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Catalysing Growth: State of ASEAN University Innovation and Entrepreneurship: Report 2024

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CATALYSING GROWTH:

STATE OF ASEAN UNIVERSITY
INNOVATION AND
ENTREPRENEURSHIP

REPORT 2024

Table of Contents

Introduction	4
Executive Summary	
Methodology	
About the AUN-UIE	
Section 1: Macroeconomic Drivers in the Region	9
Southeast Asia: The Next Growth Frontier	
Innovation & Entrepreneurship across Southeast Asia	
• Innovation & Entrepreneurship as a force for inclusive growth	
• The promotion of entrepreneurship in Southeast Asia	
The startup ecosystem as a catalyst for Innovation & Entrepreneurship	
The future of the startup ecosystem	
Section 2: Focal Points Within the Region	24
Key Sectors across Southeast Asia	
• E-commerce	
• FinTech	
• ClimateTech	
Key Sectors Across Countries	
Section 3: The Role of Universities to Champion Innovation & Entrepreneurship	32
Opportunities for Universities Across Southeast Asia	
University Deep Dives	
• Chulalongkorn University (CU)	
• Singapore Management University (SMU)	
• Universiti Malaya (UM)	
• De La Salle University (DLSU)	
• Vietnam National University – Ho Chi Minh City (VNU-HCM)	
• Institut Teknologi Bandung (ITB)	
Section 4: Advancing Together for Collective Development	40
Recommendations	
Data Management	
Technology Commercialisation	
Funding	
International Exposure	
Mentorship	
The Future of University I&E in Southeast Asia	57
References	58

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Catalysing Growth: State of ASEAN University Innovation & Entrepreneurship Report
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Introduction

Executive Summary

Over the past few years, Southeast Asia has captured global attention with its remarkable economic growth, driven by strong tailwinds. This has led to the expansion of its middle-class consumer base that is actively participating in while benefitting from the region's rapidly expanding digital economy.

In such a climate, there is tremendous potential for Innovation and Entrepreneurship (I&E) to be a critical economic driver. Homegrown startups in different Southeast Asian countries have introduced technology-first solutions that have scaled across the region, pushing businesses to innovate rapidly. Moreover, startups promote inclusive growth by leveraging scalable internet platforms and novel technologies to reach populations beyond urban centres.

Despite these advancements, challenges remain: uneven access to capital, cultural differences hindering market expansion, and a shortage of technical talent. Addressing these issues requires a platform for resource sharing and collaborative action. This is where the ASEAN University Network - University Innovation and Enterprise (AUN-UIE) is uniquely positioned to catalyse sustained I&E development.

This white paper aims to support the vision of AUN-UIE as a pivotal player in Southeast Asia's I&E landscape and seeks to:

- **Analyse macroeconomic drivers:** Explore the key factors propelling I&E in the region, the impact created, and future growth requirements.
- **Identify regional focal points:** Highlight regional growth trends and emerging opportunities unique to each country.
- **Bolster the role of universities:** Showcase how universities create value for the startup ecosystem and highlight successful initiatives.
- **Spur strategic initiatives:** Foster collaboration through knowledge sharing, leveraging resources, and joint platform utilisation.

Macroeconomic Drivers

Southeast Asia, the world's third most populous region, is experiencing significant economic growth due to its young demographic, rising incomes, urbanisation, and infrastructure development; resulting in a burgeoning middle class. This trajectory is bolstered by international agreements positioning the region at the heart of global trade and connectivity.

A vital component of this growth is the digital economy, which has expanded more than eightfold since 2016 and is expected to outpace broader economic growth. Concurrently, businesses are adapting to the needs of digital consumers, improving the countries' standings in the Global Innovation Index.

The digital economy also drives inclusive growth - providing income opportunities for informal workers, scaling small businesses, and the previously underbanked population now benefits from financial solutions offered by novel digital providers.

As a result local governments have recognised the startup ecosystem's value, investing in long-term initiatives.

The region's youth, inspired by successful entrepreneurs, represent a key resource for future I&E growth.

Focal Points Within the Region

Southeast Asia's startup ecosystem initially thrived on widespread mobile internet adoption. It is now evolving, leveraging each country's unique strengths.

Key foundational pillars include:

- **E-commerce:** Initially driven by mobile internet users, E-commerce is now evolving to meet specific consumer needs and preferences.
- **FinTech:** Encompasses a range of services from payments to wealth management, involving regulators and established financial institutions for strategic collaboration.
- **ClimateTech:** Driven by sustainable development goals and societal concerns, ClimateTech is crucial for future growth.

Each country also specialises in areas of innovation aligned with its unique advantages, contributing to the ecosystem's dynamism and future potential. For example, in Singapore, DeepTech startups are leveraging the presence of numerous research and development institutions, and strategic institutional investors. In Vietnam, its large and youthful consumer population has led to the rise of gaming and e-sports industries – key bulwarks being the juggernauts of Sky Mavis and VNG Corporation.

The Role of Universities

Universities play a pivotal role in championing I&E as they are naturally positioned to be the nesting ground to nurture entrepreneurial talent during their formative years through institutional resources and networks. This includes academic programs, student-led initiatives, research facilities, technology commercialisation capabilities, venture support programs, and international exposure.

Furthermore, universities foster collaboration with industry, government, and private sector partners facilitating investments, knowledge sharing, and strategic partnerships. Successful university-led ventures demonstrate the potential of leveraging academic assets to drive I&E.

Advancing Together for Collective Development

Southeast Asia's startup ecosystem holds immense potential and universities are crucial in realising this. However, addressing the resource limitations and varying levels of I&E maturity across universities would require tapping into the synergies within the AUN-UIE. This is to ensure the universities are well-positioned to contribute to the ecosystem

We propose focusing on five potential areas of collaboration: Data Management, Technology Commercialization, Funding, Internationalisation, and Mentorship. Success stories within the AUN-UIE network demonstrate the feasibility of organic progress in these domains but also illuminate the value of mutually aligned coordination and knowledge sharing among member universities.

This white paper aims to foster dialogue and action, positioning AUN-UIE as a key stakeholder in Southeast Asia's I&E landscape, and lifting its impact beyond the university environment.

Methodology

To develop a holistic understanding of the state of innovation in the region and the role of universities, a literature review was conducted comprising of secondary research from both commercial and academic sources to address the following questions:

1. What are the key macroeconomic factors that will lead the growth of I&E in Southeast Asia?
2. What has been the impact of I&E in the region thus far?
3. What are the key sectors driving I&E for each country in the region?
4. What are the future growth opportunities for I&E in the region how can universities maximise them?
5. How can the local universities be active players in the regional ecosystem?
6. What are the notable innovation-related activities of exemplar universities across the region?
7. How can universities across the region work together to boost the I&E ecosystem?

Additionally, we also conducted primary research using surveys, email and phone interviews with AUN-UIE members as well as industry professionals on the afore-mentioned questions.

Section	Name	Descriptions
1	Macroeconomic drivers in the region	<ul style="list-style-type: none">• Detailing the macroeconomic forces that drive the region's growth• Understanding the nascent yet high-potential position of I&E in the region• Identifying opportunities and next steps to boost the region's I&E momentum
2	Focal points in the region	<ul style="list-style-type: none">• Identifying the key areas of I&E across the region and those unique to each country
3	The role of universities to champion Innovation & Entrepreneurship	<ul style="list-style-type: none">• Outlining the unique position universities can play in I&E• Showcasing the I&E activities of exemplar universities
4	Advancing together for collective development	<ul style="list-style-type: none">• Identifying the key areas for collaboration to further bolster universities' participation in the regional I&E ecosystem• Learnings from successful case studies within the AUN-UIE network• Recommendations for universities

As with all research, there are limitations to this white paper. Due to the relative nascency and novelty of I&E in Southeast Asia, multiple reports, databases and publications often have different categorisations of industries and technology use cases. To mitigate this, the definitions and scopes of labels and categorisations were scrutinised to ensure consistency as far as possible.

Moreover, there was a lack of data across a continuous time period for all Southeast Asian states and hence, some data points would not include all states. Specific to the cited academic articles in Section 4, they draw more on North American and European contexts and focus on theoretical models rather than empirical results. This is because the localised academic publications focusing on I&E development are only just emerging given the nascency of the ecosystem. Nevertheless, the articles cited aim to develop a framework of analysis that is region-agnostic.

About the AUN-UIE

The ASEAN University Network (AUN) was established in 1995 under the auspices of the Association of Southeast Asian Nations (ASEAN). Its primary objective is to strengthen and expand cooperation among leading universities in ASEAN. Over almost three decades, AUN has continuously conducted a wide range of activities, fostering solidarity among ASEAN scholars and academicians, developing academic and professional human resources, and conducting educational and cultural youth activities. These efforts have facilitated the dissemination of information among the ASEAN academic community and beyond. The network's strategic initiatives include governance and collaboration between thought leaders and policymakers to develop ideas for regional integration. These initiatives help the region's young leaders contribute to ASEAN's growth and integration by engaging in meaningful projects and leveraging the dedicated work of AUN.

The Network currently has 30 Core Members and 184 Associate Members.



It also comprises of 17 Thematic Networks that act as specialised areas of academic cooperation and are given relatively high autonomy to pursue their own activities. The focus areas range from human development, engineering, life sciences, business and many more.

The AUN-University Innovation & Enterprise Network (AUN-UIE) was established in 2018 with the aspiration to enhance the innovative capacity of universities. The thematic network fosters collaborations through platforms that facilitate knowledge sharing, and networking, thereby strengthening the innovation and entrepreneurship ecosystem across academia, industry, and government. The AUN-UIE is a Thematic Network with 30 Core Members and is co-led by Chulalongkorn University and Singapore Management University.

In order to tackle complex challenges of Industry 4.0, AUN-UIE focuses on collaboration in three areas:

- **Entrepreneurship Education:** Train the new generation of students to develop necessary business skills including project initiation and research development.
- **University-Industry Cooperation:** Produce research to effectively accommodate the demands of the industrial sector and the current ecosystem.
- **Community Development:** Promote cross-disciplinary studies between Science, Technology, Engineering and Mathematics (STEM) and Social Sciences and Humanities (SSH) to create an advanced and ethical society as well as promote knowledge sharing on I&E among AUN Member Universities.

The network is currently led by a steering committee which comprises Chulalongkorn University, Singapore Management University, Institut Teknologi Bandung, De La Salle University, University Malaya and, Vietnam National University - Ho Chi Minh City.

FOUNDING TEAM OF AUN-UIE STEERING COMMITTEE



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SECTION 1

MACROECONOMIC DRIVERS IN THE REGION

Key Highlights:



Southeast Asia is a region poised for strong growth



I&E is important for Southeast Asia's growth



Startup ecosystem is an attractive area to develop I&E



Universities can contribute to the development needs of the startup ecosystem



726 million
strong population⁴



47%
of population
is under 30 years
(estimated)



Collectively it is
the 3rd most
populous region
in the world¹



USD 3.1 trillion
5th largest economy²

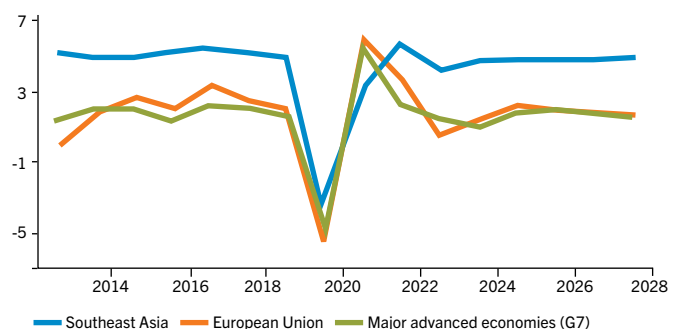


USD 6.6 trillion
4th largest global economy
by 2030 (expected)³



Southeast Asia: The Next Growth Frontier

Southeast Asia is a rapidly growing region and is home to a large consumer base that is young and urbanising. The region has consistently outpaced other larger and more developed economies in growth.



Source: IMF World Economic Outlook Database

Source: SYNC Southeast Asia Report 2023

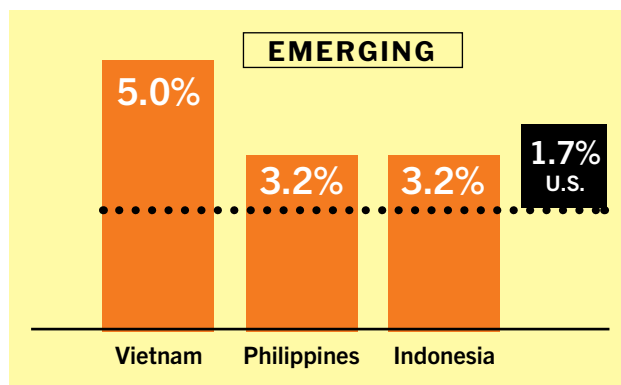
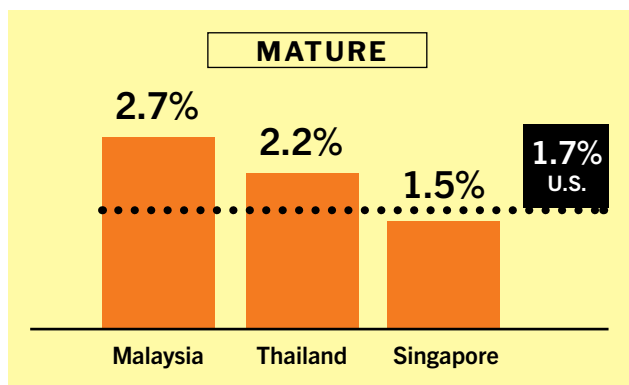
Rising incomes, and expanding high and upper-middle-class demographics drive consumption



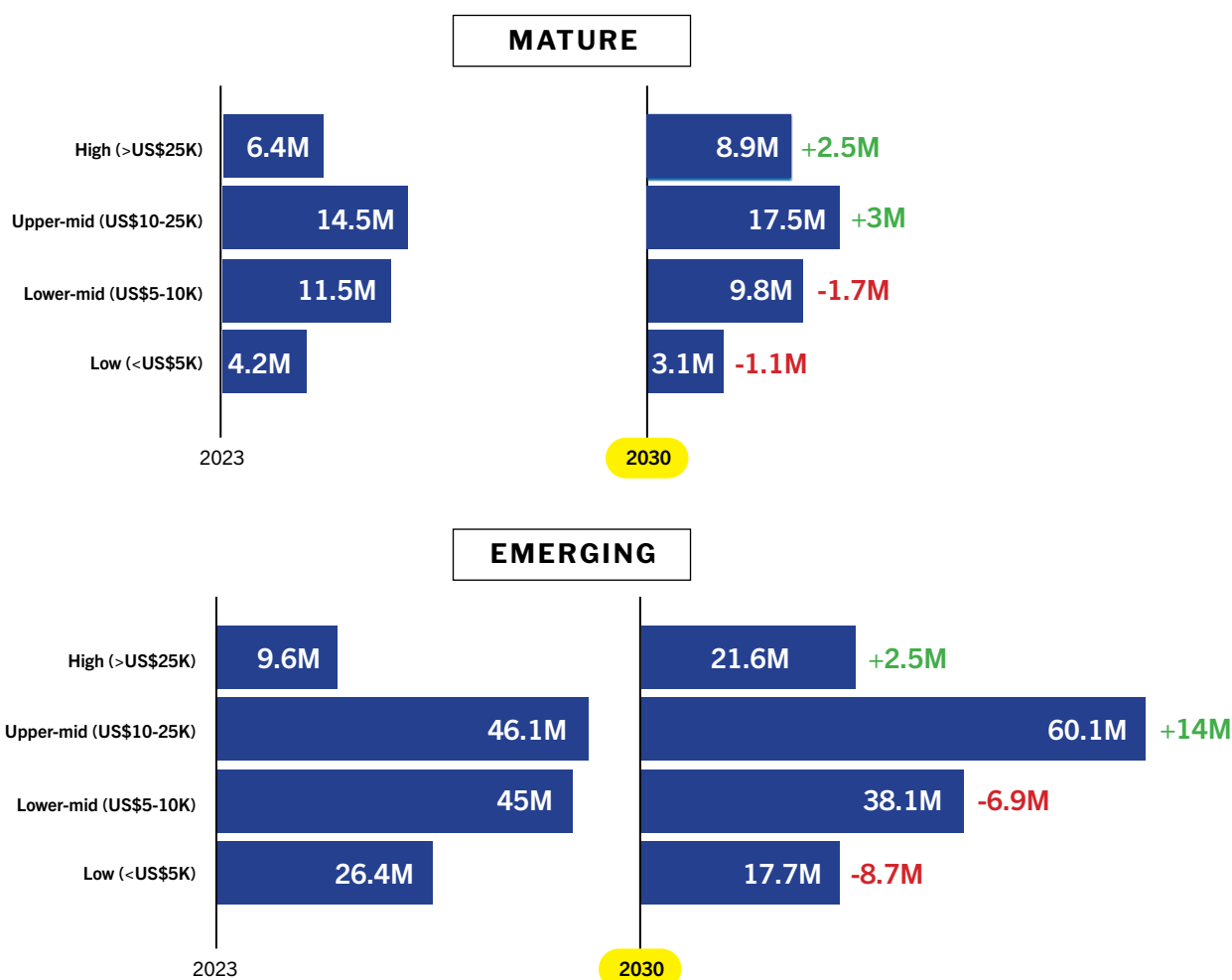
Strong growth results from a large consumer base with rising incomes, widespread internet access, and urbanisation trends.



