts human resource development. Zula and Chermack (2007) discussed the relationship between business strategy and HCD, and Bakir et al. (2015) proposed a hierarchical knowledge management framework for HCD, as noted by Garavan et al. (2012). Osman-Gani (2004) provided insights into HCD from both comparative and national policy angles. Ardichvili et al. (2012) looked at HCD strategies in BRIC countries, while Osman-Gani (2004) focused specifically on the strategies employed in Singapore.

Bibliometric research has been conducted in various fields. To see if any bibliometric studies on HCD exist, researchers searched the SCOPUS database in December 2023 using consistent parameters and "bibliometric" as the main term. While bibliometric studies have addressed different aspects of human resource management, such as those by Fachada et al. (2022) and Garengo et al. (2022), and on human capital training (Lajuni and Samsu, 2022), a comprehensive bibliometric analysis specifically targeting HCD is still needed.

This study embarks on a comprehensive exploration of the scholarly contributions in the field of HCD through the lens of bibliometric analysis, drawing upon the extensive resources of the Scopus

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database. By examining scholarly articles and conference papers published between 2003 and 2023 and focusing on documents composed in English, this research aims to illuminate the multifaceted nature of HCD discourse, spanning diverse dimensions of knowledge creation and dissemination. To bridge this gap, the following research questions have been identified:

- What is the current publication trend on HCD?
- Which themes are the most popular among scholars on HCD?
- Which are the most influential sources of HCD?
- Which Countries are the most popular among scholars on HCD?
- What is the current state of collaboration on HCD?

2. Literature review

Understanding the concept of human capital and its evolution within research requires a strong foundation in the existing literature. This section delves into relevant sources to establish a comprehensive framework for bibliometric analysis. Human capital is individuals' knowledge, skills, and abilities contributing to their productivity and economic value (Klonowska-Matynia, 2022). It is crucial for socio-economic security and sustainable economic growth. HCD integrates skills, behaviors, social attributes, and personality traits into the capacity to perform tasks that yield financial benefits (Yakovenko et al., 2022). HCD encompasses knowledge, skills, aptitudes, abilities, intelligence, training, judgment, and insight. Education is widely considered an essential element of the HCD process (Gruzina et al., 2021). The event occurred at a crucial point in developing human resources, which are essential for economic progress. The HCD context is subject to varying human interpretations due to its potential for multiple meanings (Gruzina et al., 2021). The universal ability of every individual, regardless of their status or the majority, in all geographic regions, to fully achieve their capabilities is closely linked to cultivating human capital (Anaduaka, 2014). The meticulous nature of the human development process makes it unique.

Studies highlight the importance of diverse investments in human capital, including health expenditure, education expenditure, social protection programs, and employee development practices (Hendren and Sprung-Keyser, 2020). These investments are associated with positive outcomes like human capital formation, primary education attainment, increased life expectancy, and improved performance in family businesses. Health expenditure has been recognized as crucial for achieving health goals and broader development outcomes (Okunogbe et al., 2020). However, there is a need to scale these investments further, particularly in regions facing unique HRH challenges (Ramaci et al., 2020). Policymakers should consider the inclusiveness and effectiveness of health policies, as health expenditure convergence significantly

impacts growth convergence (Anaduaka, 2014; Okunogbe et al., 2020).

Education expenditure plays a crucial role in HCD. It has been found that higher education is associated with the development of green patents, indicating the need for policies and financial support to promote education in this area (Su et al., 2021). Furthermore, the demographic dividend, which is associated with education, has been demonstrated to positively impact economic growth, emphasizing the crucial role of education in achieving sustainable development (Kotschy et al., 2020). Furthermore, the level of education and science development in a country has been found to significantly impact the environmental conditions, suggesting that investment in education and science can improve the ecological situation (Koziuk et al., 2019). Moreover, aid-funded interventions in education can lead to the accumulation of human capital, which can have implications for long-term growth and the skills composition of the labor market (Harris, 2021). Finally, measuring human capital using a latent-variable approach has shown that education, particularly parental education, is critical in determining human capital levels (Galanti et al., 2021).

