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Thai Higher Education Institutions: Roles and Challenges in Attracting International Talent to Accelerate Thai Competitiveness in the Main Economy and Industry

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Abstract. The growth and development of potential in nationally targeted industries based on the “Thailand 4.0” strategy requires highly skilled labor in specific areas to build new knowledge and competitive capacity in global competition. The formulation of policy, systems, and mechanisms in workforce production and development was the qualified mechanism for attracting and promoting talent to support the systematic mobilization of the national economy. Therefore, this research was aimed at studying the issues and recommendations regarding the roles of Thai higher education institutions (HEIs) in attracting foreign talent to work in Thailand as the mobilization of competitive capacity in main economic sectors and industries. This study was conducted using the constructivist research paradigm and the phenomenological research strategy. The key informants were representatives from 23 organizations whose roles involve talent attraction from foreign countries. Informants were selected through the purposeful sampling method and participated in in-depth interviews. Data were analyzed using content analysis and ensured by triangulation. Issues in attracting foreign-born talent to work in Thailand were summarized based on the findings and classified into three dimensions: (1) bridging gaps of national policies; (2) supporting industry development; and (3) integrating mechanism. Thai HEIs can perform their roles based on the identified components to formulate the policy and develop the talent attraction system. Future research should focus on implementing these recommended strategies in diverse contexts to assess their effectiveness and further refine approaches for attracting international talent to Thailand.

Keywords: international talent; Thai competitiveness; Thai higher education institutions

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1. Introduction

Thailand's "Thailand 4.0" policy represents a strategic move to transform the country's economy and elevate its global competitiveness. This policy focuses on fostering a value-based economy driven by innovation, creativity, and technology, with an emphasis on attracting international talent. The goal is to achieve economic prosperity, enhanced social well-being, elevated human values, and environmental protection. Key to this transformation is avoiding the middle-income trap, where economic growth slows after reaching certain income levels. The Thai Government recognizes the importance of a seamless migration process to attract overseas talent (Buasuwan, 2018; Thanitbenjasith et al., 2020a).

Thailand 4.0 is undoubtedly having a positive impact on the technology sector in Thailand. It is attracting investments and opening up new opportunities. From a recruitment perspective, it is creating an increased need for skilled labor and a high demand for professionals skilled in specific functions such as engineering, digital technology, and supply chain management. The most significant developments in technology in Thailand are coming from advances in the Internet of Things (IoT), agritech, biotech, and foodtech. The development of the Eastern Economic Corridor (EEC) is also a particular area of focus within the tech sector, as the eastern provinces aim to increase their standing as a leading ASEAN (Association of Southeast Asian Nations) economic zone. Thailand 4.0 represents the current government's aspirations for enhancing productivity and boosting economic growth. These are challenges that Thailand faces in attracting international talent and investment to bolster the country's global competitiveness, and they require overcoming challenges related to policy implementation, industry focus, and infrastructure development (Kohpaiboon, 2020; Mega Tech, 2021; Page, 2019; Sansiri News, 2018).

The synergy between higher education and industry in Thailand is part of a broader trend in Asian higher education, focusing on innovation, talent cultivation, and international competitiveness. Thailand's commitment to transforming into a creative society, as part of the Thailand 4.0 initiative, emphasizes the importance of higher education in fostering creativity and innovation. This transformation relies on robust universities to support science policy and apply research to broader society. Additionally, the development of talent with innovative capabilities is crucial for sustaining the creative society. Thailand's approach to talent cultivation emphasizes the need for new mindsets, skill sets, technology, and learning networks in its workforce (Chan, 2018).

Collaboration between academia and industry is a key driver of innovation. Universities provide a rich source of research and theoretical knowledge, which, when combined with the practical insights and resources of industry, can lead to significant advancements and technological breakthroughs. Collaboration between academia and industry is an essential aspect of fostering innovation and technological advancement. This synergy leverages the strengths of both sectors: Universities contribute extensive research capabilities and theoretical knowledge, while industry offers practical insights and resources (Guimón, 2013; Kettunen et al., 2022).

From an industry perspective, it brings a different set of strengths to the table. It typically has greater resources for development and a more direct focus on practical application and commercialization. Industry players are often better equipped to translate theoretical knowledge into tangible products and services. They also provide valuable market insights, which can guide the direction of academic research to ensure its relevance and applicability. The collaboration between these two sectors can take many forms, such as joint research projects, industry-funded academic positions, or commercialization of university-developed technologies. This partnership is beneficial to both parties: Academia gains access to industry resources and insights into real-world applications, while industry benefits from the cutting-edge research and innovation that emerge from academic institutions (Ahmed et al., 2022).