2018-30 CAGR (%) in per capita real disposable income growth



Households categorised by disposable income classes

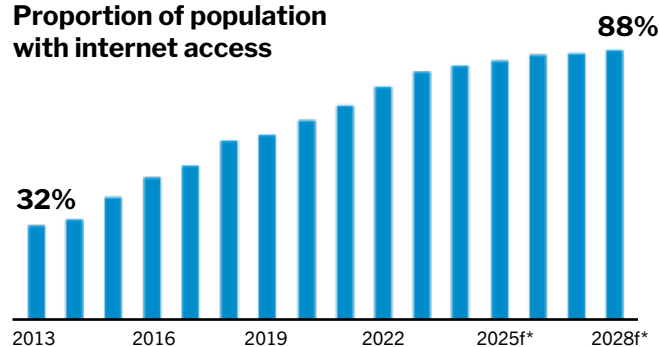


Source: SYNC Southeast Asia Report 2023

Internet Penetration Rate

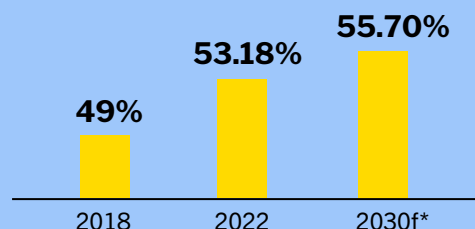


Proportion of population with internet access



*forecast | Source: Statista

Urbanisation Rate

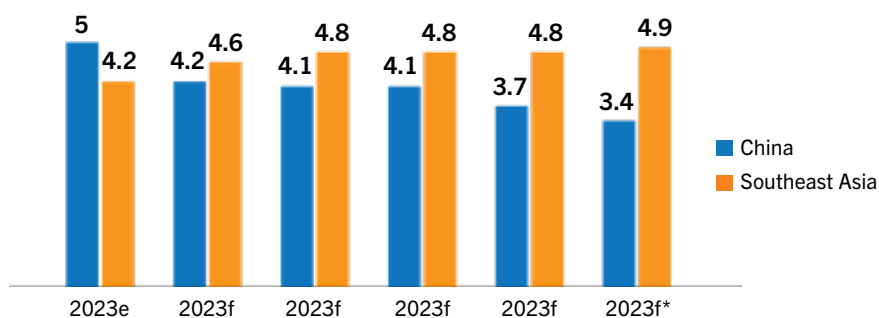


*forecast | Source: Business Times, UN

The region is enhancing economic interconnectedness through agreements like the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and Regional Comprehensive Economic Partnership (RCEP) in 2018 and 2022 respectively. CPTPP covers 13.5% of the global economy, while RCEP covers 30%, including all ten ASEAN nations⁵. Future prospects indicate the region surpassing the EU and G7 in economic growth and potentially outstripping China.



Real GDP Growth Rate (%)



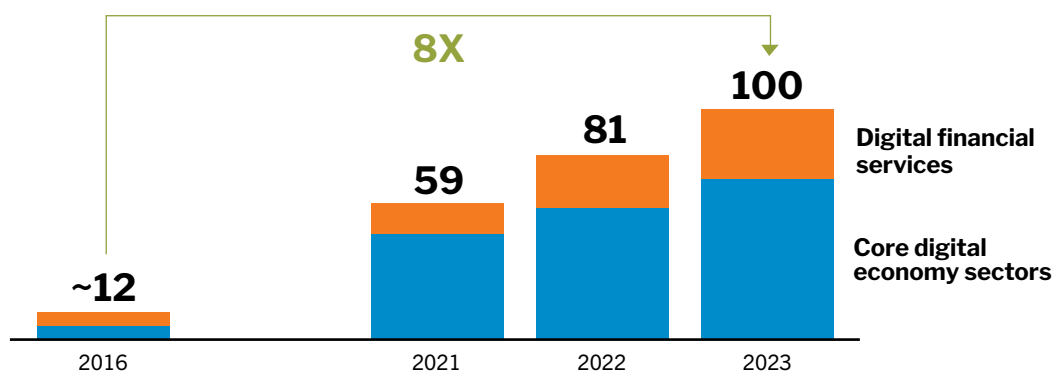
*forecast | Source: IMF World Economic Outlook Database

Innovation and Entrepreneurship Across Southeast Asia

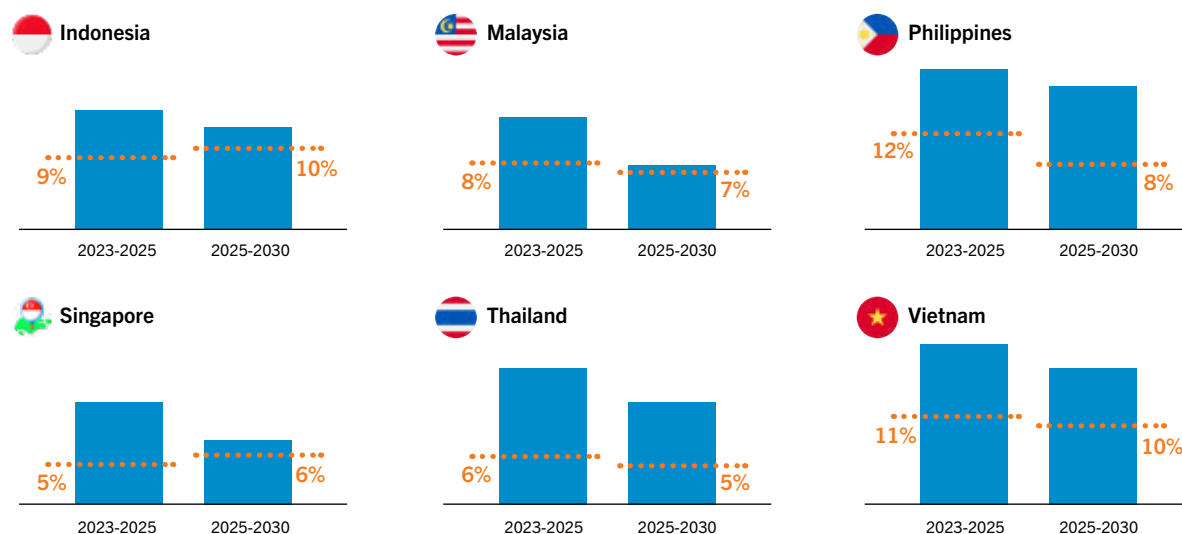
Over the past decade, we have seen I&E in Southeast Asia grow in notable ways. With the rise of home-grown technology companies and rapid digital transformation during the pandemic, the majority of the innovations we have witnessed ride the wave of our digital economy. Since 2016, the digital economy has grown over 8 times from USD 12 billion in 2016 to reach a remarkable USD 100 billion in 2023, and is forecasted to grow at rates above their overall national growth rates. Such growth potential provides an opportunity to devote human and financial capital for greater economic returns.



Southeast Asia Digital Economy Total Revenue (USD B)



Digital Economy Gross Merchandise Value vs Gross Domestic Product Growth



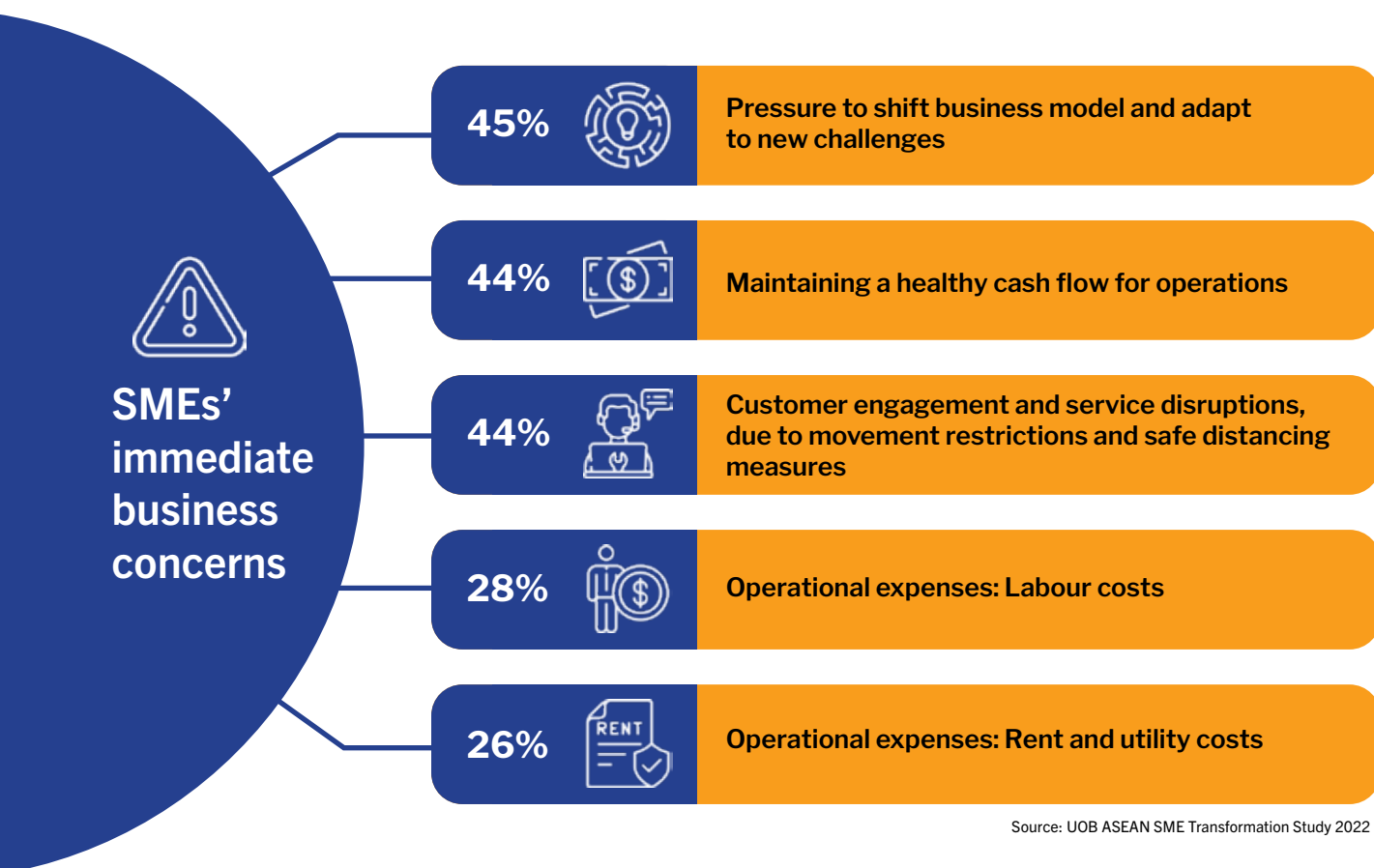
Source: e-Economy SEA 2023 Report

■ Expected digital economy CAGR Expected nominal GDP CAGR

Innovation and Entrepreneurship are pivotal to ASEAN's growth trajectory and future, alongside the surge in digital consumption

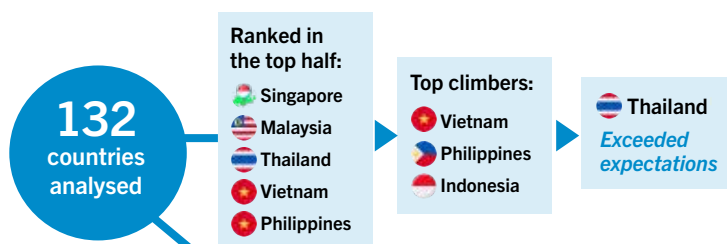
In a world of democratised and rapidly evolving technology, staying relevant is imperative. This technological pervasiveness fosters digital entrepreneurship, capitalising on digital scalability.

In Southeast Asia, entrepreneurs integrate digital technologies into business strategies, forming digital-first enterprises and shaping consumers' digitally native habits. This shift towards digitalisation enhances regional businesses' agility, adaptability, process efficiency, and scalability⁶.



Source: UOB ASEAN SME Transformation Study 2022

According to the 2023 Global Innovation Index, most of the region performed well in I&E. Among the 132 countries analysed, Singapore, Malaysia, Thailand, Vietnam, the Philippines, and Indonesia ranked in the top half. Vietnam, the Philippines, and Indonesia were noted as top climbers over the past decade, with increases of 24, 34, and 30 places respectively, while Thailand exceeded expectations. This indicates Southeast Asia's potential for progress in the realm of I&E.

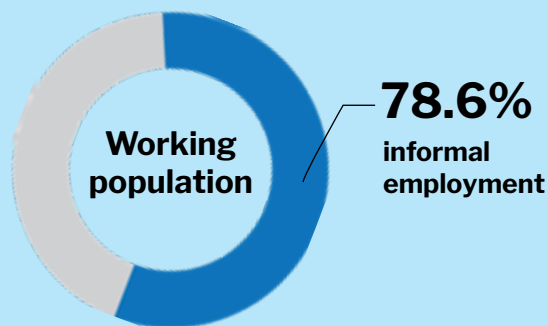


Source: Global Innovation Index 2023 Report



I&E: Driving Inclusive Growth

The region's embrace of I&E has spurred inclusive growth, notably evident in increased employment among informal workers, digitalisation of Micro, Small and Medium Enterprises (MSMEs), and improved financial inclusion.



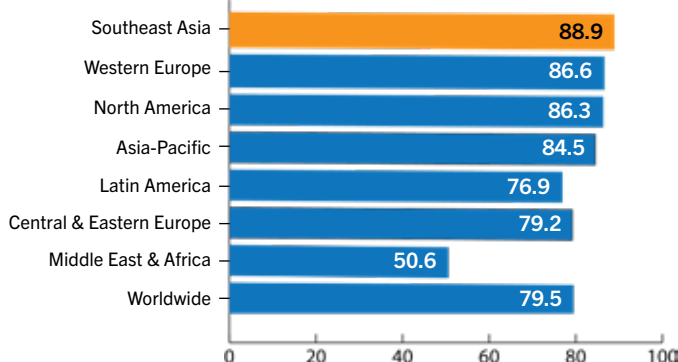
Informal Workers

In Southeast Asia, 78.6% of the workforce engages in informal employment⁷. However, with a smartphone penetration rate of 88.9%, platform companies utilising digital platforms have provided job opportunities for informal workers.

Simple onboarding processes enable individuals, including those from low-income households or with caretaking duties, to access a large consumer base, earn higher incomes, and overcome limitations of traditional work hours. Additionally, these online job opportunities are accessible to individuals in rural areas, eliminating the need to be in cities to seek employment.

Global Smartphone Usage by Region in 2023

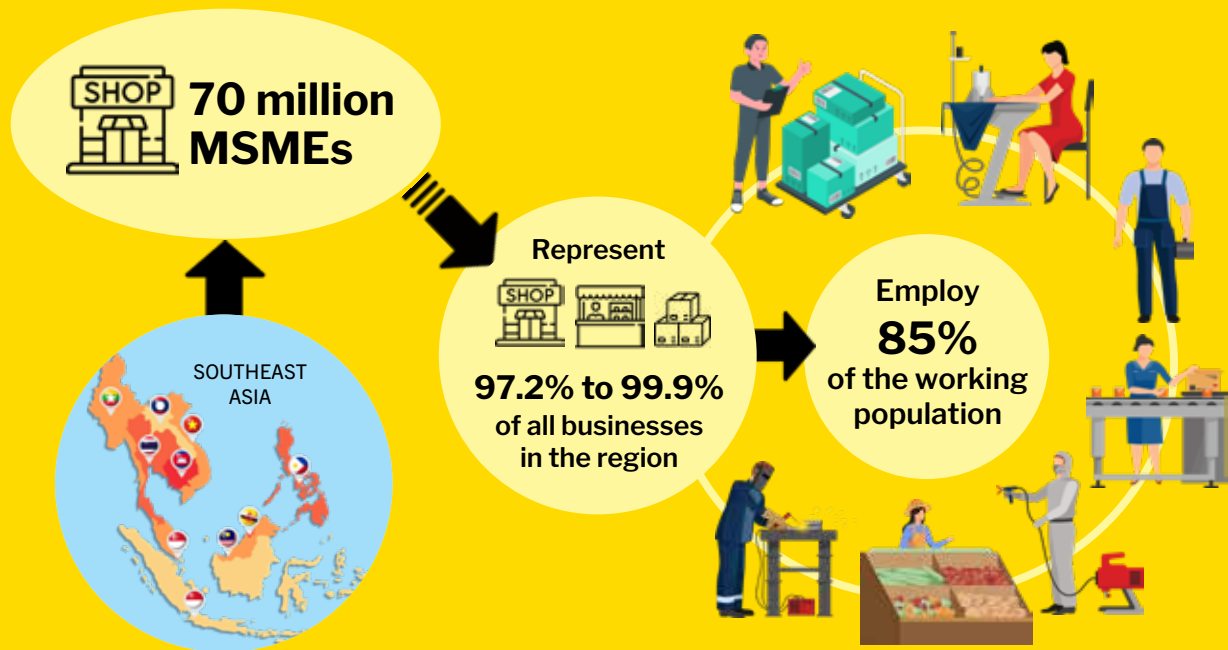
(% of internet users)



Note: Individuals of any age who own at least one smartphone and use the phone(s) at least once a month.
Source: eMarketer, March 2023
Source: Insider Intelligence



Micro, Small and Medium Enterprises (MSMEs)

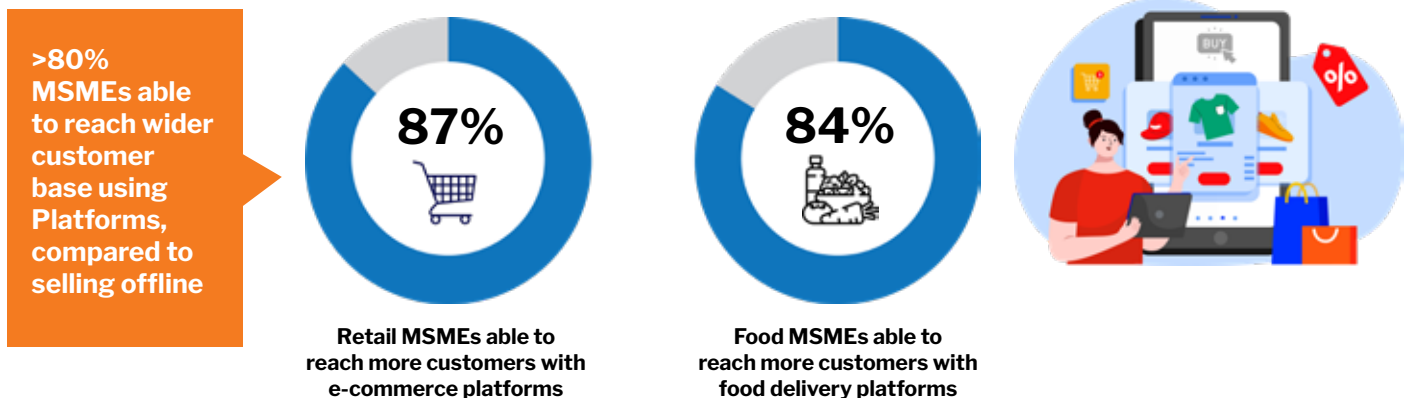


Approximately 70 million MSMEs exist in Southeast Asia, comprising 97.2% to 99.9% of all businesses and employing 85% of the working population⁸. These MSMEs have benefited in three areas with I&E.