Social protection programs are crucial in HCD (Jensen et al., 2021). These programs contribute to the capacity of individuals and households to absorb the negative impacts of climate-related shocks and stresses, thereby enhancing their resilience to climate risks (Aurino and Giunti, 2022). They also positively impact early childhood development, reducing violence and increasing father engagement. In the context of Brazil's Zero Hunger program, social protection investment was found to have variable outcomes on sustainable development goals, including poverty reduction and changes in natural vegetation. Additionally, social protection programs implemented in crisis contexts have shown potential in mitigating the detrimental effects of crises on child development outcomes, such as schooling and acute malnutrition. These findings highlight the importance of social protection programs in promoting HCD and addressing the needs and risks faced by vulnerable populations.

Employee development practices play a crucial role in HCD. Public and semipublic organizations have adopted HRM practices from the private sector to enhance employee performance (Blom et al., 2020). Innovative firms recognize the value of human capital in terms of stakeholder knowledge and legitimacy transfers and, therefore, pay salary premiums to new hires with work experience from advocacy groups (Grimpe et al., 2019). Intrapreneurship, which involves entrepreneurial employees, is promoted by factors such as impartial government institutions and higher levels of human capital (Li et al., 2020). During the COVID-19 pandemic, positive organizational practices and psychological capital for employee well-being and life satisfaction were highlighted in the public and private sectors (Ljunge and Stenkula, 2021). These

findings emphasize the significance of employee development practices in fostering human capital and creating a positive work environment.

3. Methodology

HCD has garnered increasing attention as a critical determinant of sustainable growth and prosperity in today's rapidly evolving socio-economic landscape. This article utilizes scientific cartography to depict the current comprehension of HCD visually. Science mapping is a bibliometric method to assess the quality and impact of books and other academic publications. A fascinating bibliometric approach entails identifying and visually representing the connections between evolving and expanding scientific concepts over time

(Van Eck and Waltman, 2011). Various criteria can be utilized to examine these linkages, including keywords, authors, publications, journals, institutions, and countries (Mohamud, 2023; Cobo et al., 2011). However, software effortlessly integrates multiple stages, running them simultaneously with no effort through a user-friendly interface. Once the required settings are configured, the VOSviewer software effectively performs the five processes of network extraction, normalization, mapping, analysis, and visualization (Abdullahi et al., 2023). According to Hallinger and Kovačević (2019), these tasks can be accomplished through identification, acquisition, and data analysis. Fig. 1 is a detailed chronicle of the systematic actions I undertook to collect and analyze the data for this project.