The role and challenges of higher education institutions (HEIs) in Thailand in attracting international talent and enhancing the country's competitiveness in the primary economy and industry are multifaceted and crucial. Universities are hubs for scientific research and theoretical exploration. Scholars and researchers within these institutions engage in cutting-edge studies, often pushing the boundaries of current knowledge. The academic environment nurtures critical thinking, exploration of new ideas, and the development of new theories. This environment is crucial for generating the foundational knowledge that can lead to technological innovations. Educational institutions, through collaboration with industry partners, can tailor their curricula and programs to meet the specific needs of the market. This ensures that graduates are well equipped with the relevant skills and knowledge to thrive in the workforce (Awasthy et al., 2020; Bruneel et al., 2010). Therefore, the development of policies, systems, and mechanisms to build and improve the quality of human resources is a crucial mechanism for attracting and supporting the migration of skilled personnel, including both domestic and international experts, to elevate the country's competitiveness toward becoming a high-income nation (Litania & Marsan, 2023). This necessitates an examination of the challenges and roles of universities as key mechanisms in systematically attracting high-potential individuals to drive the country's economy. This research aims to provide insights into how Thai HEIs can overcome challenges and utilize their infrastructure to help achieve the country's economic goals.

The objectives of the study were to:

- 1) explore the challenges in attracting international talent to work in Thailand; and
- 2) provide recommendations regarding the roles of Thai HEIs in attracting international talent to enhance Thailand's competitiveness in the primary economy and industry.

2. Literature Review

The literature review section explores the relationship between talent management, higher education, and economic models in enhancing national competitiveness. This review is organized into three key sub-sections, each

examining a critical aspect of how talent management and education systems interact with and support evolving economic paradigms.

2.1 Talent Management and National Competitiveness

Globalization raises concerns for public sectors, including outsourcing, downsizing, budget cuts, an aging population, and a smaller succeeding generation. Managers must possess the ability to identify, educate, and utilize personnel to ensure the success of the organization (Barner, 2006). Recognizing employee predicaments is a priority for public sectors (Kiyonaga, 2004). Therefore, the talent management process in any country and organization is essential to attract, manage, and retain talent, serving as the main driver for mobilizing national economic and industrial development.

Talent management is considered a process through which highly qualified individuals can be attracted, developed, and retained. This process encompasses stages such as recruitment, selection, identification, retention, management, and development of the workforce, with a focus on individual skills and potential for senior management roles (Lamoureux et al., 2009; Rothwell, 2010). Moreover, the talent management process provides individuals with opportunities to expand their skills and experiences through involvement in challenging duties, professional development, and career growth, thereby fostering loyalty within the organization. Additionally, talent management enhances an individual's contribution to organizational success (Barnett & Davis, 2008). Fundamentally, talent management establishes a "talent pool" comprising internal and external sources. This ensures adequate allocation for positions, while also concentrating on motivation, organizational commitment, and extra-role behaviors, all of which are influenced by organizational performance (Collings & Mellahi, 2009).

The rising demand for international talent, influenced by low birth rates and an aging population, has led most countries to face a shortage of highly skilled young adults and working-age individuals. These groups are crucial for fostering new creativity and innovation. Consequently, the strategy of attracting foreign talent is increasingly employed to address this human resource gap, a challenge common to both developed and developing countries.

Developed nations, such as the USA and Canada, have responded to the challenge of nurturing sufficient numbers of high-skilled experts for national development. These countries have implemented "brain gain" policies, including relaxation of student visa work and immigration laws to facilitate international students to stay after graduation, and they also provide incentives to talents for further staying and working. These policies are also relevant to countries and areas of the Organisation for Economic Co-operation and Development (OECD) such as China, Taiwan, Malaysia, and Singapore, where policies and mechanisms are important tools to attract and retain high-skilled labor (Mahroum, 2005), reflecting more intensive competitiveness in global human capital.

In the world's post-war era, countries such as Taiwan, Israel, and China established their policies to attract highly skilled foreigners to invest and work domestically, motivating them to make foreign direct investments and develop

institutional frameworks that led to national rapid industrialization (Chand, 2010). For example, the Chinese Government succeeded in retaining Chinese talents overseas, expanding communication with them, and utilizing these groups to mobilize foreign direct investment in China (Yin, 2005). Currently, most countries focus on the main strategy to increase national competitiveness capacity in investment. This emphasizes attracting talents from various countries to play a major role in building the capacity of the country's international competitiveness and become catalysts in human resource development in the home country of the talents. To increase this competitiveness, transnational social networks of high-skilled workers between home and host countries also connect trade and investment and introduce culture and products from the home country to the host as another way to boost national "soft power" (Chand & Tung, 2010).