1 Access to a larger customer base and access to finance

MSMEs expanded their customer base by joining online marketplaces, extending reach beyond borders through digital platforms⁹.



2 Operational efficiency

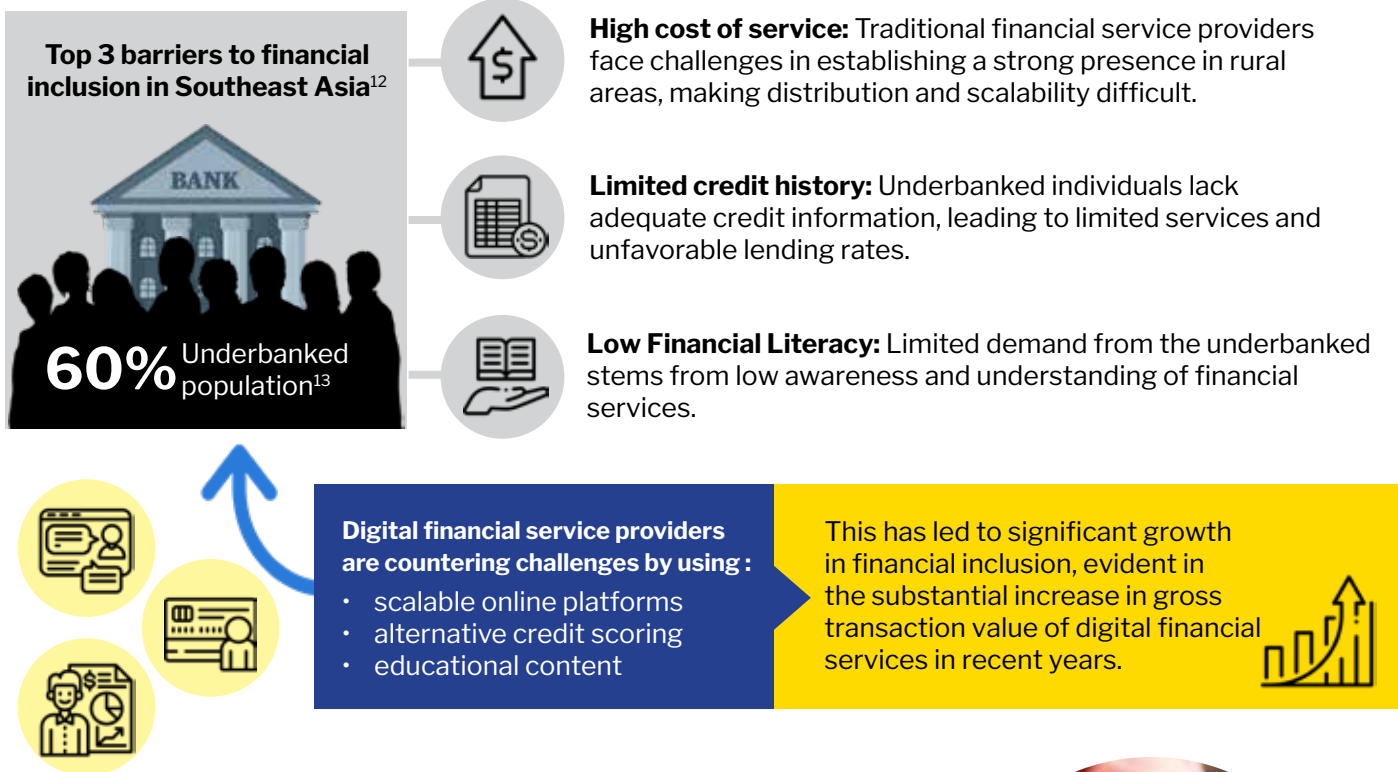
MSMEs in the region cope with leaner workforces¹⁰, addressed by startups offering user-friendly software for inventory, sales, and supply chain, automating processes to enhance operational efficiency and overcome manpower limitations.



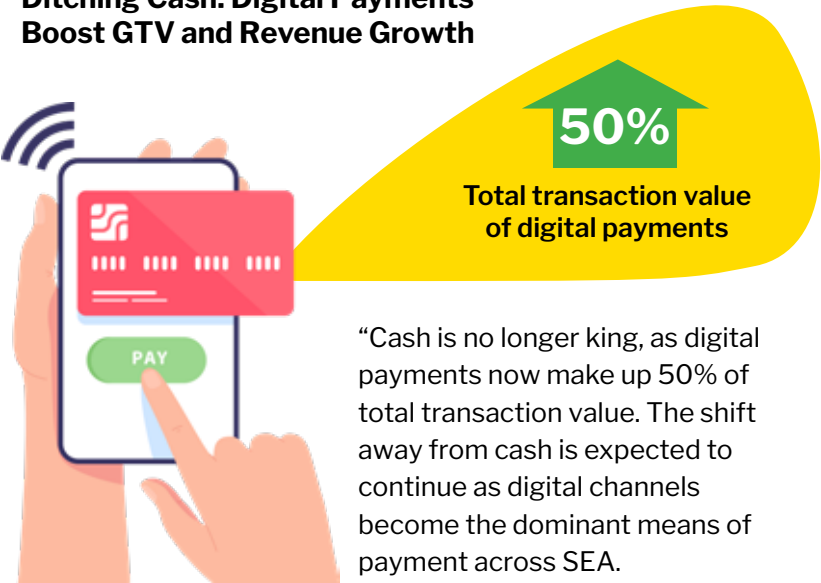
3 Access to Credit

MSMEs have historically faced challenges in accessing financing due to physical inaccessibility, lack of formal documentation and insufficient collateral to secure credit. About 60% of them were unable to get a loan when they needed financing¹¹. Digital financial service providers have overcome this hurdle by using alternative data sources to develop credit risk models that reflect the nature of MSME businesses so that they can be eligible for loans.

Financial Inclusion



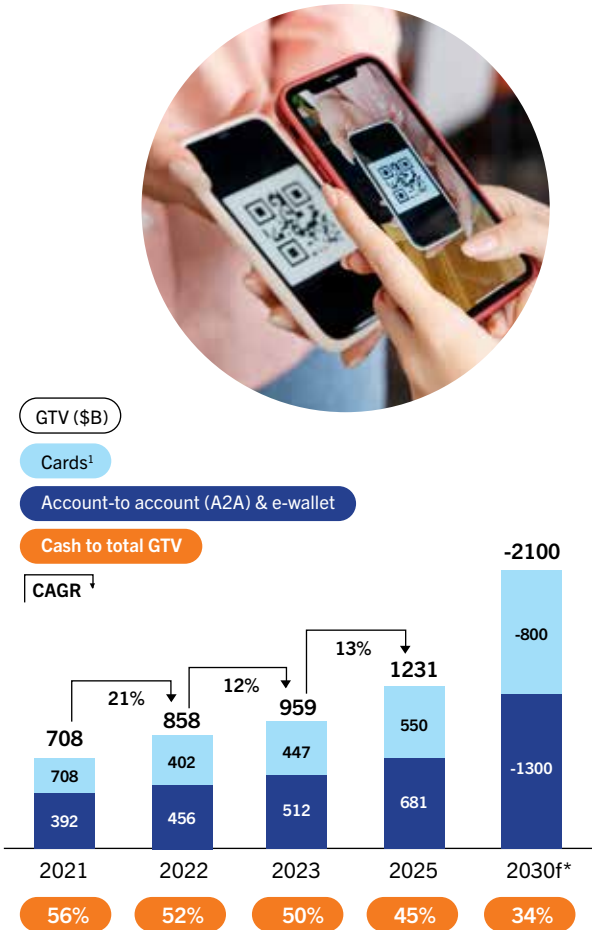
Ditching Cash: Digital Payments Boost GTV and Revenue Growth



“Cash is no longer king, as digital payments now make up 50% of total transaction value. The shift away from cash is expected to continue as digital channels become the dominant means of payment across SEA.

A2A and e-wallet channels are gaining traction off the back of government regulations encouraging the adoption of these payment channels (e.g. QRIS).”

Source: e-Conomy SEA 2023 Report



Note: (1) Cards include credit cards, debit cards, and prepaid cards.
*forecast | Source: Bain analysis

The Promotion of Entrepreneurship in Southeast Asia

As we have seen the value of I&E to the region, Southeast Asian governments have launched many initiatives to further reap the benefits. For instance, TechFest in Vietnam¹⁴, led by the Minister of Science and Technology, hosts over 1000 startups, 100 investors, and 500 speakers¹⁶, featuring the National Innovative Startup¹⁵ Talent Competition.

In Indonesia, the Gerakan Nasional 1000 Startup Digital, initiated by the Ministry of Communication and Information¹⁶, supports tech startups with workshops, hackathons, and incubation programs¹⁷. Other national efforts like Startup Studio Indonesia, HUB.ID, and the Merah Putih Fund are also fostering entrepreneurship.

In Thailand, the National Innovation Agency leads the nation's innovation efforts, including events like the Startup x Innovation Thailand Expo¹⁸ (SITE) and collaborations with universities through initiatives like SPACE-F incubator¹⁹ and AgBioTech Incubation 2023 Demo Day²⁰. It aims to further engage public and private partners to drive innovation²¹.

Meanwhile, in Singapore, government-led initiatives like StartupSG, SG Founder Grant, and SWITCH support early-stage startups and facilitate access to investment capital. Xora Innovation, a Temasek Holdings subsidiary, recently partnered with National University of Singapore and Nanyang Technological University, committing SGD 75 million to commercialise deep-tech ventures²². With resource allocation occurring at a national level, such initiatives provide strong foundational support to build on the already growing I&E ecosystem within Southeast Asia - most of it devoted specifically to startup development.

TECHFEST
VIETNAM

GERAKAN NASIONAL
1000
STARTUP DIGITAL

SITE
THAILAND x INNOVATION 2023

STARTUP SG

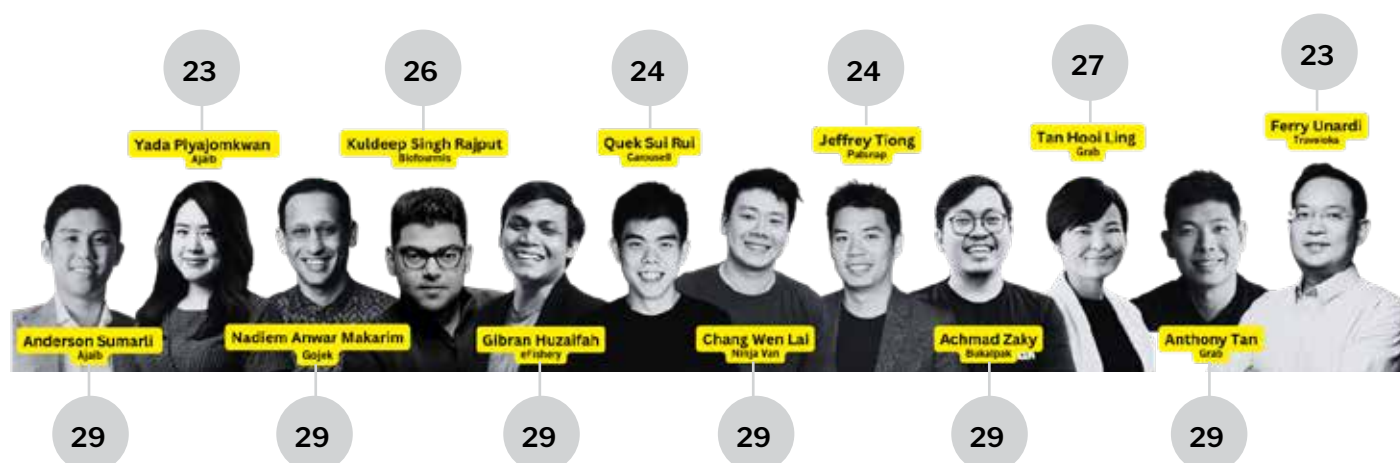
The Startup Ecosystem as a Catalyst for Innovation & Entrepreneurship



COUNTRY	GLOBAL RANKING ²³	NUMBER OF UNICORNS ²⁴	NUMBER OF STARTUPS ²⁵	NUMBER OF VCS ²⁵	INCUBATORS & ACCELERATORS ²⁵	ECOSYSTEM VALUE (US\$ BN) ²⁶
Singapore	6th	28	4000+	400	220	167.6
Indonesia	41st	14	2486	116	120	72.1
Malaysia	43rd	1	2063 ²⁷	109 ²⁸	59 ²⁹	46.7
Thailand	52nd	4	1000	45	17	6.0
Vietnam	58th	5	3472	11	55	8.1
Philippines	59th	1	700	40	35	3.5

Moreover, we observe that these game-changing entrepreneurs are getting younger and starting to build their startups soon after their tertiary education stints.

Age when founding



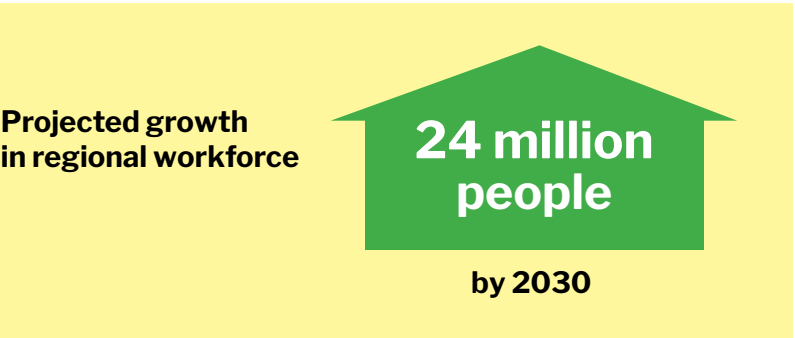
Company	Founding Members	Year of Incorporation	Education	Years from Graduation to Incorporation
Grab Holdings	Anthony Tan	2012	Master's	1
Grab Holdings	Tan Hooi Ling	2012	Master's	<1
Gojek (now GoTo)	Nadiem Anwar Makarim	2010	Master's	<1
Bukalapak	Achmad Zaky	2010	Bachelor's	1
PatSnap	Jeffrey Tiong	2007	Bachelor's	During University
Ninja Van	Chang Wen Lai	2014	Bachelor's	2
Carousell	Quek Siu Rui	2012	Bachelor's	During University
eFishery	Gibran Huzaifah	2013	Bachelor's	1
Biofourmis	Kuldeep Singh Rajput	2015	PhD Candidate	During University
Ajaib	Yada Piyajomkwan	2018	Master's	<1
Ajaib	Anderson Sumarli	2018	Master's	<1
Traveloka	Ferry Unardi	2012	Master's	During University

We can see that some of the most impactful companies in the region were created when the founding team was in their late 20s, and that they founded their companies soon after they had completed their formal education. This is not a surprise given that the population of Southeast Asia is already young with 47% of the population under 30 years of age³⁰ and that the current generation has grown up in an era of rapid digital change.

Moreover, with the regional workforce projected to grow by 24 million people by 2030³¹, it would not only mean a fresh influx of young workers to provide the needed human capital to these entrepreneurs but also increase the number of prospective entrepreneurs.

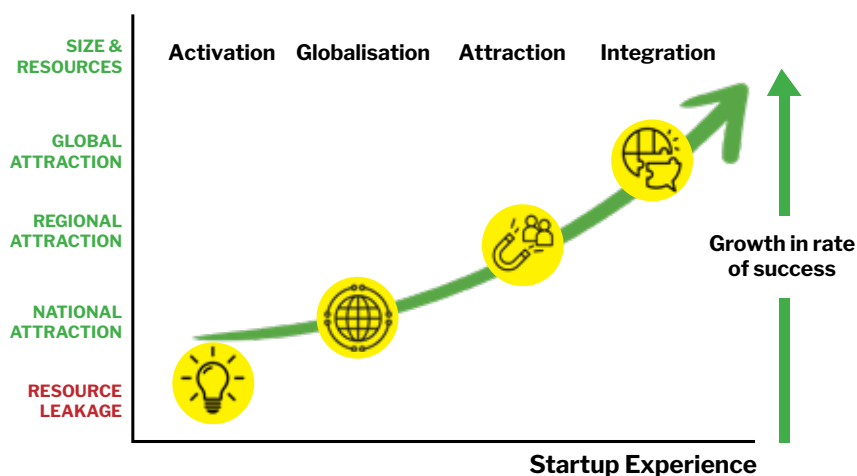
Arguably, the demographic dividend of Southeast Asia will not only be on the demand side but also the supply side. This would set Southeast Asia apart as most startup ecosystems in other parts of the world face an ageing population.

Looking ahead, much of the growth of the region’s startup ecosystem would gravitate towards the progress and development of the youth population.



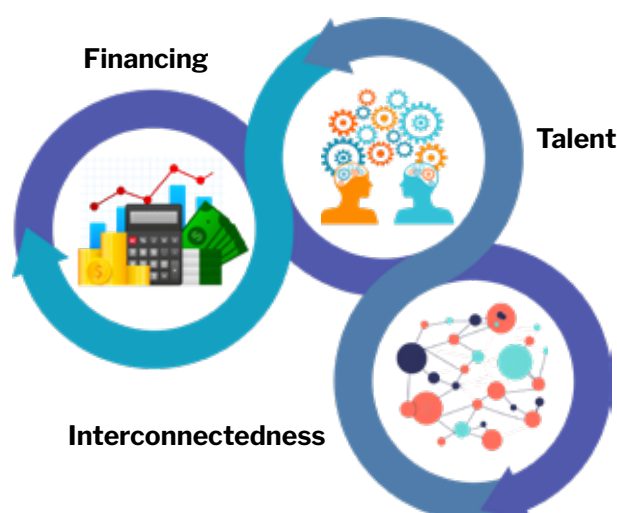
The Future of the Startup Ecosystem

Considering the potential of the startup ecosystem, there have been many initiatives on a regional to national level to energise and grow these ecosystems. Using Startup Genome's Ecosystem Lifecycle Analysis framework³², we discerned that the startup ecosystems within Southeast Asia are at different stages. At each stage, they would have different requirements to grow defined by their existing characteristics.