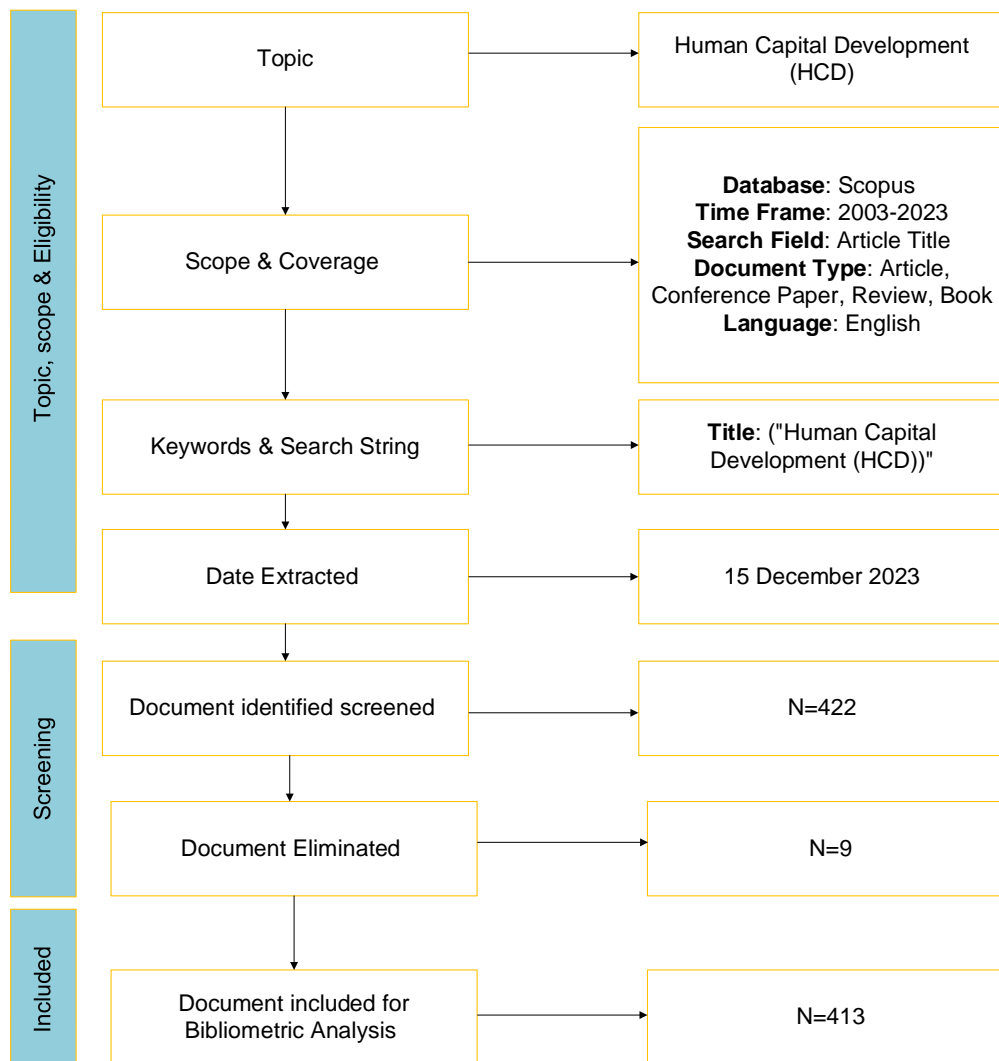


Fig. 1: Search strategy

4. Results and discussions

4.1. Overview information

Table 1 offers extensive dataset analysis covering 2003 to 2023. The material is sourced from 325 articles and books, totaling 413 documents. The 15.1% annual growth rate signifies a vibrant and rising dataset, suggesting a rise in scholarly

contributions over time. The document's mean age of 6.54 indicates that the dataset is generally current and up to date, emphasizing the significance of the information.

Upon analyzing the document, it is evident that the dataset contains many keywords. Specifically, there are 744 Keywords Plus (ID) and 1009 Author's Keywords (DE). The wide range of keywords reflects the extensive scope of subjects in the texts,

enhancing the dataset's comprehensiveness and diversity. The authors' collaboration feature indicates that among the 413 documents, 100 are created by a single individual, highlighting a substantial proportion of individual contributions. The dataset is collaborative, as indicated by an average of 2.91 co-authors per document. The international co-authorship rate of 17.68% highlights a worldwide outlook, with a significant proportion of documents having cross-border collaboration.

Upon analyzing the document, it is evident that most of them are articles, specifically 294. This indicates a strong emphasis on original research contributions. In addition, there are 45 book chapters, 59 conference papers, three books, and 12 reviews, demonstrating various scholarly contributions. Many document types indicate a dataset with multiple dimensions, encompassing not just conventional research articles but also contributions in other formats, such as reviews and conference papers.

The dataset comprises a significant number of authors, totaling 1122 persons. Out of these, 86 authors have contributed as sole authors, demonstrating the existence of both collaborative and independent research efforts. The average of 2.91 co-authors per item further highlights the dataset's collaborative nature.

4.2. Total citations and publications per year

The Fig. 2 shows the number of publications and citations per year from 2003 to 2023. There is a fluctuating pattern in the number of publications over time, with varying counts each year. In earlier years, like 2003 to 2008, there were fewer publications compared to the later years, especially from 2015 onwards, where the number of

publications notably increased. There are occasional peaks and dips within each year, suggesting potential variations in research output or publishing trends. The highest publication counts are around 2016 to 2018 and then again in 2023, while specific years, particularly in the early 2000s, have considerably lower publication numbers. This data might reflect evolving research interests, changes in academic output, or shifts in publication practices over time. Similarly, the total citations fluctuate, signaling the dynamic impact of these publications over time. The data underscores the fluidity of research output and its reception, portraying the ever-changing landscape of scholarly contributions and their varying influence within the academic community.