2.2 Higher Education Roles and Linkages to Talent Attractions

The roles of HEIs, particularly in research, innovation, and technological utilization in mobilizing national innovation and the economy, have been recognized over the past many years under the growth of a knowledge-based economy. These changes affect the awareness of social, economic, and environmental issues, as well as the potential of national competitiveness (Breschi & Malerba, 1997; Freeman, 1987; Nelson, 1993). Economic mobilization and industrial development for global competition require high-skilled workers circulating continuously in the system. Policies and systematic mechanisms are essential in national talent development to attract, develop, and retain talents into the system and to improve the country's economic development. HEIs are the main mechanisms supporting and promoting national human resource development (Thanitbenjasith et al., 2020b). Therefore, university-business-industry collaboration becomes the main mechanism for connecting knowledge, research, and innovation to utilization, and it also improves the quality of research and innovation of the university to be potential contributors to the country's economic mobilization.

HEIs have become the main mechanism for the continuous development of human capital in economic and social aspects in various countries, especially regarding resources and knowledge as catalysts for economic growth. Sustainable economic growth requires high-potential human capital and the advancement of research and technology as important foundations for new economic growth and mobilization (Grossman & Helpman, 1993). Evidently, many foreign countries have formulated policies, clear strategies, systems, and mechanisms to mobilize talent attraction in nationally targeted industries.

For example, Ireland has established a policy for developing innovation-based industries to transform businesses through talent. Organizations tasked with attracting foreign talent include IDA Ireland, a state enterprise for attracting foreign direct investment, and EURAXESS Ireland, a portal for national researcher mobility. This portal operates through collaboration among the business sector, industries, universities, and research institutes worldwide to recruit talents and experts in research and innovation. Additionally, it aims to create an ecosystem

for foreign companies to invest in Ireland (Howard & Buyuktanir Karacan, 2023; Quinn & Guscuite, 2013).

Singapore has developed a national development policy and strategies to become the talent hub in Asia. The main organization responsible for implementation is A*Star, where international talents are attracted to work and conduct business in Singapore. These efforts are directed toward research that is closely connected to the main industries (A*STAR, 2020).

Taiwan has formulated a policy to mobilize an innovation-based economy for the country's industrial transition, focusing on attracting foreign talent and establishing an international talent hub. Collaborative organizations between the government and other sectors include the Talent Circulation Alliance (TCA), which is a working group of several sectors (public, industry, academia, and civil society). They cooperate with the American Institute in Taiwan (AIT) to promote brain circulation and support Taiwan in becoming an international talent hub.

China has developed a policy of opening up talent to mobilize the country to achieve self-reliant technological power, especially in the 10 targeted industries outlined in the Made in China 2025 strategies. Measures, mechanisms, and regulations for talent attraction include the Thousand Foreign Expert Programme, a recruitment program implemented to attract foreign talent to work for an extended period and to promote them to become a "specially enlisted expert" under the long-term project (Dragon Star, 2015; Springborg, n.d.).

Malaysia has formulated a vision for national development concerning talent attraction to mobilize the country's industries across 12 national key economic areas. The main organization for attracting both domestic and international talent is TalentCorp, an institute under the Ministry of Human Resources, where talent attraction is operated under three core strategies: (1) optimize Malaysian talent, (2) attract and facilitate global talent, and (3) build networks of top talent (TalentCorp, n.d.).

Although universities are crucial for developing human capital and essential to national innovation systems, there has been minimal application in transferring knowledge from academia to industry (Areesophonpichet et al., 2022). Therefore, the connection between teaching, research, innovation, and commercial utilization is an important aspect for universities that can influence economic growth (Etzkowitz, 1998; Lendel & Qian, 2017; Schultz, 1960; Wu & Zhou, 2012).

2.3 Transition to a Bio-Circular-Green Model and Talent Acquisition

Currently, Thailand has shifted its policy to stimulate its national economy and industry through the introduction of a new economic model known as BCG economy (bio-circular-green economy). This model is designed to support sustainable development by leveraging knowledge in science, technology, and innovation. It aims to accelerate sustainable competitiveness specifically in four S-curve industries: Food & Agriculture, Energy & Materials, Health & Medicine, and Tourism & Services. Moreover, science, technology, and innovation play a

crucial role in enhancing the productivity of traditional producers such as farmers and communities. They also aid entrepreneurs in creating goods and services with high added value, including innovations that foster a circular economy. This involves eco-friendly-design, zero-waste manufacturing processes and products, encouraging reuse, refurbishment, and sharing and efficient waste management in both production and consumption by means of recycling and upcycling. This economic model differs from the linear economy, which emphasizes the use of resources and the production of waste, and it will become the main economic base, placing the value at 4.4 trillion baht (24% of GDP) in the next 5 years and creating employment for 16.5 million people. These significant numbers would lead to economic impact in four dimensions† (NXPO, 2023).