Country	Ecosystem Lifecycle Stage	Characteristics of Stage	Main Area of Development
Singapore	Attraction Phase	>3,000 startups	The main objective is to drive global resource attraction to significantly expand the size of the ecosystem and address resource gaps in human talent and capital
Indonesia	Globalisation	>1,000 startups, increased startup experience in the ecosystem, and a series of exits that trigger national resource attraction	The objectives are to increase the chances of larger and more successful startup exits by increasing global interconnectedness, developing funding sources and leveraging technological expertise
Malaysia			
Thailand			
Vietnam			
Philippines	Activation	Limited startup experience and <1,000 startups	The main objective is to grow the number of local startups, early-stage funding and a more connected local community

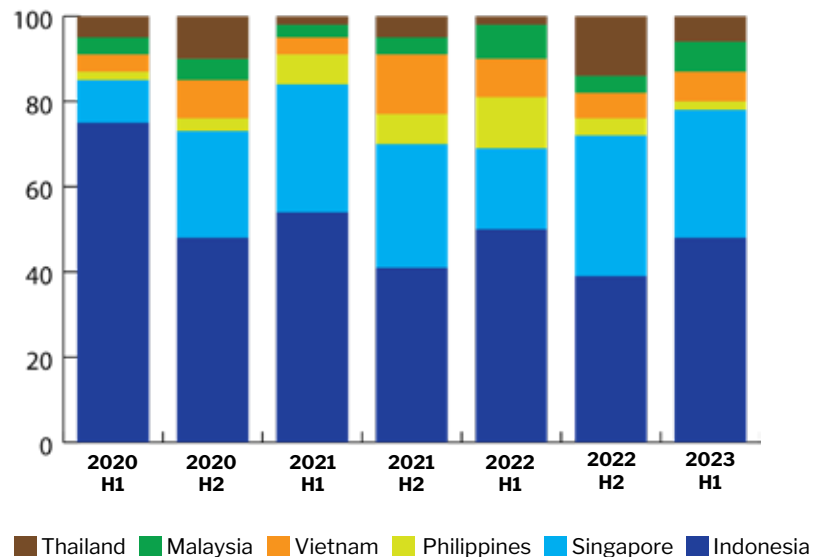
From the report, we can identify three main issues - financing, talent and interconnectedness. Due to the distinctive characteristics of each Southeast Asian country, we note disparities across the region in developing these three areas.



New VC capital invested by country, %

In terms of financing, there is a noticeable concentration within Singapore and Indonesia.

Indonesia attracts more capital due to its larger market opportunity from its sizable consumer base, and Singapore is seen as a regional launchpad as well as a robust financial sector. Hence, more can be done to promote financial support more evenly across the region or to target high-potential but underfinanced areas.



Source: Cento Ventures Southeast Asia Tech Investment Report 2023H1

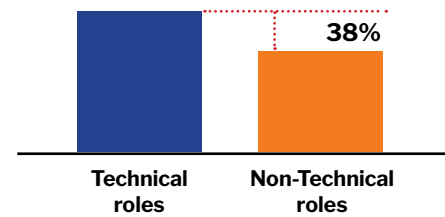
Regarding interconnectedness, we see that the more developed, well-funded startups and larger startups have exploited regionalisation to support their growth but this is not an easy feat to accomplish. This is because Southeast Asia is a group of culturally, economically, and socially unique countries.

Company	Latest Funding	Vertical	Countries
Grab Holdings	IPO	Consumer	Singapore, Malaysia, Cambodia, Indonesia, Myanmar, Philippines, Thailand, Vietnam
Sea Limited	IPO	eCommerce	Singapore, Thailand, Taiwan, Vietnam, Indonesia, Malaysia, Philippines, Brazil
Kredivo	Series D	FinTech	Indonesia, Vietnam
PropertyGuru	IPO	PropTech	Malaysia, Indonesia, Thailand, Vietnam, Singapore
ShopBack	Series E	eCommerce	Australia, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam, Germany
NIUM	Series D	FinTech	Singapore, UK, US, India, Netherlands, Malta
Ninja Van	Series E	LogisticsTech	Singapore, Malaysia, Indonesia, Vietnam, Philippines, Thailand
99 Group	Series C	PropTech	Singapore, Indonesia
PatSnap	Series E	IP	Global with 50+ countries
Trax	Series E	RetailTech	Global with 45+ countries

Entrepreneurs and investors must consider the “localisation paradox” - to simultaneously build hyper-locally and regionally to effectively scale and make their positions defensible³³. This includes engaging with regulators, working with local partners and adapting their product to the local environment. This also extends to the startup talent of the region as most startups would hire within their home countries to strengthen cohesiveness³⁴. This ultimately results in the teams not having a nuanced understanding of the future markets they expand into.

There is a shortage of tech talents given the strong demand from both traditional sectors and technology industries, resulting in **38% higher salaries** as compared to non-technical roles³⁵. Such roles revolve around the domain of software engineering, product management, data science and data engineering.

Percentage Difference in Salaries



Source: Glint's Southeast Asia Talent Report 2023

According to the data from job-matching platform SEEK Asia, which mainly operates in Southeast Asia, there has been a 42% increase in the volume of tech job ads on their platforms from 2019Q1 to 2023Q1³⁶. Moreover, on the supply side, we see that supply is also inadequate. In the ASEAN Digital Integration Index, Digital Skills and Talent was the poorest performing pillar³⁷.

2019Q1 to 2023Q1

42%

increase in the volume of tech job ads on job-matching platform SEEK Asia

Thus moving forward, the main avenues to grow within the region are:





SECTION 2

FOCAL POINTS WITHIN THE REGION

Key Sectors Across Southeast Asia

Southeast Asia's startup ecosystem is nascent yet holds a lot of potential. As the startup ecosystem grows and discovers new pathways, we see that there are common foundational pillars that will provide sustained continuation of the startup ecosystem - E-Commerce³⁸, FinTech³⁹ and ClimateTech⁴⁰.



E-Commerce

The E-commerce sector in Southeast Asia has become integral to the daily lifestyle of the region; driven by urbanisation, rising incomes, and mobile internet access. Major platforms like Lazada, Shopee, and Tokopedia are key pillars by serving the growing middle class with a wide array of products, tailored to regional tastes and logistical needs. Such platforms not only simplify consumer access to goods but also significantly impact the development of fulfilment logistics, as the demand for efficient, timely deliveries escalates.

The scale of such operations is only possible due to the influx of venture capital from regional players such as 500 Global, Openspace and East Ventures that took an early bet, to global investors such as the likes of Tencent, Alibaba and Sequoia Capital that provided larger pools of capital as the companies expanded. As digital literacy advances and consumer confidence in online shopping increases, E-commerce continues to play a bigger role in daily life.

The integration of advanced analytics and customer engagement technologies further ensures the sector's prominent role in Southeast Asia's digital economy. With its adaptive capabilities to the local user and innovative use of technology, the E-commerce industry in Southeast Asia presents substantial opportunities for sustained expansion and investment.



FinTech

The FinTech sector is an ever-growing vertical driven by rising consumer demand for cashless payments, technological advancements, and government support, meeting the needs of the underbanked.

The market revenue is projected to reach US\$ 38 billion⁴¹ by 2025, bolstered by a youthful, digitally-savvy population and supportive policies such as regulatory sandboxes and digital banking licenses. Key players in the region include FinTech startups like Grab Financial Group, SeaMoney, Ajaib, Endowus and GoPay, which are diversifying their offerings beyond basic payment solutions to encompass lending, insurance, and wealth management.

The sector's growth potential has also attracted significant capital that goes beyond pure-play venture capital as seen by the involvement of major financial institutions and mature financial technology companies.

FinTech's projected revenue in Southeast Asia



Looking ahead, the FinTech industry in Southeast Asia is poised for sustained expansion over the next decade, propelled by innovations in AI and blockchain, increased digital adoption, and greater regional economic integration facilitated by initiatives like the ASEAN Digital Economy Framework Agreement.

These elements collectively position FinTech as a crucial pillar in the region's economic framework, presenting substantial opportunities for growth and investment.



ClimateTech

ClimateTech in Southeast Asia is going through an inflection point of growth, spearheaded by strategic government initiatives and reinforced by commitments under the United Nations Framework Convention on Climate Change (UNFCCC).

These commitments are focused on controlling carbon emissions and managing plastic waste through regulations such as Extended Producer Responsibility (EPR). Regional sustainability plans like Singapore's Green Plan 2030, Indonesia's Net Zero Emission Roadmap, Thailand's Bio-Circular-Green (BCG) Economy Model, and the Philippines' Renewable Energy Expansion are driving innovations across key sectors including energy, agriculture, and transport.

These policies foster the growth of startups like eFishery, Redex, and GreenYello, leading the way in digitalising agriculture and advancing green technologies, highlighting the region's commitment to sustainable development.



Beyond technology adoption, startups like ReForm Plastic are also pioneering new business models such as the franchising of green technologies to overcome regulatory constraints and promoting adoption of technologies. Supported by robust regulatory frameworks and a growing interest in sustainability, Southeast Asia is seeing a surge in innovation that may allow the region to become a significant player in global sustainable development.

Key Sectors Across Countries

Diverse economic, cultural and geographic landscape of the region has also allowed each individual country to specialise in certain areas of innovation vis-a-vis their unique advantages. While the region's startups initially scaled due to wide adoption of mobile internet, they are now evolving into other forms that leverages the unique strengths and resources of each country.

Singapore

Singapore's BioTech and HealthTech sectors are thriving, driven by a strategic governmental focus and bolstered by a surge of innovative startups. These sectors have gained substantial momentum through the creation of Biopolis and the support of initiatives under the National Biomedical Science Strategy. Startups like Hummingbird Bioscience, MiRXES and Biofourmis are bulwarks of this growth story, showcasing how new companies are leveraging Singapore's advanced technological infrastructure and strong research capabilities from institutions like Duke-NUS⁴² and A*STAR⁴³. Hummingbird Bioscience, with its significant \$125 million⁴⁴ funding for cutting-edge cancer and autoimmune disease treatments, and Biofourmis, a pioneer in health analytics, exemplify the transformative impact of these startups in advancing personalised and predictive healthcare solutions.

The success of these startups has not only advanced health and biotechnological innovations but also attracted substantial venture capital investments from prominent firms such as Novo Holdings⁴⁵ and Flagship Pioneering⁴⁶, facilitated by the Economic Development Board (EDB). This influx of capital and expertise is crucial in scaling up operations and speeding up the commercialisation of scientific breakthroughs, further enriching Singapore's ecosystem.

As these startups continue to grow and succeed, they play a critical role in enhancing Singapore's global standing as a BioTech and HealthTech hub, driving both economic growth and substantial advancements in healthcare technologies. This dynamic sector's ongoing expansion is a testament to Singapore's strategic vision and its effective public-private partnership model, ensuring the sector's vibrant future and its ability to meet the health challenges of tomorrow.



AgriTech is emerging as a transformative sector within Indonesia's startup ecosystem, vital for modernising its agriculture to meet the demands of a growing population and a changing global climate. Agriculture, fishing and forestry are significant contributors to Indonesia's GDP⁴⁷, collectively accounting for 13.28% and are deeply integrated into the livelihoods of a large portion of its population. However, the sector has faced persistent inefficiencies in production and distribution. To address these challenges, AgriTech startups like eFishery, Sayurbox, and Tanisupply are introducing innovative solutions that streamline supply chains, improve productivity, and enhance market access through digital platforms. These startups are enabling farmers to adopt more sustainable practices and connect directly with consumers, reducing the layers of intermediaries that have traditionally eroded profits.

The support from the Indonesian government, through initiatives like the creation of digital ecosystems in partnership with the Asian Development Bank⁴⁸, underscores the strategic importance of AgriTech. This sector has attracted significant investment, demonstrating its potential for scalability and high economic impact. Top venture capital funds, including Go-Ventures and MDI Ventures, have played a crucial role in fueling this growth. By the end of 2022, private investments in Indonesian AgriTech startups like eFishery and Aruna totalled \$300 million⁴⁹, highlighting the sector's promise to bolster national food security and sustainability. With a tech-savvy, youthful demographic and targeted governmental policies, AgriTech stands as a key area for potential growth, innovation, and investment in Indonesia, poised to reshape traditional agricultural practices into a more efficient and profitable industry.



Image sources: eFishery, Sayurbox, Tanisupply, Aruna websites

Philippines

The Philippines is rapidly becoming a significant player in Southeast Asia's digital and gaming sectors, with substantial engagement in social media and a dynamic startup ecosystem. A prime example is Kumu, a Filipino social entertainment platform that has evolved from a simple live streaming app into a comprehensive digital community offering a range of services including social TV and e-commerce since its launch in 2018. A notable Series C funding round led by General Atlantic has brought Kumu's total funding to over \$100 million⁵⁰, highlighting its role as a major digital content hub that caters to the global Filipino diaspora.

The surge in digital consumer engagement during the pandemic has further stimulated sectors like content creation, social commerce, and esports, attracting significant international investments. With its robust growth and innovation, the Philippines is poised to become a regional leader in digital content and gaming. This growth is supported by media startups such as Bhapi, Glide, and Nikxs, which are at the forefront of digital innovation, driving the country's reputation as a hub for creative digital solutions.



Image sources: kumu website

Vietnam



Vietnam's gaming industry is undergoing a transformative phase characterised by rapid growth and significant venture capital investments, which are propelling the rise of innovative startups. Leading this wave are standout unicorns like VNG Corporation, which has evolved from a gaming company into a tech conglomerate, and Sky Mavis, the creators of the blockchain-based game Axie Infinity. Sky Mavis recently secured a Series B funding round of \$152 million⁵¹, led by Andreessen Horowitz, elevating its valuation to nearly \$3 billion. This vibrancy in the startup scene, bolstered by venture funds such as Vertex Ventures, highlights Vietnam's status as a high-potential market for gaming investments.



Image sources: VNG website

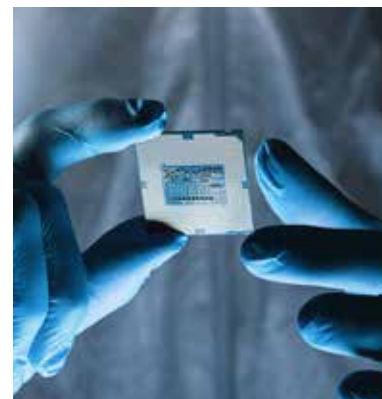
Furthermore, Vietnam's strategic advantages in the gaming sector are fostering significant growth and enhancing its position in the global market. The country boasts over 18 million eSports players⁵², supported by the Vietnam Esports and Entertainment Sports Association (VIRESA) that promote the industry through tax incentives and educational programmes. These efforts help lower barriers for gaming startups and foster a conducive environment for sector development.

The industry's expansion is also supported by strategic partnerships with major tech firms like Intel⁵³, which bring both capital and expertise, thus enhancing the local gaming and eSports ecosystems to meet international standards. This robust infrastructure combined with Vietnam's extensive access to smartphones and improving internet connectivity, is essential as the industry increasingly shifts towards mobile and online gaming platforms. This ecosystem not only nurtures local talent and innovation but also aligns with the cultural preferences of Vietnamese gamers, further driving the sector's growth and regional influence.

Malaysia

Malaysia's push into semiconductor advancements, augmented by initiatives like Industry4WRD and Malaysian Research Accelerator for Technology and Innovation (MRANTI) and supported by National Technology and Innovation Sandbox (NTIS), offers a compelling opportunity for Industry 4.0 to thrive as a focal point for startups. MRANTI accelerates the commercialisation of innovation and research and NTIS provides a controlled environment to prototype new technologies. The semiconductor industry, poised for expansion, benefits from substantial investments by both domestic and international entities, highlighted by Intel's \$7 billion⁵⁴ commitment and healthy foreign direct investment in Penang.

Key venture capital funds such as Gobi Partners, Cradle Fund, and MAVCAP have been integral in supporting startups specialising in semiconductor design, manufacturing efficiency, and supply chain optimisation. Noteworthy startups like T-Robot, DF Automation & Robotics, and Robopreneur are spearheading advancements in robotics and automation. With Malaysia's reinforced commitment to Industry 4.0, collaborative efforts between government agencies, startups, venture capital firms, and corporate entities position the nation to emerge as a significant player in this sector.



Thailand

Thailand's digital health sector is on a remarkable growth trajectory, underscored by the Thailand 4.0 policy and the Thailand Digital Economy and Society Development Plan, which aim to transform the country into a regional hub for medical and wellness services. This vision is supported by substantial venture funding from corporate venture capital arms and government-led funding initiatives as well as a robust ecosystem of startups leveraging the nation's extensive medical expertise. For instance, companies like Ooca and Baiyaphytopharm are pioneering innovative healthcare solutions, from comprehensive mental health services to biopharmaceuticals using plants as biofactories. There is also ecosystem builders like Chula Medical Innovation Center that aid in the commercialisation of medical research through product development and access to funding. The sector's potential is further highlighted by startups like QueQ, which enhances patient experience through digital queuing systems in over 100 hospitals, significantly reducing wait times.

The market for digital health in Thailand, projected to reach USD 1.4 billion by 2025⁵⁵, is driven by emerging technologies such as telemedicine and mobile health applications. Initiatives like Siriraj⁵⁶ Hospital's use of AI and 5G technology for rapid medical diagnoses exemplify how digital advancements are integrated into healthcare frameworks, improving efficiency and patient outcomes. Despite challenges such as infrastructural and digital literacy gaps, the perseverance of Thai startups, supported by government initiatives and a proactive approach to healthcare innovation, positions Thailand as a leader in Southeast Asia's health tech advancements, paving the way for continued growth and regional influence in digital health solutions.



