ASEF HIGHER EDUCATION innoLab

White Paper for Universities on Navigating Artificial Intelligence Innovation Ecosystems in

AI for Sustainable Development

Lead Authors

Yang BONG
University of Nottingham, United Kingdom

Sharina YUNUS
Universiti Teknologi Brunei, Brunei Darussalam

Contributing Authors

Rashikala WEERAWARNA
Holmesglen Institute of TAFE, Australia

Roman SENKERIK
Tomas Bata University, Czech Republic

Rui TAN
Nanyang Technological University, Singapore

Tehreem MASOOD
The Superior University, Pakistan

Thomas LEONI
University of Applied Sciences Wiener Neustadt, Austria

Timothy WAWN
Nazarbayev University, Kazakhstan

Vanessa CAMILLERI
University of Malta, Malta

Editors

Claudio RIVERA
RTU Riga Business School, Latvia

Cleo CACHAPERO
Asia-Europe Foundation

Martin HAMMERBAUER
Asia-Europe Foundation

ASIA-EUROPE FOUNDATION · 復旦大學 FUDAN UNIVERSITY · AE4AI NETWORK

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Executive Summary

With only 17% of SDG targets on track for 2030, AI has emerged as a powerful catalyst for transformative change. Higher education institutions (HEIs), as hubs of innovation and talent development, are uniquely positioned to harness Artificial Intelligence's (AI) transformative potential for sustainable development.

A systematic examination of institutional approaches to AI-SDG integration, drawing from consultations with distinguished experts from the AE4AI network comprised of senior university leaders, and academic researchers from Asia and Europe, revealed distinct patterns of engagement - from established leaders to emerging adopters. This diversity in institutional readiness presents a number of opportunities to address identified challenges and builds a compelling case for universities to take decisive action in leading the AI-SDG transformation. Based on these findings, Five (5) Bold Moves were identified as critical pathways for universities to advance their AI-SDG capabilities and establish leadership:

Bold Move 1: Revolutionise Ranking Metrics by aligning incentives with SDG impact measurements

Bold Move 2: Stop Competing, Start Collaborating by catalysing global partnerships for AI-SDG innovation

Bold Move 3: Build Future-Ready Curricula through the test for a comprehensive AI-SDG integration

Bold Move 4: Champion Open Data Access through open AI-SDG repositories

Bold Move 5: Move Beyond Tenure and Embrace Lifelong Learning to promote faculty development

By implementing these bold moves, universities can position themselves at the forefront of AI-enabled sustainable development. Those who act decisively now will emerge as influential leaders in shaping our global future. Success demands not just commitment, but immediate and sustained action to drive lasting impact.

Current Status Quo and Importance

Universities have traditionally served as centres of learning, research hubs, and catalysts for societal transformation. As centres of learning, they shape future leaders and innovators. As research hubs, they drive technological breakthroughs and knowledge creation. As community anchors, they translate innovation into tangible societal benefits. This established role uniquely positions them to leverage AI's potential for advancing sustainable development.

There are increasing expectations for universities to demonstrate their sustainability impact, as seen in the growing prominence of the Times Higher Education Impact Rankings and QS Sustainability Rankings, which assess universities against the SDGs as well as their governance,

environmental and social impact. These signals a broader shift towards universities playing a leading role in advancing sustainable development.

Drawing from consultations of 30 experts across Asia and Europe, analysis of the current landscape revealed two distinct university archetypes in AI-SDG integration. The first comprises of established institutions actively embedding AI-SDG initiatives throughout their strategic plans, research agendas, and curricula. The second consists of emerging institutions in the early stages of AI-SDG adoption, where integration efforts are either in planning phases or initial implementation.

In this section, we examine AI's transformative potential for sustainable development, analyse current university engagement patterns, and explore higher education's important role in the AI-SDG ecosystem.

