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Brain Drain, Education System, and National Power: Mapping Future Agenda

Penghijrahan Bakat, Sistem Pendidikan, dan Kuasa Nasional: Melakar Agenda Masa Hadapan

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ABSTRACT

Brain drain is a widespread problem, particularly in developing nations. Many countries link the challenges associated with brain drain to issues within the education system, economic conditions, and political stability. However, there is a lack of comprehensive research on the impact and consequences of brain drain on national power. Brain drain is closely tied to national power as it involves the human capital necessary to enhance a country's capabilities for national development and sovereignty. Therefore, this study aims to investigate the push and pull factors of brain drain and to explore the link between education systems and their implications for national power. This research utilises a systematic literature and bibliometric review approach to understand brain drain in current literature comprehensively. Two thousand three hundred seventy (2370) studies in the Scopus database were analysed using VOSviewer, and 33 articles were selected to gain insights into brain drain's push and pull factors. Factors such as education, political stability, career opportunities, social norms, quality of life, and access to advanced research and technology are significant reasons of brain drain. Additionally, this study also discusses its limitations and future directions.

KEYWORDS
Brain Drain, Education, National Power, Literature Review, Bibliometric

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ABSTRAK

Penghijrahan bakat adalah masalah yang meluas, terutamanya di negara-negara membangun. Banyak negara mengaitkan cabaran berkaitan penghijrahan bakat dengan isu-isu dalam sistem pendidikan negara, keadaan ekonomi, dan kestabilan politik. Walau bagaimanapun, terdapat kekurangan penyelidikan komprehensif berkaitan impak dan akibat penghijrahan bakat ini terhadap kuasa nasional. Pengaliran keluar pakar berkait rapat dengan kuasa nasional kerana ia melibatkan modal insan yang diperlukan untuk meningkatkan keupayaan pembangunan nasional dan kedaulatan negara. Oleh itu, kajian ini bertujuan untuk mengkaji faktor-faktor tolakan dan tarikan penghijrahan bakat dan untuk meneroka hubungan antara sistem pendidikan dan implikasinya terhadap kuasa nasional. Penyelidikan ini menggunakan pendekatan sorotan literatur sistematik dan bibliometrik untuk memahami penghijrahan bakat dalam literatur semasa secara menyeluruh. Dua ribu tiga ratus tujuh puluh (2370) kajian dalam pangkalan data Scopus dianalisis menggunakan VOSviewer, dan 33 artikel dipilih untuk mendapatkan pandangan mendalam mengenai faktor-faktor tolakan dan tarikan pengaliran keluar pakar. Faktor-faktor seperti pendidikan, kestabilan politik, peluang kerjaya, norma sosial, kualiti hidup, dan akses kepada penyelidikan dan teknologi maju adalah penting dalam memahami mengapa pakar berhijrah. Selain itu, kajian ini juga membincangkan limitasi penyelidikan dan arah kajian masa depan.

KATA KUNCI

Penghijrahan Bakat, Pendidikan, Kuasa Nasional, Soroton Literatur & Bibliometrik

1.0 Introduction

In an era of globalisation and knowledge-based economies, the phenomenon of brain drain has become a critical concern for nations worldwide, affecting both developing and developed countries. Brain drain, defined as the emigration of highly skilled individuals from their country of origin, has significant implications for national power and development (Smith et al., 2020). According to the United Nations Department of Economic and Social Affairs (2020), there were approximately 281 million international migrants globally in 2020, with a significant portion of 30-35% of them being highly educated professional experts. The Organisation for Economic Cooperation and Development (OECD) reports that the number of migrants with tertiary education in OECD countries increased by 70% between 2000 and 2010, reaching 35 million (OECD, 2022). This trend is not limited to developing nations; for instance, the United Kingdom experienced a net loss of 1,400 academics from its universities in 2021 (Higher Education Statistics Agency, 2022).

Similarly, European countries face an intra-EU brain drain, with countries like Romania and Bulgaria losing up to 10% of their skilled workforce to Western European nations (European Commission, 2021). In Southeast Asia, brain drain has particularly affected countries like Malaysia, Thailand, and the Philippines. Malaysia, for instance, experienced a significant outflow of talent, with an estimated 1.7 million Malaysians working abroad as of 2019, of which about 20% were tertiary-educated professionals (World Bank, 2011; Bunyan, 2024; Department of Statistics Malaysia, 2024). The Malaysian government's Returning Expert Programme, launched in 2001, has successfully attracted back over 5,000 highly skilled professionals by 2022 (Talent Corporation Malaysia, 2023). Similarly, Thailand's Reverse Brain Drain Project has facilitated the return of more than 200 Thai scholars and experts annually since its inception in 1997 (National Science and Technology Development Agency of Thailand, 2022). The Philippines, facing a persistent outflow of healthcare professionals, saw about 19% of its newly registered nurses leave the country in 2019 (Philippine Overseas Employment Administration, 2020).