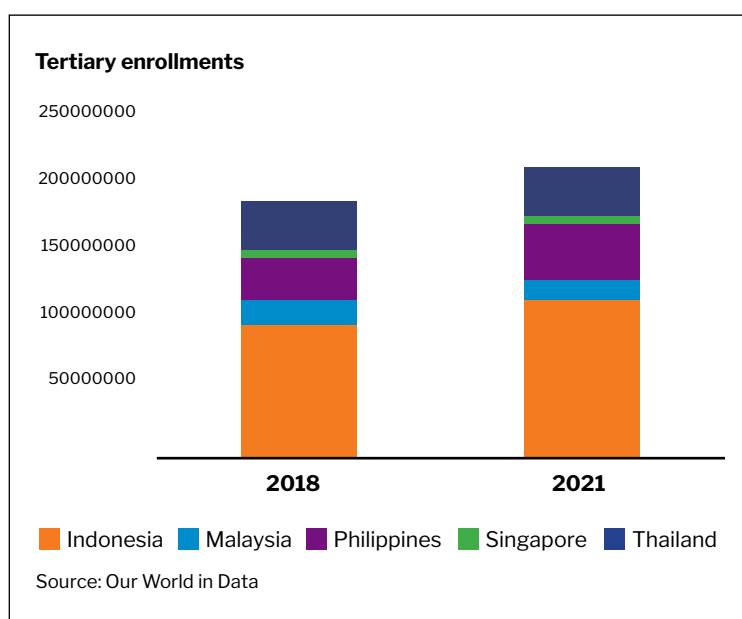
SECTION 3 THE ROLE OF UNIVERSITIES TO CHAMPION INNOVATION AND ENTREPRENEURSHIP

Opportunities for Universities Across Southeast Asia

Addressing the challenges faced by the regional startup ecosystem, universities are poised to play a pivotal role. The rise in tertiary education enrolment, fuelled by the region's economic development, sets the stage for a growing pipeline of potential entrepreneurial talent.

The early triumphs of this initiative are evident from the success of five Southeast Asian startup unicorns that were nurtured within the academic environment⁵⁷.

Furthermore, research reveals the distinct value of formal education in cultivating successful entrepreneurs⁵⁸ and that startups with founders holding at least a bachelor's degree are more likely to achieve unicorn status⁵⁹. Additionally, universities serve as neutral platforms facilitating public-private partnerships, making them ideal settings for fostering and meeting the needs of the startup ecosystem.



Given this compelling value proposition, the AUN-UIE has the remarkable opportunity to effectively utilise its extensive network, complementary resources and coordinated platform to support the growth of young entrepreneurial talent. It also provides a springboard for achieving global outreach, industry access, and the promotion of regional partnerships, placing the AUN-UIE in a prime position to drive I&E across ASEAN.

University Resources	How they help nurture entrepreneurs and entrepreneurship
Academic Programmes	Provide foundational education and knowledge about entrepreneurship to students that will allow them to take the first steps in starting a business
Student-led Initiatives	Peer-to-peer communal and social support, knowledge transfer between seniors and juniors and expanding networks
Incubators	Business development programmes that help entrepreneurs test proofs-of-concept, build market-ready products and secure funding
Network expansions	Access to investors, mentors, corporates, partners, and faculty that would be extremely challenging if they were to source it themselves
Technology Transfer	Commercialisation of research initiatives of faculty members by supporting them in both administrative matters and business development
Research Facilities	Access to equipment and resources to experiment in cutting-edge fields, especially in DeepTech. Some research facilities are also in collaboration with corporate partners that leverage their proprietary assets and knowledge
Wide-reaching platforms	Conferences, competitions and market expansion programmes which allow great exposure and coverage

Leveraging insights from our survey spanning the AUN-UIE ecosystem, we observe that ASEAN universities are actively engaged in a range of programmes and initiatives aimed at nurturing the startup ecosystem. These efforts are particularly focused on enhancing access to investment, talent development, and fostering interconnectedness. To offer a more detailed understanding of the initiatives currently underway, we offer a deep dive into incubation programmes offered by six universities hailing from six countries. Although we cannot showcase every institution from our survey, our analysis of these six universities offers insight into the vast potential emerging from universities throughout the ASEAN region.

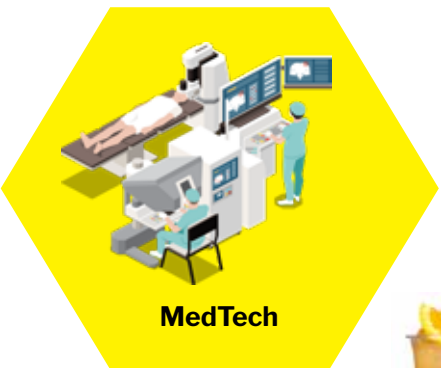
Chulalongkorn University's Innovation Hub (CU iHub) boasts a robust incubation program, engaging numerous entrepreneurial faculty members and prioritising ESG reporting. With 367 startups incubated, it also manages thirteen student clubs spanning various tech and entrepreneurship fields. CU iHub hosts the CHULA Deep Tech Demo Day to spotlight promising DeepTech startups and foster investor connections. Additionally, it leverages university resources, including networks and funding, to bolster faculty-led ventures.



13 student clubs



CU Top 3 Key Industries



MENTORS



Panachit Kittipanya-ngam
CEO/ Co-Founder, ZTRUS



Patai Padungtin
CEO/ Co-Founder, Builk One Group



Chatchanart (Joez) Jiratornsirikul
CEO, SeekONE Holding

Startups

METICULY

- Custom-tailored, 3D printed titanium bone implants using AI and precision technology
- Implants designed for individual patients based on CT Scans
- More accurate for surgical applications, enhancing patient recovery and improving quality of life



INCRE.BIO

- Food BioTech company creating next generation of healthier and more sustainable food and beverages
- Sugar free juices with nearly zero calories



HIVEGROUND

- Innovative drone technology for aerial surveying and analytics
- Products include cutting edge drones and software

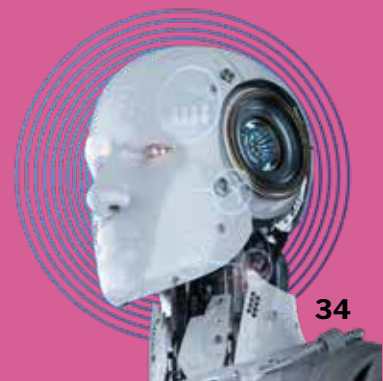


FLAGSHIP EVENT



CHULA Deep Tech Demo Day

Showcase high potential DeepTech startups and connect them to investors.



SMU Institute of Innovation and Entrepreneurship (IIE) advances the growth of entrepreneurship within the university, locally and in Asia. One of its key programmes is the Business Innovations Generator (BIG) Incubation programme.

\$S\$613M

collectively raised since 2009

613 incubated startups

SMU Top 3 Key Industries



Sustainability



EdTech



Industry 4.0

FLAGSHIP EVENT

**LEE KUAN YEW
GLOBAL BUSINESS PLAN COMPETITION**



**Biennial
event**



**Unites startups,
investors, aspiring
entrepreneurs,
and partners**



**Provides insights
into Asia's business
landscape**



**Offers top-notch
networking
opportunities**



**Promotes discovery
and investment in
promising ventures**

MENTORS



Shirley Wong
Managing Partner,
TNF Ventures Pte Ltd



Professor Yaacob Ibrahim
Professor & Advisor to the President,
Former Minister of Communications
and Information



John Cheng
(SMU Alumnus)
Founder and Managing
Director of Innovate 360

Startups

CASTOMIZE

- Innovative MedTech firm improves healthcare with lighter, waterproof orthopedic casts
- Enhanced comfort and ventilation benefit patients
- Doctors gain accuracy, easy application, and improved monitoring



WASNA

- Delivers donor-free manufacturing for drug development
- Serum alternative boosts growth of stem cells, fibroblasts, and skin cells
- Cuts growth medium costs by 95% with cultivated meat
- Sets affordable, sustainable standards for red blood cell production by eliminating plasma

TURTLE TREE LABS

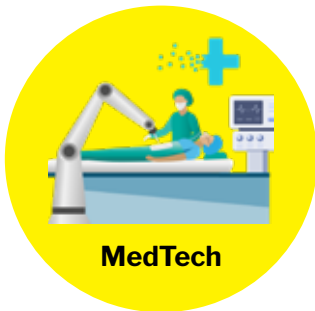
- Pioneers in cell-based milk production, specialising in sustainable nutrition solutions such as LF+®, the inaugural sustainably crafted lactoferrin via precision fermentation
- Delivers milk mirroring traditional dairy in composition, appearance, and flavor



UM Centre of Innovation and Enterprise (UMCIE) initiated its University of Malaya Deep Tech (UMDT) Accelerator Programme to promote the commercialisation of technological innovation by its researchers. UMDT is a 6-month programme and provides participating startups with mentorship, classes and grants. It is a specialised programme with each startup comprising at least one UM researcher and a business co-founder.



Top 3 Key Industries



MENTORS

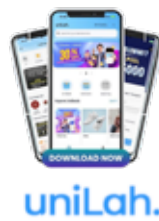


A. Zakir Jaafar RTTP
CEO, UVCC Sdn Bhd



Dr Lee Ching Shya
Technology Transfer Manager,
University of Malaya

Startups



UNILAH

- Student centred application designed to enhance university experience
- Platform aggregating essential services and information
- Simplify campus life, offering features that cater to academic needs, social interaction and university-wide announcements

BIOAPPS

- Specialises in prosthetic and orthotic services
- Provides customised solutions to enhance mobility and comfort
- Serves patients from both public and private sectors in Malaysia



BIO SIGHT

- Specialises in non-invasive scoliosis diagnosis
- Streamlines scoliosis diagnostic process
- Offers high accuracy
- Easy to use for hospitals, clinics, physiotherapists, chiropractors and individual consumers



KEY ACTIVITIES



UMCIE Technology Transfer Unit focuses on Intellectual Property (IP) management and advising on IP rights



Facilitates monetisation of IP from R&D, technology matching, support services for commercialisation, business development



Fosters public-private partnerships and engages in industry-focused activities



DLSU's Animo Labs is a tech business incubator aiming to commercialise research. It provides services in business development, prototyping, fundraising, and access to university resources. Animo Labs also hosts competitions to foster technopreneurship in areas like 5G, climate change, sustainability, and the circular economy.



Startups

TITAN

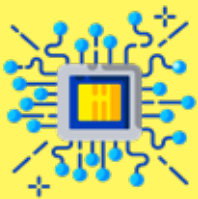
- Automated computer vision capable of tracking, classifying and counting vehicles, profiling speeds and estimating air pollution level based on vehicular counts
- Based on moving object segmentation and vehicle detection, tracking, classification, counting, speed estimation and air quality estimation
- Use cases: Traffic management, road infrastructure improvement



Top 3 Key Industries



Supply Chain & Logistics Tech



NanoTech



Industry 4.0

CATCH ALL

- Uses AI and data analytics to enable cost-effective and sustainable mobility and traffic efficiency solutions
- Enhances traffic and transport management systems



NANOTRONICS

- Produces advanced materials, products and solutions supporting key enabling industries
- Offers nanostructured material products and custom product development services
- Leverages core competencies in advanced and nanocomposite polymer and additive manufacturing or 3D printing technologies



FLAGSHIP PROJECT

The Strategic and Collaborative Alliance for Leveraging Ecosystem of Startups (SCALE) is a government-funded project by Animo Labs to enhance the startup ecosystem in the Nation Capital Region (NCR). It involves mapping ecosystems in 17 NCR cities, creating 5-year development plans, and forming the SCALE-NCR Consortium to boost collaboration among 15 TBIs.

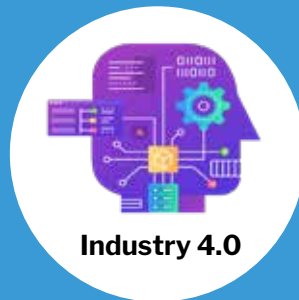


Vietnam National University – Ho Chi Minh City (VNUHCM) spearheads its Innovation and Entrepreneurship (I&E) initiatives primarily through the Ho Chi Minh University of Technology – Technology Business Incubator (HCMUT-TBI).

The HCMUT-TBI incubator program collaborates with partners to offer professional certification programs in collaboration with corporate giants like Microsoft and Cisco, and runs the iStartX acceleration program, which employs the Lean Startup methodology. TBI also provides comprehensive support for startups, including business development training, fundraising assistance, mentorship, intellectual property advisory, co-working space, IT infrastructure, and access to fabrication labs.



Top 3 Key Industries



Startups



INDOFIL

- Specialises in solar photovoltaic (PV) projects
- Services commercial and industrial clients
- Collaborated with Gamuda Land and Pousung



GCALLS

- Founded by HCMUT alumni
- Provides integrated call management for MSMEs
- Enhances sales and service capabilities
- First to win USD 1 million from SharkTank Vietnam



INEXT TECHNOLOGY

- IT solutions for the hospital sector
- Offers PACs (Picture Archiving and Communication Systems) for medical image storage
- iTeleM system for remote diagnosis and treatment
- Aids in smoothening the patient diagnosis to treatment process

FLAGSHIP EVENT



The flagship event hosted by HCMUT-TBI is the annual Bach Khoa Innovation competition, established in 2018. This competition offers students from schools and universities in Ho Chi Minh City a dynamic platform that merges advanced science and technology with practical business models. It encourages young participants to apply their knowledge to address real-world challenges faced by businesses and society, ultimately helping them transform their innovative ideas into reality.



In Institut Teknologi Bandung (ITB), Lembaga Pengembangan Inovasi dan Kewirausahaan (LPiK) is the agency that encourages the utilisation of research results. One key programme is its incubator which supports the commercialisation of research outcomes in the university. This also includes IP registration and management, matching with a technopreneur coach and providing co-working spaces. All of these efforts have led to the incubation of 244 startups, 117 registered IPs and 212 research innovations. The university also produces entrepreneurial graduates, including Indonesian unicorns Bukalapak and eFishery.

244
startups



117
registered
IPs

212
research
innovations

Top 3 Key Industries



Industry 4.0



ClimateTech



**Air, Water
and Waste
Management**

MENTORS



**Hendarsyah
Aditya Saptari**
Chairman, Pemimpin.id



Yulia Nur Hasanah
Secretary of Business Administration
Study Program, Telkom University



Nazmi Ahmad
Founder & CEO, Bigg Fellas

Startups

ELEVARM

AgriTech startup leverages AI and data to help small farmers optimise practices and access value chains. Mobile apps offer disease identification and guidance. On-farm facilities provide inputs. Secured \$1.39M from Insignia Ventures, Endeavour, and 500 Global.



KAZEE



Big data and AI software company offers corporate clients insights for better decision-making. Services include media sentiment, market intelligence, and spatial analysis. Clients include Bank Rakyat Indonesia, Financial Services Authority of Indonesia, and Telkom Indonesia.

EBM SCITECH

R&D company develops new products and improves existing ones. Completed 27 projects, producing 3 client spin-offs. Current CEO, Dr. Agus Chahvadi, is an ITB alumnus.



FLAGSHIP PROJECT

Incubated Startup and IP Development Database



Comprehensive data platform to track multiple data points regarding innovation outcomes



Registry of all past and present incubated startups



Composition of technology verticals and comprehensive breakdown of faculty research projects and development stages



SECTION 4

ADVANCING TOGETHER FOR COLLECTIVE DEVELOPMENT

Recommendations

Set against salient, long-term factors that will enhance the regional I&E ecosystem over time, universities have been vital players offering significant and unique value-add. They have made notable contributions to the growth of the startup ecosystem, encouraging innovation and an entrepreneurial spirit across the region through different means i.e. industry collaborations, launchpads for young startups, bulwarks of research and development as well as connectors of resources.

Despite these achievements, there is noticeable variance in the level of progress among universities in their I&E efforts as each has carved out its niche and competitive edge in different sectors. This variance underscores the value of cross-university collaboration. By pooling resources, sharing effective practices, and establishing partnerships among universities, we can overcome these disparities and leverage each institution's distinctive strengths.

Such joint efforts promise to significantly boost our collective impact, fostering a more unified and resilient startup ecosystem across the region. Our goal with collaboration is to even out the playing field, ensuring that every university can both contribute to and benefit from the ecosystem's growth.



Collaboration Across Five Key Areas



Data management

Technology commercialisation



Funding



Mentoring



Internationalisation



Data Management

As the regional digital economy expands, university incubators can enhance their services with data-driven strategies⁶⁰:



Personalising support by analysing startups' backgrounds, needs and goals



Evaluating programs using KPIs and feedback for continuous improvement

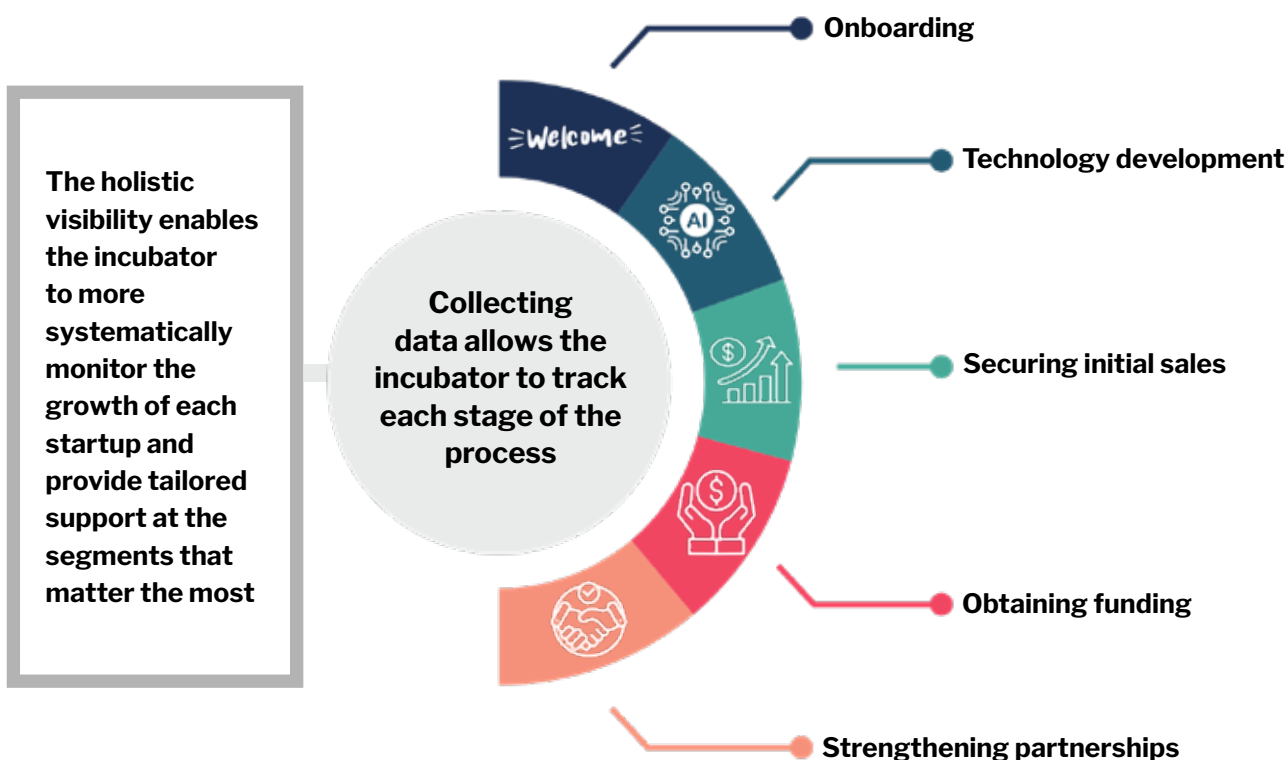


Identifying high-potential initiatives through historical performance analysis to spot key success factors



Institut Teknologi Bandung's Experience in Data Management

One example of successful data management is ITB-LPiK's database which tracks the outputs of incubated startups, developed IP and research projects. For startups it has a registry of all of its 244 incubated startups as well as a breakdown of verticals they belong to. Regarding university research, they also have a registry of faculty research projects and IP, the Technology Readiness Level (TRL) of their research areas and faculty involved, as well as a holistic dashboard for the state of IP development in the university.

