

Research Article

Shaping the future: Satryo Brodjonegoro's blueprint for education in Indonesia

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Abstract: The election of the new Indonesian Government heralds a new direction in higher education in Indonesia. Higher education is critical to Indonesia amidst significant global and national challenges, including globalisation, the uptake of advancing technologies, and climate change. This paper examines the potential role and leadership of Satryo Soemantri Brodjonegoro, the newly appointed Indonesian Minister for Higher Education, Science and Technology, can play in strengthening Indonesia's resilience. As a prominent figure in academia and the education bureaucracy, Brodjonegoro's work has significantly influenced the direction of Indonesia's human capital development landscape. This review synthesises his academic publications, policy initiatives and strategic vision, which reveals a focus on driving innovation, enhancing research capacity, and promoting interdisciplinary collaboration within Indonesia's further education system. Central to Brodjonegoro's thinking is that human capital is a catalyst for national development, and he is focused on preparing Indonesia for the demands of the Fourth Industrial Revolution. This paper also contextualises his work within global trends in Higher Education reform, exploring how his leadership aligns with international best practices and contributes to the broader discourse on education and technological advancement in developing economies. By critically analysing Brodjonegoro's body of work and its practical implications, this review attempts to provide insights into his potential long-term impact on Indonesia's educational reform and its positioning as a knowledge-driven economy.

Keywords: applied learning; Brodjonegoro; higher education; vocational education; workforce skill

1. Introduction

Indonesia's trajectory toward becoming a knowledge-based economy is shaped significantly by the philosophies and contributions of its educational leaders. This paper examines one of those leaders Satryo Soemantri Brodjonegoro's and his contributions to higher education reform. Recently appointed as Indonesia's Minister for Higher Education, Science and Technology, Brodjonegoro has long been a leading force in shaping the country's educational and human capital frameworks. His distinguished career blends academic achievements with policy innovation, largely focusing on transforming Indonesia's higher education system to meet the evolving demands of the Fourth Industrial Revolution (Yudhoyono et al., 2024). This shift demands technical progress and reimagining human capital as a key asset to drive national growth amid globalisation and technological change (van Diermen, 2018).

Positioned within broader global trends in Higher Education reform, this review will critically assess Brodjonegoro's influence and examine how his leadership aligns with, and contributes to, international best practices for developing economies. This paper examines Brodjonegoro's academic work, policy efforts, and strategies to highlight the

lasting impact of his leadership on Indonesia's educational reforms, particularly in preparing for a knowledge-based, innovation-driven economy.

Globally, institutions of higher learning are reshaping how they engage with society by serving as advocates for social responsibility, guiding the next generation of leaders, fostering human potential, and nurturing civically minded graduates. They aim to strengthen communities, create connections, and inspire leaders of tomorrow by instilling values that empower individuals to make meaningful societal contributions. Achieving a higher standard of accountability to society is challenging, and few Higher Education institutions excel in fostering this important area. However, making education quality a shared responsibility is increasingly seen as essential to these efforts. Indonesia's rich diversity presents a valuable opportunity to enhance the effectiveness of its higher education system (Brodjonegoro, 2016).

Indonesian Higher Education institutions are increasingly exploring methods to enhance their accountability, responsiveness and adaptability to community needs. Developing and sharing these successful community engagement methods and practices encourages universities to foster meaningful local impact and social responsibility. In this context, Brodjonegoro highlights the necessity for a major shift in academic mindset and structure to truly enable this community-centred responsiveness. He suggests the prevailing model of regulation-focused higher education institutions could be shifted to an accountability-focused approach to improve performance (Brodjonegoro, 2002b).

Achieving this shift requires a thorough reassessment of how Higher Education institutions engage with their communities (Jongbloed et al., 2008). Since the early 1980s, the Indonesian government has implemented service learning initiatives, known as *Kuliah Kerja Nyata* (KKN), aimed at fostering social responsibility and equipping students with essential job skills. The KKN program has successfully achieved the instillation of a sense of social responsibility, solidarity, and tolerance in students by immersing them in community-oriented projects (Hidayat & Balakrishnan, 2024).

This paper explores Brodjonegoro's intellectual framework, focusing on his efforts in enhancing Indonesia's research capacity, promoting interdisciplinary collaboration, and fostering innovation across academia and industry. His approach emphasises the importance of adaptive skills, knowledge creation, and responsive education models, which are increasingly relevant as Higher Education institutions globally are expected to meet both local and international benchmarks for competitiveness and inclusivity (Voak et al., 2023). By synthesising Brodjonegoro's contributions and philosophy, this paper aims to provide a comprehensive understanding of his role in advancing Indonesia's education system as a central pillar in human capital development.