The concept of national power, traditionally associated with military might and economic strength, has evolved to encompass a broader spectrum of factors in the 21st century. The global movement of human capital not only impacts source countries' intellectual resources but also affects their economic growth, technological advancement, and international competitiveness. A cross-national study found that a 10% increase in emigration rates of highly skilled workers is associated with a 0.8% decrease in GDP per capita across developing and developed countries (Johnson & Lee, 2022). As nations worldwide grapple with the challenges posed by brain drain, the role of education systems in mitigating this issue and enhancing national power has come under increased scrutiny. Nye's (2020) seminal work on soft power highlights the importance of a nation's ability to attract and co-opt rather than coerce, placing education at the forefront of national power strategies. Education systems serve as the primary incubators of human capital, crucial in developing the skills and knowledge necessary for national development and global influence.

The global landscape of higher education is rapidly evolving, with new technologies, changing labour market demands, and increasing international talent competition. The UNESCO Institute for Statistics reports that the number of internationally mobile students doubled from 2 million to 5.3 million between 2000 and 2019, with projections suggesting this figure could reach 8 million by 2025 (UNESCO, 2022). This trend underscores the need for education systems to adapt and innovate to remain competitive and relevant. Moreover, the COVID-19 pandemic has accelerated the adoption of digital learning platforms and remote work arrangements, potentially exacerbating the brain drain by enabling skilled professionals to work for foreign companies without physically relocating (Thompson, 2023). These developments present both challenges and opportunities for nations seeking to retain their talent and

bolster their national power through education.

Soft skills education has gained traction recently, particularly in Asian countries like Malaysia, as a potential strategy to address brain drain and enhance national competitiveness. This holistic approach to education emphasises the development of critical thinking, communication, leadership, and ethical decision-making skills alongside traditional academic knowledge (Abdullah et al., 2021). A study by Lim and Tan (2023) found that graduates from universities with strong soft skills programs were 30% less likely to emigrate and reported higher job satisfaction and career progression. However, the integration of soft skills education into broader national strategies for talent retention and power enhancement remains limited, highlighting a significant gap in both research and practice (Chen, 2022). Furthermore, there is a lack of comprehensive frameworks that link soft skills education to specific dimensions of national power, such as innovation capacity, cultural diplomacy, and global leadership in emerging fields like artificial intelligence and sustainable development.

Despite these efforts and challenges, the relationship between brain drain, education systems, and national power remains understudied, particularly in the context of developing and implementing effective educational strategies to address these issues (Garcia & Patel, 2023). While numerous studies have examined the economic impacts of brain drain (e.g., Brown et al., 2021; Zhang, 2022), there is a paucity of research exploring how education systems can be strategically designed and leveraged to not only mitigate brain drain but also enhance various dimensions of national power. This includes investigating how educational policies and practices can foster technological innovation, strengthen cultural influence and national ethos, as well as bolster diplomatic leverage through talent retention and development (Li & Johnson, 2022; Ismail et al., 2021).

Therefore, this study conducts a systematic literature review and bibliometric analysis to understand the main context and the landscape of brain drain. The nature of bibliometric analysis helps frame the following research questions: (1) How has research concerning brain drain evolved so far? (2) Which sources published a brain drain study? (3) Who are the most prominent authors? (4) To identify the cluster or themes of the brain drain issues for future studies. Furthermore, this study aims to explore the intricate relationships between brain drain, education systems, and national power. Hence, using a systematic literature review, the researchers address the following research questions: (1) What are the push-pull factors of brain drain? (2) What prominent factors need to be strategically addressed to mitigate brain drain while simultaneously strengthening national power effectively? This study adds to the knowledge of education strategies, economic empowerment, and national development strategies to develop a strong, progressive and sovereign nation with local expertise.

2.0 Methodology

A systematic literature review was conducted to explore studies of the push and pull factors of the brain drain around the globe. Bibliographic analysis was employed, a type of systematic literature review widely applied in summarising social science research (Block and Fisch 2020; Block and Kuckertz 2018). Since journal articles are recognised as validated knowledge (Azam et al. 2021; Millar and Doherty 2016), the focus was on peer-reviewed journal articles addressing the push and pull factors of brain drain. The literature search process was divided into three phases: (1) identification of article sources (stages 1, 2, 3), (2) defining and filtering of articles (stage 4: inclusion and exclusion criteria), and (3) article recognition and retrieval (stages 5, 6). The seventh stage involved coding, analysing, and reporting the findings.

Following the process outlined by Block and Fisch (2020), bibliographic data was gathered from the Scopus database, extracting details such as author names, article titles, keywords, abstracts, journal names, and publication years, resulting in a dataset of 2370 brain drain-related articles. The analysis unfolded in two main steps: first, offering a descriptive overview of the literature, and second, employing

two bibliometric techniques - keyword occurrence and co-citation analysis (Simao et al., 2021). The keyword analysis identified thematic clusters within the research field, while the co-citation analysis unveiled the most influential articles, authors, and journals (Zupic and Čater, 2015). Visualising the co-citation networks using VOSviewer revealed intricate relationships among critical researchers. Notably, the network displayed several prominent clusters, with authors such as Docquier F., Beine M., and Ozden C. emerging as central nodes, signifying their substantial influence on brain drain research. This co-citation analysis at the author level provided valuable insights into the intellectual foundations of brain drain studies, aiding in identifying potential gaps and future research directions concerning education systems and national power within the context of brain drain.