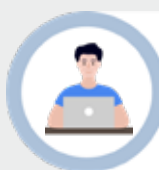


From our survey, we find that university incubators are already practising data collection to improve their programmes. However, they indicated several hurdles in unlocking its true potential:



Data Quality and Completeness

Incubators often struggle with data quality, leading to inconsistencies and inaccuracies that hinder insights and informed decision-making



Lack of Skilled Personnel

A shortage of skilled data professionals undermines the ability to translate data into actionable strategies



Data Privacy and Security

Stricter regulations and data governance requirements make securing sensitive information a top challenge



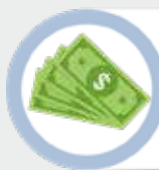
Technological Infrastructure Constraints

Outdated systems, lack of interoperability, and scaling issues in technological infrastructure impede effective data management



Integration and Siloed Data

Respondents struggle to integrate data due to organizational silos, hindering a unified view and complicating analysis and insight generation



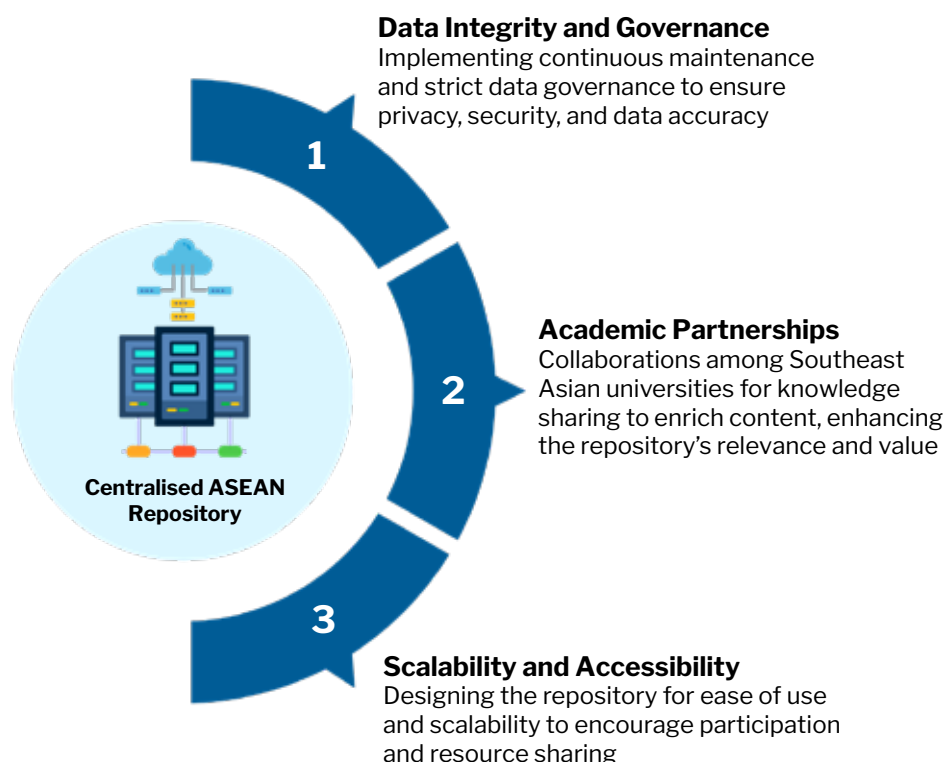
Cost

Data management including software, hardware and training is only cost effective at large scale



Recommendation: Centralised ASEAN Repository of Startup Data

Addressing the challenges of managing startup data, a possible initiative is a Centralised ASEAN Repository for Startup Data, in collaboration with AUN-UIE universities. This initiative focuses on:



The repository aims to unify the regional startup ecosystem, enhancing data-driven strategic planning and collaboration.

It facilitates engagement from the private and public sectors, and international organisations to leverage innovation opportunities in the region. This includes collaborations between corporate innovation labs and startups, joint IP development with global research institutes, and data utilisation for policy making by government agencies.

Such a database would also increase the visibility of ASEAN startups, attracting venture capital and fostering an interconnected ecosystem.



Technology Commercialisation

Universities are pivotal in developing the capacity for technological innovation in the ASEAN region. Principally, universities produce extensive research in a broad array of technologies and faculty are often at the forefront of pioneering projects⁶¹. Moreover, universities often have infrastructure and networks that encourage innovation and experimentation in a climate of exploration and knowledge discovery⁶².

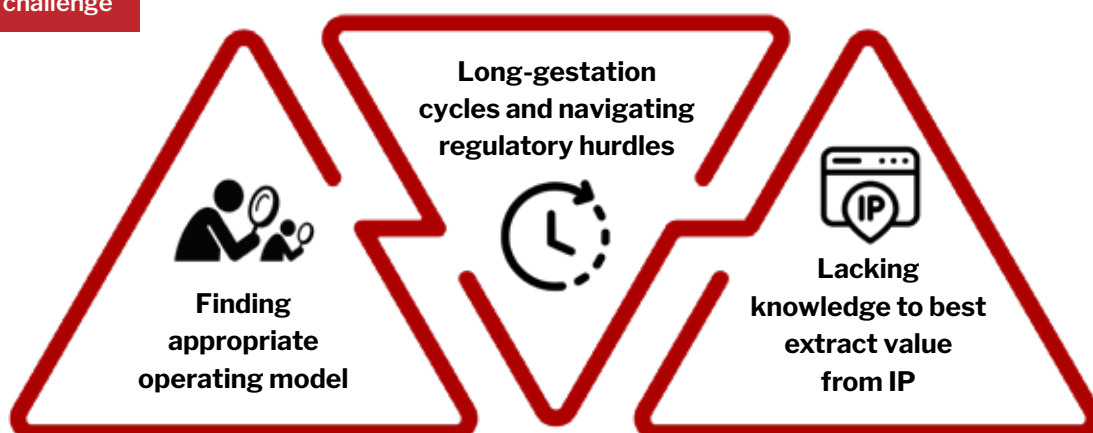
Notably, startup incubators in the region focus on DeepTech verticals or industries that leverage the research capabilities of the universities⁶³. Based on our survey, the top sectors for university spinoffs are in HealthTech, AgriTech and FoodTech. Some examples of successful spinoffs include:



Startup Name	Description	Vertical
nabsolute	Better delivery of bioactive ingredients that are applied to skin	BioTech
BioSight	A non-invasive measurement device to detect scoliosis	MedTech
Mineed Technology	Transdermal microneedle delivery system	MedTech
Baiya Phytopharm	Plant-based therapeutics and vaccines	AgriTech
Nanosense	Strip-based testing for food-based pathogens	FoodTech
MUI Robotics	Odour-sensing technology that digitalises scents	Air Management
SenziQ	Advanced sensor technology and real-time analytics to capture insights into movements within closed environments	Data Analytics

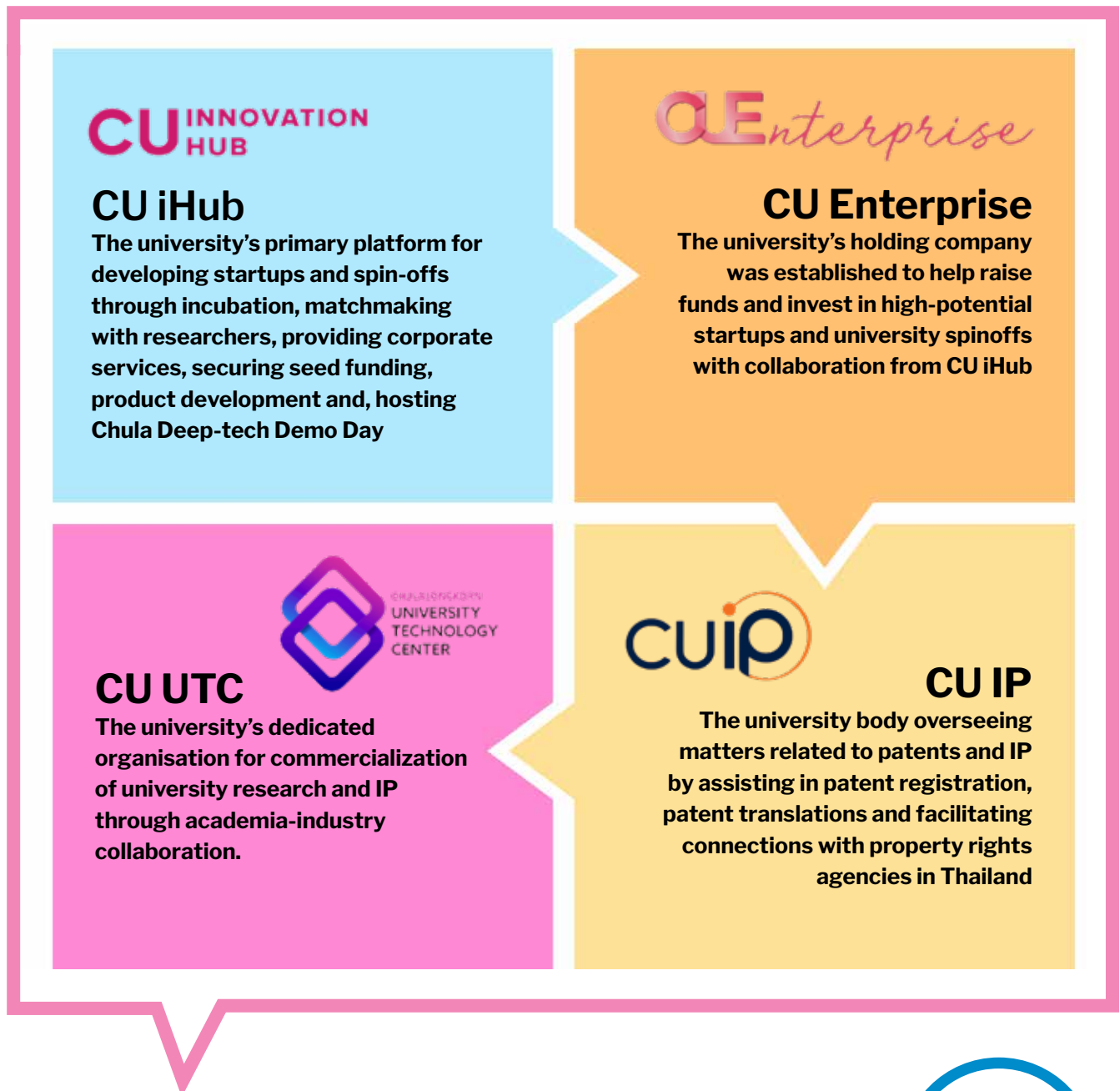
Despite the focus on vibrant research-intensive verticals, successful commercialisation remains a stubborn challenge

Key Impediments⁶⁴

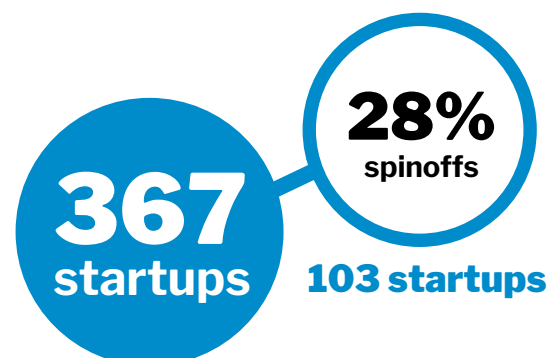


Chulalongkorn University as a Success Story

CU has a slew of key initiatives to foster innovation and technology commercialisation. These initiatives facilitate the journey for technological innovations to become market-ready ventures through a multi-faceted support system that leverages the university's capabilities. This includes CU Innovation Hub (iHub), CU Enterprise, CU Technology Center (UTC) and, CU Intellectual Property Institute (CUIP).

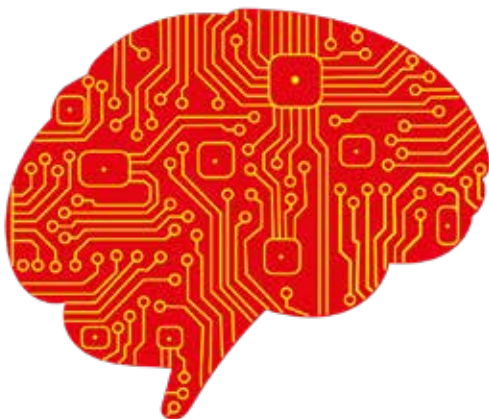


This structured support system has yielded significant results, including an increase in publications, research impact, funding, internships, and industry partnerships. Impressively, the university has incubated 367 startups, with 28% being spinoffs (103 startups), demonstrating CU's substantial impact on fostering an entrepreneurial ecosystem.





Recommendation: Regional Knowledge Platform for Technology Commercialisation



In response to these challenges, the recommendation is made to establish a regional knowledge platform for technology commercialisation within the broader AUN-UIE Network.

The knowledge platform aims to leverage the collective knowledge, experience, and resources of AUN members and find strategic alignment regarding domain knowledge.

Ultimately, this initiative seeks to enhance the capacity for effective technology commercialisation within the AUN through sharing of best practices and resources, collaboration and training.

The formation of a regional knowledge platform aims to standardise technology transfer processes, bridge capability gaps, and establish a unified platform for knowledge exchange. By leveraging our shared experience and competencies, this initiative will strengthen the technology commercialisation capabilities in the region, accelerating technological innovation and fully exploiting university-based R&D assets.

Platform for Education and Thought Leadership



The knowledge platform would offer a multifaceted approach to educational opportunities and thought leadership within the AUN-UIE Network in relation to technology transfer.

This can be done through regular knowledge-sharing sessions like workshops and seminars, both in physical and digital formats to enable peer-based learning of best practices and discussions of latest case studies. Moreover, the knowledge platform serves as a dynamic stage for thought leadership, enabling stakeholders across the AUN to share perspectives, showcase progress, and launch initiatives.

This would not only serve the academic community but also invite the public and private sector to understand the perspectives of universities and facilitate tripartite dialogue.

Professional Development



In the long run, these collective best practices and experiences within the AUN-UIE Network can be synthesised to develop comprehensive frameworks and methodologies applicable to technology commercialisation. Such synthesis could lead to the establishment of a standardised program or a professional certification program, aimed at equipping university administrators across the region with the necessary skills for effective technology transfer activities.

An existing example is the Registered Technology Transfer Professional (RTTP) designation administered by the Alliance of Technology Transfer Professionals.



Funding

Funding reflects the incubator's capacity to nurture startups from their inception through to market entry and subsequent growth phases. It is hence not surprising that 59% of survey respondents consider "securing external funding" a key indicator of an incubator's success⁶⁵.

59%
consider securing external
funding a key indicator of an
incubator's success



The benefits of seeking early-stage funding include



Prototype Development and Product Testing

Early-stage financing enables startups to craft prototypes and conduct essential product tests, verifying their innovations' desirability and market viability.



Market Entry and Expansion

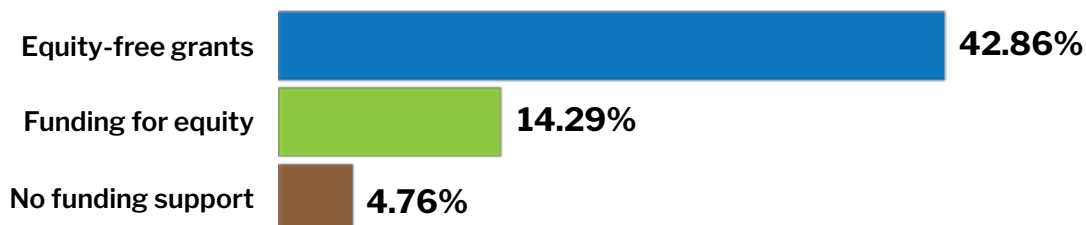
Sufficient funding is a competitive advantage for startups to finance their growth and overcome the cost barriers for market entry.



Attracting Further Investments

Gaining initial funding often allows them access and visibility to investor networks which helps greatly in securing future funding rounds.