2. Method

This thematic literature review explores Brodjonegoro's intellectual contributions and leadership philosophy, focusing particularly on his impact on Indonesian Higher Education. The researchers have utilised social theories to structure and systematise this review, to enhance and expand our understanding (Neuman, 2014). This approach is a suitable vehicle for synthesising complex ideas and identifying key themes, patterns and gaps in Brodjonegoro's body of work and the broader contextual literature on educational reform and human capital development (Hart, 2018). Such a synthesis allows for an in-depth analysis of his strategic priorities, policy initiatives, and the global trends, he endeavours to address in the higher education landscape, providing a holistic view of his potential influence on Indonesia's educational landscape (Creswell & Guetterman, 2019).

The exploratory nature of this literature review provides a broad, open-ended investigation into the topic area to identify significant themes, trends, and gaps in existing research (Creswell & Guetterman, 2019). This approach is beneficial in areas where literature is either sparse or rapidly evolving, as it allows researchers to map out a

comprehensive understanding of various perspectives and methodologies without prematurely limiting its scope (Neuman, 2014). Exploratory reviews often use iterative cycles of literature scanning, coding and analysis to refine the focus, then progressively honing in on relevant concepts and issues that surface during the review process.

The literature selection chosen to underpin this work focused on sources that explicitly address Brodjonegoro's contributions to higher education and human capital development focusing on key thematic areas such as civil society, governance, autonomy, vocational education and industry engagement, as well as access and equity, while also incorporating contextual and comparative studies on global higher education reforms, particularly within the ASEAN region. Sources unrelated to either higher education reform or human capital development, or papers that did not offer direct insights into Brodjonegoro's work, were excluded.

To identify and analyse the themes within Brodjonegoro's work, a thematic coding process was applied. Extracted data from each purposively selected publication was initially coded based on Brodjonegoro's outlined goals, strategies and outcomes in educational policy. Codes were grouped into overarching themes related to innovation, interdisciplinary collaboration, research capacity building, and knowledge application in human capital development (Bazeley, 2018). The themes were synthesised and contextualised within global and regional trends, with an emphasis on Brodjonegoro's alignment with international standards.

Moreover, to ensure the reliability of the findings, the thematic codes were periodically reviewed to maintain consistency and to address any emerging patterns across different sources. Triangulation was also employed by cross-referencing Brodjonegoro's initiatives with global benchmarks and policies. This approach enhances the validity of the review by assuring that Brodjonegoro's contributions are examined against a balanced array of perspectives, reflecting both his influence and broader trends in educational reform.

This review is limited to publicly available literature, and while it aims to provide a comprehensive synthesis, there may be insights or initiatives not accessible in the public domain. We note that future research could build on this review by incorporating empirical data from stakeholders in the Indonesian Higher Education sector to gauge the practical impact of Brodjonegoro's initiatives. By conducting this thematic review, the study aims to offer a robust understanding of Brodjonegoro's influence and identify key areas where his leadership philosophy has driven transformative changes in Indonesia's Higher Education system.

3. Results

Indonesia, the fourth most populous country and tenth largest economy globally is emerging as a powerhouse with over 5.1% GDP growth in 2023 (World Bank, 2024). That said, human capital development emerges as a major impediment to social and economic development. A recent report from the World Bank on Indonesia's economic prospects notes that "potential growth had been declining due to weaker labour input, human capital formation, and productivity growth" (World Bank, 2024, p. 4). This is echoed in the OECD's post-pandemic recovery outlook, identifying a major challenge exists in the very high incidence of educational informality and relatively low levels of skills across the nation (Olivia, 2021).

Indonesia's Human Development Index (HDI) was 74.39 in 2023 (United Nations, 2023). The Human Development Index (HDI) provides a composite assessment of core dimensions in human development: longevity and health, access to knowledge, and a sufficient standard of living. This measure aggregates average outcomes across these key aspects to provide an overall assessment of progress in human well-being. Despite this progress, Indonesia ranks 78 out of 193 United Nations member states on the overall performance in progress towards achieving the 17 Social Development Goals. While

progress has been made in two goals i.e. no poverty and quality education, the remaining goals are slow to progress or not progressing (Sachs et al., 2024). Babacan (2007) identifies the critical role that education plays in the social and economic development and social cohesion, with McGinty et al (2018) identifying the positive impact of inclusion in education of disengaged people, especially young people. As noted by Minister Brodjonegoro, the risks of inequality are expected to peak in the coming decade as developing countries face the challenging shift towards more competitive, transparent, and rules-based market systems. Education appears to be the most effective remedy against the negative impacts of globalisation-driven inequality: the greater the level of education, the more likely long-term wealth inequality will be reduced (Brodjonegoro, 2002a).