3.0 Findings & Discussion

3.1 Bibliometric analysis

3.1.1 Co-occurrence analysis of keywords

Figure 1 shows that the complex brain drain research network reveals interrelations between migration, education, and national power. Higher education is at the core of this phenomenon, serving as both a catalyst for skilled emigration and a potential solution for retention. The visualisation emphasises the global nature of brain drain, with nodes representing various regions and countries, highlighting its impact on emerging markets and developed nations. The prominence of “human capital formation” and “knowledge transfer” nodes suggests that education systems play a crucial role in shaping a nation’s intellectual capital and, by extension, its power on the global stage. However, economic factors such as “unemployment” and “financial crisis” indicate that brain drain is often driven by economic instability, potentially eroding a nation’s financial resilience. This erosion can create a cyclical effect, where the loss of skilled individuals further weakens the economy, leading to more emigration. The visualisation also underscores the critical impact of brain drain on healthcare systems, with nodes like “medical brain drains” and “physicians” pointing to the negative consequences for public health in source countries. This multifaceted representation suggests that future directions for education systems must consider a wide array of interconnected factors to address brain drain and enhance national power effectively.

To mitigate brain drain and bolster national power, education systems must evolve to meet the challenges highlighted in the visualisation. The strong link between “higher education” and “innovation” suggests that universities should focus on fostering entrepreneurship and cutting-edge research to create attractive opportunities for skilled individuals. Simultaneously, the connection to “diaspora” nodes indicates the potential for leveraging transnational communities to facilitate knowledge transfer and investment, turning brain drain into “brain circulation.” Education policies should align with broader national and regional development strategies, as suggested by nodes like “internationalisation of higher education” and “regional development.” This alignment can help create a more resilient economic environment, potentially reducing the financial motivations for emigration.

Additionally, the prominence of healthcare-related nodes emphasises the need for targeted retention strategies in critical sectors. Education systems could address this by offering specialised programs and incentives for healthcare professionals, potentially in collaboration with the health sector. The visualisation’s emphasis on “global justice” and “human rights” also suggests that ethical considerations should be integrated into education and migration policies. By addressing these factors, education systems can play a pivotal role in enhancing a nation’s ability to develop, attract, and retain talent, thereby strengthening its economic, innovative, and soft power capabilities in the global arena.

