

**Bridging Myanmar's
University-Industry Gap: An AI-Enabled
Framework for Strengthening
University–Industry Collaboration**

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Abstract

University–industry collaboration (UIC) is a critical driver of innovation, human capital development, and knowledge-based economic growth. University–industry collaboration (UIC) in Myanmar is significantly constrained by limited research capacity, weak trust mechanisms, and information asymmetries, alongside other challenges such as underdeveloped digital infrastructure, insufficient AI-skilled human capital, fragmented governance, and outdated educational curricula. To address these issues, this study introduces an AI-enabled collaboration ecosystem operating in two stages: a Pre-Collaboration Decision Support System, which optimizes partner matching and evaluates institutional credibility, and a Post-Collaboration Support System, which deploys a structured collaboration toolkit to guide partnership implementation. The framework seeks to promote sustainable and transparent partnerships that mitigate the structural and institutional barriers while promoting equitable participation among emerging and established institutions. Furthermore, our research includes the current AI development stage of Myanmar which will be useful for related stakeholders to refer to assess the AI landscape in Myanmar. All of these insights and the framework

from the research regarding Myanmar's context also provide guidance for other ASEAN and Timor-Leste countries seeking to align human capital development with digital transformation initiatives.

1. Introduction

Artificial intelligence (AI) is rapidly transforming education and research systems across the world. From intelligent tutoring tools to data-driven policymaking, AI is reshaping how knowledge is produced, shared and applied. Within the ASEAN region, countries such as Singapore, Malaysia, and Thailand have begun integrating AI into their education systems to improve access, equity, and innovation. In such countries, university–industry partnerships function as engines of innovation, offering students clear pathways into research and development careers.

However, in Myanmar, there is a persistent gap between universities and industrial companies and the progress remains limited due to deep-rooted structural and institutional constraints, leading to skill mismatch and talent loss which hinders technological advancement and human capital development for the knowledge-based economy.

To highlight the barriers, firstly, Myanmar's educational and research landscape faces chronic underfunding, limited research incentives, and low salaries for academic and technical specialists (Han Tin, 2008; Marcon, 2022; Nam et al., 2015). Secondly, many universities operate with outdated curricula and insufficient laboratory facilities, leaving them ill-equipped to support AI-related learning or experimentation (Han Tin, 2008; Barriers and facilitators, 2023; Arup Group, 2023). Thirdly, there is a lack of the inadequate digital infrastructure and limited access to computing resources for research environments. Finally, political instability and governance challenges restrict academic freedom and foster the absence of long-term national strategies for science

and technology, creating an environment in which researchers and educators struggle to thrive (Marcon, 2022; ILO, 2022).

All of those constraints result in students, especially trained in science, technology, engineering, and mathematics (STEM), not ready to thrive in an innovative and knowledge-driven economy. This persistent loss of talent weakens Myanmar's institutional capacity and undermines its ability to innovate locally, regionally and globally. (Marcon, 2022; Nam et al., 2015; Tun et al., 2025). As for the industrial companies sector in the private sector, they experience the lack of the expertise needed to adopt and scale AI-driven innovations. The erosion of human capital also has long-term consequences not only for higher education but also for the country's broader socioeconomic and technological development.

In response to these challenges, this paper investigates how structural, institutional, and political factors contribute to talent loss in Myanmar's AI education sector, and proposes actionable solutions to reverse this trend. The specific objectives are to:

1. Examine the institutional, political, and economic factors driving talent loss in higher education and AI fields;
2. Analyze the social, ethical, and cultural implications of weak UIC for Myanmar's development and
3. Recommend AI-Enabled Collaboration Ecosystem to strengthen local capacity, prevent talent loss, and promote equitable participation in AI education.

By framing weak UIC as both a symptom and a driver of Myanmar's educational and technological stagnation, this study underscores that retaining skilled human capital is essential for establishing an inclusive and sustainable AI ecosystem. Insights drawn from Myanmar's experience may also provide valuable lessons for other ASEAN and Timor-Leste contexts facing similar

challenges in balancing human resource development with digital transformation.