AI's Transformative Power

As a transformative technology, AI is increasingly recognised as a powerful enabler for sustainable development, with the immense potential to drive significant progress across the three key pillars of the SDGs: economic, environmental, and social (Vinuesa et al, 2020; Nasir et al., 2023). Economically, AI has the potential to accelerate economic growth and improve resource efficiency by driving automation, enhancing real-time data analysis and enabling more informed decision-making, seen across a range of industries such as manufacturing, finance and transportation (Nti et al., 2022; Peng et al., 2023). Socially, AI is revolutionising key areas of the SDGs such as healthcare by facilitating personalised treatments, supporting telemedicine, and improving diagnostic accuracy. It has also been adopted in other sectors that impact society such as urban planning, further fostering the sustainability of cities and communities (Singh et al., 2023). Environmentally, AI has the potential to support sustainability by optimising energy use, advancing renewable energy adoption, protecting biodiversity and mitigating climate change (Akter, 2024; Leal Filho et al., 2024).

Across Asia and Europe, HEIs are observed to have increasingly leveraged AI in advancing SDGs through integrating AI development and application into real-world solutions (Goralski & Tan, 2020; Sætra, 2021) A 2023 survey across 38 countries revealed a growing trend in AI adoption for sustainability research, with 76% of academics engaged in SDG research, and 50% actively using AI in their SDG-related projects, marking a pivotal shift in universities' approach to sustainability challenges (Filho et al., 2023). Despite its promise, deploying AI for SDGs presents clear challenges, especially in ensuring equitable access and ethical implementation (Aderibigbe et al., 2023). Universities, as institutions dedicated to the public good are uniquely positioned not only to lead in advocating for responsible AI development, but also to champion AI research and deployment to advance the SDGs, emphasising the importance of driving cutting-edge solutions in addressing the most pressing global challenges. Aligning AI advancements with sustainable development principles hence is crucial in mitigating the imbalance of AI development that could often prioritise economic applications over social and environmental needs (Nasir et al., 2023).

Institutional Archetypes and Engagement in AI for SDG

Our first archetype of HEIs comprises those that are currently engaged in deploying AI for SDGs. These institutions are distinguished by several key characteristics such the large pool of expertise in AI and sustainability, resource-rich infrastructure, and strong government backing to drive cutting-edge research in addressing global challenges. These institutions typically have a strong and established track record in AI and sustainability research allowing them to leverage their reputation to secure institutional grants and external partnerships to advance their footprint in AI for SDGs.

However, these universities are often constrained by traditional ranking metrics, which prioritise specific outcomes such as research publications volume and institutional reputation. As a result, they may focus on stakeholder-driven research to maintain or improve their rankings. Their reliance on meeting stakeholder demands can restrain research independence, aligning priorities with influential interests rather than broader societal needs. In addition, this may also potentially reduce incentives for exploring high-risk research areas, possible even with a narrower research focus agenda, leading to AI for SDG research that may be overly saturated in the Global North, (Vinuesa et al, 2020). Furthermore, their global prominence also exposes them to geopolitical tensions, potentially disrupting international collaborations and funding, complicating their ability to contribute to AI research for SDGs consistently.

The second archetype of HEIs constitutes those that are in the early stages of AI-SDG adoption. These institutions are prevalent in the Global South but are also widespread across the Global North. They may face several barriers that restrict their ability to prioritise AI research and application for SDGs. These HEIs are characterised by a lack of AI infrastructure, shortage of skilled talent in the relevant fields and wider financial limitations for AI research and development. Additionally, these HEIs experience change resistance at both institutional and departmental level, which is exacerbated by gaps in local policies and governmental funding that restricts the potential of these institutions from leveraging AI technologies for addressing SDGs, both locally and internationally. However, these HEIs possess a multitude of opportunities to further develop their capabilities in AI for SDGs, for example, forming partnerships with other universities, industries, and governments by leveraging on the strengths and resources of their partners for mutual development.

The Pivotal Role of Universities

Understanding the institutional archetypes and their current state from established leaders to emerging adopters reinforces the critical need for universities to champion AI-enabled sustainable development. The diversity in the level of institutional engagement reveals the untapped potential for universities to drive AI-enabled sustainable innovation, regardless of their current capabilities.

Undoubtedly, AI represents a generational opportunity to accelerate and transform sustainable development on a global scale. However, its potential can only be fully unlocked through responsible and inclusive deployment. Universities stand at the forefront of this transformation, not only as hubs of knowledge creation and innovation but as leaders in aligning cutting-edge research with global sustainability goals.

