



Executive Summary

The ASEAN University Network–University Innovation Enterprise (AUN-UIE) is one of the 17 thematic networks established in 2018 with the main objectives of (1) strengthening and leveraging the innovative capacity of universities in ASEAN, (2) providing a space for research and academic cooperation, and (3) equipping current and future generations of ASEAN students with technological competencies and innovative thinking.

This executive summary provides updates on two recent events: the 3rd AUN-UIE Annual Meeting and the 1st AUN-UIE webinar in 2022, which were both held online due to the COVID-19 outbreak. The 3rd AUN-UIE Annual Meeting was co-organized by Chulalongkorn University, Chulalongkorn University Innovation Hub (CUIHub), and the ASEAN University Network Secretariat on December 2nd, 2022, under the theme “Roles of Higher Education Institutes in Promoting Innovation and Entrepreneurship Development and Ways Forward,” with participation from 15 universities, namely,

1. Universiti Brunei Darussalam, Brunei
2. Universitas Airlangga, Indonesia
3. Universiti Malaya, Malaysia
4. Universiti Sains Malaysia, Malaysia
5. University of Yangon, Myanmar
6. University of Mandalay, Myanmar
7. De La Salle University, the Philippines
8. National University of Singapore, Singapore
9. Nanyang Technological University, Singapore
10. Singapore Management University, Singapore
11. Burapha University, Thailand
12. Chiang Mai University, Thailand
13. Chulalongkorn University, Thailand
14. Prince of Songkla University, Thailand
15. Mahidol University, Thailand

Participating universities shared updates on their activities, challenges, and best practices relevant to developing innovation and entrepreneurship ecosystems over the past two years during the COVID-19 lockdown. Despite pandemic disruptions, many universities made progress collaborating locally, regionally, and globally. New platforms were created to train researchers to commercialize their work, and students gained real-life entrepreneurial experience through new learning programs. However, some activities such as start-up training, incubation work, internships, and exchange

programs were paused, delayed, or moved online. Nonetheless, it was encouraging to see new universities joined the recent meeting.

The host announced the appointment of Prof. Kaywalee Chatdarong as the new chairman of the AUN-UIE network, succeeding Assoc. Prof. Natcha Thawesaengskulthai, who was promoted to become a Global Chief Innovation Officer based in Washington D.C., USA. Prof. Chatdarong currently serves as Chula's Vice President for Strategic Planning, Innovation, and Global Engagement. Toward the end, proposed activities for the AUN-UIE network in 2023 include a hackathon with SDGs' themes, a quarterly UIE talk, and other onsite events to promote engagement and learning opportunities among universities and students in innovation and enterprise-related work. Singapore Management University will host the 4th AUN-UIE Annual Meeting tentatively on 16th September 2023.

On December 9th, 2022, the 1st AUN-UIE webinar was co-hosted by Chulalongkorn University, CUIHub, Singapore Management University, and the ASEAN University Network Secretariat. The webinar featured speakers from Asia and Europe who provided insightful perspectives on "Roles of Higher Education Institutes in Promoting Innovation and Entrepreneurship and Ways Forward," with sub-themes including entrepreneurship education, assessment of higher education institutes in innovation promotion, the importance of education-industry partnership and trends for new skills, as well as the EU's new guidelines in value creation for innovation work with useful examples.

Entrepreneurship Education

The Ministry of Higher Education, Science, Research, and Innovation in Thailand has implemented a strategic policy to develop an innovation ecosystem by proposing five new models for institutes, including:

1. Entrepreneurial university with a focus on business model, innovation, and commerce.
2. Subscription university with a lifelong learning platform.
3. Sharing university with shared resources and activities.
4. Experiential university with a work-integrated learning system.
5. Partnership university with a strong relationship between industry and business organizations.

Chulalongkorn University chose the entrepreneurial university model, based on its resources and human capacity, according to Prof. Kaywalee Chatdarong, Chulalongkorn University's Vice President for Strategic Planning, Innovation, and Global Engagement. Higher education plays an important role in creating leaders, educators, innovators, and connectors who can be agents of change for students who prefer a more individualized learning system with global exposure, innovative knowledge, skills, and experiences to become entrepreneurs. The Journal of Industry and Higher Education presented a model for assessing university innovation ecosystems for the Association of Southeast Asian Nations' universities, which identified four key change agents to support the innovation ecosystem development: connectors, innovators, educators, and change agents. The COVID-19 pandemic was seen as a key driver of change in the world-class educational landscape, shifting the focus towards integrated innovation and enterprise, and research and education towards socio-economic impacts, which could effectively help sustain the development and well-being of citizens. Other influential factors, such as AI, 5G, geopolitics, climate change, and emerging diseases, should also be considered.