Funding Support for Startups



Examples of International Programmes within the AUN-UIE Network

Features a tiered grant scheme that provides financial backing according to the startup's development stage

University of Indonesia's **UI Incubate**

Allocates grants to academic staff for developing business ideas with clear commercial potential, encouraging internal innovation

University Sains Malaysia's **PID Grant**

Delivers seed funding for select startups, indicating a committed effort to stimulate startup growth

Vietnam National University - Ho Chi Minh City's **iStartX**

Aids researchers and faculty in commercialising research, offering substantial funding for each application

Mahidol University's **iNT Pre-seed Fund**

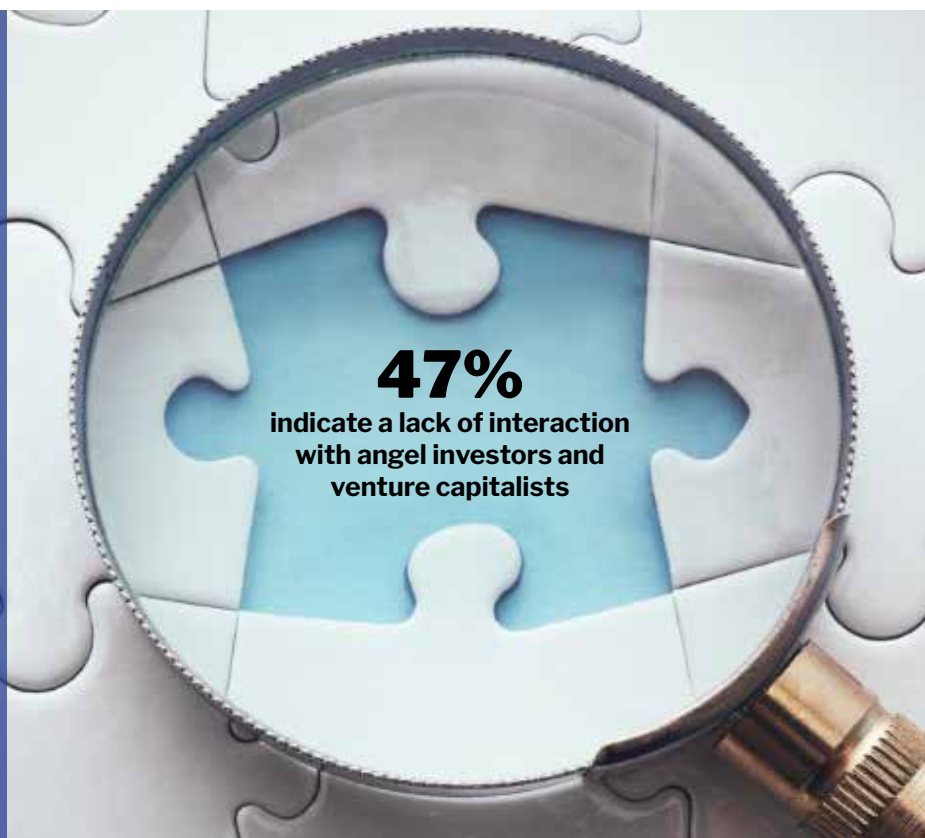
Offers a startup grant funding programme in collaboration with Asian Development Bank for its students and university staff

Universitas Gadjah Madah's **Innovative Academy**

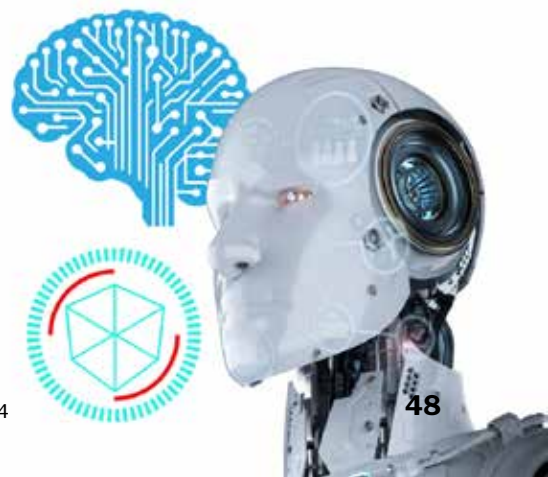
Despite the importance placed on securing external funding, we see that engagement with both angel investors and venture capitalists tends to be limited.

From our survey, 47% of respondents indicate a lack of interaction, often not engaging more than once annually.

This points to a significant access gap, suggesting that universities are seeking external funding for their startups but face challenges connecting with investors.



Additionally, funding programmes are designed to favour the prototype and technology development stages. With later-stage funding opportunities for regionalisation and growth expansion being significantly harder to secure, the universities have an opportunity to fill this gap - especially for startups in DeepTech.



SMU's Experience in Promoting Startup Funding

Singapore Management University (SMU) is an active champion of the regional startup ecosystem through a series of strategic initiatives that closely integrates the dynamic venture capital scene in Singapore. These initiatives include leveraging SMU's strategic position within the startup and investment community and democratising access to funding through various platforms:



Strategic Positioning



Being a recognised business school in the heart of Singapore's commercial and financial district, the university leverages its strategic location to consistently engage the investor community through thought leadership events, community building efforts and serving as a key node for emerging fund managers to raise visibility and enhance access to deal flow.

LEE KUAN YEW GLOBAL BUSINESS PLAN COMPETITION

Lee Kuan Yew Global Business Plan Competition (LKYGBPC)

The LKYGBPC is SMU's flagship global entrepreneurship event, gathers the world's brightest university-affiliated innovators in Singapore. Offering up to S\$2 million in prizes, the competition provides finalists a platform to interact with corporate leaders and venture capitalists through mentorship, judging, and networking sessions. This crucial engagement facilitates the securing of their first proof of concept, initial revenue, and opens doors to substantial funding opportunities from investors.

VC OFFICE HOURS

from
LEE KUAN YEW
GLOBAL BUSINESS PLAN COMPETITION

VC Office Hours (VCOH) is an initiative under the Lee Kuan Yew Global Business Plan Competition (LKYGBPC) to democratise access to the region's leading VCs and angel investors to gather advice and receive funding through a one-to-one table consultation session.

BUSINESS INNOVATIONS GENERATOR

Investor Integration in Incubation Programmes: Through SMU's incubation program, BIG - Business Innovations Generator, VCs are involved from the onset as industry mentors. They provide entrepreneurs with critical advice on business models, growth strategies and constructive feedback on their pitches to better help them secure fundraising.



Student-Run Venture Capital Fund: SMU pioneered Southeast Asia's first student-run venture fund - Protégé Ventures. This fund empowers students to gain first-hand experience in venture capital end-to-end, thus equipping students with a practical understanding of startup evaluation from an investor's perspective. A clear outcome is fostering the next generation of venture capitalists and being the first-funders of startups founded by university students and recent graduates.

These initiatives have not only helped SMU startups successfully secure USD 600 million in funding, but also established SMU's role as a vital conduit between the university environment and investor networks. SMU's approach demonstrates how universities can be instrumental in facilitating the flow of capital to the startup ecosystem.



USD 600M
funding secured
by SMU startups



Recommendation

Foster Investor Relations

Incubators should proactively cultivate relationships with a diverse array of investors (VCs, angel investors, and corporate venture arms). By establishing stronger connections with the investor community, incubators can ensure that their startups have broader access to potential funding sources. This could be through hosting thought leadership dialogue, industry networking events or even invitations to share their perspectives in closed-door sessions.



Implement Regional Training Programmes

Offering training programmes and resources focused specifically on fundraising strategies that have greater depth compared to the current offerings of workshops. This would include pitch development, capitalisation table management, investors relations and understanding of financial instruments and deal terms to name a few areas. This will empower startups with the necessary skills and knowledge to successfully secure funding and prevent costly mistakes.



Establish a Regional Funding Platform

A platform that democratises connections between startups, investors, and other funding opportunities at both local and regional levels. This platform could serve as a central hub, not tied to any single university, but rather a collective effort across institutions to leverage local and regional networks effectively. Such a model was proven during VCOH and can be implemented digitally for greater scale.



By creating a dedicated platform for facilitating funding connections, focusing on building investor relationships and providing targeted training, universities can be a key platform to democratise access to funding in the region. This approach not only closes the access gap but also strengthens the overall ecosystem, enabling startups to secure the necessary capital for growth and overcome geographical limitations.

International Exposure

Each Southeast Asian country offers unique advantages and value propositions that, when combined, create a holistic and supportive ecosystem for startups to leverage⁶⁶. The benefits not only include a larger market size but, also finding the best resources for business development i.e. human talent, IP protection, supply chain, incubation programmes, governmental grants and investor networks.

	Singapore A global startup hub with government regulations that promote entrepreneurship and investment, powerful intellectual property protection laws, business-friendly tax policies, numerous free trade agreements and investment guarantee agreements.
	Indonesia The largest economy in Southeast Asia that is home to the region's category leaders (eFishery, Xendit, Kredivo, Go-Jek, and Traveloka). It is also the most populous country in the region that is young, has high mobile internet penetration and a fast-growing digital economy.
	Vietnam Vietnam is the third-largest consumer market in Southeast Asia boosting a population of 97 million with a young median age of 32. The country's growing manufacturing hub and large pool of technology development professionals primes it as a key node of economic activity and abundant source of sought-after technical talent.
	Malaysia An emerging startup scene supported by strong government policies and institutions, especially the commitment of its sovereign wealth fund, Khazanah Nasional ⁶⁷ . Moreover, there is a strong presence of corporate players through corporate venture arms and innovation labs that provide strategic value add through their existing businesses operations.
	Thailand Thailand's capital market is "one of Asia's deepest and most liquid, alongside growing offerings in alternative asset classes" ⁶⁸ . The country is home to a vibrant startup community with True Digital Park being the region's largest startup hub. Moreover, corporate venture arms are the main source of funding allowing startups to leverage the scale of these corporates to their advantage.
	Philippines The second most populous country in the region with a significantly large proportion of university graduates, a culture of social interaction and a high internet penetration rate. Moreover, domestic consumption constitutes most of its GDP. All these factors provide founders with many opportunities in the consumer space.
	Cambodia A rapidly growing startup ecosystem anchored by government support. This includes the Khmer Enterprise and the Startup Cambodia National Program that have emerged to help startups in areas such as digital platforms, seed funding, and research.
	Laos Laos boasts rich natural resources and strategic positioning, presents opportunities in clean energy, agriculture, eco-tourism, and serves as a gateway for expanding into neighbouring markets. Programs run by the Lao National Chamber of Commerce and Industry exemplify the country's commitment to fostering entrepreneurship and innovation.
	Myanmar Myanmar remains a huge untapped opportunity for digitalisation that would benefit first-movers greatly. Moreover, the technology ecosystem builders, such as Phandeeyar's Tech Accelerator and Seedstars, are laying the seeds for its future development.



Collaborative efforts and cross-border partnerships within the region are crucial for fully maximising the value of each country's strengths⁶⁹. This collective approach enables startups to overcome geographical limitations and leverage the immense potential of the region's diverse assets to build resilient, innovative, and scalable businesses.

To instil a global mindset within incubated startups and university communities, universities have been increasingly incorporating international activities.

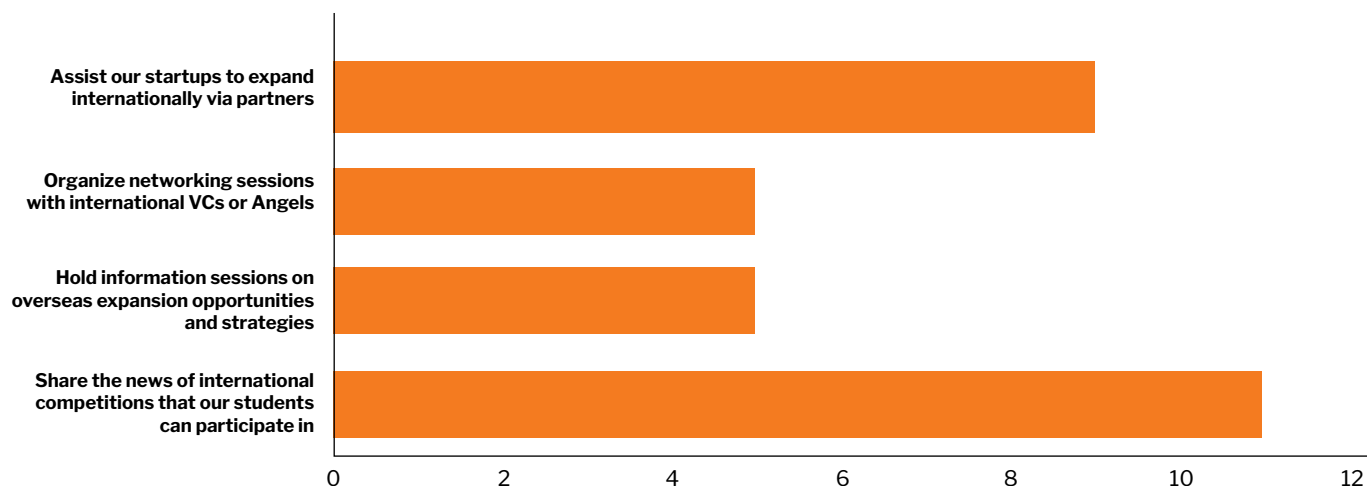
Some of these initiatives have produced alumni who became founding members of notable companies such as MatahariMalls.com, ShopBack and Circles.Life⁷⁰.

Notable initiatives

- The National University of Singapore (NUS) and the Singapore Management University (SMU) have their NUS Overseas College and Global Innovation Immersion program respectively. These programmes allow students to pursue onsite internships in startups and growth-stage technology companies in the region for 3-6 months.
- Ateneo de Manila University Intellectual Property Office ran its TechXplore programs which was a one-week overseas trip for students to be immersed in the Silicon Valley environment.
- The University of Economics Ho Chi Minh City Institute of Innovation partners Leipzig University in Germany for two-way market immersion programs with mutual reciprocal hosting of selected startups.
- Universiti Malaya and Universiti Putra Malaysia, Universiti Brunei Darussalam and Chulalongkorn University partnered with City University of Hong Kong for the HK Tech 300 Southeast Asia Startup Competition. The competition allows participating startups to explore the market for startups in South-East Asia, Hong Kong and Asia.

These are commendable efforts. Nevertheless, more can yet be done to promote international exposure which is both edifying and empowering.

Universities' International Exposure Efforts





Recommendation

Universities could consider investing more resources in strategic initiatives to bolster international engagement and foster a global perspective among startups and academic communities within the AUN. By facilitating meaningful international experiences and cross-border partnerships, I&E activity among university communities and startups will benefit from the diversity of ideas they encounter and the networks they forge. Moreover, these initiatives would span both public and private sectors.

Short-term Immersion Programmes within the AUN-UIE Network

Capitalising on the strength of bilateral partnerships within the AUN, this strategy involves hosting immersive, experiential programmes directly within the network. Each university's innovation and incubation center would act as a focal point for market immersion and knowledge exchange. This effort would not only aim at market expansion but also explore deeper engagements in technology research and forge corporate partnerships, thereby enriching the entrepreneurial ecosystem with international insights and opportunities. The virtues of such a model are evidenced by the A tripartite initiative of the Central German University Alliance Halle, Jena and Leipzig, it hosts bilateral market immersion programmes with university partners in Vietnam, Japan and Greater China for startups within each country.



Common Job Board across the AUN Network

This platform would promote entrepreneurship amongst students and enhance international exposure by offering overseas internships at incubated startups. This streamlines the process of connecting students with internship opportunities across the AUN network, facilitating talent acquisition for startups. This unified platform would list diverse internship opportunities, spanning different regions and sectors, to ensure broad access to international experiences. This model is already in use by SMU and NUS through their overseas internship programmes and could be replicated for the AUN network.

Overseas Webinar Series

To raise awareness and stimulate engagement with global markets and practices, an overseas webinar series is proposed. This series would serve as an accessible platform for startups and academic institutions to acquire knowledge about international market insights, best practices, and strategies for global expansion. Additionally, it would provide an avenue for establishing cross-border connections, laying the groundwork for more extensive and experiential international collaborations and programmes in the future.



By implementing these recommendations, we can bridge the identified gaps in international exposure and foster a globally oriented entrepreneurial ecosystem within the AUN. Through these concerted efforts, universities within the network can play a fundamental role in preparing startups not just for competitive success within their local markets but also for impactful presence and growth in the global arena.

With a holistic approach to internationalisation, we can augment the global competencies of university-incubated startups to ensure that they are well-positioned to thrive in an increasingly interconnected world.



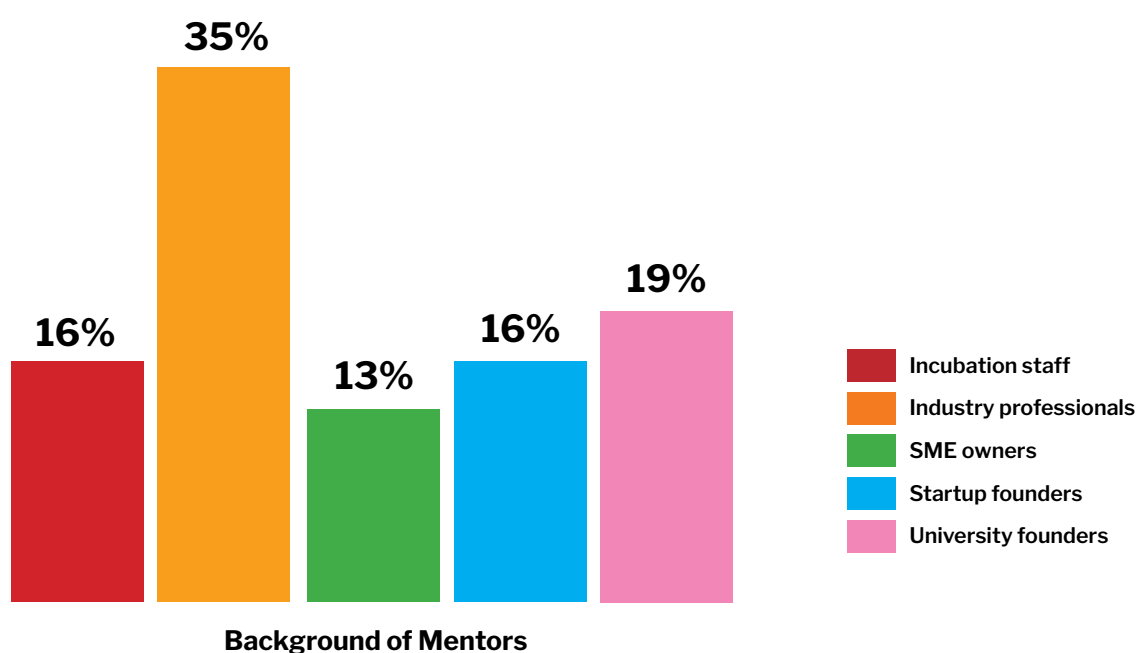
Mentorship

Mentorship is a critical element in the entrepreneurship landscape, deeply influencing the growth and success of startups. The entrepreneurial path is fraught with uncertainties and challenges, making the guidance from seasoned mentors not just beneficial but essential⁷¹, particularly for deep tech startups facing the dual hurdles of technological innovation and market penetration.

The AUN-UIE survey results underline the significance of mentorship in the entrepreneurial journey, with all respondents affirming their commitment to providing their incubated startups access to mentors. Such support serves to bridge the gap between founders and networks of experts and veteran entrepreneurs who impart vital insights, strategies, and advice, thereby mitigating risks and fostering accelerated development.

Institutions like the University of Brunei Darussalam and SMU stand out by offering structured platforms like the Expert Directory⁷² and a dedicated mentor⁷³ page, respectively, facilitating direct connections between startups and mentors.

The survey further reveals that mentors across the network predominantly align with five distinct categories, offering startups a diversity of relevant expertise.