The development directions of BCG economy entail harnessing the country's domestic potential in biodiversity, knowledge, technology, and innovation to add value to existing resources. This involves connecting with technological developments in the four main industries of the country, as well as digital technology development to add value to the targeted industries. Developing competitiveness potentials in these targeted industries requires advanced technology and adherence to global production standards, necessitating talents and experts from both domestic and international areas to expand the new developmental base of the Thai economy.

However, the connection between universities and industries has rarely operated smoothly due to disparities and systemic gaps in technological knowledge transfer from HEIs to commercial utilization in the private sector. Additionally, there is an imbalance in research and innovation costs and the rapid changes in technology and knowledge, which affects spillovers from academia to industry (Hou et al., 2020). Nonetheless, the growth and development of the competitiveness of the country's future targeted industries require highly skilled workers and experts who can generate new knowledge for national problem-solving and development, especially enhancing the competitiveness capacity of Thai industries in global competition.

While Thailand boasts numerous organizations dedicated to human resource development across its industrial sectors, there is room for improvement and discussion regarding policies and structures aimed at attracting and developing talent. The Eastern Economic Corridor Office (EECO) of Thailand serves as a prime example of this effort. It operates as an agency for educational workforce development, collaborating with the private sector and HEIs. This collaboration

* *Dimension 1: Delivering prosperity and improving value creation:* The country would experience stable economic growth and expand commercial opportunities on the global stage.

Dimension 2: Employment with high income: The country would create new jobs in the BCG industries, establish high-paying positions, and raise the income level of laborers in the new economic sectors.

Dimension 3: Reducing inequalities: The country would boost community income by empowering local communities to realize their potential.

Dimension 4: Creating stability under a natural resource base: The country would enhance the efficiency of natural resources and the value chain to minimize waste generation and preserve the country's resource base, thereby reducing negative environmental impact.

aims to generate skilled personnel for 10 targeted industries, marking a shift from a supply-driven to a demand-driven EEC model. In this model, the private sector actively participates as both a co-trainer and co-financier in degree programs and vocational certifications. A notable initiative is the Arai Academy, an innovative educational system launched as an industrial learning space. It encourages vocational and higher education institutions to provide students with direct experience and opportunities to enhance their engineering skills. Additionally, non-degree short-course modules are offered, emphasizing reskilling and upskilling to address technological disruptions. These modules are specifically designed to swiftly produce competent personnel.

3. Materials and Methods

This study was conducted under the belief that truth is diverse and resides in the minds of individuals, with reality being shaped by those who create truth. Moreover, it is acknowledged that researchers and their subjects are inherently connected to the context discovered during research. This acknowledgment is further strengthened by the interaction between researchers and subjects, leading to agreements and the creation of knowledge through dialectical exchanges (Guba, 1990). Therefore, the constructivist research paradigm was employed in this study to understand the experiences and opinions of informants (Creswell, 2003, 2009; Patton, 2002). Within this paradigm, the study aimed to provide specific and in-depth explanations necessitating a holistic approach (Lincoln & Guba, 1985). Consequently, phenomenology was adopted as the primary inquiry strategy, aligning well with qualitative research methods (Creswell & Plano Clark, 2007). The key informants in this study represented Thai organizations involved in promoting the attraction of foreign talent, selected through purposive sampling. These organizations are tasked with attracting talent from foreign countries in fields such as science, technology, and innovation to work in five targeted industries in Thailand. The organizations were categorized into 3 groups: (1) 7 public organizations, (2) 12 private organizations, and (3) 4 research institutes/universities (see Table 1). In total, 23 organizations were relevant to the sample size required for qualitative research employing the phenomenological inquiry strategy (Marshall et al., 2013).

Table 1: List of key informants

Types of organization	Key informants
Public organizations	1) Ministry of Higher Education, Science, Research and Innovation 2) Office of the Permanent Secretary for Higher Education, Science, Research and Innovation 3) Office of the Permanent Secretary for Labor 4) Thailand Science Research and Innovation (TSRI) 5) The Board of Investment of Thailand 6) The Eastern Economic Corridor Office of Thailand (EECO) 7) The Institute for the Promotion of Teaching Science and Technology

<p style="text-align: center;">Private organizations</p>	<ol style="list-style-type: none"> 1) ABBOTT Laboratories Co., Ltd. 2) Charoen Pokphand Group Co., Ltd. 3) CP Medical Center Co., Ltd. 4) Delta Electronics (Thailand) PCL. 5) Digital Council of Thailand 6) Digital Government Development Agency 7) PTT Global Chemical PCL. 8) Thai Federation of Logistics 9) Thai Medical Device Technology Industry Association 10) The Federation of Thai Industries 11) The Human Capacity Building Institute 12) The Siam Cement PCL.
<p style="text-align: center;">Research institutes / universities</p>	<ol style="list-style-type: none"> 1) Chulalongkorn University 2) King Mongkut's University of Technology North Bangkok 3) King Mongkut's University of Technology Thonburi 4) Thailand Development Research Institute