According to Prof. Sun Sun Lim, Vice President for Partnership and Engagement at Singapore Management University, entrepreneurship education has been well-established and has made a significant progress in the ASEAN region. Over the past decade, schools and universities in Singapore and throughout the region have incorporated entrepreneurship and innovation into their curricula, making it unnecessary for ASEAN universities to seek formal entrepreneurial education in far-off locations such as the US or Europe. She noted that the AUN-UIE Network has the potential to lead higher education institutes to collaborate closely and raise the quality of innovation and entrepreneurship education across the region.

Assessment of China's National Entrepreneurial Ecosystem Development

Assoc. Prof. Steven White from Tsinghua University (TU)'s Department of Innovation and Enterprise provided an assessment of China's national entrepreneurial ecosystem, including a case study of Tsinghua University's efforts to promote innovation and entrepreneurship education over the past decade. Since the 1980s, China's economy has been primarily driven by cost innovation, which focuses on making existing products cheaper. However, little emphasis has been placed on product innovation, which adds value to products and services. Prof. White explained that innovation in China has been mainly derived from how to produce, rather than what to produce, resulting in low profits from intellectual property rights. Chinese entrepreneurs have traditionally focused on imitating and mastering perceived leading firms, technologies, industries, and countries, as well as incremental and business model innovation, without generating fundamental technologies or adding value to innovations. As a result, it has been difficult for China to shift from a cost-innovation trajectory to a differentiation-innovation trajectory. Nevertheless, changes are currently underway.

The fundamental elements of national entrepreneurial ecosystems include ecosystem structures, dynamics, and key actors such as entrepreneurs, government, and innovators. These actors have specific roles, activities, and interactions, both at the organizational and individual levels. In addition to these key agents, there are also material factors such as finance and human capital, as well as formal factors such as rules, regulations, strategies, and policies. However, the importance of informal factors such as culture, mindset, and norms is increasingly recognized as they are more challenging to change.

China's previous successful business model relied on a low-cost structure for products and quick access to marketing. One example of this success was China's solar photovoltaic (PV) production, which initially entered the market in 2002 without government subsidies and did not gain any global market share due to the competition from existing products made in the US and Europe. However, over time, the Chinese product became more competitive, and China gained an increased global market share of 50% within seven years. Despite this success, one of the major Chinese solar PV firms, Suntech, went bankrupt soon after due to the lack of new technologies, highlighting the need for continued innovation to sustain long-term success.

Other instances of Chinese firms experiencing success and then subsequently failing can be seen in industries such as packaging machinery, coffee makers, hair dryers, refrigerators, and automobile accessories, according to the report by www.alibaba.com. These products faced intense competition based on pricing, which is commonly referred to as "red oceans." Due to the lack of

differentiation and inadequate intellectual property protection, it was easy for other firms to imitate these products. As the market became increasingly crowded with new entrants, the products quickly became commoditized. Another example is the iPhone X, whose total production costs, including technology and assembly, were US\$378 per unit. However, the made-in-China version could be sold for just US\$14 due to capturing only a small piece of the necessary values in production, while key components such as screens, CPUs, and chips must be imported.

China has a long-standing concern about its dependence on foreign technology, which has limited its access to key technologies. The US's sanctions on Chinese products, such as CTE and Huawei, have only exacerbated this situation, leading to a decoupling and techno-nationalism in the US, the West, and China. This trend has continued across administrations, from Barack Obama to Donald Trump to Joe Biden. However, the pressure from these events has spurred many Chinese companies to make progress in technology and innovation. In order for China to become technologically self-sufficient and lead the market, changes must be made at all levels, with a focus on new technologies, entrepreneurs, and innovation-driven companies. China aims to become a global technology leader by 2025, with its economy being primarily driven by the private sector, including new venture capital and entrepreneurs.