In this global context, the major challenge impacting on Indonesia's development, with concurrent implications for Higher Education institutes is Human Capital Development. Approximately 70% of the population of Indonesia is of working age (Muhyiddin et al., 2024). The human capital index for Indonesia was 0.54 in 2020, the index measuring the productivity level of a child born today (World Bank, 2020). The concept of human capital consists of the capabilities, skills and talents built by individuals through education, experience and health. While the human capital index for Indonesia is higher than other middle-income nations, it is below neighbouring countries and below the average of ASEAN nations (World Bank, 2020). Moreover, Indonesia is projected to experience a demographic dividend, where the working-age population (ages 15-64) will outnumber those in the dependent age groups. This shift is anticipated to provide a unique opportunity for economic growth, as a larger proportion of the population enters productive employment relative to those of non-working age (Rostiana & Rodesbi, 2020).

Indonesia's demographic dividend offers significant advantages if managed effectively, particularly through developing a skilled workforce. By investing in human capital, the country can enhance labour productivity and promote broader social progress. The HDI shows that the mean years of schooling is 9 years while the expected years of education is 14 years per person (World Bank, 2024). Reaching the expected years of schooling and pathways to education is critical for Indonesia's future. The failure to get the human capital aspect right can result in problems such as; increasing unemployment, poverty, and social inequality (Adriani & Yustini, 2021). As Brodjonegoro unfortunately notes one consequence of high current inequality is the increased challenge of providing quality education to those who are less privileged, which heightens the risk of inequality continuing into the future "unfortunately one price of high current inequality is the greater difficulty of delivering good education to the currently less well off, and thus the risk of inequality persisting into the future" (Brodjonegoro, 2002a).

4. Discussion

Satryo Soemantri Brodjonegoro's appointment as Indonesia's Minister of Higher Education, Science and Technology, is based on his considerable career in academia and his profound individual influence on the development of Higher and Vocational Education in Indonesia. His leadership roles, as Director General of Higher Education (1999-2007) and Chair of the Indonesian Academy of Sciences (2018-2023), have positioned him as a transformative figure within the Indonesian educational policy landscape. In particular, Brodjonegoro's tenure as Director General of Higher Education is notable for his leadership in initiating structural reforms in Indonesia's Higher Education sector. A key accomplishment was his role in developing a World Class University initiative which aimed to elevate the status of Indonesian universities, allowing them to compete globally. This reform involved aligning Indonesian University curricula with international standards, enhancing faculty qualifications, and improving university management systems (Wahyudi & Lutfi, 2019), which has elevated Indonesia's

education system in a globally competitive, inclusive, and innovation-driven sector that actively contributes to socio-economic growth, and marks Indonesia as a growing knowledge-based economy (Brodjonegoro & Greene, 2012).

Brodjonegoro recognised that for Indonesian universities to become more respected, they needed to increase their academic output and enhance their international reputation (Brodjonegoro, 2002a). Consequently, as part of his Higher Education Long-Term Strategy, he encouraged a focus on increasing research excellence, introducing interdisciplinary programs, and strengthening all levels of postgraduate education (Rakhmani & Siregar, 2016). These reforms have led to an improved performance of Indonesian universities, as reflected particularly in the QS World University Rankings (Ibrahim & Fadhli, 2021). Another critical aspect of Brodjonegoro's work was his commitment to improving Vocational Education in Indonesia. Recognising the skills gap between graduates and industry needs, he championed the development of vocational training programs that aligned with labour market demands (Indrawati & Kuncoro, 2021). Brodjonegoro emphasised the importance of industry-university linkages and facilitated partnerships between vocational schools and industries to ensure that graduates were equipped with relevant and up-to-date practical skills (Otache, 2022).

He also supported the creation of new vocational programs in emerging sectors, such as automation, digital technologies and green energy, to meet the increasing demands of Indonesia's growing economy (Ramadhan et al., 2024). His focus on Vocational Education was driven by a belief in the role of education in socio-economic development, aiming to reduce unemployment and create a skilled workforce that could compete globally. Brodjonegoro's global outlook is reflected in his emphasis on international collaboration (van Diermen, 2018) and, during his time as Director General, he initiated numerous partnerships with foreign universities and international organisations, facilitating student exchange programs and joint research projects and introducing international double-degree programs (Freisleben, 2015). Most notably, the collaboration with the Japan International Cooperation Agency, which supported the development of Indonesia's Technical Education infrastructure. This involved the establishment of advanced engineering faculties and research centres (Susanto, 2021). In this respect, Brodjonegoro's vision of internationalisation extended beyond students to faculty exchanges, encouraging Indonesian scholars to pursue Higher Education programs abroad, and return to share their expertise, thus fostering a globally competitive academic environment in Indonesian Higher Education (Lambey et al., 2023).