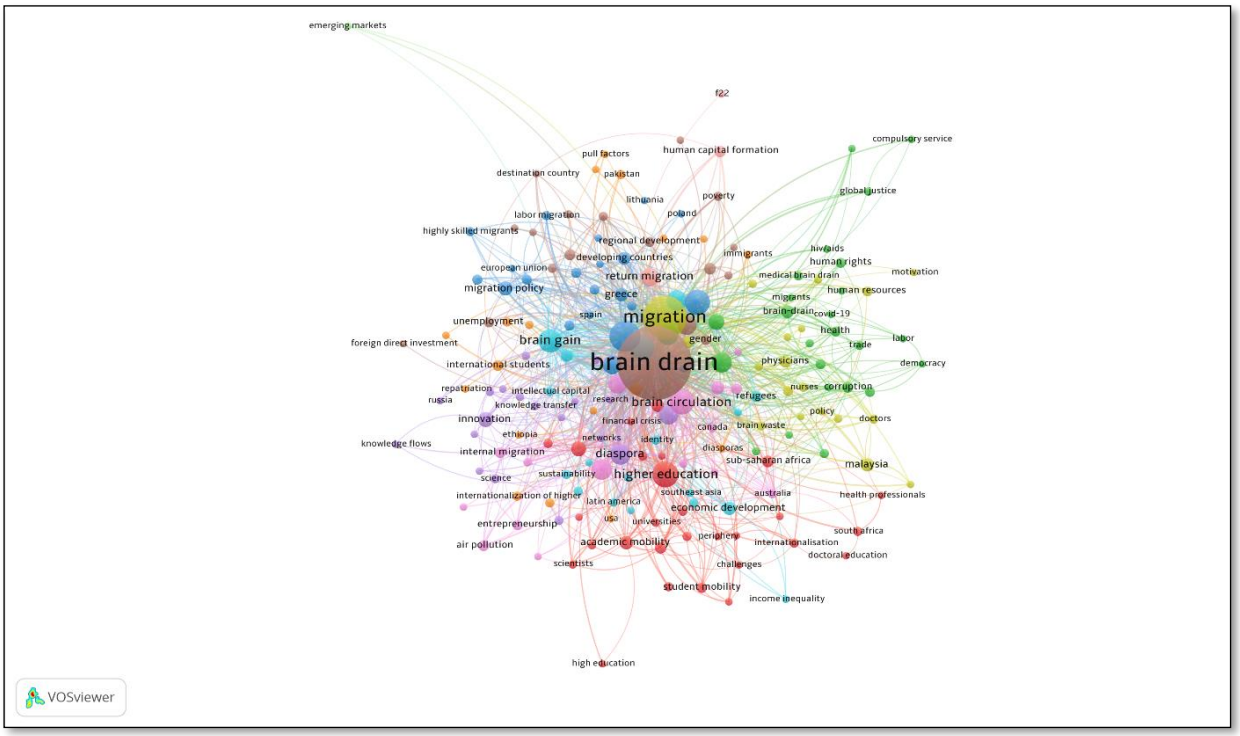

Figure 1: Co-occurrence analysis of the Scopus Database

3.1.2 Co-citation analysis

a. Co-citation at the source level

The co-citation network visualisation provides valuable insights into the linked nature of research on brain drain, education systems, and national power (refer Figure 2). At the centre of this network, prominent nodes represent key journals like the “Journal of Development Economics” and “American Economic Review,” indicating that the economic aspects of brain drain are central to the discourse. This suggests that the economic implications of brain drain are crucial in understanding its impact on national power. Education-focused journals such as “Economics of Education Review” highlight the critical role of education systems in this phenomenon.

The network also reveals strong connections to health-related publications like “The Lancet” and “Human Resources for Health,” underscoring the significant impact of brain drain on healthcare systems - a vital component of national power. The inclusion of journals focused on international business applied psychology, and world development points to the multidisciplinary nature of brain drain research and its far-reaching consequences on various aspects of national power. Notably, the presence of nodes related to global networks, international migration, and career development internationally suggests that addressing the brain drain requires a comprehensive understanding of global labour markets and mobility patterns. This visualisation emphasises that future education systems must consider economic factors, health, social sciences, and international development perspectives to mitigate brain drain and enhance national power effectively. By aligning education policies with these diverse research areas, nations can better position themselves to retain talent, foster innovation, and strengthen global competitiveness.

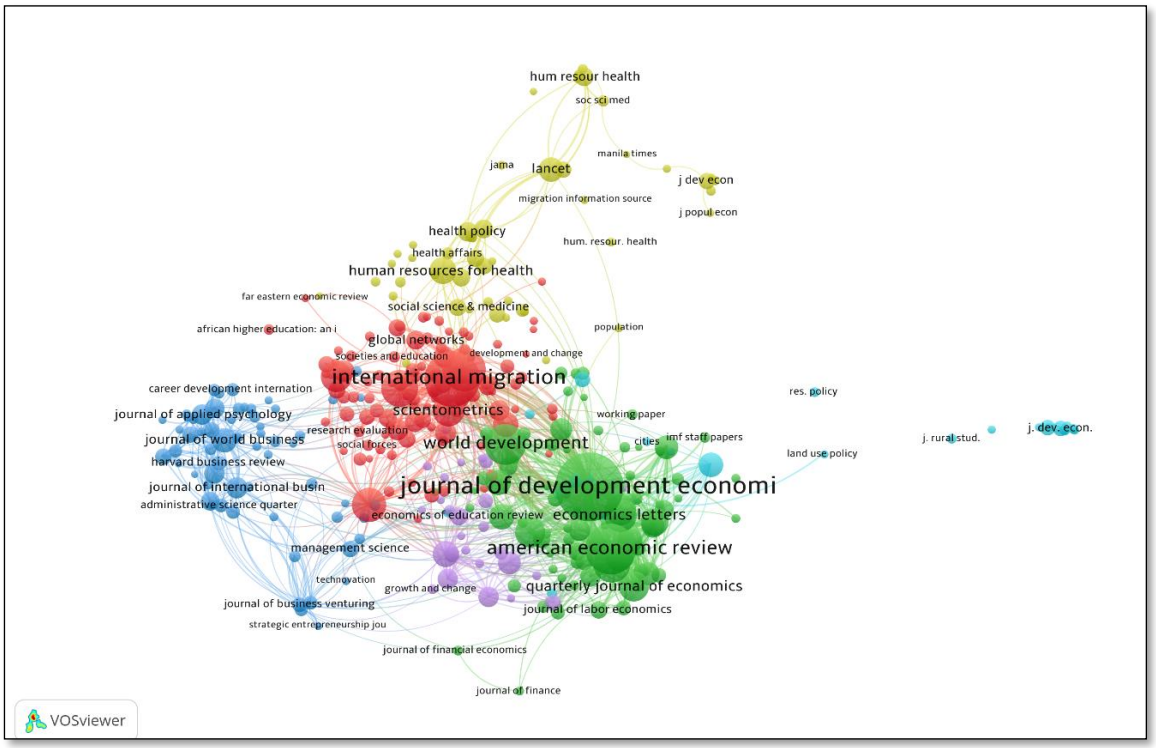

Figure 2: Co-citation analysis at the source level of the Scopus database

b. Co-citation at the author level

Figure 3 shows a co-citation network at the author level that provides valuable insights into the key researchers and their interconnected work on brain drain, education systems, and national power. At the centre of this network are prominent nodes representing influential authors such as Docquier F. and Beine M., indicating their significant contributions to the field. This centrality suggests that their work on international migration, human capital formation, and the economic impacts of brain drain has been foundational in shaping our understanding of how skilled migration affects national power.