The interview protocol served as the primary instrument for conducting in-depth interviews, supplemented by data collection on talent attraction policies and nationally targeted industries from books, articles, and various domestic and international research sources to obtain practical findings. Data gathered from interviews and relevant documents were analyzed and categorized through content analysis (Miles & Huberman, 1984) to ensure accuracy and facilitate the conclusion of research findings (Corbin & Strauss, 2008). Additionally, the triangulation method, including time, place, and key informants, was utilized to enhance the credibility and reliability of the findings (Lincoln & Guba, 1985).

4. Results and Discussion

Documents and interviews with representatives in targeted industries have revealed that Thai industry should take the direction of focusing on competitive advantage and national security to become self-resilient. Representatives were from the public sector at both policy and practical levels, as well as the business sector, which plays an important role in mobilizing targeted industries. The targeted industries should be connected with three economic groups for national economic development: BCG economy, digital economy, and health and wellness economy. They should also link to national competitiveness in terms of resources, geography, knowledge, and a high-skilled Thailand workforce, as well as align with the growth direction of the global economy. Furthermore, all related targeted industries need foreign talent attraction in specific fields to mobilize and build potential in high-skill and professional workforce competitiveness. Moreover, the issues of attracting foreign talents to work in Thailand can be summarized in the following findings.

4.1 Bridging Gaps of National Policies

The research revealed that policy formulation in national economic mobilization still lacks clear developmental directions in technology and workforce for

industries. Although targeted industries were identified, the priority of each industry contains different investment and development factors, which exclude distinct flagships in technological development. This leads to identifying unclear push-pull factors. Additionally, Thailand lacks a specific needs analysis policy and plans for talents and a high-skilled workforce, leading to insufficient information and unclear goals in attracting them for further development in national targeted industries. Furthermore, academia and industries are rarely connected to prepare future human production and development. Laborers should be transformed into workers with future skills. Academia especially should be aware and produce capable personnel whose competencies might meet the workforce demand in future industries. Clear policy formulation results in attracting specified talents to match the goals of economic mobilization and reduce brain drain problems in the country (Cervantes & Guellec, 2002).

Regarding benefits and remuneration, the research revealed that Thailand faces challenges in attracting high-potential foreign researchers and business start-ups due to shortcomings in budget allocation mechanisms and support systems. The lack of incentives for top-tier foreign researchers, coupled with inadequate support compared to the private sector, hinders collaboration and investment. Additionally, Thailand's failure to integrate tourism and well-being areas as attractions for foreign talent limits its potential in leveraging its tourism industry to attract high-skilled individuals seeking flexible working environments. In contrast, countries such as Ireland have implemented initiatives like the Immigrant Investor Programme and the Start-Up Entrepreneur Programme to create a business-friendly environment, offering streamlined residence permission processes to attract foreign entrepreneurs (IDA, 2021).

In terms of laws and regulations, Thailand's intellectual property regulations and investment incentives have not effectively enticed researchers and start-ups. Challenges with public marketing, visa application delays, and income tax procedures further hinder talent attraction efforts. Countries with competitive advantages, such as Ireland and Malaysia, have clearer regulations and administrative mechanisms, including post-study work visa schemes, to attract foreign talent and investment. This demonstrates the importance of streamlined processes and supportive policies in fostering economic growth (IDA, 2021; Koh, 2015; Lucas, 2004).

The research sheds light on several key challenges facing Thailand in its efforts to foster economic growth and attract foreign talent. First, the formulation of policies for national economic mobilization lacks clear directions in technology and workforce development for industries, resulting in unclear priorities and insufficiently defined goals. This deficiency hampers the country's ability to attract and retain high-skilled laborers and talents crucial for the development of targeted industries. Moreover, there is a notable gap in the connection between academia and industries, highlighting the need for better collaboration to prepare future workers with the necessary skills for emerging industries. Clear policy formulation is essential to attract specified talents and address brain drain issues. Additionally, Thailand faces obstacles in attracting high-potential foreign

researchers and start-ups due to shortcomings in budget allocation mechanisms and support systems, as well as challenges in integrating tourism and well-being areas to effectively attract foreign talent. The country's intellectual property regulations and investment incentives have also failed to entice researchers and start-ups, further hindering talent attraction efforts. In contrast, countries such as Ireland and Malaysia have implemented streamlined processes and supportive policies, including post-study work visa schemes, demonstrating the importance of clear regulations and administrative mechanisms in fostering economic growth and attracting foreign talent. Addressing these challenges requires concerted efforts from policymakers, industry stakeholders, and educational institutions to align priorities, bridge gaps, and capitalize on the full potential of the country's human capital and resources.