Brodjonegoro has been a staunch advocate for promoting research and innovation in Indonesia's Higher Education system, with his initiatives aimed at transforming universities into research hubs capable of driving national development (Lambey et al., 2023). During his leadership within the Indonesian Academy of Sciences, Brodjonegoro worked to integrate research with industrial needs, promoting the triple helix model that connects academia, industry and government. He emphasised applied research that could lead to tangible innovations in sectors such as manufacturing, information technology, and renewable energy (Etzkowitz & Zhou, 2017). His work in promoting STEM (Science, Technology, Engineering and Mathematics) education and securing funding for scientific research, helped lay the foundation for Indonesia's advancement in technological innovation and assisted its goal of becoming a knowledge-based economy, whilst at the same time acknowledging the huge challenge of producing graduates for future work placements (Brodjonegoro, 2016).

Satryo Soemantri Brodjonegoro's extensive career in education has left a lasting impact on both Higher and Vocational Education in Indonesia. His efforts in reforming Higher Education, enhancing vocational training, fostering international collaboration, and promoting research and innovation, have modernised Indonesia's educational landscape. His work highlights the critical role that education plays in national

development, emphasising the need for global competitiveness, skilled human resources and a research-driven economy.

4.1 Brodjonegoro leadership and legacy

Brodjonegoro emphasises that, while generating new knowledge remains essential in Indonesian Higher Education, the real value lies in organising, adapting, and applying existing knowledge to meet the country's needs in key areas such as food and energy security (Shaturae, 2021; Tobing & Manurung, 2021). This 'knowledge configuration' process has been seen to ultimately serve society best, allowing Higher Education institutions to address local challenges more effectively through a responsive approach. A central key to this work is given in his view that the transition from knowledge creation to knowledge organisation poses a particularly significant challenge for universities in developing countries (Brodjonegoro, 2002a).

In Indonesia, Higher Education institutions face considerable obstacles to knowledge creation, including limited research funding, out-dated technology, and fewer opportunities for international partnerships. To address these challenges, these institutions can focus on adapting and applying global research within a local framework (Utomo, 2021). This approach, often called 'knowledge configuration', enables Higher Education Institutions to serve a vital role by modifying environmental research from comparable countries or tailoring business theories to meet specific regional economic needs, thus aligning their contributions with the community's priorities (Simamora et al., 2023). In the process of generating knowledge, Brodjonegoro argues that Indonesia should cultivate world-class researchers, including renowned scientists, and establish itself as a hub for groundbreaking experiments and knowledge creation (Brodjonegoro, 2016).

To bolster local research capacity in Indonesia, fostering partnerships with international research institutions can support more localised knowledge production. Developing systems that facilitate equitable knowledge exchange allows for integrating unique regional contexts into global academic discourse (Cervantes, 2017). Additionally, Higher Education institutions are pivotal in nurturing critical thinkers and promoting innovation. Achieving this outcome may involve transitioning from traditional 'guru-centred' pedagogy to a more student-focused learning approach that emphasises active engagement and independent thought (Fairman & Voak, 2023). Developing student agency, where students become the critical thinkers, means acting to reshape and improve knowledge and problem-solving abilities to meet the demands of complex Artificial Intelligence systems (George, 2023). This shift in student agency provides opportunities for students to engage and provide research that directly addresses local challenges, ensuring relevance and applicability (George, 2023). In this regard, the Jodipan experiment (see later) provides a unique opportunity to display this connection (Voak & Fairman, 2024).

The following themes within a Higher and Further Education context were explored: (i) Civil Society, (ii) Governance and Autonomy, (iii) Vocational Education and Industry Engagement, and (iv) Access and Equity.

4.2 Civil Society

In Indonesia, Higher Education institutions are categorised into public and private universities (Digdowiseiso, 2020). Public universities are highly competitive and are challenging for students to gain access, whilst private institutions provide varied entry points. In the latter case, the quality of education between institutions can differ significantly (Digdowiseiso, 2020; Utomo, 2021). Many private universities primarily emphasise individual student advancement, although a number maintain a community-centred approach (Faishal, 2024; Machaira, 2019). Brodjonegoro suggests that this

landscape justifies the importance of community support and involvement in Higher Education as it fosters greater alignment between educational offerings and societal needs. He specifically opines that in many countries, it is widely recognised that community investment in higher education should be substantially greater than in primary education (Brodjonegoro, 2002b).