2. Related Work

The advancement of artificial intelligence (AI) within Myanmar's education sector is severely constrained by multiple structural and institutional barriers. The main challenges to Myanmar's AI development can be understood through two main interrelated deficiencies: **weak university–industry collaboration and outdated, inflexible curricula**. Literature on innovation systems notes that institutional misalignments, transactional barriers, and limited resources impede effective knowledge transfer and commercialization (Barriers and facilitators, 2023). In Myanmar, these obstacles are particularly acute: universities lack structured mechanisms for collaboration, limiting opportunities for shared research outputs or innovation pipelines. (Barriers and facilitators, 2023)

Curricular stagnation deepens this divide. Most higher education programs remain outdated and unresponsive to evolving technological demands, producing graduates who lack competencies in AI, machine learning, and data science (Han Tin, 2008). Myanmar also ranks among the lowest in ASEAN in ICT readiness, reflecting slow AI adoption and persistent infrastructure gaps such as limited computing resources, unreliable broadband access, and a lack of curated datasets (Machmud et al., 2021). These constraints make it difficult for universities to engage in applied AI research, preventing meaningful experimentation or innovation.

The consequences of these systemic limitations are profound and talent loss continues to be one of the most visible outcomes. International AI readiness assessments rank Myanmar 149th globally in AI readiness in healthcare, underscoring deficiencies in governance, infrastructure, and institutional capacity (Tun et al., 2025).

These structural gaps also exacerbate internal inequalities. Research indicates that digital literacy and technology access correlate closely with household income and geography, meaning AI-related benefits accrue primarily to urban, higher-income populations (Thida & ThaZin, 2023). This reinforces existing socioeconomic divides, leaving rural communities without equitable access to AI-enabled opportunities. Additionally, Myanmar's dependence on external AI solutions raises concerns of cultural misalignment, as foreign-developed systems may overlook local linguistic and contextual needs (Marcon, 2022; Arup Group, 2023).

3. AI Landscape & Context

The advancement of artificial intelligence (AI) in Myanmar is shaped by the nation's digital transformation agenda but constrained by systemic challenges in governance, infrastructure, and human capital. This section outlines Myanmar's current AI policy direction, sectoral context, and overall readiness for AI adoption together with foundational dimensions for understanding the country's broader digital and developmental pathway.

3.1 National Policy and Governance Framework

Myanmar has begun integrating AI into its development policy discussions. In February 2025, the Ministry of Science and Technology announced progress toward drafting a National AI Strategy and Policy to promote AI across key sectors, establish ethical standards, and strengthen cooperation with international partners (Xinhua, 2025). Despite this initiative, Myanmar still lacks a formal AI governance framework. Institutional fragmentation and limited regulatory capacity have slowed the development of data protection, algorithmic accountability, and responsible AI principles (US-ASEAN Business Council, 2023).

Subsequently, AI is indirectly governed through broader digital strategies, such as the Myanmar Digital Economy Roadmap 2018–2025, which promotes innovation and digital trade, and the E-Governance Master Plan 2030, which emphasizes digital government transformation as a growth driver (Ministry of Information [MOI], 2024). However, legal experts note that these policies provide little direction for AI-specific regulation (Law Gratis, 2024).

3.2 Sectoral Context: Education and Technology

The education and technology sectors serve as the foundation for AI development, yet both remain under-equipped. Myanmar's higher education institutions generally lack curricula that address emerging fields such as data science, machine learning, or automation. As a result, graduates often struggle to meet global skill demands, contributing to a steady loss of talent (Access Partnership, 2023). As the core issues, weak university–industry collaboration, limited research funding and outdated laboratory infrastructure hinder innovation and applied AI research.