The network's structure reveals several distinct clusters, likely representing different but interrelated research areas within the brain drain discourse. Authors like Bhagwati J.N. and Borjas G.J. are prominently featured, suggesting the importance of economic perspectives in analysing brain drain's impact on national development and power. The presence of authors from diverse academic backgrounds - including economics, education, and policy studies - underscores the multidisciplinary nature of brain drain research. This complexity highlights the need for comprehensive approaches in education system reforms to mitigate brain drain and enhance national power. The visualisation also shows relations to authors focusing on global talent mobility (e.g., Saxenian A.), indicating the relevance of understanding transnational knowledge networks in developing strategies to leverage diaspora connections for national benefit. The network's density and interconnectedness emphasise that future directions for education systems must draw from a wide range of expertise, integrating economic, social, and policy perspectives to effectively address brain drain and strengthen a nation's human capital base, ultimately contributing to its global competitiveness and power.

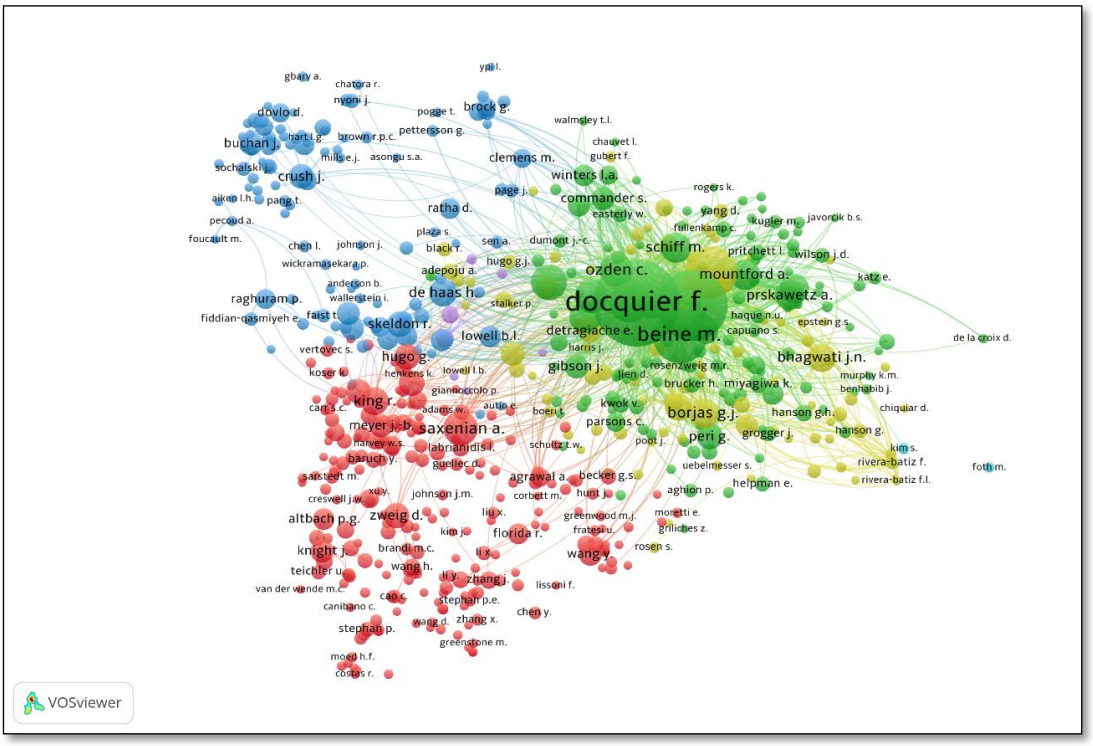

Figure 3: Co-citation at the author level of the Scopus database

3.2 Push and Pull Factors of Brain Drain

In this review, researchers adopted 'A Theory of Migration' by Everett Spurgeon Lee (Lee, 1966). Building upon Ravenstein's earlier 'Laws of Migration', Lee's theory provides a robust framework that researchers have since applied to understand the factors influencing highly skilled individuals to emigrate. Lee's theory posits that migration decisions, including those leading to brain drain, are influenced by factors associated with the area of origin, the location of destination, intervening obstacles, and personal factors. By applying Lee's push-pull theory to brain drain research, researchers can systematically examine the multifaceted nature of this phenomenon, providing insights into both the motivations of highly skilled migrants and the structural conditions that facilitate or hinder their movement.

In the context of brain drain, push factors encompass conditions in the country of origin that compel talented individuals to leave, such as economic instability (Vega-Muñoz et al., 2021; Gherhes et al., 2020), limited career opportunities (Okafor & Chimereze, 2020; Chand, 2019; Adeosun, O.T. and Popogbe, O.O., 2021; Caliscan, Tumer & Karaca, 2023), or political persecution (Chalari & Koutantou, 2021). Conversely, pull factors are attributes of destination countries that attract these skilled migrants, including superior job prospects, advanced research facilities, or better quality of life (Topalović, & Hampel, 2023; Vega-Muñoz et al., 2021). Based on the thirty-three (33) articles that have been identified for further analysis on factors of brain drain, the push and pull factors of brain drain are listed as follows (Table 1 and Table 2):