New Learning Platform - A Case Study from Tsinghua University

Since 2001, China has seen a significant increase in human capital investment and new learning platforms, which have contributed to innovation in the country. This can be observed through the growing number of graduates with Master's and Ph.D. degrees in science and engineering fields, as well as the increasing number of foreign R&D centers. According to statistics from the Ministry of Education in China shared by Assoc. Prof. White, from 1978 to 2019, 6.56 million domestic graduates went to study abroad, with 4.9 million completing their studies, and 86% of them returning home after graduation with new knowledge and technical know-how. Furthermore, with 35% of the Chinese population, or 480 million people, in the high- and middle-income levels, there is an opportunity for them to contribute more to the national economy with higher value-added products and services. Private venture capital financing and corporate venture capital financing in China, especially from large technological firms such as Baidu, Tencent, Alibaba, JD, Fuxing, and Haier, have increased since 2014, resulting in a good portfolio and higher investment than the US in building an innovation ecosystem.

China's success story in electric vehicles (EVs) is worth mentioning. Ten major EV producers from China have surpassed Tesla with the largest number of sales globally. In addition, the Chinese EV exports more than doubled between 2020 and 2021, with an expected market share in Thailand of over 80% by 2023.

The university can play a critical role in fostering collaboration and partnership between education and industry for the future of education. In 2012, a venture capital firm visited TU and noted that the university was not producing enough research for commercialization in the market. In response, TU launched a new education platform in April 2013 called the "X-Lab," which brought in alumni to work with current students. The X-Lab provided students with a range of resources and services to learn about starting a business, including mentorship from industry and finance experts, educational and training materials, legal support documents, best practice guides, and free working

spaces. Through initiatives like the X-Lab, universities can create a more supportive environment for entrepreneurship and innovation, and help bridge the gap between academia and industry.

Mr. Herbert Chen, President of International Association of Science Parks and Areas of Innovation and TusHolding (China) pointed out the need for universities to adapt and keep up with the rapid changes in technology and business models. He emphasized the importance of integrating innovation and entrepreneurship education into the curriculum and providing students with real-world experiences and knowledge in technology transfer, IP protection, and company structure setup. This would help prepare them for the fast-paced and dynamic environment of the business world and enable them to make meaningful contributions to society. Mr. Chen also suggested that even if students did not start their own companies after graduation, they should still learn how to manage a company, as this knowledge will be valuable in any field they choose to pursue.

Tsinghua University by the combined effort of the School of Economics and Management and TU Science Park (TusPark) has also taken steps to integrate entrepreneurship education into its curriculum, and that the "Start a New Business" course has shown success in helping students start their own companies. The involvement of both successful and unsuccessful entrepreneurs at the CEO level in teaching the course is also valuable, as it provides students with a more realistic understanding of the challenges and risks involved in starting a business. Additionally, the inclusion of an "Entrepreneurship Bank" and "Incubation Fund" provides students with resources and support to help them turn their ideas into reality. The course is also open for students from Beijing University and lasts up to 3 years to allow students to learn and experience how to build a working relationship with investors and other members. After graduation, they would become a part of Tsinghua Entrepreneurship Alumni. During the initial run, the course showed some success after about one year. More than half of 73 teams attending the course could set up a company and ten of them managed to obtain a direct investment through the course with a total amount of RMB 30 million, meaning that a few of them did start up a business when they completed their degree.

TU also initiated Chinese University Innovation & Entrepreneurship Alliance which brought together 137 universities and 50 enterprises to share best practices and experiences. There were also the Chinese University Innovation and Entrepreneurship Education Research Center, which promoted innovation and entrepreneurship for educational research, and a new online learning platform called the "XuetangX," which provided world-class education courses from more than 700 elite universities worldwide for both students and the public. Another important initiative was TusStar, which operated over 200 incubators in major Chinese cities and had a presence in nearly 20 innovation networks across Asia, the US, and Europe.

Higher education institutes, therefore, need to provide for student's interests in entrepreneurship. New businesses or start-ups in high-tech fields are very important for the country. Modern universities must strive for more incubators, working spaces and university science parks to improve success rates of student entrepreneurs. They must also promote creative, innovative, and entrepreneurial competition in an atmosphere that encourages a sense of honor and strong integrity. This should set examples on how students learn from real-life experience in a competitive environment so that they could become a driving force for and contribute to the society after graduation.

The Education-Industry Partnership as Policy Strategy to Boost Innovation and Future Skills

Dr. El Iza Mohamedou, Head of Center for Skills from the Organization for Economic Co-operation Development (OECD), pointed out the importance of collaboration and partnership between education and industry as a vehicle to ensure the right skill development for the youth. Over the past decade, ASEAN education and skill development system were improved significantly, but there remained a lot to do. Take for example, the performance in reading, mathematics and science in the Performance of International Student Assessment or PISA 2018, students from Singapore were among the highest performing country across Asia with an above-average score of OECD whereas those from Brunei, Indonesia, Malaysia, the Philippines and Thailand scored much lower than the OECD's average. When considering the negative impacts the COVID-19 pandemic had on the labor market and the education system in the region, ASEAN countries must collaborate more actively with the industry sector. This would offer an opportunity for the higher education institutes to learn what trends for future skills in the labor market were. By doing so, they could strengthen skill development and provide youth and adults with the skills needed in the current societal and economic contexts.

