



Human Capital Horizons BRICS Nations Reshaping Global Workforce Dynamics

Muhammad Rafi Dhia¹

¹Universitas Muhammadiyah Jakarta, Indonesia

*Correspondence e-mail: rafidhia23@gmail.com

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ABSTRAK

Human capital telah menjadi mesin utama pertumbuhan ekonomi dan daya saing global, khususnya ketika perubahan teknologi dan transisi demografis membentuk ulang pasar tenaga kerja. Studi ini meneliti bagaimana negara-negara BRICS Brasil, Rusia, India, Tiongkok, dan Afrika Selatan mentransformasi dinamika tenaga kerja global melalui pembangunan human capital. Dengan menggunakan desain deskriptif kualitatif dan tinjauan pustaka berbasis dokumen dari jurnal-jurnal terindeks, analisis menunjukkan adanya korelasi positif yang kuat antara Indeks Pembangunan Manusia (HDI) dan Indeks Human Capital (HCI), yang menegaskan bahwa investasi pada pendidikan, kesehatan, dan keterampilan tenaga kerja secara langsung mendorong pembangunan manusia. Temuan ini menyoroti inisiatif skala besar dalam bidang pendidikan, pelatihan vokasional, dan infrastruktur digital, serta strategi mobilitas talenta dan keterlibatan diaspora yang meningkatkan arus human capital dan menarik investasi asing langsung. Perbandingan antarnegara memperlihatkan respons nasional yang beragam terhadap tekanan demografis, ketimpangan, transformasi digital, dan ketidaksesuaian keterampilan Tiongkok dan India menunjukkan program ekspansif di bidang sains, teknologi, dan pendidikan, sementara Brasil, Rusia, dan Afrika Selatan menghadapi kemajuan yang lebih lambat serta disparitas sosial-ekonomi yang persisten. Secara keseluruhan, studi ini menyimpulkan bahwa investasi berkelanjutan pada pendidikan yang selaras dengan industri, perlindungan sosial, keterampilan digital dan hijau, serta kebijakan diaspora merupakan faktor penting bagi negara-negara BRICS untuk memperkuat kesiapan tenaga kerja dan meningkatkan pengaruhnya terhadap pasar tenaga kerja global.

Kata Kunci: BRICS, Human Capital, Workforce Development; Talent Mobility, Global Labor Markets

ABSTRACT

Human capital has become a key engine of economic growth and global competitiveness, particularly as technological change and demographic transitions reshape labor markets. This study investigates how the BRICS nations Brazil, Russia, India, China, and South Africa are transforming global workforce dynamics through human-capital development. Employing a qualitative descriptive design and a desk-based literature review of peer-reviewed journals the analysis reveals a strong positive correlation between the Human Development Index (HDI) and the Human Capital Index (HCI), confirming that investments in education, health, and workforce skills directly foster human development. The findings highlight large-scale initiatives in education, vocational training, and digital infrastructure, as well as strategies for talent mobility and diaspora engagement that enhance human-capital flows and attract foreign direct investment. Comparative insights show diverse national responses to demographic pressures, inequality, digital transformation, and skills mismatches China and India demonstrate expansive programs in science, technology, and education, while Brazil, Russia, and South Africa face slower progress and persistent socio-economic disparities. Overall, the study concludes that sustained investment in education industry alignment, social protection, digital and green skills, and diaspora policies is essential for BRICS nations to strengthen workforce readiness and exert greater influence on global labor markets.

Keywords : BRICS, Human Capital, Workforce Development; Talent Mobility, Global Labor Markets



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INTRODUCTION

In the twenty-first century, human capital has emerged as a central driver of economic growth and global competitiveness in the twenty-first century, particularly as technological change and demographic transitions reshape labor markets (Choi et al., 2024a); (Mohanty & Sethi, 2019). Within this evolving landscape, the BRICS nations Brazil,

Russia, India, China, and South Africa have emerged as pivotal actors. Collectively representing more than 40 percent of the world's population and a significant share of global GDP, these economies are laboratories for innovative workforce strategies that influence not only domestic labor markets but also global employment patterns (Beletskaya, 2022).

The rise of BRICS is not merely an economic narrative; it is also a story of transformation in skills development, education systems, and talent mobility. Each member nation faces distinct demographic realities, from India's youthful workforce to China's aging population, yet all share a commitment to strengthening human capital as a foundation for sustainable growth (Zotova, 2022). Through large-scale investments in education, vocational training, and digital infrastructure, BRICS countries are reshaping how talent is cultivated and deployed, thereby influencing global labor supply chains and innovation capacity (Tahir & Burki, 2023).