Integrating service-learning projects and project-based learning programs into the University curriculum allows students to apply academic knowledge to community needs. These service-learning projects include teaching in local schools, conducting environmental and community projects, or supporting local businesses with skills like accounting, marketing and management (Hasan et al., 2023).

The 'Painted villages of Jodipan' initiative within Malang, which was referred to earlier, is an exemplar of service-learning. In this civil society project, university students engaged the local community living in a slum dwelling beside the Brantas River in Malang, to paint their houses. To assist in this project, the students enlisted a paint company and a team of volunteers, which included members of the Defence forces, an achievement that clearly illustrated the social nature of the initiative (Voak & Fairman, 2024). The 'Rainbow village of Jodipan Malang' is now a well-known tourist attraction and is gaining international social media attention as a tourist attraction in Malang. The primary goals of this service-learning experience were to (i) encourage students to develop skills to identify a local community's needs, (ii) build a relationship with impacted clients and communities, (iii) gain an understanding of the nature and extent of the social and economic disadvantage of the relevant community, (iv) experience building soft skills in communication and negotiation with impacted clients, and (v) building collaboration with industries and relevant support groups to plan and fund initiatives. In this example, the hard skills of painting and decorating are the focus of the learning experience.

In a similar context, another civic project undertaken by Malang students was to digitalise the contents of the Malang Museum. This service-learning project provided a significant increase in the awareness of local culture and museum artefacts, as well as providing an opportunity for an international audience to view the Museum artefacts. Engaging with local communities through service-learning projects to improve education, health, the Arts and history, acts to strengthen Higher Education's role as a centre of learning for the entire community.

4.3 Governance and Autonomy

Indonesia, as a developing nation, has adopted a utilitarian approach to Higher Education, aligning it closely with neoliberal values that prioritise economic rationality and self-interest (Pogukaeva et al., 2016). While this model supports rapid economic development, it risks undermining the traditional moral and ethical commitments of Higher Education to help students to become morally capable of navigating life (Hidayat & Balakrishnan, 2024; Naval et al., 2011). Consequently, the foundational social mission of universities—to serve the public good and be a 'moral force' (Brodjonegoro, 2002b)—may be compromised, as economic objectives tend to overwhelm institutional priorities. With the swift expansion of this utilitarian framework, there is concern that unchecked growth could diminish the traditional roles of Higher Education, moving away from its core function as a social institution dedicated to holistic development and societal enrichment (Gaus & Tang, 2023).

Universities in Indonesia are expected to play a role in the restoration of moral and social values in society (Brodjonegoro, 2002b). The Indonesian motto of *Bhinneka Tunggal Ika* (Unity in Diversity) encapsulates the genuine sense of identity in the nation, and Voak et al. (2023) noted that Unity in Diversity is central to the notions of Indonesian nationhood, respecting and celebrating the rich diversity of national identity (Hakim, 2012). The concept of 'Pancasila' underpins this notion that is designed to emphasise

cooperation, justice, social harmony and which creates a peaceful and unified society (Zalzulifa et al., 2024).

Pancasila also has helped to develop a unique framework that helps vocational education in Indonesia to not only prepare students for the workforce but also to cultivate socially responsible citizens who contribute positively to society (Zalzulifa et al., 2024). The synergy between vocational skills and the values inherent in Pancasila equip Indonesian students to be well-rounded professionals, fostering a balance of technical expertise, ethical behaviour and civic responsibility (Riyanti & Prasetyo, 2020).

A further contribution of Pancasila is that it helps to (i) implement the service learning approach known as *Kuliah Kerja Nyata*, (ii) provide community engagement programs, (iii) build communities through educational projects such as Jodipan (Voak & Fairman, 2024), and (iv) contribute to local economies and promote environmental sustainability. In this way, service learning plays a pivotal role in fostering community resilience by empowering both individuals and communities to address challenges collaboratively, and, at the same time, shows how applied education programs can play a substantial role in advancing local economic empowerment in Indonesia, particularly in the hospitality and tourism sector. Through meaningful engagement in service projects, participants develop valuable soft skills, such as problem-solving, teamwork and community empathy, which all are essential for navigating life.