Currently, the two major drivers of changes that were shaping the future work in the ASEAN region, disrupting existing jobs and creating new positions were the green and the digital transition. Growing goals of technology industry changed existing jobs significantly. Routine tasks were also being automated and human-machine interactions were increasing. The region's economic growth used to rely on unsustainable natural resource exploitation and high carbon-intensive activities. However, climate change and the environmental crisis had made it evident that countries now needed to adopt a foresight strategy that required a short-term economic trade-off. This shift could lead to a disruption of many jobs in carbon-emission intensive sectors. Last five years, ASEAN had attempted to grab up generations of new energy technology and it tended to keep growing in both states' policy scenario and the sustainable development scenario. Vietnam, according to OECD, more than doubled its renewable energy production between 2016 and 2020 and Singapore also increased its renewable energy production by more than 50% in the same period. Even though economy had been disrupted by economic, the transition to clean energy had not stopped. Earns and Young's studies of eight economies across Asia found as many as 800 clean energy projects in the pipeline between August and September 2020. This showed an investment potential in the green economy worth 316 US\$ billion. To achieve these projects and support the green economy, the ASEAN region must strengthen skill development and provide youth and adults with the skills required by the green sector and promote innovation and research to improve the infrastructure and technology.

OECD's presentation also highlighted how technology was altering the industry and labor market. Employments in the information, computer and technology or the ICT had been growing rapidly in the ASEAN region over the past few years. It was expected to keep growing in the next decade, especially the needs for digital and technical skills to supply the demands of employers. Due to unprecedented transition, it was evident that educational system had struggled to provide youth with the digital and technical skills needed to supply the demands of employers. Yet what set workers in these professions apart from their counterparts was their proficiency, literacy, numeracy and problem-solving skills in technology-rich environments. Hence, it was extremely important to strengthen the foundation skills in addition to promoting the development of industry's specific skills.

Matching skill demands and supplies had also become a challenge for the region, especially the mismatches of over-qualifications, under-qualifications and fields of study. Most countries had between 30% and 40% of workers in jobs that did not match their qualifications. Over-qualifications did not always represent specific set skills. It served as an approach to understand how efficient the knowledge and skills were being used in the labor market. Skill mismatch can result in a lower productivity and competitiveness. Hence, ASEAN should develop and implement policies to make the best use of existing skills and qualifications.

The EU's New Guidelines in Value Creation for Innovation Work

Last but not least, Mr. Kjell-Håkan Närfelt, a Strategy Chief Advisor from VINNOVA, a Swedish government's innovation agency, mentioned the new guidelines for knowledge valorization that the European Commission had adjusted from the former guidelines to the new ones. The knowledge valorization was meant to develop, manage and turn knowledge and intellectual assets generated by R&D, invention and innovation activities into socio-economic benefits or commercial values. The knowledge and intellectual assets could include any products generated by R&D activities and others such as publications, know-how, processes, practices, software etc. Currently, the agencies that required this type of knowledge were academics, universities, research centers, individuals (e.g. innovators, researchers and also students), science parks, intellectual property experts etc. He noted that the guideline recommendations that had been used since 2008 by universities and public research organizations by focusing on intellectual property rights and knowledge transfer activities had changed. There were a set of new guidelines for universities to shift its focus from knowledge creation to value creation for economy and society and from intellectual property rights to intellectual asset management. In addition, the knowledge and technology transfer for public research organizations should be changed to entrepreneurial practices and processes and skills for all research and innovation actors.

In summary, higher education institutes in ASEAN countries have a very important role in fostering innovation and entrepreneurship education across various platforms for students, including equipping them with modern and digital technology skills needed for changing society and economy. A close collaboration and strong partnership among various group of stakeholders, in particular the industry can greatly benefit both the universities and students. To do so, universities must be ready to reform and shift to the new customized-learning system so that students will be well equipped with future-proof skills such as design thinking, problem-solving, and creativity to readily become an agent of change or an innovator or creator that can significantly contribute to the future growth of their society, region and the world at large.

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