In the technology sector, infrastructural and socioeconomic limitations are dominant barriers. Internet penetration stands at around 44 percent, and rural areas experience inconsistent electricity access which are both critical constraints on digital growth (Access Partnership, 2023). Private-sector adoption of AI remains limited to digital marketing, fintech, and small-scale automation in logistics. While young entrepreneurs increasingly use generative AI tools for content creation and translation, overall integration remains fragmented and uncoordinated (Myanmar Political Observer, 2024).

3.3 Readiness: Technology, Human Capital, and Infrastructure

International benchmarks consistently rank Myanmar among the least prepared in ASEAN for AI

integration. The Government AI Readiness Index 2023 placed Myanmar **126th globally** and **9th in ASEAN**, with a readiness score of **32.5**, reflecting weaknesses in infrastructure, human capital, and governance (Oxford Insights, 2023; ERIA, 2024). Similarly, Myanmar scored below regional averages in the Network Readiness Index and ICT Development Index (Oxford Business Group, 2020).

The country's low AI readiness can be attributed to several key structural gaps:

1. **Infrastructure Deficit** – Limited broadband access and unreliable electricity hinder data-center development and AI research (Access Partnership, 2023).
2. **Human Capital Gap** – Outdated educational systems and limited professional training restrict the supply of AI-skilled workers (US-ASEAN Business Council, 2023).
3. **Data and Research Ecosystem** – Absence of open datasets and cloud computing resources restricts local experimentation.
4. **Governance and Ethics** – The absence of clear AI regulatory mechanisms exposes Myanmar to risks of unethical deployment (Law Gratis, 2024).

4. Problem Dynamics

University–industry collaboration (UIC) in Myanmar remains an emerging but underdeveloped component of the national innovation system, constrained by institutional, financial, and sociocultural barriers. Evidence shows that while universities have begun engaging in consulting, training, and limited research partnerships, these activities are not sufficiently aligned with industry needs, nor do they match the absorptive capacity of the private sector (Ei Ei Htwe, 2017). Industries express interest in licensing, joint research, and spinoff development, but these mechanisms remain largely absent due to low R&D investment and

the lack of technology transfer infrastructure.

Myanmar's R&D intensity is one of the lowest globally, with gross expenditure on R&D at only 0.02% of GDP and just 28 researchers per million population (WIPO, 2023). These structural limitations hinder the commercialization of academic research and prevent the country from transitioning toward an innovation-driven economy (Sinha, 2018). Higher education system weaknesses further exacerbate these challenges. Disparities in educational access, outdated facilities, and minimal research funding reduce both academic credibility and institutional capacity, making high-impact collaboration difficult (World Bank, 2020).

The private sector often questions the relevance and reliability of academic outputs, partly because Myanmar has no universities ranked in major global or regional rankings, limiting international visibility and industry confidence (WIPO, 2023). Moreover, corporate R&D investment is extremely low, with major firms contributing little to national research output. Culturally, universities have historically prioritized teaching over research or entrepreneurship, leaving minimal institutional space for innovation-oriented collaboration (Halász & Khin Khin Thant Sin, 2023).

Structural governance gaps further impede UIC. Myanmar lacks strong Science, Technology, and Innovation (STI) institutions capable of coordinating national research priorities. There is no fully operational national research council, limited publicly funded research organizations, and no centralized STI data system, resulting in fragmented and temporary collaborations (Ei Ei Htwe, 2017). Universities lack technology transfer offices, performance-based funding, and clear guidelines for industry engagement. These gaps undermine trust and prevent long-term partnerships between universities and industries.

The consequences of weak UIC are extensive ,especially in the four main dimensions below:

- **Economic** – Low R&D investment and limited collaboration prevent the emergence of high-tech industries and restrict innovation among SMEs. Myanmar remains dependent on low-value-added sectors such as agriculture and labor-intensive manufacturing
- **Social** – Weak UIC limits students' access to industry-relevant skills, worsening skill mismatches and lowering youth employability
- **Cultural** – Universities are often perceived as disconnected from real-world challenges, weakening public confidence in the higher education system
- **Ethical** – Inequality deepens as only a small number of institutions with international connections gain access to research funding and capacity-building opportunities (Sinha, 2018).