Based on the results and discussion, HEIs should play a crucial role in addressing the challenges identified and fostering economic development in Thailand. These institutions serve as key hubs for skills development, providing students with the technical expertise and practical knowledge needed to support targeted industries. By designing curricula and training programs aligned with the demands of emerging sectors, universities contribute to equipping the workforce with the necessary skills for industry growth and innovation. Additionally, HEIs play a pivotal role in driving research and innovation, generating new knowledge, and fostering technological advancements. Through collaborative research initiatives with industry partners, universities contribute to the development of cutting-edge technologies and solutions that address the needs of targeted industries. Furthermore, universities act as talent pipelines, producing a steady stream of graduates equipped with the skills and qualifications needed to drive economic growth. By nurturing talent and fostering a culture of entrepreneurship and innovation, HEIs supply the workforce with skilled professionals capable of contributing to the success of targeted industries. Lastly, fostering stronger university-industry collaboration is essential to address gaps in talent management and industry-academia collaboration, ultimately enhancing national industrial competitiveness.

4.2 Supporting Industry Development

Several industries still require specialists and experts in standards who have experience in translational research on a scale similar to that of industrial production. Additionally, there is a lack of highly skilled laborers with a comprehensive understanding of industrial production processes and proficiency in English to facilitate technological transfer, especially in targeted industries linked to the three main economic groups in economic mobilization (i.e., BCG economy, digital economy, and health and wellness economy). These demands necessitate academia's involvement in producing and developing the national workforce, with universities serving as the primary mechanism for creating social impact in terms of human capital preparation for both short- and long-term economic mobilization (Armstrong & Taylor, 2000). Universities can help increase the capacity of the workforce to meet short-term demand and prepare human resources to meet future industry requirements. Furthermore, they promote the skills development of industrial laborers, including upskilling and reskilling, to prepare them for new

technological disruptions. Therefore, triple-helix collaboration should remain the primary mechanism for integrating the capabilities of the public sector, universities, and industry to enhance competitiveness in the industry (Etzkowitz, 2008). The goal, here, should be identifying technological growth targets in each industry so that the academic community can prepare the workforce to meet the growth and national demand of each industry.

The findings underscore the critical need for specialists and experts in various industries, particularly in translational research and industrial production processes. This highlights a significant gap in highly skilled labor availability, particularly in sectors crucial to economic mobilization, such as BCG economy, digital economy, and health and wellness economy. Academia's involvement in producing and developing the national workforce is essential, positioning universities as primary agents for addressing short- and long-term human capital needs. Universities can play a pivotal role in increasing the workforce to meet immediate industry demands, while preparing the workforce for future requirements through upskilling and reskilling initiatives. The importance of triple-helix collaboration, integrating the public sector, universities, and industry, cannot be overstated, particularly in identifying technological growth targets tailored to the needs of each industry. By aligning academic efforts with industry demands, universities can effectively contribute to enhancing industry competitiveness and meeting national economic development goals.

Based on the results and discussion, HEIs should play multifaceted roles in addressing the identified challenges and fostering economic development in Thailand. First, they serve as pivotal hubs for skills development, designing curricula and training programs aligned with the demands of emerging sectors such as the BCG economy, digital economy, and health and wellness economy. Through these initiatives, universities equip students with the technical expertise and practical knowledge needed to excel in the evolving workforce. Second, universities drive research and innovation, generating new knowledge and technological advancements that contribute to industry growth and competitiveness. Collaborative research initiatives with industry partners further facilitate the development of cutting-edge technologies and solutions tailored to industry needs. Third, HEIs act as talent pipelines, producing graduates equipped with the skills and qualifications required to drive economic growth in targeted industries. By nurturing talent and fostering a culture of entrepreneurship and innovation, universities supply the workforce with skilled professionals capable of contributing to industry success. Additionally, universities facilitate industry collaboration, bridging the gap between theoretical knowledge and practical application through partnerships with industry stakeholders. These collaborations enable students to gain real-world experience and insights, while supporting companies in accessing cutting-edge research and talent. In summary, HEIs in Thailand play integral roles in supporting economic development and driving growth in targeted industries by focusing on skills development, research and innovation, talent pipeline management, and industry collaboration.