Table 1: Push Factor of Brain Drain

THEME	CATEGORIES	EVIDENCE
Economic Challenges	• Low salaries • Limited job opportunities • Economic instability in origin countries	• Many emigrants from developing countries migrate for better salaries (Vega-Muñoz et al., 2021; Gherhes et al., 2020). • Economic problems, such as unemployment and economic recession, play a vital role in the brain drain (Vega-Muñoz et al., 2021; Mukhtarov et al., 2022).
Professional Development Constraints	• Poor career advancement	• Nurses, doctors, educators, engineers, and IT professionals migrate due to limited career development (Vega-Muñoz et al., 2021; Okafor & Chimereze, 2020; Chand, 2019; Adeosun, O.T. & Popogbe, O.O., 2021; Caliscan, Tumer & Karaca, 2023; Chalari & Koutantou, 2021; Gherhes et al., 2020). • Countries that are involved include Turkey, Greece, and Nigeria.
Political and Institutional Issues	• Political instability and corruption • Weak legal order	• National conditions within the source country include crisis, violence, poverty, insecurity, unemployment, and corruption (Aytac & Cetin, 2019; Panagiotakopoulos, 2020; Nnoruga & Osigwe, 2023). • Legal order must be strong enough for citizens to feel safe in their country (Mukhtarov et al., 2022) • The Balkans seek better educational systems and job opportunities in developed countries due to political stability and religious fractionalisation (Topalović & Hampel, 2023).
Educational and Research	• Inadequate education facilities	• Albanian and Balkan students perceived values of quality education satisfaction,

Limitations	• Limited research opportunities	especially in higher education institutions (Petreska et al., 2023; King & Gëdeshi, 2021). • Professors or intellectual capital will move to a 'better place' to carry out their advanced study (Vega-Muñoz et al., 2021; Chand, 2019).
Cultural and Social Pressures	• Social norms and mentalities • Lack of meritocracy	• Nepotism destroys trust towards the ruler and forces a high-skilled workforce to leave the country (Chalari & Koutantou, 2021). • Prolonged austerity has led to a new migration wave of young professionals and scientists (Chand, 2019).

Table 2: Pull Factor of Brain Drain

THEME	SUB-THEME	EVIDENCE
Economic Opportunities	• Higher salaries • Economic stability	• Higher wage rates for high-skilled workers significantly influence migration (Adovor et al., 2021; Vega-Muñoz et al., 2021). • Economic stability abroad was a significant pull factor for IT professionals (Metin & Ertan, 2022).
Career Growth	• Professional development opportunities • Better career prospects	• Albanian students were attracted by international career prospects (King & Gëdeshi, 2021; Teney, 2021; Nnoruga & Osigwe, 2023). • Career prospects were essential for EU physicians migrating to Germany (Teney, 2021; Vazzana & Rudi-Polloshka, 2019). • Beneficiary countries that attract professionals with better professional development opportunities (Nnoruga & Osigwe, 2023).

Quality of Life	• Better living standard • Social freedom	• Turkish medical students argued that working abroad improves living standards (Caliscan et al., 2023). • Allure of a more liberal atmosphere and social stability in the destination country (Topalović, & Hampel, 2023; Vega-Muñoz et al., 2021).
Advanced Education and Research	• Quality in education • Good research opportunities	• Studying internationally at a reputable higher education gives satisfaction and quality of study (King & Gëdeshi; Caliscan et al., 2023; Belarbi et al., 2023; Lanko, 2021). • Research productivity for innovation is conducive and advanced in developed countries (Vega-Muñoz et al., 2021; Gherhes et al., 2020; Mendoza et al., 2024). • Technological advancement and facilities in destination countries attract talent or high-skilled professionals to migrate (Mukhtarov et al. 2022).

The brain drain's push and pull factors are complex and interconnected. While economic factors play a significant role, other aspects, such as education systems, political stability, career opportunities, social norms, quality of life, and access to advanced research and technology, also significantly influence migration decisions. Understanding these factors is crucial for developing effective strategies to mitigate brain drain and promote brain circulation or retention of skilled professionals in their home countries.

3.3 Brain Drain, Education System, and National Power

The education system plays a pivotal role in shaping a nation's human capital and, consequently, its susceptibility to brain drain (Petreska et al., 2023; Jovcheska, 2024). UNESCO defines an education system as "the entire network of public and private educational institutions" that aims to provide education to a country's population (UNESCO, 1997). In the context of brain drain, the education system serves a dual function: it is both a potential catalyst for emigration and a critical tool for the retention and attraction of skilled individuals. The quality and accessibility of education in a country significantly influence brain drain patterns. A robust education system can act as a defence against brain drain by providing high-quality training and research opportunities that rival those available abroad.

Conversely, inadequate educational infrastructure or limited advanced study options can push talented individuals to seek opportunities elsewhere. As Docquier and Rapoport (2012) note, "the relationship between education and migration is at the heart of many debates on the costs and benefits of migration for origin countries." This argument encapsulates the intricate relationship between education systems, migration patterns, and national power. Countries invest heavily in education to enhance human capital

and drive economic growth, yet this investment can paradoxically facilitate brain drain as highly educated individuals become more globally mobile. This mobility can significantly impact a nation's power by reducing innovation, economic productivity, and institutional capacity. The quality of a country's education system can act as either a retention factor or a push factor, influencing whether talented individuals stay or seek opportunities elsewhere. While brain drain often has negative connotations, educated migrants can potentially benefit their home countries through remittances, knowledge transfer, and return migration with enhanced skills. Understanding this complex interplay is crucial for policymakers in structuring education systems and creating incentives to retain or attract skilled individuals, ultimately balancing the benefits of a globally engaged population with the need to maintain national development and power.