Strengthening university–industry collaboration in Myanmar requires systemic reform, but most mechanisms remain partially implemented or at pilot stage. The National Council for Science, Technology, and Innovation Development (NCSTID) exists but lacks sufficient authority and funding, while online directories of research facilities provide some transparency yet are not fully updated (Ei Ei Htwe, 2017). Workshops, project showcases, and Japan International Cooperation Agency(JICA)-supported training programs have begun to build human capital, but performance-based faculty incentives, technology transfer offices, and joint graduate supervision with industry are largely absent or limited to small pilots (Halász & Khin Khin Thant Sin, 2023; Sinha, 2018). Occasional conferences and exhibitions exist, but they are not institutionalized. With only 28 researchers per million population, 0.02% of GDP spent on R&D, and no top-ranked universities or corporate R&D investment (WIPO, 2023), Myanmar's innovation

system is at a very early stage of growth. Scaling these initiatives with coherent policy, sustained funding, stronger institutional support and technology innovation is essential to enable universities, industries, and government to collaboratively drive economic modernization, social development, and long-term national competitiveness.

5. Solution framework

To address Myanmar's longstanding limitations in university–industry collaboration, characterized by weak research commercialization, low R&D expenditure (0.02% of GDP), and minimal researcher density (28 FTE per million people) (Ei Ei Htwe, 2017), this study proposes an AI-enabled collaboration ecosystem that supports the full lifecycle of academic–industry partnerships. With the inspiration from transnational co-innovation frameworks that integrate social-science understanding with artificial intelligence to strengthen network trust and knowledge flows (Cai et al., 2019), our new innovative system leverages AI-based recommendation system to match and recommend suitable partners across Myanmar and ASEAN, incorporating institutional context, sectoral needs, and ethical credibility scoring. Beyond matching, the solution is designed as a complete collaboration support environment by including structured communication and documentation tools to ensure that recommended partnerships can be transformed into actionable, sustained, accountable co-innovation rather than superficial or short-term project engagements. By combining algorithmic decision support with mechanisms that nurture procedural trust and transparency, the system aims to reduce asymmetric expectations between universities and firms, empower evidence-driven collaboration, and ultimately contribute to Myanmar's transition toward a competitive, knowledge-based economy.

5.1 Pre-collaboration Support System

As in Figure 1, this pre-collaboration stage comprises the AI-driven algorithms to give quality recommendations of possible partners for university-industry collaboration.

Input Layer: Universities and Companies in Myanmar and ASEAN

The system collects structured data from universities and firms across Myanmar and ASEAN, including research areas, laboratory and infrastructure capacity, patent or innovation portfolios, funding availability, and collaboration preferences. Universities additionally provide information on academic expertise, publication records, and research readiness, while firms report industry sector, technology needs, timelines, commercialization goals, and investment potential. This comprehensive dataset addresses the underutilization and incomplete representation of Myanmar's research capacity, where existing directories and inventories remain partial or outdated (Ei Ei Htwe, 2017), and allows the system to consider both strong and emerging institutions in partnership recommendations.

AI Recommendation Engine with Contextual Factors

The recommendation engine evaluates potential partnerships using contextual factors such as regional development priorities, research alignment, intellectual property considerations, R&D absorptive capacity, and socio-economic constraints. The engine balances technical compatibility with socio-economic and institutional realities, including Myanmar's limited innovation infrastructure (Gábor Halász & Khin, 2022). By integrating these factors, the system produces more realistic and sustainable collaboration options that enable not only strong-to-strong but also weak-to-weak or weak-to-strong partnerships, promoting capacity development and inclusive innovation.

Credibility Scoring Using AI

To overcome trust deficits, weak reputation systems, and information asymmetry identified as core barriers to effective university-industry collaboration in Myanmar (Ei Ei Htwe, 2017; Sinha, 2018), our solution also integrates an AI-driven credibility scoring model. Unlike conventional global ranking systems that disadvantage emerging R&D ecosystems, the proposed scoring mechanism applies multi-criteria reputation learning, combining research quality, historical collaboration success, human capital metrics, publication clusters, patent networks, and organizational commitment to innovation.