To effectively mobilize collaboration between industry and universities, several key strategies can be implemented. First, there is a pressing need to establish formal partnerships between academic institutions and industries across various sectors. These partnerships should facilitate joint research projects, internships, and co-op programs, allowing students to gain practical experience, while addressing industry challenges. Additionally, industry advisory boards comprising sector representatives can provide invaluable guidance to academic programs, ensuring curriculum alignment with industry needs. Second, collaborative research initiatives between university faculty and industry researchers should be encouraged, supported by funding opportunities and grants tailored to industry–university collaborations. Third, the implementation of work-integrated learning programs, such as co-op programs and internships, can provide students with hands-on experience in industry settings, while enabling companies to identify and recruit top talent. Moreover, technology transfer offices within universities can facilitate the commercialization of research findings, fostering entrepreneurship and industry engagement. Overall, fostering a culture of collaboration through joint advisory committees and ongoing communication is essential for mobilizing the collective capabilities of academia and industry to meet current and future industry demands, ultimately driving economic growth and innovation.

4.3 Integrating Mechanisms

An example of a foreign organization with continuous economic growth and clear mechanisms for workforce administration is TalentCorp. This organization serves as a global talent hub and coordination center for engaging overseas Malaysians, raising awareness of work opportunities, and providing a channel for employers to attract Malaysian students and experts. Furthermore, TalentCorp offers an online platform for all overseas Malaysians to access employment opportunities from Malaysian employers (Koh, 2015; Lee, 2013).

Singapore has research entities within A*STAR (Agency for Science, Technology and Research) to work together with an academic medical center and a hospital for research excellence. The country also has a collaborative center for international research and development, called CREATE (Campus for Research Excellence and Technological Enterprise), which cooperates with top-ranked universities (such as MIT, Shanghai Jiao Tong University, etc.). Additionally, Singapore has established a research and innovation initiative among universities in Singapore, foreign HEIs, and industry sectors to further develop industry and entrepreneurs (A*STAR, 2020).

Currently, Thailand boasts numerous organizations dedicated to skill and workforce development for industrial competitiveness, along with measures for talent attraction for both employment and investment purposes. However, the current research uncovered several key findings. First, there is a lack of organizations responsible for talent attraction, retention, and development that directly engage with industrial agencies requiring specialized talents. Public organizations involved in talent attraction include the Office of National Higher Education Science Research and Innovation Policy Council (NPXO), the Ministry

of Higher Education, Science, Research and Innovation (MHESI), the Strategic Talent Centre (STC), the Board of Investment of Thailand (BOI), the EEC Human Development Center, and the Thailand Professional Qualification Institute (TPQI) (a public organization), among other organizations. Second, Thailand lacks comprehensive data on competencies for high-skilled workforce development, essential for conducting workforce needs analyses in targeted industries. Lastly, there is a lack of inter-organizational integration for talent attraction, hindering national human resource development efforts aimed at fostering highly skilled personnel to drive national industrial competitiveness.

The establishment of university–industry collaboration still has some limitations on collaborative work. Any strong potential in this collaboration can be created under the public sector to connect its inter-organizational operation in terms of supporting incentives, promoting universities to become science parks for the mobilization of research and innovation, and connecting them with the country’s economic and social development.

In accordance with the findings, the examples provided highlight the importance of foreign organizations in driving economic growth through effective workforce administration and research collaboration. TalentCorp, as a global talent hub in Malaysia, demonstrates how a centralized organization can facilitate connections between overseas citizens and local employers, thereby maximizing talent utilization. Similarly, Singapore’s A*STAR and CREATE exemplify successful research collaborations between academia, medical centers, and industry, showcasing the value of partnerships in advancing research and innovation. However, the discussion also sheds light on challenges faced by Thailand in talent management and industry–academia collaboration. The lack of dedicated organizations for talent attraction and retention, coupled with insufficient data on competencies for high-skilled workforce development, underscores the need for a more coordinated approach to human resource development. To address these gaps, fostering stronger university–industry collaboration is essential, and HEIs should play a crucial role in fostering economic development and enhancing industrial competitiveness. By leveraging the support of the public sector and incentivizing universities to become hubs for research and innovation, Thailand can better align its educational and research efforts with economic and social development goals, ultimately enhancing national industrial competitiveness.

5. Conclusions and Recommendations

Summarizing the directions for further development in Thailand, the research underscores the need for a clear policy formulation in national economic mobilization, particularly focusing on technology and workforce for industries. While targeted industries have been identified, there is a lack of clarity in investment priorities and development factors, leading to unclear push–pull factors and insufficiently defined goals. Additionally, Thailand lacks specific policies for needs analysis and talent development, resulting in a dearth of information and unclear objectives for attracting high-skilled labor and talents to support national industries. Bridging the gap between academia and industries is essential to prepare future workers with the requisite skills for emerging sectors.

Clear policy formulation is crucial to attract specified talents and mitigate brain drain issues. Furthermore, addressing challenges in attracting high-potential foreign researchers and start-ups, integrating tourism and well-being areas to attract foreign talent, and improving laws and regulations are imperative initiatives to foster economic growth and enhance industrial competitiveness.