For university leaders, prioritising AI for SDGs is not just an option - it is a necessity. It addresses the urgent challenges of our time, from climate change to social and economic inequality, while also ensuring the long-term viability and success of the institutions. By positioning themselves at the forefront of AI research for sustainability, universities can attract critical funding and talents, build meaningful partnerships and train future workforce equipped to tackle the grand challenges that resonate globally. This leadership not only strengthens their reputation but also secures a competitive advantage in an academic and funding landscape increasingly centred on sustainability.

The strategic imperative is clear: universities must act decisively to lead in harnessing AI for SDG or risk falling behind, losing relevance, research opportunities, and the ability to draw top talent in an increasingly sustainability-focused world.

Challenges and Opportunities

As highlighted by Palomares and colleagues (2021), significant gaps remain in the leveraging of AI for SDGs by HEIs. While some universities have embraced AI for SDGs and others are emergent adopters, significant barriers exist that hinder progress in the uptake of impactful research in the area. In this section we summarise the overarching opportunities and challenges that universities face as they prioritise and deploy AI for sustainable development, providing insights into how these institutions can overcome obstacles and capitalise on the potential of AI for sustainable innovation.

Challenges for Universities in Leveraging AI for SDGs

a. Lack of resources

While leading HEIs in developed nations may possess the infrastructure, data, and funding to develop sophisticated AI systems to leverage AI for sustainable development (Vinuesa et al., 2020; Filho et al., 2023), under-resourced HEIs face significant barriers, particularly in accessing the computational power and datasets required for AI research. Even though there is progress amongst universities with high engagement in AI for sustainability, this resource gap reinforces existing global inequalities, undermining the meaningful participation of less-resourced HEIs in AI-driven sustainability efforts and exacerbating the existing digital divide between developed and developing nations (Kaneshige & Hong, 2018).

b. Lack of strong incentives to invest in AI for sustainable development

Under current models of measuring success, universities are primarily incentivised to excel in research output and teaching quality, measured by metrics such as publications, citations and student satisfaction surveys. This focus on traditional university ranking metrics can often divert attention from broader sustainability goals. Consequently, there is less motivation to invest resources in addressing grand challenges like the SDGs which currently have limited impact on university rankings. Moreover, the growing trend of de-globalisation and shifts in geopolitical environment may further de-prioritise global sustainability goals in favour of national or regional interest (Gerrard M.B., 2024).

c. Funding gap in AI for sustainable development

As investments in AI for sustainable development do not typically yield traditional return on investment such as profitability or intellectual property gains, universities may lack the incentive to prioritise such opportunities. According to a recent McKinsey report, 55% of grants for AI research and deployment across the SDGs are $250,000 or smaller and remain in the research and innovation phase, indicating the absence of strong investment in the AI for SD projects (McKinsey & Company, 2024). Universities would find it a challenge to develop AI capabilities in the SDGs needed to research and scale these AI applications, reflected in the underfunding of AI for SDGs and the limited success of research transitions into real-world applications that address sustainability challenges (Kulkov et al., 2023).

Opportunities for Universities in Leveraging AI for SDGs

There are, however, significant opportunities for universities to lead in championing sustainable development by taking on the pivotal role of developing and deploying AI technologies in getting the SDGs back on track. These opportunities include:

a. Building specialist knowledge and becoming thought leaders in sustainable development

Sustainable development is a dynamic and critical field, offering universities the opportunity to lead by harnessing AI to drive the creation of new knowledge in this burgeoning field. Universities can position themselves as hubs of advanced research and innovation in sustainability, ensuring their relevance in an era where innovative ecosystems are rapidly transformed due to the impact of AI (Wawn et al, 2024). Leveraging AI for sustainable development not only supports the SDGs, but also alleviates universities' financial pressures by attracting funding, and positions them to lead on the ethical, legal, and societal implications of AI and the future of information.

b. Forming collaborations and partnerships in sustainable development

Collaborative efforts in sustainable development are essential for shaping policy and resource allocation, which also improves research outcomes and knowledge creation. Universities that pool their resources in sustainability initiatives can achieve greater collective impact (Caniglia et al., 2018; Sadic, 2024). Opportunities exist for universities across the board to engage in joint research on sustainable development and to share AI infrastructure, particularly where there is a complementary strength between institutions in the Global North and South. Such collaboration enables resource pooling, enhances research capabilities in sustainability, and drives impactful outcomes on a global scale.