Table 1: Overview information

Description	Results
Main information about data	
Timespan	2003:2023
Sources (Journals, Books, etc.)	325
Documents	413
Annual growth rate %	15.1
Document average age	6.54
Average citations per doc	12.68
References	18362
Document contents	
Keywords plus (ID)	744
Author's keywords (DE)	1009
Authors	
Authors	1122
Authors of single-authored docs	86
Authors collaboration	
Single-authored docs	100
Co-authors per doc	2.91
International co-authorships %	17.68
Document types	
Article	294
Book	3
Book chapter	45
Conference paper	59
Review	12

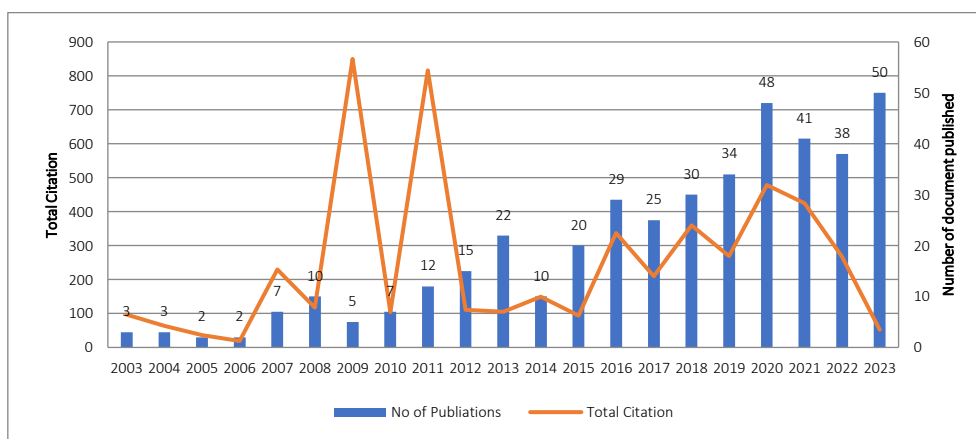


Fig. 2: Total publications and citations by year

4.3. Contributing countries

Figs. 3 and 4 present a quantitative assessment of scholarly publications associated with different countries in the domain of HCD. China leads with 96 papers, India with 40 documents, and the United States with 26 records. The United Kingdom,

Germany, Malaysia, Australia, Italy, and Qatar also make noteworthy contributions. The distribution of publications indicates a broad global involvement in HCD research, emphasizing extensive interest and investment across many countries.

Despite this widespread involvement, African countries are notably underrepresented in the

dataset, suggesting a significant gap in the global academic landscape of HCD. This underrepresentation may stem from various systemic and logistical challenges affecting the African academic community. Key issues likely include limited research funding, inadequate research infrastructure, and competing local priorities that may not align closely with HCD themes prominent in more resourced regions. Additionally, historical and systemic inequities in creating and disseminating global knowledge contribute to the limited visibility of African perspectives in scholarly work on HCD.

There is a critical need for focused efforts to enhance collaboration and capacity building in the African academic sector to address this disparity. International partnerships can play a pivotal role in this regard, supporting research initiatives and helping develop educational and research

infrastructure. Funding agencies and international research bodies could allocate specific grants and programs to support HCD research in Africa. Moreover, promoting local research agendas that align with the immediate needs and priorities of African countries could stimulate more active involvement in HCD research.

Enhancing representation involves acknowledging these challenges and systematically working to address them through collaborative efforts and policy adjustments. By increasing the involvement of African scholars and institutions in HCD research, the academic community can strive toward a more inclusive and comprehensive understanding of HCD, which includes diverse perspectives and experiences. This approach will not only fill the current gap but also enrich the overall discourse in HCD, leading to more equitable and effective strategies globally.