4.4 Vocational Education and Industry Engagement

Competitiveness will be crucial for the long-term survival of educational institutions. To maintain their competitive edge, Higher Education institutions must be equipped with essential tools and frameworks that enable effective performance and facilitate accountability audits (Brodjonegoro, 2002a). These tools include legal recognition, governance autonomy, accountability measures and organisational health, and, in this regard, for national Higher Education systems to successfully enhance the country's competitiveness, they need to be structurally sound and well-coordinated (Brodjonegoro, 2002a). Whilst this applies equally to all individual institutions, which must prioritise quality, accessibility, equity, and autonomy to adapt to the changing educational landscape, a comprehensive overhaul of the existing system is also necessary to achieve these goals and ensure effective Higher Education delivery (Hartono et al., 2019).

Brodjonegoro and Handayani opine that TVET's role is in the supply of a skilled labour force to meet the economic needs of the nation, supplying skilled workers who have specific competencies needed for industry, suggesting that in many countries, vocational education is closely linked to the development of skilled workers through diverse training models, driving economic growth and fostering product innovation (Handayani & Brodjonegoro, 2015). Furthermore, they opine the alignment between polytechnic competencies and industry challenges has begun to take shape, but external factors have intensified the situation. Economic, social, cultural, political, and technological influences, particularly advancements in information technology have directly impacted polytechnic education. The integration of modern technology into the design and operation of industrial equipment has transformed work patterns and the required skillsets, necessitating the development of a workforce with qualifications that are substantially different from those of the past (Handayani & Brodjonegoro, 2015).

To add complexity to this area, the competencies needed for Indonesia's workforce are influenced by the nation's changing economic development objectives, their advanced industrial requirements, increasing levels of technological progress and a swathe of global trends (Abdullah et al., 2021). As Indonesia aims to compete in both regional and international markets, there is a strong emphasis on cultivating skills that boost productivity, foster innovation and enhance adaptability (Di Gropello et al., 2011). In general, the vocationalisation of education in Indonesia is evident in two main areas: (i)

the revitalisation of vocational school programs and (ii) the implementation of competency-based curricula across various aspects of formal education (Handayani & Brodjonegoro, 2015; Pathak, 2017). However, despite the commonly acknowledged advantages of aligning education with labour market needs, the vocationalisation efforts have yet to address critical issues such as unemployment and the misalignment between educational outcomes and market demands (Subkhan, 2023).

Handayani and Brodjonegoro (2015) also indicate that the Indonesian economy is a service economy and that the competencies required in this sector are different to the 'manufacturing' sector when they suggest the competencies required in manufacturing industries differ from those needed in trading or service industries (Handayani & Brodjonegoro, 2015). In this respect, whilst the service sector plays a significant role in the contribution to national GDP, in a globalised world the shift of technologies and knowledge advancements in AI requires a broader acceptance of new ways to engage international trade.

In addition, technical competencies needed in sectors such as manufacturing, automation, machining, welding, and robotics differ significantly from those in service-oriented fields like customer service and marketing (Handayani & Brodjonegoro, 2015). Indeed, to thrive in today's global economy, the modern Indonesian workforce must cultivate a more comprehensive understanding of recently emerging skills (Abdullah et al., 2021) which include adopting digital and technological competencies, engaging in e-commerce and digital marketing, enhancing digital literacy, and implementing sustainable practices along with energy-efficient methods. Brodjonegoro (2012) argues that Indonesia is in a unique position to prosper in the development and utilisation of sustainable energy. This progress could ultimately lead to community prosperity through energy self-sufficiency and the efficient use of resources. He promulgates Indonesia, is endowed with abundant natural resources and a strategic geographic position, holds significant potential to advance eco-technology by fostering regional and human empowerment (Brodjonegoro, 2012).

The cultural diversity and the richness of Indonesia's natural resources provides opportunities to develop a range of human capabilities to meet this natural strategic advantage, and consequently the question of the issue of technical skills vs the soft skills provision requires exploration (Sobri et al., 2023; Voak & Fairman, 2020). The modern workforce demands various soft skills, including leadership, initiative, cross-cultural communication, adaptability, flexibility, problem-solving, and teamwork (Purwanto et al., 2023). These competencies can be effectively developed through educational strategies, such as blended learning, flipped classrooms, work-integrated learning and project-based learning, and by incorporating these approaches, individuals can enhance their soft skills and better prepare for the dynamic demands of today's job market (Varma & Malik, 2023).