To address the unique regional asymmetry, the model calibrates its evaluation logic based on user context:

- For ASEAN users, the score highlights Myanmar institutions with emerging capabilities, niche specializations, or impact potential, ensuring that low-baseline institutions can still be discovered when they demonstrate growth trajectories rather than top-tier output alone.
- For Myanmar users, credibility scoring becomes a decision-support tool to identify trustworthy external partners and evaluate domestic institutions fairly, rewarding progress and consistency rather than absolute performance.

This context-sensitive approach to institutional trust uses machine learning techniques such as Multi-Criteria Decision Making (MCDM) and Graph-based Reputation Learning, which have been validated in collaborative network and research evaluation systems (Hezam, 2023; Maral, 2024; Huo et al., 2024). By reframing credibility from an absolute ranking into relative, transparent, and growth-oriented benchmarking, the platform reduces uncertainty, builds confidence in collaboration choices, and supports equitable knowledge exchange across uneven innovation landscapes.

Output Layer: Suggested University–Industry Partnerships

The system generates a ranked set of recommended partnerships, complete with credibility scores, contextual rationale, and projected collaboration value. Beyond identifying optimal matches, the system provides transparent explanations to strengthen and facilitate informed decision-making (Cai et al., 2019). By including universities and firms from across ASEAN, the platform helps overcome Myanmar's low research capacity and weak innovation infrastructure, creating opportunities for co-supervision, shared laboratories, cross-border projects, and capacity-building initiatives that generate both social and economic impact.

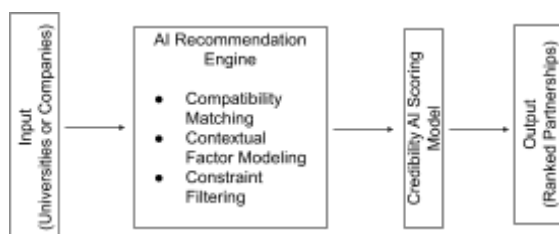


Figure 1: AI-Enabled Pre-Collaboration Decision Support System for University–Industry Partnerships

5.2 Post-collaboration Support System

Once stakeholders receive the recommended university-industry matches, the system should provide a structured foundation for the next step of collaboration planning. To better understand how universities can effectively collaborate with industry and other academic institutions, this research investigates the factors, trends, and technologies that facilitate open innovation. The systematic literature review identified seven key domains: Social Behavior, People, Process, Organization, Environment, Technology, and Performance that form the framework for effective university collaboration in open innovation (Fitriasari, Sensuse, Hidayat, & Purwaningsih, 2024). Based on this framework, the following section presents the design of a Post-Collaboration Support System, which

operationalizes these domains into practical tools, workflows, and decision-support mechanisms to facilitate structured and efficient partnerships.

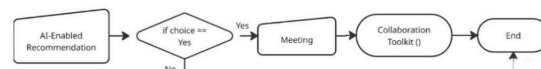


Figure 2: Post-Collaboration Support System for University–Industry Partnerships

The proposed Support System is designed to support university-industry and inter-university collaborations by providing flexible, stage-specific tools tailored to different levels of engagement (Joiko et al., 2019). After users review and accept the recommended partnership, the system facilitates an initial meeting between the potential collaborators to clarify interests, expectations, and areas of alignment. Following this first meeting, the system then directs users to a Collaboration Toolkit, which provides structured guidance for each party involved in the collaboration. The toolkit includes standardized procedures that outline step-by-step workflows and responsibilities for universities, industry, government, and other partners. In addition, the toolkit offers shared workspace tools to support real-time collaboration, document sharing, and joint project management. Agreement templates, including contracts, intellectual property agreements, and confidentiality arrangements, further simplify the formalization of partnerships. Research highlights the importance of these structures: Lee (2011), in a case study of the Tokyo Institute of Technology, found that formalized arrangements and institutional commitments facilitated more exploratory research and larger-scale interdisciplinary collaboration.