Moreover, BRICS cooperation extends beyond national borders. Collaborative frameworks such as the BRICS Network University and joint skill-development programs foster cross-border knowledge exchange and professional mobility, reinforcing the bloc's collective bargaining power in international labor markets (Beletskaya, 2022); (Choi et al., 2024a). By prioritizing human capital, these nations are positioning themselves as influential architects of new norms in employment standards, talent management, and workforce resilience (Zotova, 2022); (Tahir & Burki, 2023).

This article explores the multifaceted ways in which BRICS nations are reshaping global workforce dynamics. It examines evolving human-capital policies, the socio-economic drivers behind these reforms, and their implications for international labor markets. By analyzing how BRICS strategies intersect with global trends in technology, migration, and education, the discussion provides insights into opportunities and challenges that lie ahead for policymakers, business leaders, and researchers seeking to understand the future of work in an interconnected world (Mohanty & Sethi, 2019);(Uddin et al., 2025).

LITERATURE REVIEW

Human Capital and Global Workforce Dynamics

Human capital, defined as the collective skills, knowledge, and abilities of individuals that can be enhanced through education and training, is a pivotal driver of global workforce dynamics and economic growth (Turekulova et al., 2016). Global leadership transforms these individual capabilities into strategic resources for multinational enterprises, thereby strengthening competitive advantage (Minbaeva, 2025). Human capital management further supports this process through strategic HRM practices that emphasize agility, inclusivity, sustainability, and technology integration to optimize workforce potential (Sharma et al., 2025). Technological advances particularly those associated with the Fourth Industrial Revolution have reshaped labor markets by increasing productivity, mobility, and competition, while simultaneously generating structural unemployment and income inequality (Safronchuk et al., 2020). At the same time, skilled international labor migration highlights global talent mobility, with emerging economies in South and Southeast Asia and the Arabian Peninsula becoming key players in attracting talent (Ewers et al., 2022). This dynamic intensifies the risk of brain drain in less developed regions, further exacerbating socio-economic inequalities (Giwa et al., 2025).

Education and training remain essential for skill development and sustained competitiveness, requiring continuous investment and strong public private partnerships to secure productivity gains (Bilorusets et al., 2025). Organizations must also address the challenges of an aging workforce by strategically managing older employees to maximize returns on human capital investments and to leverage the substantial development already undertaken (West & Berman, 2016). Sectoral demands, such as those in maritime transportation, underscore the importance of a resilient and adaptive workforce capable of meeting economic, environmental, and social expectations, making the resolution of skill shortages and the enhancement of training content critical for long-term sustainability (Caesar, 2023). Effective human capital development additionally depends on robust policies and significant investments in education, health, and training to support socio-economic growth and adapt to global market pressures (Plaksiuk et al., 2023). Emerging trends reinforce these priorities: diversity, equity, and inclusion in HRM foster innovation and align with ESG standards, while strategies like establishing global talent hubs and engaging diaspora communities help countries build local human capital and mitigate brain drain. Furthermore, the growing demand for digital competencies requires continuous

learning and technological adaptation to maintain a competitive edge in the global economy (Shliakhetko et al., 2024).

BRICS Economic and Demographic Context

The BRICS countries Brazil, Russia, India, China, and South Africa have emerged as pivotal actors in the global economy, experiencing sustained economic growth and development over recent decades (Duggan, 2018). Despite this expansion, income inequality persists across these nations, shaped by educational disparities, labor market imbalances, and wealth concentration (Makhetha-Kosi et al., 2025). Collectively, BRICS economies advocate for a multipolar world order, seeking greater representation for developing nations in international economic structures while deepening economic integration and financial cooperation to strengthen socio-economic resilience (Duggan et al., 2022). Demographically, China and India alone account for over one-third of the global population, with China comprising 18.7 percent and India 17.8 percent as of 2015, while Brazil and Russia also add significant demographic weight to the group. However, these nations face diverse demographic pressures, including aging populations, youth development concerns, gender inequality, and rapid urbanization. Policy responses, often aligned with Sustainable Development Goals (SDGs), have been critical for example, Russia's initiatives to counter population decline demonstrate proactive demographic planning (Moiseev et al., 2024).

Socio-economic factors further shape the BRICS landscape. Persistent income inequality demands policies that expand access to education, foster innovation, and enhance financial inclusion (Makhetha-Kosi et al., 2025). Labor markets reveal wide structural diversity, characterized by substantial informal sector employment and variable unemployment rates. Gender dynamics influence fertility patterns, with higher gender equality correlating with lower birth rates in most BRICS nations except Russia (Kizilova & Mosakova, 2019). Sectoral contributions underscore the importance of agriculture, where population size and land area drive economic performance, though patterns differ markedly across countries. Tourism emerges as another strategic sector, benefitting from good governance and globalization while contending with environmental degradation, necessitating sustainable policy frameworks (Guan & Qamruzzaman, 2022). Looking forward, demographic projections and models of capital accumulation and productivity growth suggest that BRICS economies will continue expanding their influence over the next half-century, reshaping global labor markets and socio-economic indicators in the process.