c. AI for sustainability on campus and in universities' ecosystems

Universities have a unique opportunity to drive significant sustainability improvements on their own campuses and the wider university ecosystems. Leveraging AI, campuses can serve as living labs for sustainability innovation and adopt a circular economy mindset. Examples include conserving resources, such as electricity and water in campus buildings by optimising the operation of relevant systems. Additionally, rethinking education and curricula with AI and SDGs presents a transformational opportunity to prepare staff and students to address global challenges effectively. As drivers of change, universities can also disseminate sustainability practices to the various

surrounding communities, thus broadening the scope of the impact further. This could also lead to increased opportunities to create a practice-driven alliance between universities and diverse societal groups.

Bold Moves, Guiding Principles, and Key Actions

The status quo analysis highlights the strategic necessity for universities to take decisive action in leveraging AI for sustainable development, positioning themselves as leaders in shaping sustainable futures. The challenges and opportunities identified in the previous section highlight not just the potential for transformation, but the imperative for action. The following bold moves offer a strategic framework for university leaders to establish their institutions as leaders in AI for sustainable development, driving meaningful, equitable and sustainable solutions to the world's most pressing challenges while providing a clear roadmap to achieve this vision.

Bold Move 1: Revolutionise University Rankings!

Are your Key Performance Indicators (KPIs) driving real impact? Traditional university rankings often prioritise metrics that inadvertently limit the incentives for universities to prioritise advancing the SDGs. To address this, universities should agree on an evaluation system that focuses on impact-centred metrics, highlighting contributions to the SDGs. This should include the reallocation of grants and scholarships to support sustainability-focused research and initiatives, ensuring that resources are directed toward meaningful and transformative outcomes. By aligning success metrics with the SDGs, universities can incentivise outputs that drive societal and environmental progress—an increasingly critical area in global ranking systems.

Guiding Principle: Impact-Driven Excellence

Traditional university rankings often prioritise conventional metrics, often overlooking real-world impact. This principle advocates for a fundamental shift toward measuring and rewarding universities based on their meaningful contributions to sustainable development. By redefining excellence through the lens of AI-enabled sustainability impact, universities can align their strategic priorities with global sustainability goals while upholding academic excellence.

Key Actions

1. **Establish impact-centred evaluation metrics:** Implement a framework that prioritises impact-based metrics over traditional publication-focused systems to assess contributions to the SDGs, such as climate resilience and healthcare access. This approach clarifies the university's role in advancing sustainability.
2. **Integrate sustainability metrics into governance:** embed sustainability into the university's mission by forming a task force to develop metrics for tracking energy consumption, waste management, carbon emissions, and social impact. This data will guide target-setting and foster a culture of sustainability learning.
3. **Support student engagement in sustainability:** offer targeted scholarships and awards for students involved in AI-driven sustainability projects to cultivate future researchers and innovators, ensuring alignment with the university's SDG commitments.

4. **Launch AI startup incubation programmes:** create incubation programmes focused on developing AI solutions for specific SDGs, providing seed funding, mentorship, and resources to support innovative projects with measurable sustainability impacts. Prioritising funding for high-impact AI research will help address pressing sustainability challenges effectively.

Bold Move 2: Stop Competing, Start Collaborating!

Can we truly tackle global challenges in isolation? Universities must shift their focus from competing to collaborating, recognising that collective efforts drive greater impact. By forming strategic alliances with other HEIs, tech companies, AI providers, and private enterprises, universities can amplify their AI capabilities, enhance staff and student skills, and expand infrastructure for sustainability research. These partnerships create powerful synergies by combining complementary resources, expertise, and innovation. Together, institutions can accelerate meaningful advancements in sustainability while upholding ethical standards and fostering long-term social and environmental progress.

Guiding Principle: Collaborative Innovation

Global challenges require collective action. This principle emphasises shifting from institutional competition to strategic collaboration, recognising that meaningful sustainability impact can only be achieved through shared resources, knowledge, and capabilities. Through intentional partnerships, universities can amplify their impact while fostering an ecosystem of AI-enabled sustainable innovation.