Collectively, this stage along with Pre-Collaboration Decision Support System enables universities and industrial companies to address structural and resource constraints, thereby promoting

broader and more equitable participation in interdisciplinary innovation for university-industry collaboration.

6. Discussion

In this study, we set out to address the critical question of how to strengthen university–industry collaboration (UIC) in Myanmar through an AI-enabled ecosystem, given the country’s limited research capacity, talent loss and weak trust mechanisms. Our key findings indicate that a recommendation engine calibrated with institutional capacity, research alignment, and contextual socio-economic factors combined with a credibility scoring model can offer more equitable and strategic partner matching. By integrating structured communication tools, the proposed system has the potential to transform superficial or transactional engagements into sustained, transparent co-innovation.

These results have substantial implications. If implemented, such a system could accelerate Myanmar’s innovation capacity by lowering information asymmetries, building procedural trust, and directing scarce resources toward collaborations with the greatest potential impact. From a practical standpoint, universities could more easily identify credible partners, while firms, particularly smaller ones could gain access to relevant academic expertise, aligning with evidence that small businesses in emerging economies benefit from university linkages when risk and uncertainty are reduced (Storz et al., 2021). Moreover, credibility scoring and decision-support mechanisms could compensate for structural barriers that undermine trust in nascent innovation ecosystems (a challenge documented in other developing markets (Kleiner-Schaefer & Schaefer, 2022)). All of these solutions will enhance university-industry collaboration, leading to helping the talent loss problem in Myanmar for the innovative and knowledge-based economy.

However, the study has some limitations. Our proposals remain theoretical: we did not yet pilot the system in real-world settings in Myanmar, so its effectiveness, adoption challenges, and impact are not empirically validated. Additionally, while the multi-criteria decision-making (MCDM) approach is promising, its success depends heavily on the accuracy and timeliness of input data, which may be difficult to obtain in low-capacity institutions like Myanmar. Finally, the credibility model’s fairness and cultural sensitivity will require careful calibration to avoid reinforcing existing hierarchies or excluding emerging institutions.

For future research, empirical pilot studies are essential: deploying the system in a sample of Myanmar universities and firms could test usability, adoption barriers, and real-world outcomes. Comparative studies across ASEAN or other developing contexts (e.g., Timor-Leste) would help generalize the framework. Further work could also explore how to integrate “brain-bridge” networks into the system, leveraging mobile scientists to sustain international ties even if they do not return home permanently (From Brain Drain to Brain Bridges: How Mobile PhD Scientists Connect Home Countries to Global Science, 2025). Lastly, refining the MCDM and trust model with participatory inputs from local stakeholders would enhance transparency, legitimacy, and contextual fit.

7. Conclusion

This paper presents Myanmar’s persistent talent loss and weak university–industry collaboration stem not only from limited infrastructure and funding, but also from a lack of trust, fragmented governance, and insufficient mechanisms to translate academic knowledge into innovation. By proposing an AI-enabled collaboration ecosystem that combines partner-matching, context-aware credibility scoring, and structured post-collaboration support, the research offers a practical pathway to

reduce information asymmetry, build procedural trust, and incentivize equitable, long-term engagement between universities and industry.

Although the framework still requires pilot implementation and local calibration, it demonstrates how AI can go beyond technical efficiency to support inclusive innovation in environments with constrained capacity. Key takeaways for ASEAN and Timor-Leste from this research include the value of growth-oriented reputation systems over traditional rankings, the need to design collaboration tools that support emerging rather than only well-established institutions, and the importance of transparency mechanisms that build trust in early-stage innovation ecosystems. Strengthening such collaboration structures is essential for retaining talent, improving research relevance, and advancing more equitable, knowledge-based development not only for Myanmar but also across ASEAN and Timor-Leste region.

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