Human Capital Development Policies in BRICS

Human capital development is a pivotal driver of economic growth and sustainable development in the BRICS countries Brazil, Russia, India, China, and South Africa where improvements in human potential are closely tied to national prosperity. Key indicators such as the Human Development Index (HDI) and Human Capital Index (HCI) exhibit a strong correlation, demonstrating that advancements in education, health, and skills directly foster human capital development (Ugnich et al., 2024). Empirical evidence further reveals a bidirectional causality between human capital and GDP, underscoring the necessity of sustained investment to stimulate long-term economic growth (Choi et al., 2024b). Country-specific strategies highlight varying levels of commitment: China and India have introduced comprehensive programs spanning primary to higher education, with a particular emphasis on science and technology to strengthen their human capital base. In contrast, Russia and Brazil have implemented more limited, targeted programs that lack comprehensive, long-term frameworks for human capital development. Importantly, human capital must reach a threshold HCI of 0.57 to significantly enhance foreign direct investment (FDI) inflows, while the synergy between financial sector development and human capital has been shown to further attract FDI (Tsurai, 2022).

Environmental sustainability and policy integration represent critical dimensions of these efforts. Human capital development contributes to environmental quality by promoting green skills and facilitating the decoupling of carbon emissions from economic growth, aligning with global sustainability objectives (Iorember et al., 2024); (Ganda, 2022). Despite notable progress, BRICS nations continue to face challenges in achieving balanced development and efficient utilization of human resources, necessitating more targeted and coordinated policies (Oh et al., 2017). Recommendations include increased educational expenditure, strengthened financial systems, and

investments in ICT to improve efficiency and advance Sustainable Development Goals (Pata, 2025). Policymakers must also ensure adequate energy supply, expand foreign investments, enhance healthcare systems, and implement robust environmental regulations to support sustainable economic development (Azam, 2019). Collectively, these strategies illustrate that while BRICS countries are actively enhancing human capital to drive growth, attract FDI, and meet sustainability targets, comprehensive long-term planning remains essential for fully leveraging their human capital potential.

RESEARCH METHODS

This study employs a qualitative descriptive approach through a desk-based literature review to analyze how BRICS nations reshape global workforce dynamics via human capital development. Secondary data were collected from peer-reviewed journals. Relevant sources were identified using academic databases (e.g., Scopus, Web of Science) and key terms including BRICS, human capital, and workforce development. All materials were synthesized using thematic content analysis to capture shared strategies and country-specific practices, ensuring a concise yet comprehensive understanding of BRICS human-capital policies and their global implications.

RESULTS AND DISCUSSION

Human Capital Trends and Key Initiatives in BRICS

A strong positive relationship emerges between human capital and human development across the BRICS countries. The Human Development Index (HDI) and Human Capital Index (HCI) exhibit a high correlation, with a Pearson coefficient of 0.84, demonstrating that improvements in education, health, and workforce skills directly foster human development (Ugnich et al., 2024). Among the BRICS nations, South Africa ranks 109th out of 189 countries in HDI, reflecting persistent socio-economic challenges and historical inequalities that constrain education investments and overall progress (Maponya et al., 2024). Brazil and Russia display relatively high present human capital capacity yet lack comprehensive long-term strategies for education and human capital development (Ardichvili et al., 2012). In contrast, China and India have implemented extensive national programs spanning primary through higher education, particularly in science and technology, to strengthen their human capital base. Major workforce initiatives also vary: China's Belt and Road Initiative (BRI) incorporates skill-building and knowledge-transfer programs to support sustainable growth (Shahzad et al., 2023), while India and South Africa struggle to utilize human resources efficiently compared to Brazil, Russia, and China (Hassan et al., 2019). Brazil faces delays in digital industry development, with a large proportion of youth disengaged from education or employment, highlighting the need for policies linking technical education to industry demands (Mello et al., 2019).

Comparative analysis further underscores the importance of technology adoption and financial inclusion in advancing human development. ICT penetration, including internet usage and broadband access, significantly enhances HDI by improving educational opportunities, healthcare delivery, and economic prospects (Kumari, 2025). Financial inclusion measured by access, depth, efficiency, and stability also positively influences HDI, highlighting the need for strong financial systems to support human capital growth (Sohail et al., 2025). Overall, the results indicate that while BRICS countries exhibit diverse human capital capacities and development levels, sustained investments in education, ICT infrastructure, and comprehensive workforce programs remain essential to achieving long-term human development and meeting Sustainable Development Goals (SDGs) (Pata, 2025).