Key Actions

1. **Establish public-private partnerships:** forge partnerships with HEIs, technology companies and private enterprises to secure funding, enhancing resources for sustainability initiatives aligned with SDGs.
2. **Collaborate with government agencies and NGOs:** Build alliances with government bodies, NGOs and other community groups focused on sustainability to gain policy support, share knowledge, and access grants for impactful AI research aligned with the SDGs.
3. **Launch industry-funded research programmes:** create AI research labs with private industries dedicated to sustainability, providing ongoing funding, and fostering collaboration to align research with industry needs.
4. **Pursue international R&D grants:** seek grants from organisations like the United Nations and World Bank to fund large-scale AI projects addressing critical sustainability challenges and expanding global impact.

Bold Move 3: Build Future-ready Curricula!

Is your curriculum future-ready? Universities need to fundamentally transform their curricula to align with the demands of a rapidly evolving world. This requires not only systematically integrating AI and SDGs concepts across disciplines but also mandating comprehensive training and

interdisciplinary projects that empower and motivates all members of the university community to contribute to impactful, solution-driven outcomes to pressing global challenges.

Guiding Principle: **Transformative Learning Education**

Evolve beyond traditional disciplinary boundaries to address complex sustainability challenges. This principle advocates for an integrated approach that embeds AI-SDG competencies across all disciplines, preparing learners to drive innovative solutions for global sustainability while adapting to rapidly evolving technological landscapes.

Key Actions

1. **Integrate AI and SDG content into curricula:** Embed AI and SDG concepts into all academic programmes, ensuring every student understands the role of AI in promoting sustainability, regardless of their discipline.
2. **Develop specialised programmes in AI and SDGs:** offer certifications or micro-credentials in AI for SDGs to attract professionals and non-degree learners seeking to develop skills in AI and sustainability.
3. **Provide mandatory training for faculty and staff:** implement mandatory training programmes for faculty and staff on the potential and responsibilities of AI in achieving the SDGs, ensuring they are equipped to integrate these concepts into their teaching.
4. **Promote hands-on learning opportunities:** Partner with industry leaders and NGOs to offer internships focused on AI for sustainability, providing students with interdisciplinary and multi-stakeholder experiences in addressing SDG-related challenges.

Bold Move 4: Champion Open Data Access!

Is your data really making an impact? To address the world's most pressing challenges, institutions must champion open data practices by making their datasets accessible and actionable. This requires not only releasing untapped data resources but also fostering a culture of transparency and global collaboration, providing data access for collaboration and co-development. By leading the way in data openness, universities can empower researchers, policymakers, and innovators to develop equitable, impactful solutions that drive progress on a global scale. By creating open-access data repositories especially of regional and environmental data, universities can empower research while partnering with stakeholders to advocate for ethical data-sharing standards.

Guiding Principle: **Open Impact**

Data accessibility drives sustainable innovation. This principle champions the equal use of AI-SDG data, recognising that open access to quality datasets accelerates collaborative problem-solving and enables equitable participation in sustainable development. Through transparent data sharing, universities can catalyse global innovation while ensuring ethical and responsible data practices.

Key Actions

1. **Implement open data policies for sustainable research:** Develop policies to ensure ethically sourced research data is accessible while respecting privacy regulations.

2. **Create shared AI infrastructure networks:** Establish resource-sharing agreements with other universities, especially under-resourced ones, to pool computational power and data resources for cost-effective sustainable AI research.
3. **Establish ethical guidelines for AI research:** Create guidelines that emphasise transparency, social responsibility, and alignment with the SDGs, ensuring accountable and beneficial AI development.
4. **Align resources with open data research:** Direct funding and support toward projects that leverage AI using open data to address global challenges and contribute to the SDGs.

Bold Move 5: Move Beyond Tenure and Embrace Lifelong Learning!

Is your faculty prepared to shape the future? Faculty members need to embrace lifelong learning to be equipped continuously with the skills and knowledge needed to in the AI era alongside pressing sustainability challenges, Universities hence must shift from traditional career models to continuous professional development. Faculty should actively engage in lifelong learning through structured programmes focused on AI applications, sustainability, and interdisciplinary SDG approaches. This will foster a culture of innovation and adaptability.

Guiding Principle: Continuous Innovation

Faculty excellence requires perpetual evolution. This principle champions a shift from traditional academic career models to dynamic professional development, recognising that effective AI-SDG leadership demands continuous learning and adaptation. By fostering a culture of lifelong learning, universities can empower faculty to lead in a rapidly evolving landscape of AI and sustainability.