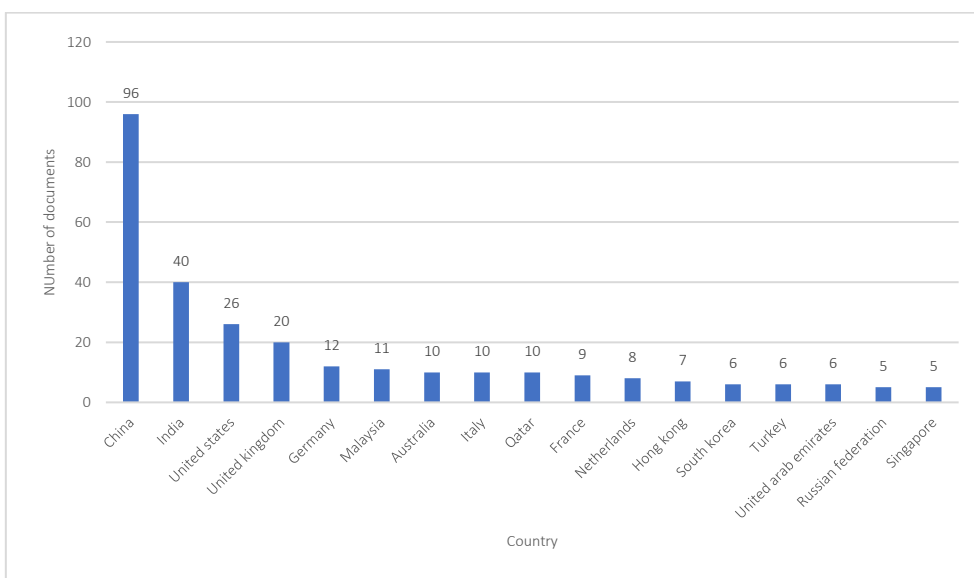


Fig. 3: Contributing countries

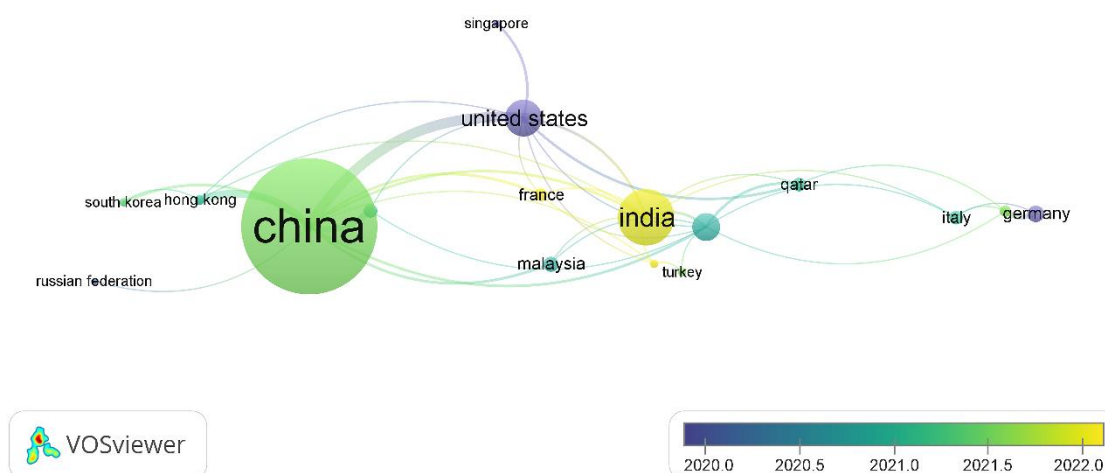


Fig. 4: Countries

4.4. Sources

Table 2 displays information on several sources, encompassing the total number of publications (TP), total citations (TC), citations per paper (CPP),

CiteScore, Source Normalized Impact per Paper (SNIP), SCImago Journal Rank (SJR), and the rank of each journal. The "International Food and Agribusiness Management Review" is notable for its moderate number of publications (4) and a matching

low citation count per paper (CPP) of 4. The CiteScore of 2.9 categorizes it in the second quartile (Q2), denoting a modest influence within its discipline. In contrast, the "Journal of European Industrial Training" has a far lesser number of publications (4), but it has an incredibly high CPP of 29, leading to an extraordinarily high CiteScore of 642.9. The SNIP and SJR values of the latter further highlight its substantial influence.

Regarding the IOP Conference Series, both "Earth and Environmental Science" and "Materials Science and Engineering" exhibit similarities in terms of the number of publications (5) and a relatively modest citation count per paper (1-1.4). Although the Earth and Environmental Science series offers precise CiteScore and SJR values, the Materials Science and Engineering series must provide this information, making it difficult to evaluate its total influence

precisely. The publication "Lecture Notes in Networks and Systems" has a modest number of 5 publications, each with a relatively low to moderate citation count of 2. The journal's CiteScore categorizes it in the fourth quartile (Q4), signifying a comparatively diminished influence about the other journals listed.

"Sustainability" stands out due to its significant number of publications (7) and a big citation count per piece (55), leading to a high CiteScore of 5.8. This categorizes it into the second quartile (Q2), indicating a substantial influence within its respective domain. "Worldwide Hospitality and Tourism Themes" has a comparable quartile rating to Sustainability, but it has a lower CPP and CiteScore, suggesting a moderate influence compared to Sustainability.