It is essential to explore how Indonesia and other nations are addressing the increasing demand for change in Vocational Skills development. The partnership between Technical and Vocational Education and Training (TVET) institutions and industry sectors plays a crucial role in equipping Indonesian students with the job-ready skills they need for future employment, but that said, there is a serious problem with the link between universities and employers, particularly in understanding the employers' needs (Abdullah, 2014; Brodjonegoro, 2016). This trend is not unique to Indonesia; it is a global phenomenon. For instance, in South Africa, researchers Makgato and Moila (2019) highlighted such partnerships to ensure that the education system remains aligned with the evolving needs of the labour market.

In this context, Abdullah et al. (2021) have noted that universities' ability to engage with industry requires institutional management to open pathways for entrepreneurial staff to share their real-life experiences with students. The role of educators is critical in encouraging the implementation of work integrated learning opportunities with industry, since this provides a building block for relevant work experiences (Drewery & Pretti,

2021). Whilst addressing the students' work readiness is not the sole responsibility of Higher Education, it does, however, play a significant role in preparing students for transition into employment in the field or sector in which they were educated (Lambey et al., 2023). There are several competency frameworks that apply to skills development for industry. These frameworks contain the four fundamental characteristics of: Workforce Development, Training and Learning, Assessment and Credentialing, which are inter-related as illustrated in the Figure 1.

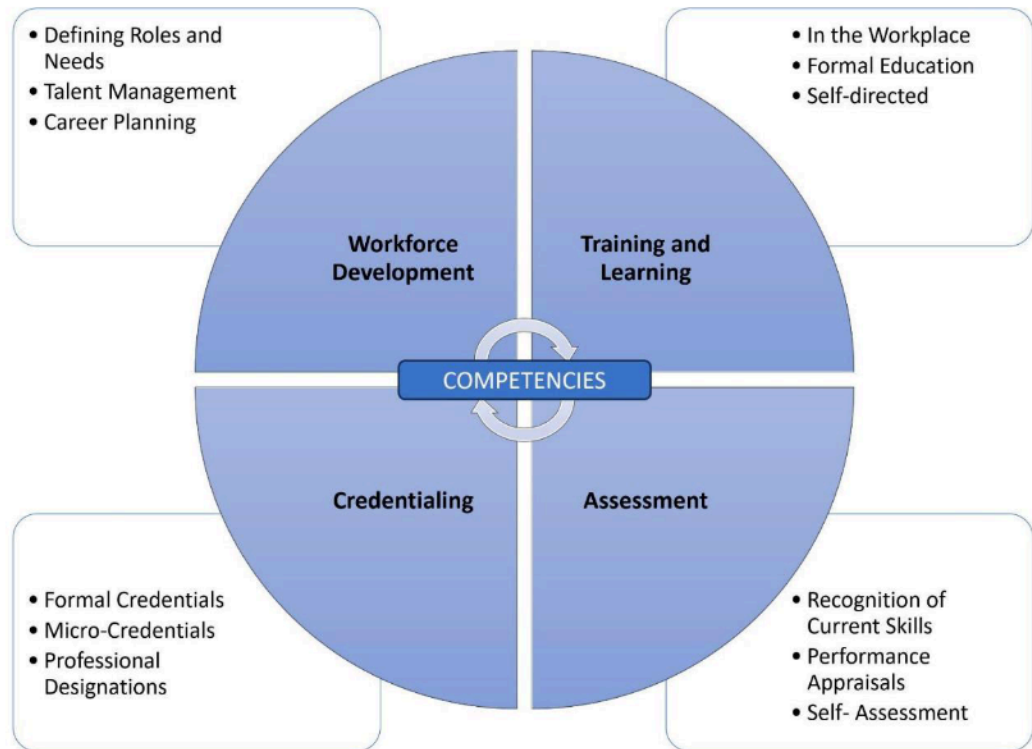


Figure 1. Competency Frameworks (e Campus Ontario Open Competency Toolkit)

This framework outlines the expected behaviours and performance associated with occupations, as well as outlining career progression and competencies common to occupations within the framework. Whilst competencies span job roles, occupations and industry sectors, this generic framework may need to undergo significant revision and development through collaboration and engagement with newer industry sectors in order to meet specific industry needs.

Handayani and Brodjonegoro (2015) have suggested that the competencies needed in the polytechnic curriculum should reflect the needs of industry, and this can be achieved in many ways. Insights from industry collaboration will encourage universities to align curricula more closely with workforce demands, helping graduates to be more job-ready. Options include inviting industry to be part of the curriculum design process, and collaborating with industry on the particular competencies which are seen to be required. These authors emphasise that Polytechnic curriculum development must now place greater emphasis on industry involvement, evolving from mere participation to active collaboration.