Regarding the roles of HEIs, they serve as pivotal catalysts for addressing the identified challenges and fostering economic development in Thailand. First, universities play a crucial role in skills development by designing curricula and training programs aligned with the needs of emerging sectors such as the BCG economy, digital economy, and health and wellness economy. Through research and innovation, universities generate new knowledge and technological advancements that contribute to industry growth and competitiveness. They act as talent pipelines by producing graduates equipped with the skills and qualifications needed to drive economic growth. Furthermore, HEIs facilitate industry collaboration, bridging the gap between theoretical knowledge and practical application through partnerships with industry stakeholders. Leveraging the support of the public sector and incentivizing universities to become hubs for research and innovation are crucial to align educational and research efforts with economic development goals, ultimately enhancing national industrial competitiveness.

Considering the challenges in attracting talent to work in Thailand, administrative mechanisms have posed significant hurdles in matching demand and supply, especially in key industries, resulting in a higher demand for highly skilled specialists. Systematic administration is crucial for effectively attracting foreign talent to achieve this goal; therefore, talent development policy should be comprehensively and properly implemented. Figure 1 presents the suggested principles for attracting foreign talent to work in Thailand.



Figure 1: Suggested principles for attracting talent to Thailand

The principles should be implemented in the following way:

- *Targeted industry and products*: Identify nationally targeted industries and products under technology mapping, such as electric vehicle parts and chargers, system integrator products, etc.

- *Future skill sets*: Identify future skill sets to mobilize targeted industries for talent attraction to fill the gap and prepare to develop the workforce with the country's future skills.
- *Critical mass*: Identify the number of targeted talents required in each industry to be sufficient in operational mobilization.
- *Mission-oriented approach*: Utilize the mission to promote the targeted industry as the fixed point to identify the needs of the talent. Industrial development requires clear policy and public-private-university collaboration under an obvious direction. A public-private pilot project should be run using targeted technologies from foreign countries or large companies in the industrial sector.
- *Talent tracks*: Diversify the administration to serve five talent groups: researchers, professionals, entrepreneurs/start-ups, students/researchers, and high-skilled laborers.
- *Facilitation*: Provide administrative and facilitating systems, including legal, SMART Visa, job matching, health insurance, and life and living services.
- *National organization*: Establish a national organization for administrating and creating inter-organizational collaboration under related missions about talent attraction, talent retention, talent development, talent platform, talent database, and connection and exploration of collaboration from public and private organizations at national and international levels.

Furthermore, another research finding is that Thailand lacks a policy formulation and clear talent attraction system. Policies facilitating and attracting talent based on the missions of each organization are provided and available. These include industrial investment promotion and attraction; the SMART Visa policy for attracting high-skilled individuals and investors seeking to work and invest in national targeted industries; and adjustments in qualifications, criteria, and benefits to include all talent groups. An example is the adjustment of reporting rules and establishment of a one-stop service for facilitating talents who wish to stay in Thailand for an extended period. Therefore, formulating a policy and setting up a talent attraction system for foreigners to work in Thailand require further systematic development and adjustment to mobilize and meet the direction of targeted national industries.

Universities in Thailand can fulfill their role amidst challenges in policy formulation and the development of the talent attraction system in various ways. First, formulating policy and identifying the direction of technology and the workforce in targeted industries for national development should entail clear goals in the industry's technological development. This includes technology and flagship projects, national talent policy, national skill-based workforce planning, and academic-industry missions, alongside higher education and vocational education. Second, developing targeted industries for talents should align with national goals. This should encompass industries for high-skilled workers to complement policies for sectors such as the BCG economy and digital economy, as well as industries for semi-skilled labor to align with the health and wellness economy. Third, developing administrative mechanisms should encompass the

identification of mission-based organizations, the adjustment or revision of their missions, and the creation of a national skill set database. Furthermore, it should encompass the integration of an inter-organizational database and the formulation of a talent development plan connected to foreign talent attraction. These mechanisms will prepare high-skilled domestic individuals to serve future industrial development. Lastly, benefits, incentives, laws, and regulations should be identified and made available to talents. These should cover rules/conditions, talent arrival procedures, attraction methods, high payments, investment opportunities, entry–exit travel, as well as family and health benefits.

The limitations of this study include the focus on specific geographic regions or industry sectors, which may limit generalizability, as well as the influence of cultural, social, or political factors specific to the Thailand context. Future research should aim to explore the long-term impacts of implementing the recommended strategies for attracting international talent to Thailand, assessing their effectiveness in enhancing the country's competitiveness in the global market. Additionally, investigating the challenges and opportunities encountered during the implementation process would provide valuable insights for refining and adapting these strategies to different contexts and sectors. Moreover, comparative studies with other countries or regions considering similar initiatives could offer valuable lessons and best practices for optimizing talent attraction efforts.

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