Table 2: Sources

Journal name	TP	TC	CPP	CiteScore	SNIP	SJR	Rank
International Food and Agribusiness Management Review	4	16	4	2.9	1	0.4	Q2
IOP Conference Series: Earth and Environmental Science	5	6	1	0.8	0.255	0.197	N/A
IOP Conference Series: Materials Science and Engineering	5	7	1.4	N/A	0.517	N/A	N/A
Journal of European Industrial Training	4	116	29	642.9	153.478	86.091	N/A
Lecture Notes in Networks and Systems	5	11	2	0.7	0.19	0.151	Q4
Sustainability	7	382	55	5.8	1.198	0.664	Q2
Worldwide Hospitality and Tourism Themes	6	28	5	3.5	0.621	0.423	Q2

TP: Total papers; TC: Total citations; CPP: Citations per paper; SNIP: Source normalized impact per paper; SJR: SClmago journal rank; N/A: Not applicable

4.5. Influential authors

Table 3 and Fig. 5 provide data on different authors, comparing their academic influence and output in the subject. Osabohien R has achieved a noteworthy h-index of 4, indicating a significant effect in terms of citations. Osabohien R has a g-index of 4 and a decent m-index of 0.571. Osabohien R has significantly impacted HCD since 2018, as shown by a total citation count of 134 and a publication count of 4.

On the other hand, Jusoff K, Kong E, and Qamruzzaman M have identical h-indices of 3, indicating a similar level of citation impact. However, their g-indices and m-indices differ, suggesting differences in their joint and individual academic contributions. Jusoff K, who commenced their academic journey in 2011, has consistently maintained a solid academic presence throughout the years. Kong E and Qamruzzaman M joined the academic community in 2013 and 2021, respectively.

Tisurai K stands out from Jusoff K by having a greater g-index of 5 and a moderate m-index of 0.3, indicating a distinctive combination of influential and collaborative research since 2015. Authors with an h-index of 2, such as Adedeji AA, Adediran O, Adeniyi O, Agbebi M, and Ali M, have a lower citation effect but make important contributions to HCD. Adedeji AA stands out with a greater total citation count (TC: 55) than the others, suggesting potential influence in specific research areas.

Adeniyi O, Adediran O, and Agbebi M, on the other hand, have comparable indices. Still, Ali M distinguishes himself with a superior m-index of 0.4, indicating a possible greater inclination towards collaboration since joining the academic sphere in 2020. This study provides a comprehensive analysis of the authors' academic backgrounds, influences, and career paths, offering vital knowledge to enhance the overall comprehension of HCD research in the Scopus database.

Table 3: Top authors

Author	H-index	G-index	M-index	TC	NP	PY-start
Osabohien R	4	4	0.571	134	4	2018
Jusoff K	3	3	0.214	30	3	2011
Kong E	3	3	0.25	38	3	2013
Qamruzzaman	3	3	0.75	84	3	2021
Tsaurai K	3	5	0.3	30	8	2015
Adedeji Aa	2	2	0.286	55	2	2018
Adediran O	2	2	0.286	12	2	2018
Adeniyi O	2	2	0.25	12	2	2017
Agbebi M	2	3	0.286	20	3	2018
Ali M	2	2	0.4	4	2	2020