Impacts on Global Workforce Dynamics

BRICS human-capital strategies are reshaping international labor markets by enhancing talent mobility and fostering the global accumulation of skills. Rapid economic growth and modernization reforms have made BRICS countries increasingly attractive destinations for skilled professionals (Shavshukov, 2018). Policies in China and India aimed at reversing brain drain and fostering brain gain further intensify global competition for talent, with migration of highly skilled professionals to BRICS nations projected to rise and alter global labor dynamics. This movement supports the brain-gain hypothesis, whereby the prospect of emigration to higher-productivity countries motivates greater human-capital accumulation in the sending nations, expanding the global stock of human capital and benefiting both host and source economies .

Foreign direct investment (FDI) emerges as another key mechanism through which BRICS human-capital strategies influence the global workforce. While FDI typically promotes growth through financial development, its direct effect on economic expansion can be negative, consistent with dependency theory (Tsaurai, 2022). Human capital development strengthens the positive contribution of FDI to economic growth, and investment opportunities abroad drive migration patterns, reallocating human-capital supply across borders (Peterburgsky, 2025). Global labor standards present a more complex picture: multinational corporations from BRICS countries often invest in regions with lower labor standards, particularly in developed economies, although prior trading relationships remain significant in shaping location decisions in developing countries. Policy implications underscore the need for increased education spending, financial-system deepening, and environmental alignment of financial institutions to maximize the benefits of human capital and reduce CO₂ emissions (Li & Ullah, 2022). Collectively, these findings show that BRICS human-capital strategies exert wide-ranging impacts on talent mobility, FDI flows, and labor-standards practices, highlighting the strategic role of human capital development in advancing sustainable global workforce dynamics.

Comparative Country Insights and Emerging Challenges

BRICS countries face intersecting challenges across demographic pressures, digital transformation, inequality, and policy implementation, yet their responses and outcomes differ substantially. Demographically, all members show strong efforts to increase the availability of skilled health personnel (SHP) to meet Sustainable Development Goals (SDGs), with China registering the highest SHP growth rate (Yan et al., 2023). However, rapid urbanization and internal migration continue to strain healthcare systems, particularly in China where migrant populations face limited access to medical services (Jia, 2024). Digital transformation serves as both a catalyst for growth and a potential driver of disparity. All BRICS nations have adopted national digitalization strategies to reduce regional inequality (5), but outcomes vary due to uneven digital infrastructure and ICT penetration (Ignatov, 2020). For example, while digital initiatives in South Africa's Gauteng Province demonstrate progress in narrowing gaps (de Bruyn et al., 2025), rural areas continue to experience significant digital exclusion (Mwansa et al., 2025). Similarly, China's digital governance improves healthcare access for migrants but still reflects regional and individual heterogeneity in benefits (Jia, 2024).

Inequality remains a persistent concern across the bloc, with income disparities fueled by educational gaps, labor-market inequality, and wealth concentration. Digitalization compounds these issues by both alleviating and amplifying them; innovation patenting receipts (IPRs) have, in some cases, intensified income disparities within BRICS economies (Uche et al., 2024). Pronounced regional disparities notably in China's economic and digital development (9) and South Africa's digital access (Mwansa et al., 2025) underscore these uneven outcomes. Policy analysis highlights further divergences: while BRICS countries share a common interest in trade liberalization (Makala et al., 2025), protectionist measures and economic disparities impede cohesive action. Sustainable development performance also varies; Russia and South Africa lead in selected areas, whereas China and India grapple with pollution and lower quality of life indicators (Gebert & de Mello-Sampayo, 2025). Overall, the findings emphasize that although BRICS nations share structural challenges and opportunities, targeted policies promoting education, innovation, and financial inclusion are essential to reduce inequality, strengthen digital infrastructure, and advance inclusive and sustainable economic growth.

International Talent Mobility and Diaspora Engagement

BRICS countries are increasingly leveraging diaspora networks and skilled migration to strengthen human-capital flows and enhance global competitiveness. Diaspora networks facilitate cross-border transfers of goods, capital, and knowledge, supporting efficient specialization, investment, and productivity growth while integrating home countries into the global economy (Rapoport, 2016). This dynamic underpins the concepts of brain gain and brain circulation, where emigrants return or collaborate transnationally to transfer knowledge and skills back to their countries of origin (Naghavi, 2017). Notable examples include Indian computer scientists in Silicon Valley partnering with counterparts in Bangalore and the return of Chinese professionals boosting China's technology sector. India and China have been particularly proactive, instituting policies that promote return migration and

simplify investment and travel for their diasporas, thereby fostering emotional and economic ties to encourage ongoing contributions to national development (Lum, 2015).