Key Actions

1. **Create funding for SDG-aligned AI Research:** Establish grants and awards specifically for AI projects that contribute to sustainability and the SDGs, incentivising impactful research.
2. **Enhance career advancement for faculty:** Provide incentives such as promotion opportunities and research bonuses for faculty involved in AI initiatives aligned with the SDGs, promoting academic excellence.
3. **Foster cross-disciplinary collaboration:** Encourage partnerships across disciplines—engineering, social sciences, business—to develop innovative AI solutions for sustainability challenges.
4. **Engage the campus community:** Motivate students, faculty, and staff to participate in sustainability initiatives, reinforcing the university's commitment to measurable sustainability performance.

Conclusion and Call to Action

This white paper has explored how universities can harness the potential of AI in advancing Sustainable Development Goals. By outlining the status quo, it has identified two distinct archetypes of institutions, established leaders with advanced AI-SDG integration and emerging institutions beginning their journey. Despite these disparities, both archetypes share opportunities to address common challenges, from rethinking outdated metrics to fostering equitable access to AI tools and infrastructure.

The five bold moves presented, each supported by actionable strategies, offer a clear roadmap for universities to recalibrate their approaches and take decisive action. These include revolutionising ranking systems to prioritise sustainability impact, transforming competition into collaboration, embedding AI and SDGs into future-ready curricula, democratising data access and advancing faculty development through lifelong learning. Together, these moves emphasise not only the urgency of adaptation but also the immense potential for universities to lead global efforts in addressing pressing environmental, social, and economic challenges.

In embracing these bold actions, universities can move beyond competition, foster strategic collaboration, and foster equitable access to AI-powered solutions that align with the shared goal of building a sustainable future. By embedding AI and sustainability across research, academics, and campus operations, universities will be able to drive measurable impact and position themselves as leaders in AI and sustainable development. The strategic framework outlined in this white paper offers a clear path forward for institutions to lead in AI-enabled sustainable development, regardless of their current capabilities. The time to act is now.

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Background

Established in 2021, the **ASEF Higher Education Innovation Laboratory** (ASEFInnoLab) creates opportunities for higher education stakeholders from Asia and Europe to expand their professional network, exchange knowledge, and collaboratively build their capacity to address common global challenges.

The programme's fifth edition (ASEFInnoLab5) focused on Universities' Role in AI Innovation Ecosystems. It was a comprehensive peer-to-peer learning experience implemented virtually from May to June and in-person on 21-25 October of 2024. The ASEFInnoLab5 Onsite Event in Shanghai, China laid the foundation for the development of three high-level white papers focused on AI Governance, AI in Education, and AI for Sustainable Development as well as the design of the upcoming ASEFInnoLab6 Project.

Implementing Partners

Asia-Europe Foundation (ASEF)
ASEF is an intergovernmental not-for-profit organisation located in Singapore. Founded in 1997, it is the only institution of the Asia-Europe Meeting (ASEM). ASEF promotes understanding, strengthens relationships and facilitates cooperation among the people, institutions and organisations of Asia and Europe. ASEF enhances dialogue, enables exchanges and encourages collaboration across the thematic areas of culture, education, governance, sustainable development, economy, public health and media. For more information, please visit https://asef.org/.

Fudan University
Fudan University is a major public research university in Shanghai, People's Republic of China. Founded in 1905, today it is widely considered as one of the most prestigious and selective universities in the country. The QS University Rankings 2021 ranked Fudan as the 7th most reputable university in Asia, while it is classified as a Double First Class University by the Ministry of Education in China. Fudan also actively incubates high-tech industries and encourages them to convert knowledge to power. In return, the multi-pattern development of the high-tech industries helps the University to industrialise the research outcomes. For more information, please visit https://www.fudan.edu.cn/en.

Supporting Partner

Asia-Europe for Artificial Intelligence (AE4AI) Network
The AE4AI Network was established by 20 academics and university managers from Asia and Europe in 2023 with the intent to enhance universities' role in AI innovation ecosystems and together pursue collaboration and actions on AI Governance, AI in Education, and AI for Sustainable Development. For more information, please visit https://www.asiaeurope4ai.org/.

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