TC: Total citation; NP: Number publications; PY: Publication year start

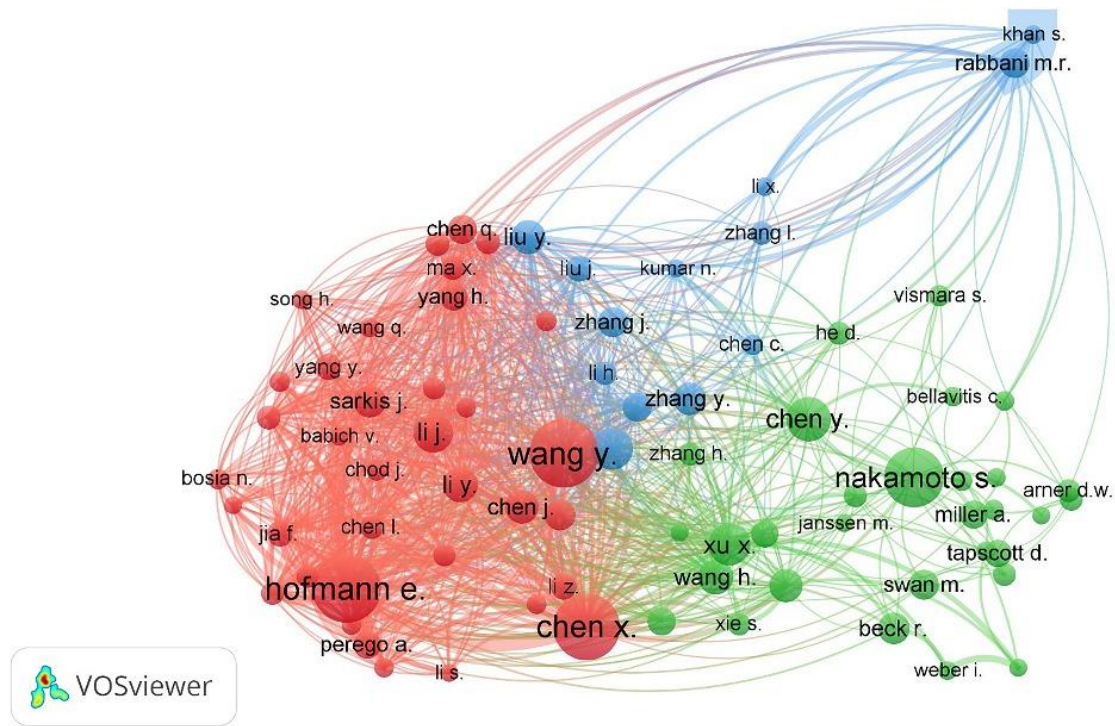


Fig. 5: All authors

4.6. Keywords co-occurrences

Table 4 and Fig. 6 present a comprehensive analysis of current trends in HCD. Clusters 1 and 3 emphasize the importance of human capital and its cultivation, indicating a strong interest in understanding and promoting human capital skills. Cluster 2 highlights the relationship between innovation, sustainable development, and human resource management, highlighting the importance of using innovation and sustainable practices to maximize human capital utilization and enhance organizational performance. Incorporating "foreign direct investment" in Cluster 1 signifies the recognition of international capital flows as crucial catalysts for HCD and economic progress. Clusters 1 and 5 emphasize the connection between economic

growth, investment, and higher education, suggesting a deliberate effort to understand the impact of investing in education and human capital on promoting innovation, productivity, and long-term economic well-being. Education as Cluster 4 is emphasized as a crucial catalyst for human capital accumulation and socio-economic progress.

The analysis of these keywords reveals the complex and interrelated relationship between HCD and factors such as education, innovation, economic growth, and sustainability. By identifying these connections, researchers can analyze emerging patterns, potential subjects for further study, and opportunities for multidisciplinary cooperation to promote human resource development and sustainable socio-economic advancement.

Table 4: Keyword co-occurrences

Keywords	Cluster	Links	Link strength	Occurrences
Human capital	1	44	367	192
Human capital development	3	40	243	137
Education	4	37	106	36
Human capitals	2	28	120	23
Economic growth	1	26	75	22
Innovation	2	31	83	22
Personnel	2	25	93	20
Training	3	15	46	20
Development	4	24	47	16
Sustainable development	2	28	73	15
Human	1	23	48	12
Employment	3	24	54	12
Economic development	1	21	48	11
Investment	1	22	43	11
Economics	2	21	57	11
Higher education	5	18	27	9
Foreign direct investment	1	11	23	8
Human development index	1	18	30	8
Humans	1	22	40	8
Panel data	1	17	31	8