Despite these advances, several challenges and barriers remain. Skilled migrants often face integration obstacles that limit the effective utilization of their expertise and impede the accumulation of social capital. Addressing these barriers requires targeted policies and well-implemented skilled migration programs (Sardana et al., 2016). The outflow of skilled workers has also sparked debate: while traditional perspectives emphasize the risks of brain drain, newer analyses highlight the developmental potential of brain gain and diaspora engagement (Rapoport, 2016). From a comparative perspective, China prioritizes the return of its scientific and entrepreneurial elite, whereas India focuses on easing diaspora investment and travel, reflecting different historical and political contexts (Lum, 2015). At the broader economic level, BRICS nations implement business-friendly schemes to reinforce supply chain management and bolster competitiveness, yet they continue to face hurdles in achieving mutual recognition arrangements among customs authorities (Wei, 2016). Overall, these results show that BRICS countries' diaspora engagement and skilled-migration strategies offer substantial benefits for human-capital development and economic growth, provided that integration barriers and policy gaps are effectively addressed.

Education Industry Alignment and Skills Mismatch

BRICS countries are adopting diverse, multi-layered strategies to bridge the gap between higher education, vocational training, and labor-market demands, thereby strengthening workforce readiness. Public private partnerships and apprenticeships emerge as core mechanisms, enabling closer coordination between educational institutions, industry, government, and civic organizations an approach especially valuable in large, heterogeneous nations such as Russia and China (Remington & Yang, 2020). In China, "3 + 1" programs integrate three years of academic study with a year of practical training, ensuring curriculum relevance and fostering professional development for educators while tightening the link between academia and industry (Wang et al., 2024). International collaborations in vocational education and training (VET) further improve students' academic, social, and intercultural competencies, enhancing employability through workplace experience and customized curricula (Gao, 2019). Higher-education initiatives follow similar principles: Brazil addresses qualification gaps through programs that develop social and emotional skills, support internships, and strengthen ties with employers (A. R. Goulart et al., 2021), while South Africa promotes work-integrated learning (WIL) with modular training that blends academic and practical components (Della Tamin et al., 2019).

Digital transformation adds another critical dimension. Preparing students for Industry 4.0 demands coordinated action from public initiatives, multinational companies, and educational institutions to equip learners with advanced technological skills (Erro-Garcés & Aranaz-Núñez, 2020). Policy reforms such as India's New Education Policy (NEP) 2020 and the Samagra Shiksha Abhiyan integrate vocational and skill-development programs into school curricula to better align education with market requirements. Despite these advances, challenges persist: resource limitations, insufficient infrastructure, undertrained teachers, and a persistent digital divide hinder implementation (Kumar et al., 2025). Continuous curriculum evaluation, inclusion of soft skills, and stronger higher-education–industry partnerships remain essential to keep pace with evolving labor-market needs (V. G. Goulart et al., 2022). Overall, BRICS countries demonstrate measurable progress in education industry alignment, but sustained investment in teacher training, technology, and curriculum modernization is vital to fully close the skills mismatch and build a future-ready workforce.

CONCLUSION

This study shows that BRICS nations are reshaping global workforce dynamics through strategic human-capital development that strongly correlates with human development outcomes. Large-scale investments in education, digital infrastructure, and targeted workforce programs have strengthened talent pipelines and attracted foreign direct investment, while policies encouraging international talent mobility and diaspora engagement have expanded the global stock of skills. Yet persistent inequality, demographic pressures, uneven digital access, and skills mismatches reveal the need for sustained and coordinated action, underscoring that human capital is not merely a domestic growth engine but a strategic asset shaping international labor markets and global competitiveness. To address these challenges, BRICS governments should deepen education–industry partnerships by

expanding apprenticeships, public–private collaborations, and curriculum reforms to align vocational and higher education with evolving industry demands, particularly in digital and green sectors.

They should also enhance social protection and inclusivity through stronger health-care systems, social safety nets, and gender-equity programs to ensure a resilient, productive workforce across regions and demographics. Leveraging diaspora networks through policies that support return migration, knowledge transfer, and diaspora investment will help maximize brain gain and innovation spillovers, while continued investment in digital literacy and climate-responsive skills will prepare workers for Industry 4.0 and the global sustainability transition. Future research could complement this qualitative synthesis with comparative empirical analyses such as panel data or mixed-methods approaches to quantify the causal effects of human-capital investments on productivity and foreign direct investment within BRICS. Further sector-specific investigations, for example in renewable energy or advanced manufacturing, would clarify how human capital drives emerging industries, and longitudinal studies on diaspora engagement and talent mobility could illuminate how transnational networks evolve and how policy frameworks can best harness them for sustainable global workforce development.