Moreover, education systems are intrinsically linked to a country's economic development, culture, technological advancement, and global competitiveness – all factors influencing brain drain and national power. By fostering innovation, research, and development, a robust education system can create an environment that retains local talent and attracts skilled individuals from abroad, potentially turning brain drain into "brain circulation" (Saxenian, 2005). Understanding the role of education systems in brain drain dynamics is crucial for policymakers. It highlights the need for targeted investments in education, particularly in areas of strategic importance for national development. Furthermore, it underscores the importance of aligning educational outputs with labour market needs to create attractive opportunities for highly skilled individuals within their home countries.

Education and research opportunities significantly influence brain drain patterns. Inadequate education and research opportunities in home countries act as push factors, as noted by Petreska et al. (2023) in their study of Western Balkan countries. Conversely, access to advanced research facilities and cutting-edge technology in destination countries is a decisive pull factor, as Chand (2019) highlighted in the context of African professionals and Mendoza et al. (2024) for academics from Southern Europe migrating to Mexico.

Working conditions and quality of life considerations also factor into brain drain dynamics. Poor working conditions in home countries contribute significantly to brain drain, as Okafor & Chimereze (2020) observed in their study of Nigerian nurses. In contrast, Gherhes et al. (2020) and Caliscan et al. (2023) noted that better quality of life and higher living standards in destination countries are significant pull factors. They also mentioned that a well-designed education system can improve working conditions and quality of life by producing skilled professionals across various sectors, including healthcare and public services.

National development initiatives can influence brain drain in both directions. Mukhtarov et al. (2022) proposed that focusing on technological development and providing tax exemptions for research and development can be effective strategies to minimise brain drain, suggesting that a country's technological advancement can be a pull factor for retaining talent. Besides, cultural and national identity factors play a more nuanced but equally important role. Chalari and Koutantou (2021) identified established Greek mentalities as powerful drivers of migration, contributing to the disappointment and pessimism that ultimately prohibit return. On the pull side, Metin & Ertan (2022) found that countries with widely spoken languages are more likely to attract migrants, indicating that cultural and linguistic familiarity can be a pull factor.

A robust education system can address many of these factors simultaneously. It can also foster a strong national identity (sense of belonging to the origin country) and cultural pride, potentially reducing the desire to emigrate (Ismail et al., 2021; Marschelke, 2021). Based on the study by Nnoruga & Osigwe (2023), brain drain has challenged Nigeria's national development due to its crises such as violence, corruption, and insecurity. As for Russia, the brain drain issues have increased concerns about global academic influence (Lanko, 2021). Consequently, they hardly transform their human capital into a stable

nation, strengthening their national power. Therefore, high-quality education and research opportunities can decrease the need for talented individuals to seek advanced training abroad.

National development and power dynamics are critical as they foster innovation and technological advancement, enhancing a country's global competitiveness for highly skilled individuals to remain or return. While a complex interplay of factors influences brain drain, the education system stands at the nexus of these influences. By reforming and investing more in education systems, countries can work towards transforming brain drain into brain circulation, creating a virtuous cycle of knowledge exchange and development (Vega-Muñoz et al., 2021; Chand, 2019). This approach requires long-term commitment and collaboration between policymakers, educational institutions, and industry stakeholders to ensure that educational outputs align with national development goals and labour market needs.

In conclusion, the multifaceted nature of brain drains, as evidenced by the various push and pull factors discussed, underscores the central role of education systems in both contributing to and potentially mitigating this phenomenon. Cultural and national identity factors, educational and research opportunities, working conditions, quality of life considerations, national power dynamics, and immigration policies are closely related to a country's education system. Addressing brain drain through education is not just about preventing the loss of talent but about creating an environment where talent can thrive and contribute to national and global progress (King & Gëdeshi, 2021; Ismail et al., 2021). It is about building resilient, adaptable, and innovative societies capable of meeting the challenges of an increasingly interconnected and competitive world.

4.0 Future Direction

4.1 Robust Education System

Education has emerged as a central issue in the context of brain drain. Leaders must establish a clear vision and mission for the country to retain national talent and effectively foster contributions to national development. This vision should articulate a comprehensive national plan, aligning educational goals with national priorities. Many countries are focused on Industry Revolution 4.0 and are beginning to transition toward Industry Revolution 5.0, which emphasizes human-machine collaboration and innovation. However, these trends can exacerbate unemployment crises and brain drain when leaders fail to anticipate global economic shifts. Therefore, it is crucial to revise national development plans and create a realistic vision that can be achieved by local talent.