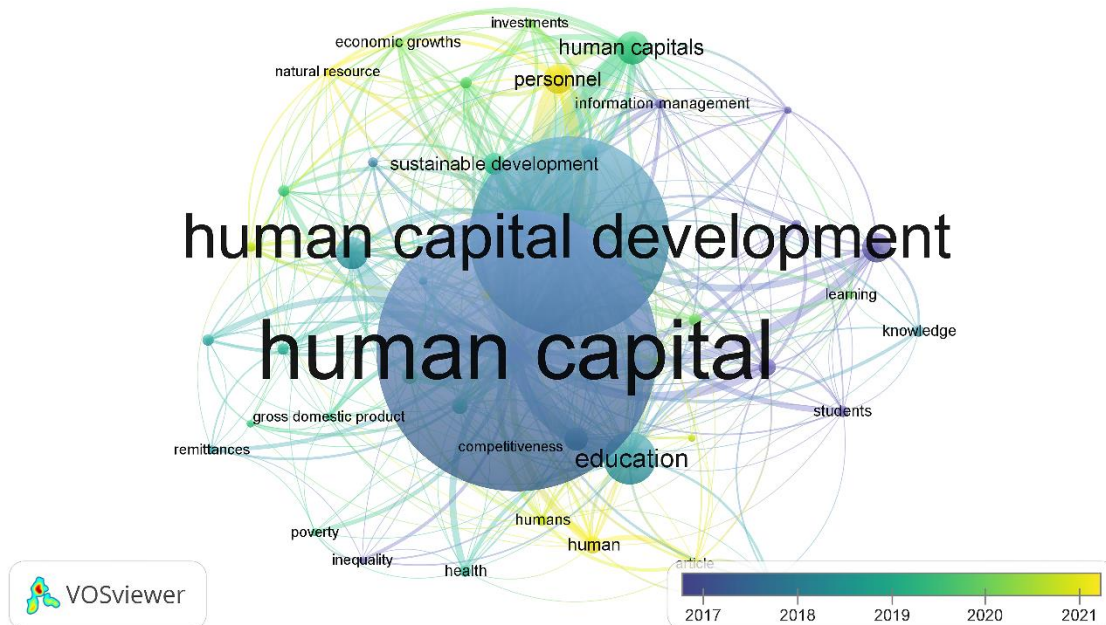


Fig. 6: Keywords co-occurrences

5. Limitation

This study's bibliometric analysis is mainly limited by its reliance on a single database. The research team used the SCOPUS database due to its extensive coverage of social sciences. Although other databases like Dimensions, PubMed, and Web of Science (WoS) are also reliable sources, using only SCOPUS may have influenced the results. It is recognized that the findings could differ if data were collected from multiple databases or a combination of them.

6. Conclusion

The extensive analysis of the dataset from 2003 to 2023 revealed a dynamic landscape of scholarly contributions. It shows a 15.1% annual growth rate and a mean age of 6.54 years, reflecting its vibrancy and contemporary nature. The collaborative nature of the research, with an average of 2.91 co-authors per document and a significant international co-authorship rate of 17.68%, is notable. The variety of document types, combined with the fluctuating pattern of publication numbers over time, emphasizes the multidimensional and evolving nature of academic output. The graph analyzing scholarly publications emphasizes the fluidity and changing impact of research within the academic community. The global distribution of publications indicates active participation from various countries, providing opportunities for international collaboration and knowledge exchange.

Despite the valuable insights the analysis provides, there are some limitations to consider. The dataset focuses primarily on articles and books, potentially excluding other forms of scholarly communication. Furthermore, the analysis is dependent on the accuracy and completeness of the metadata, which may influence the findings. The

quality and impact of publications are multifaceted, and a more nuanced assessment would necessitate considering factors other than raw citation counts. Geographic distribution may not accurately represent institutional affiliations, and the dataset may not capture all relevant dimensions of scholarly activity.

To delve deeper into the causes and implications of these trends, it is essential to explore the socio-economic, technological, and political forces that shape them. This investigation could examine how economic shifts, policy changes, and technological advancements influence the patterns of publication and collaboration in HCD research. Furthermore, these insights can significantly inform policymakers, educators, and business leaders, helping them craft strategies that effectively enhance HCD. By understanding these dynamics, stakeholders can tailor educational advancements, support policy adjustments, and facilitate business alignment with current research focuses, optimizing the cultivation and utilization of human capital globally.

Future research could employ various advanced methodologies to address the identified gaps in the literature. Longitudinal studies could be used to trace the evolution of themes and collaborations over time, providing insights into the temporal dynamics of the field. Network analysis could be particularly beneficial in mapping the interconnections between researchers and institutions globally, helping to understand the structure and influence of various academic networks. Comparative studies between different regions or disciplines could reveal unique challenges and opportunities in HCD, highlighting the impact of local contexts on research outputs. Additionally, meta-analyses of existing literature could synthesize findings across individual studies, providing a higher-level view of the research landscape and identifying overarching trends and anomalies.

Further investigation into the impact of different document types on overall influence could enhance understanding. Continuation of tracking evolving research interests and emerging trends would ensure the dataset's relevance. Additionally, examining the dynamics of influential journals and authors in more detail could contribute to refining academic assessment methodologies and offer a deeper understanding of HCD research in databases such as Scopus and Web of Science.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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