REFERENCE

- Ardichvili, A., Zavyalova, E., & Minina, V. (2012). Human capital development: comparative analysis of BRICs. *European Journal of Training and Development*, 36(2/3), 213–233.
- Azam, M. (2019). Relationship between energy, investment, human capital, environment, and economic growth in four BRICS countries. *Environmental Science and Pollution Research*, 26(33), 34388–34400.
- Beletskaya, M. (2022). BRICS labor markets: Competing with the largest economy. *BRICS Journal of Economics*, 3(2), 75–96.
- Bilorusets, L., Mylenkyi, V., Lunova, T., Zhurba, O., & Samoilenko, V. (2025). The Development of Human Capital within the Framework of the Demographic Economy of Ukraine: Factors of Stability. *International Journal of Economics and Financial Issues*, 15(4), 144.
- Caesar, L. D. (2023). Emerging dynamics of training, recruiting and retaining a sustainable maritime workforce: a skill resilience framework. *Sustainability*, 16(1), 239.
- Choi, C.-H., Zhou, X., & Ko, J.-O. (2024a). Can Human Capital Drive Sustainable International Trade? Evidence from BRICS Countries. *Sustainability*, 16(1), 135.
- Choi, C.-H., Zhou, X., & Ko, J.-O. (2024b). Can Human Capital Drive Sustainable International Trade? Evidence from BRICS Countries. *Sustainability*, 16(1), 135.
- de Bruyn, C., Musa, K., & Castanho, R. A. (2025). Can Digitalization Bridge the Gap? Exploring Human Development and Inequality in Gauteng Province, South Africa? *Sustainable Development*, 33(3), 3847–3857.
- Della Tamin, M., Du Plooy, D. M., Solms, S. V., & Meyer, J. (2019). A Proposed Modular Work Integrated Learning Framework for South Africa. *IEEE Access*, 7, 2559–2566. <https://doi.org/10.1109/ACCESS.2018.2884567>
- Duggan, N. (2018). The BRICS and nontraditional security. In *BRICS and Global Governance* (pp. 150–167). <https://doi.org/10.4324/9781315569925>
- Duggan, N., Hooijmaaijers, B., Rewizorski, M., & Arapova, E. (2022). Introduction: ‘The BRICS, global governance, and challenges for South–South cooperation in a post-Western world.’ *International Political Science Review*, 43(4), 469–480.
- Erro-Garcés, A., & Aranaz-Núñez, I. (2020). Catching the wave: Industry 4.0 in BRICS. *Journal of Manufacturing Technology Management*, 31(6), 1169–1184. <https://doi.org/10.1108/JMTM-09-2019-0344>
- Ewers, M. C., Khat tab, N., Babar, Z., & Madeeha, M. (2022). Skilled migration to emerging economies: The global competition for talent beyond the West. *Globalizations*, 19(2), 268–284.

- Ganda, F. (2022). The environmental impacts of human capital in the BRICS economies. *Journal of the Knowledge Economy*, 13(1), 611–634.
- Gao, Y. (2019). The way collaboration benefits vocational students: a case study of a joint venture college in China. *Asia Pacific Journal of Education*, 39(1), 65–78. <https://doi.org/10.1080/02188791.2019.1572594>
- Gebert, I. M., & de Mello-Sampayo, F. (2025). Efficiency of BRICS countries in sustainable development: a comparative data envelopment analysis. *International Journal of Development Issues*, 24(1), 38–54. <https://doi.org/10.1108/IJDI-12-2023-0287>
- Giwa, A., Ngakam, J., Mirzaei, S., & Ikuomola, A. D. (2025). Emerging Dependencies: GCC States and Sub-Saharan African Healthcare Labor Migration Through World Systems Theory. *World Medical & Health Policy*.
- Goulart, A. R., Liboni, L. B., & Cezarino, L. O. (2021). Qualification as a societal challenge and the role of higher education from a system approach. *Higher Education, Skills and Work-Based Learning*, 11(5), 1002–1019. <https://doi.org/10.1108/HESWBL-06-2020-0118>
- Goulart, V. G., Liboni, L. B., & Cezarino, L. O. (2022). Balancing skills in the digital transformation era: The future of jobs and the role of higher education. *Industry and Higher Education*, 36(2), 118–127. <https://doi.org/10.1177/09504222211029796>
- Guan, C., & Qamruzzaman, M. (2022). A symmetric and asymmetric nexus between environmental sustainability and tourism development in BRIC nations: What is the role of good governance and globalization? *Frontiers in Environmental Science*, 10, 973420.
- Hassan, S. U., Rymbai, M. S., & Bhat, A. A. (2019). Economics of human resources development under globalization era: a study of BRICS countries. *European Journal of Training and Development*, 43(7/8), 682–698.
- Ignatov, A. (2020). The digital economy of BRICS: Prospects for multilateral cooperation. *International Organisations Research Journal*, 15(1), 31–62.
- Iorember, P. T., Gbaka, S., Işık, A., Nwani, C., & Abbas, J. (2024). New insight into decoupling carbon emissions from economic growth: Do financialization, human capital, and energy security risk matter? *Review of Development Economics*, 28(3), 827–850.
- Jia, H. (2024). Government Digital Transformation and the utilization of Basic Public Health Services by China's migrant population. *BMC Public Health*, 24(1), 3253.
- Kizilova, K., & Mosakova, E. A. (2019). The birth rate in BRICS countries under the gender inequality in the labor market. *Вестник Российского Университета Дружбы Народов. Серия: Социология*, 19(4), 630–638.
- Kumar, V., Choudhary, S. K., & Rajendra, K. O. (2025). Envisioning Industry Training in School Education in India: Challenges and Recommendations. *Lecture Notes in Networks and Systems*, 1206 LNNS, 75–82. https://doi.org/10.1007/978-981-96-0201-8_4
- Kumari, N. (2025). Tech-fueled human development: “role of ICT in enhancing human development-a panel analysis.” *Journal of Economic Studies*.
- Li, X., & Ullah, S. (2022). Caring for the environment: how CO2 emissions respond to human capital in BRICS economies? *Environmental Science and Pollution Research*, 29(12), 18036–18046.
- Lum, K. (2015). Operationalizing the highly skilled diasporic transnational family: China and India's transnational governance strategies. *Diaspora Studies*, 8(1), 51–65. <https://doi.org/10.1080/09739572.2014.957974>
- Makala, Z., Makhetha-Kosi, P., Shambare, R., & Ninana, A. (2025). Comparative analysis of trade policies for BRICS and developed economies. In *Analyzing the Impact of BRICS+ Nations' Trade Policies on Global Economies* (pp. 93–121). <https://doi.org/10.4018/979-8-3693-7969-1.ch004>