4.5 Access and Equity

Addressing access and equity issues requires coordinated efforts between the Government, educational institutions, and the private sector. Improved resource allocation, a focus on regional development, and the promotion of inclusive policies can help bridge these areas' needs and create a more equitable Higher Education system. In

this regard, particular emphasis should be placed on addressing: (i) aspects of the rural-urban divide; (ii) the problem of socio-economic exclusions; (iii) and the digital divide. In the first case, students from rural and remote areas face fewer Higher Education opportunities compared to those in urban centres across Jawa: Jakarta, Surabaya, Malang, Yogyakarta or Bandung. Jawa is just one of the 17,000 islands in Indonesia, which span four time zones. In addition to this, Institutions in the remote outer islands and rural regions often have limited resources, fewer specialised programs, and a lower quality of facilities and teaching staff. Some institutions in remote or under-funded areas struggle to attract and retain qualified faculty members, and they often lack the resources for curriculum development, particularly in fields like science, technology, engineering and mathematics (Brodjonegoro, 2016). Larger, more established institutions in urban centres, tend to receive more government funding and private sector support than smaller or rural institutions. This disparity affects the quality of facilities, faculty, and academic resources available to students in less well-funded institutions. Improving access to scholarships for rural students, and providing government incentives for faculty relocations as well as investing in digital infrastructure are some of the specific solutions worth considering.

In the second case, socio-economic exclusions are felt for many families, with the cost of higher education being prohibitive. This expense relates not only to tuition fees, but also associated costs like transportation, accommodation, books and technology. Such an impost limits access for students from low-income households, contributing to a lower enrolment rate among disadvantaged groups. Finally, Fairman et al. (2021) observed that many rural and regional communities did not have reliable internet access and, in some instances, no electricity. In this respect, the COVID 19 pandemic highlighted the access and equity issues related to learning online and the challenges of implementing regional innovation in Indonesia (Rahmanda, 2022). The less well- resourced Universities and educational institutes struggle to provide the digital infrastructure and support facilities required for 'online' courses, this being an absolute requirement for the successful delivery of online courses (Fairman et al., 2021).

In this context, Indonesian Higher Education Institutes could benefit from making changes in accountability toward their clientele and redefine their strategic mission in order to leverage their full potential, and to meet a world-class standard that Brodjonegoro believes is possible. He contends Indonesia's vast diversity presents an opportunity to enhance the effectiveness of its higher education system (Brodjonegoro, 2016).

5. Conclusion

The Indonesian higher education sector is facing significant challenges in an increasingly globalised environment. Addressing these challenges requires enhancing human capability development to meet both current and future demands. Successfully navigating these issues will necessitate a robust foundation in pedagogy such as curriculum development reform, faculty training and research funding. A transformation of university approaches, aligning educational services with the needs of individuals, communities, and research efforts (Brodjonegoro, 2002a). Brodjonegoro envisions an Indonesian education system that is globally competitive, inclusive, and innovation-driven—one that meaningfully contributes to socio-economic growth and positions Indonesia as a knowledge-based economy.

This paper has explored Brodjonegoro's proposed Blueprint for Change, contextualising it within global higher education trends. By examining the theoretical and practical elements of Brodjonegoro's framework, this analysis sheds light on the necessary future directions for Indonesia's educational reform. Through a critical evaluation of Brodjonegoro's work and its practical applications, this paper also

highlights the potential long-term impact of these reforms on Indonesia's advancement as a knowledge-driven economy and its role in the global landscape.

As Indonesia seeks to enhance the global competitiveness of its higher education system, the landscape ahead presents both opportunities and strategic imperatives. The internationalisation of Indonesian universities will require a focus on developing frameworks that promote human mobility, such as reciprocal partnerships with foreign institutions, joint degree programs, and accessible pathways for international students and faculty, in addition to infrastructure investments and global benchmarking. Indonesia's human capability development will need to address key elements including aligning curriculum with global standards, enhancing English language proficiency across programs, and investing in digital infrastructure to support remote and hybrid learning, which is essential for expanding Indonesia's global academic reach.

Furthermore, fostering a research environment that aligns with global sustainability and innovation priorities, while remaining responsive to Indonesia's socio-economic needs, will be crucial in positioning the country in a global economy. Future research could entail examining how universities are building and maintaining partnerships with industry and communities to equip students with practical, workforce-relevant skills. Creating policies that support student and faculty exchanges and recognising international qualifications can also drive Indonesia's higher education sector to facilitate greater human mobility, while also attracting talent and building a globally aware workforce.

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