Collaboration across sectors—particularly between education, higher education, the economy, and industry—is essential for enabling national talents to fulfil their roles effectively. The collaboration also needs to involve empowering education policy to strengthen national identity and foster a robust national ethos. This, in turn, cultivates a strong sense of belonging and enhances citizens' loyalty (Ismail et al. 2021; Thareneu & Seet,2014). This strategy of instilling national identity among locals can encourage more experts and highly educated locals to come back and serve the nation in all areas, increasing the national capacity. Furthermore, such cooperation can guide universities in restructuring curricula to ensure relevance to industry needs, addressing concerns that certain programs are currently viewed as outdated.

Moreover, the government must ensure that budget allocations for developing national talent are distributed fairly and effectively. Scholarships for national talent should come with practical terms and conditions, including a service agreement requiring a commitment to serve in government departments or local positions for a specified duration. Scholarship funding should prioritise qualified candidates pursuing postgraduate degrees or research in critical fields. Support for undergraduate programs has diminished in importance, given that many local institutions already offer high-quality education in essential areas. Besides, national talents themselves must adopt a critical and creative approach to their roles and responsibilities. Even in the absence of clearly defined jobs or roles provided by the government

or industry, they should leverage their entrepreneurial skills and ideas to establish businesses that meet community needs and contribute to national development.

In summary, addressing brain drain through education requires a multifaceted approach that includes visionary leadership, cross-sector collaboration, fair distribution of resources, and the proactive engagement of national talents. Countries can better retain their intellectual capital and drive sustainable development of national power by fostering an environment that supports innovation and the practical application of skills.

4.2 Economic empowerment

Economic factors also play a key role in driving brain drain through both push and pull dynamics. Any country with the vision to develop and retain talents to strengthen its national power needs to overcome the economic challenges that contribute to brain drain as well as provide economic opportunities for its talents to flourish. Policies fostering global value chain participation, labour market reforms and inclusive growth can improve domestic employment conditions, potentially mitigating skilled labour migration (World Bank, 2020).

Participation in the global value chain needs to be done strategically to ensure that valuable local resources including local talents are not exploited for the benefit of foreign powers. A country that fails to develop strong and self-sufficient industrial and technological capabilities will remain at the lower tiers of the global economy, serving primarily as a resource supplier for industries in more advanced nations. Prioritizing high-value economic activities, including attracting high-quality foreign investments, not only generates more high-skilled job opportunities with competitive salaries to address brain drain but also strengthens national economic power.

Beyond attracting investments and creating employment opportunities, the government must cultivate an economic environment and business culture that encourages calculated risk-taking innovation and entrepreneurship activities. This entails streamlining bureaucratic processes to reduce regulatory barriers that stifle business growth and ensuring a robust social security system that mitigates risks for entrepreneurs and workers. Additionally, improving living standards and establishing work-life balance are essential to retaining talents and fostering a productive workforce. A well-supported entrepreneurial ecosystem, coupled with policies that enhance quality of life, will enable sustainable economic growth and reinforce national resilience in an increasingly competitive global landscape.

5.0 Limitation and Conclusion

Brain drain has been a critical issue in many countries and should be addressed accordingly and strategically. To address these brain drain issues, countries may need to focus on improving governance (policymaking), strengthening national identity or national ethos, and creating cultural and professional environments that can retain and attract talented individuals. These strategies could involve combating corruption, promoting ethical values, investing in research and development, and leveraging diaspora networks to create brain circulation rather than brain drain. Prior studies have found a strong relationship between economic factors and the educational system influencing brain drain issues. Many authors emphasised the economic conditions and career environment affecting the intention of local professionals to move abroad as they seek a better quality of life and career growth for themselves.

In this context, most research has focused on pull and push factors focusing on economic conditions, educational quality, and professional opportunities that influence brain drain issues. Although this topic is essential for employers and policymakers, the findings remain contradictory. The contradiction is related to knowledge fragmentation and the interaction's multidisciplinary framework, which includes concepts from various fields. Diverse perspectives on the relationship between brain drain and national power serve

as a stark reminder of the ambiguity of the relationship. Therefore, research into brain drain and national power has many opportunities to further our understanding of this topic.

This research has several limitations. First, the choice of keywords and the Scopus database was limited. Given the unique database and keyword search approach, some potentially relevant literature may have gone unnoticed. As a result, a particular body of knowledge was omitted from consideration. The results might have differed if the researchers had chosen alternative keywords and databases. Second, relevant research results may have been missed due to the removal of non-English language articles on brain drain, education, and national power. Third, methods of bibliometric analysis were quantitative and used to gain insight into research patterns in a specific sector or subfield and evaluate citation as a measure of influence only. Further research could be performed using meta-analysis, in which the results of statistical analyses conducted across multiple studies are combined and analysed.

Future studies may conduct empirical studies with local context situations as different countries have different cultures, policies, values, and socio-economics, which could lead to different outcomes that may contribute to the body of knowledge. Finally, there is a conscious effort to be overly descriptive in evaluating this study. This study did not identify any in-depth content analysis; thus, a comprehensive examination of the content of the articles is definitely outside the scope of this study. Despite the limitations mentioned above, this study sample is representative of the currently available literature and provides a comprehensive overview of the topic.

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