- Makhetha-Kosi, P., Shambare, R., Mjacu, L., & Ngonisa, P. (2025). The Impact of Trade Policies on Income Inequality in BRICS Countries. In *Analyzing the Impact of BRICS+ Nations' Trade Policies on Global Economies* (pp. 289–318). IGI Global Scientific Publishing.
- Maponya, L., Ogujiuba, K., & Stiegler, N. (2024). The nexus between economic, demographic, policy and human development in South Africa: An econometric analysis. *Journal of Infrastructure, Policy and Development*, 8(12). <https://doi.org/10.24294/jipd.v8i12.5567>
- Mello, S. L. de M., Ludolf, N. V. E., Quelhas, O. L. G., & Meiriño, M. J. (2019). Innovation in the digital era: new labor market and educational changes. *Ensaio: Avaliação e Políticas Públicas Em Educação*, 28, 66–87.
- Minbaeva, D. (2025). GLOBAL LEADERSHIP AND STRATEGIC HUMAN CAPITAL IN MNES. In *Advances in Global Leadership* (Vol. 16, pp. 183–187). <https://doi.org/10.1108/S1535-120320250000016020>
- Mohanty, S., & Sethi, N. (2019). Outward FDI, human capital and economic growth in BRICS countries: an empirical insight. *Transnational Corporations Review*, 11(3), 235–249.
- Moiseev, V. V., Kolesnikova, J. S., Yagudina, E. V., Kuznetsova, A. M., & Molchanova, M. A. (2024). Effectiveness of demographic policy measures in addressing population decline in contemporary Russia. *Journal of Infrastructure, Policy and Development*, 8(9), 1–13.
- Mwansa, G., Ngandu, M. R., & Mkwambi, Z. (2025). Bridging the digital divide: exploring the challenges and solutions for digital exclusion in rural South Africa. *Discover Global Society*, 3(1), 54.
- Naghavi, A. (2017). Intellectual property protection and the brain drain. In *The International Mobility of Talent and Innovation: New Evidence and Policy Implications* (pp. 243–265). <https://doi.org/10.1017/9781316795774.009>
- Oh, H., Seo, D., Yoo, S., & Kim, J. (2017). Analysis of strengths and weaknesses in the National Human Resource Development systems of BRICS. *Human Resource Development International*, 20(4), 268–281.
- Pata, U. K. (2025). How to progress towards sustainable development by leveraging renewable energy sources, technological advances, and human capital. *Renewable Energy*, 241. <https://doi.org/10.1016/j.renene.2025.122367>
- Peterburgsky, S. (2025). Investment opportunities and labor mobility: Evidence from Europe. *Finance Research Letters*, 82. <https://doi.org/10.1016/j.frl.2025.107570>
- Plaksiuk, O., Prodanova, L., Yakusheva, O., Nagaichuk, N., Prikhno, I., & Jakubčinová, M. (2023). HUMAN CAPITAL AS A FACTOR OF SOCIOECONOMIC DEVELOPMENT OF THE STATE: THE MAIN TRENDS OF THE SLOVAK REPUBLIC. *Financial & Credit Activity: Problems of Theory & Practice*, 4(52).
- Rapoport, H. (2016). Migration and globalization: what's in it for developing countries? *International Journal of Manpower*, 37(7), 1209–1226. <https://doi.org/10.1108/IJM-08-2015-0116>
- Remington, T. F., & Yang, P. (2020). Public-private partnerships for skill development in the United States, Russia, and China. *Post-Soviet Affairs*, 36(5–6), 495–514. <https://doi.org/10.1080/1060586X.2020.1780727>
- Safronchuk, M. V., Ivanitskaya, N. V., & Baibulov, A. K. (2020). Global labor market and challenges of digitalization. *International Scientific and Practical Conference*, 142–150.
- Sardana, D., Zhu, Y., & van der Veen, R. (2016). Unlocking the Talents-in-Waiting: Case Study Analysis of Chinese and Indian High-Skilled Migrants in South Australia. *International Migration*, 54(6), 74–93. <https://doi.org/10.1111/imig.12294>
- Shahzad, A., Rashid, H., & Abbas, S. M. (2023). The Belt and Road Initiative: Catalyzing Human Capital Development and Technological Innovation for Sustainable Growth. *China Quarterly of International Strategic Studies*, 9(01–04), 361–380.

- Sharma, P., Singh, B., & Sahni, L. (2025). Harnessing Human Capital: Innovative HRM Practices for Global Competitiveness. In *Innovative Approaches for International Competitiveness Through Human Resource Management* (pp. 615–648). IGI Global Scientific Publishing.
- Shavshukov, V. M. (2018). The BRICS in the international money and debt capital markets. *Journal of Business and Retail Management Research*, 12(3).
- Shliakhetko, V., Petrukha, N., Krupa, V., Berest, I., & Baran, I. (2024). Security issues in the formation and competition for human capital in the context of destabilisation of the European labour market. *International Journal of Services, Economics and Management*, 15(6), 677–695.
- Sohail, H. M., Ullah, M., Nazir, M. S., & Tang, C. (2025). Unveiling the financial pathway to human development: insights from non-linear ARDL and Granger causality analysis. *Humanities and Social Sciences Communications*, 12(1), 1–17.
- Tahir, M., & Burki, U. (2023). Entrepreneurship and economic growth: Evidence from the emerging BRICS economies. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100088.
- Tsaurai, K. (2022). Role of financial sector development in foreign direct investment inflows in BRICS. *Investment Management & Financial Innovations*, 19(3), 215.
- Turekulova, D., Mukhambetova, L., Beisengaliyev, B., Babasheva, G., Sadu, Z., & Karkinbayeva, S. (2016). Human capital as the main value of a modern society. *Journal of Economic & Management Perspectives*, 10(3), 66–74.
- Uche, E., Ngepah, N., Onwe, J. C., Zaman, U., & Odhiambo, N. (2024). A question for sustainable development goal 10: How relevant is innovation patenting receipts to income distributions? *Technological Forecasting and Social Change*, 206. <https://doi.org/10.1016/j.techfore.2024.123506>
- Uddin, M. R., Sadik, N., & Rahman, M. M. (2025). Globalization, physical capital, and human capital nexus with economic growth: evidence from BIMSTEC. *Research in Globalization*, 100284.
- Ugnich, E., Kazakova, A., & Tkacheva, O. (2024). Human potential and capital of BRICS countries in sustainable development goals system. *BIO Web of Conferences*, 141, 04025.
- Wang, W., Hussin, M., & Majid, M. Z. A. (2024). Employment Skills in Tertiary Work-Based Learning: A Multiple-Stakeholder Investigation into China's "3 + 1" Programs. *International Journal of Learning, Teaching and Educational Research*, 23(9), 198–219. <https://doi.org/10.26803/ijlter.23.9.11>
- Wei, L. (2016). Strengthening customs cooperation of BRICS countries: Improving people-oriented capacity building strategies to achieve mutual recognition of Accredited Operator programs. *World Customs Journal*, 10(1), 115–132. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85010931079&partnerID=40&md5=593c25897b9737ba7134430905fa83fa>
- West, J. P., & Berman, E. M. (2016). Managerial responses to an aging municipal workforce. In *Local Government Management: Current Issues and Best Practices* (pp. 239–255). <https://doi.org/10.4324/9781315539386-25>
- Yan, F., Li, H., Wang, W., & Zhang, J. (2023). The trend in density of skilled health personnel in BRICS countries: Implication for China and India. *The International Journal of Health Planning and Management*, 38(3), 759–772.
- Zotova, E. (2022). Transition to formal employment in the BRICS countries: Challenges and perspectives. *BRICS Journal of Economics*, 3(2), 51–74.