Some notable mentors include

	<p>Patai Padungtin</p> <p>Patai Paddington is the CEO and founder of Builk One Group in Thailand as well as an alumnus of CU. Builk One is a B2B marketplace for the construction industry and software tool for cost reduction. The company raised a Series B+ round from The Siam Cement Group and other corporate venture funds.</p>
	<p>John Cheng</p> <p>John Cheng is the founder and CEO of Innovate360, Singapore's first food accelerator with facilities, with more than 12 years of experience in food manufacturing, trading, business strategy and transformation. He is also the chairman of Feed9billion, an open innovation platform focusing on food production, as well as an alumnus of SMU. He is part of the Ministry of Trade and Industry's Pro-enterprise Panel (PEP) and a Board Member of the Singapore Science Centre.</p>
	<p>Prof. Glenn Navarra Baticados</p> <p>Prof. Glenn Navarra Baticados is from the University of Philippines (UP) where he teaches innovation, agribusiness, and entrepreneurship. He was the former Director of the UP Los Banos Technology Transfer and Business Development Office, Innovation Fellow of the London Royal Academy of Engineering and a pioneer alumnus of the Filipinnovation Entrepreneurship Corps.</p>
	<p>Delta Purna Widyangga</p> <p>Delta is the CEO and co-founder of Qiscus as well as an alumnus of Nanyang Technological University. Qiscus is Indonesia's leading customer engagement platform that helps clients increase their sales and productivity across different markets. When asked about his inspiration to be a founder, he said that he wanted "to create value for the world, without changing who I am".</p>
	<p>Dr. Muhammad Zakir Jaafar</p> <p>Dr. Muhammad Zakir Jaafar is formerly the Head of the Technology Transfer Office (TTO) at University of Malaya and the CEO of Commercialisation Putra Science Park of Universiti Putra Malaysia focusing on IP commercialisation.</p>

Notwithstanding the value of mentorship, a palpable disparity in startups' access to quality mentorship prevails across the region. Fundamentally, there is an uneven distribution of experienced mentors and there are varying degrees of maturity within local startup ecosystems.

The variability in mentorship—reflected in the number of mentors and their time committed to mentoring—signals a critical supply-demand imbalance of experienced mentors in the region. Clearly, while some startup ecosystems are more developed, offering richer mentorship opportunities, others face a paucity of such resources.



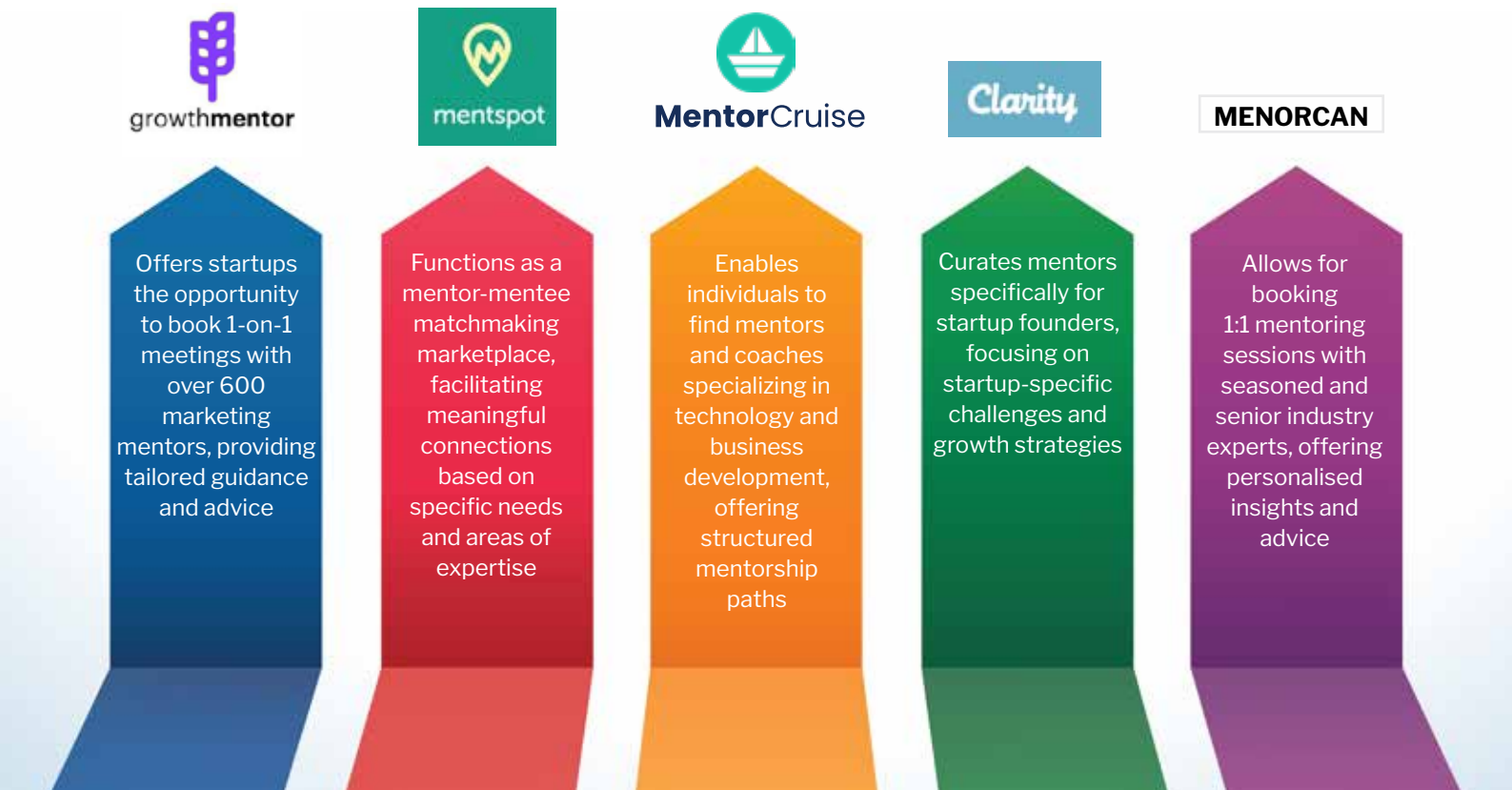


Recommendation

Addressing the mentorship gap notable across universities in Southeast Asia necessitates a scalable approach that capitalises on the region's collective resources.

Establishing a regional mentorship platform would be a viable solution for democratising access to experienced mentors, ensuring that all university-incubated startups can benefit from a wealth of domain expertise, market knowledge, and operational insights regardless of their home base.

The concept of a mentorship platform is well-established within the global startup ecosystem, with several successful examples demonstrating the model's viability and effectiveness:



Implementing a regional mentoring platform, inspired by these proven models, represents a wide-reaching and impactful way to address the existing disparities across universities in Southeast Asia.

Such a platform would not require the development of new, complex infrastructure but would instead utilise existing and user-friendly networks and technologies to facilitate connections and knowledge exchange.

Moreover, leveraging the unique position of universities to bridge startups with corporate partners presents an additional layer of value. These corporate entities possess deep industry insights and can significantly contribute to fostering startup-corporate collaborations, enhancing startups' access to commercial channels and proprietary assets.

This initiative promises not only to enhance the startup ecosystem's vibrancy and success but also to strengthen the collaborative spirit and innovation capacity across Southeast Asia.



The Future of University I&E in Southeast Asia

The I&E ecosystem in Southeast Asia holds great potential – demographically-driven growth, digital consumption, and widespread economic development. At the same time, the region's youth are increasingly technologically native, more educated and are key players in the region's entrepreneurship scene.

All of these factors combine to position the region's universities to deliver a unique value proposition as a catalyst and facilitator of resources that overcome constraints to sustainable and long-term development of I&E in the region.

As we have seen in this white paper, universities are already playing the critical role of serving as a nucleus where academia, research and enterprise development can coalesce to empower both students and faculty to found their own startups. Also, they serve as viable conduits for democratising access to capital, knowledge sharing, industry collaborations and market expansion to support the growth of startups.



5 collaboration areas for AUN-UIE to enhance university contributions to the regional I&E ecosystem

Looking ahead, this white paper aims to inspire future dialogues and mutually beneficial outcomes within the network and beyond to not only realise the potential of I&E within Southeast Asia but to also establish universities as vital building blocks in the sector's success.





REFERENCES

References

1. ASEAN Indonesia 2023. (2023, September 1). Interesting facts and data about the ASEAN region - ASEAN Indonesia 2023. Interesting Facts and Data about the ASEAN Region. <https://asean2023.id/en/news/interesting-facts-and-data-about-the-asean-region>
2. Chew, M. Y. (2023, March 8). Capturing the rise of ASEAN amid economic resilience and growing wealth. The Business Times. <https://www.businesstimes.com.sg/wealth/wealth-investing/whos-who-private-banking-mar-2023/capturing-rise-asean-amid-economic>
3. Ibid
4. Ibid
5. Lee, S.-H. (2023, May 23). ASEAN Free Trade agreements. RSIS Commentary. <https://www.rsis.edu.sg/rsis-publication/cms/world-trade-amidst-war-inflation-and-protectionism-asean-free-trade-agreements>
6. Chiyachantana, C. N., & Prasarnphanich, P. M. (2022a, May 29). Digital Entrepreneurship in ASEAN. Center for Management Practice. <https://cmp.smu.edu.sg/ami/article/20220529/digital-entrepreneurship-asean>
7. Irena, M. (2022, May). Informal workers: why their inclusion and protection are crucial to the future of work . The ASEAN Magazine. Retrieved from <https://asean.org/wp-content/uploads/2022/05/The-ASEAN-Magazine-Issue-21-2022-Informal-Economy.pdf>.
8. The ASEAN Secretariat. (2024b). Development of Micro, Small, and Medium Enterprises in ASEAN (MSME). Association of Southeast Asian Nations (ASEAN). <https://asean.org/our-communities/economic-community/resilient-and-inclusive-asean/development-of-micro-small-and-medium-enterprises-in-asean-msme/>
9. Chiyachantana, C. N., & Prasarnphanich, P. M. (2022a, May 29). Digital Entrepreneurship in ASEAN. Center for Management Practice. <https://cmp.smu.edu.sg/ami/article/20220529/digital-entrepreneurship-asean>
10. Tan, M. (2022, March 14). Realizing the potential of over 71 million msme in Southeast Asia. Asian Development Bank Southeast Asia Development Solutions. <https://seads.adb.org/solutions/realizing-potential-over-71-million-msmes-southeast-asia>
11. Tech for Good Institute. (2021b). (rep.). The Platform Economy: Southeast Asia's Digital Growth Catalyst. Retrieved from <https://techforgoodinstitute.org/research/tfgi-reports/the-platform-economy-southeast-asias-digital-growth-catalyst/>.
12. Tech for Good Institute. (2021a). (rep.). The Platform Economy: Southeast Asia's Digital Growth Catalyst. Retrieved from <https://techforgoodinstitute.org/research/tfgi-reports/the-platform-economy-southeast-asias-digital-growth-catalyst/>.
13. Chaudhuri, R., Galvin, J., Sattanathan, B., Sunmugam, C., & Thomas, R. (2022, May 25). Mobile wallets: Southeast Asia's new Digital Life hack. McKinsey & Company. <https://www.mckinsey.com/industries/financial-services/our-insights/mobile-wallets-southeast-asias-new-digital-life-hack>
14. Vietnam+ (VietnamPlus). (2023, May 24). Techfest Vietnam 2023 launched in Hanoi. <https://en.vietnamplus.vn/techfest-vietnam-2023-launched-in-hanoi-post253522.vnp>
15. Vietnam's National Agency for Technology Entrepreneurship and Commercialisation Development (NATEC) . (n.d.). Outlook Of Startups And Innovation Ecosystem In Vietnam. World Bank Public Documents. Retrieved from <https://thedocs.worldbank.org/en/doc/c6c7ae-6c8fe37bedcf404369f1dbccce-0070072022/related/NATEC-Startup-and-innovation-ecosystem.pptx>.
16. OpenGov Asia. (2019, May 24). Indonesia's 1001 Digital Startup Movement to boost digital economy. <https://opengovasia.com/2019/05/24/indonesias-1001-digital-startup-movement-to-boost-digital-economy/>
17. Crunchbase. (n.d.). Gerakan Nasional 1000 Startup Digital - Crunchbase Company Profile & Funding. <https://www.crunchbase.com/organization/1000-startup-digital>
18. Yeo, S. (2021, October 19). QuickBytes: How Thailand's National Innovation Agency is driving startup growth. Tech in Asia. <https://www.techinasia.com/quickbytes-thailands-national-innovation-agency-driving-startup-growth>
19. The Fish Site. (2023, April 3). Aquaculture-related startups feature heavily in this year's space-F accelerator. <https://thefishsite.com/articles/aquaculture-related-startups-feature-heavily-in-this-years-space-f-accelerator>
20. TechNode Global. (2023, October 30). Thailand's NIA and Maejo University Showcase Ten agbiotech-powered startups at AgBioTech Incubation 2023 Demo Day. <https://technode.global/2023/10/30/thailands-nia-and-maejo-university-showcase-ten-agbiotech-powered-startups-at-agbiotech-incubation-2023-demo-day/>
21. Leesa-Nguansuk, S. (2023, July 25). New National Innovation Agency chief sets out plan for 4-year expansion in Thailand. Bangkok Post. <https://www.bangkokpost.com/business/general/2617175/new-national-innovation-agency-chief-sets-out-plan-for-4-year-expansion-in-thailand>
22. Temasek. (2023, September 12). NTU, NUS, and Temasek to invest S\$75 million to accelerate the commercialisation of deep tech ventures. Temasek Newsroom. <https://www.temasek.com.sg/en/news-and-resources/news-room/news/2023/NTU-NUS-Temasek-invest-75m-deep-tech-ventures>
23. StartupBlink. (n.d.). Best Countries for Startups. <https://www.startupblink.com/>
24. Choudhary , L. (2024, February 22). A list of SEA's unicorns and their early investors. Tech in Asia. <https://www.techinasia.com/list-south-east-asias-unicorns-early-investors>
25. Tiongson, P. (2023, December 26). E27 launches Startup Ecosystem Roundups for 2023. e27. <https://e27.co/e27-launches-startup-ecosystem-roundups-for-2023-20231225/>

26. Startup Genome. (n.d.-b). Ecosystems- explore the global map of Innovation. <https://startupgenome.com/ecosystems>
27. Boon. (2023, March 20). The State of Malaysia Digital Economy: Growth and Opportunity 2023. twimbit. <https://twimbit.com/insights/the-state-of-malaysia-digital-economy-growth-and-opportunity-2023>
28. Securities Commission Malaysia . (2023). (rep.). SC Annual Report 2022. Retrieved from <https://www.sc.com.my/api/documentms/download.ashx?id=5619a860-9538-48f9-9db6-aa78ffdf6a3f>.
29. Tracxn. (n.d.). Here is the list of top 10 Accelerators & Incubators in Malaysia. https://tracxn.com/d/investor-lists/accelerators-incubators-in-malaysia/_ipYdkLo_FgbzV1gMFal2rSjzf-PIM3igOaXj1iIGQrM
30. Meta, Bain & Co., & DSG Consumer Partners. (n.d.-b). (rep.). SYNC Southeast Asia Report 2023. Retrieved from <https://www.facebook.com/business/m/sync-southeast-asia>.
31. Ibid
32. Startup Genome. (n.d.-a). Ecosystem Lifecycle Analysis. <https://startupgenome.com/article/ecosystem-lifecycle-analysis>
33. Moed, J. (2019, June 21). Scaling in Southeast Asia: Lessons from the region's biggest startups. Forbes. <https://www.forbes.com/sites/jonathanmoed/2019/06/21/scaling-in-southeast-asia-lessons-from-the-regions-biggest-startups/?sh=15a990491cff>
34. Xiao, M. (2024, February 27). Beyond a borderless mindset: Here are the most important principles of building a successful startup team in Southeast Asia. Glints TalentHub Blog. <https://employers.glints.com/en-sg/blog/beyond-a-borderless-mindset/>
35. Suruga, T. (2023, April 4). Asean Startups Face Talent Crunch despite tech layoffs: Study. Nikkei Asia. <https://asia.nikkei.com/Business/Startups/ASEAN-startups-face-talent-crunch-despite-tech-layoffs-study>
36. Tech Collective. (2023, May 23). Tech jobs aren't going away according to seek. <https://techcollectivesea.com/2023/05/23/tech-jobs-seek-ceo/>
37. Martinus, M., & Seth, F. N. (2023, July 6). Current key drivers of asean integration: Digital Skills and mobilities. FULCRUM. <https://fulcrum.sg/current-key-drivers-of-asean-integration-digital-skills-and-mobilities/>
38. Google, Temasek, & Bain & Co. (n.d.-a). (rep.). e-Conomy SEA 2023 Report. Retrieved from https://services.google.com/fh/files/misc/e_economy_sea_2023_report.pdf; PricewaterhouseCoopers. (2022, October 1). Tech start-up funding trends and outlook: Singapore. PwC. <https://www.pwc.com/singapore/financial-services/venture-hub/tech-startup-funding-trends-and-outlook.html>; InCorp Indonesia. (2024, June 19). Indonesian startup outlook for 2024. InCorp Indonesia. <https://www.cekindo.com/blog/indonesian-startup>; Oundjian, A., Cua, J., Lim, R., Badillo, K., Varona, F., Ikink, J., Mantecon, B., & Elizalde, C. (2024, March 20). Philippines Venture Capital Report 2024. Boston Consulting Group. <https://www.bcg.com/publications/2024/philippines-venture-capital-report-2024>
39. Google, Temasek, & Bain & Co. (n.d.-b). (rep.). e-Conomy SEA 2023 Report. Retrieved from https://services.google.com/fh/files/misc/e_economy_sea_2023_report.pdf; Ministry of Science, Technology and Innovation (Malaysia). (n.d.). (rep.). Malaysia Startup Ecosystem Roadmap 2021-2030: SUPERcharging The Way To Our Shared Future. Retrieved from [https://www.mosti.gov.my/wp-content/uploads/repository/penerbitan/2021/\(SUPER\)%20Malaysia%20Startup%20Ecosystem%20Roadmap%202021-2030.pdf](https://www.mosti.gov.my/wp-content/uploads/repository/penerbitan/2021/(SUPER)%20Malaysia%20Startup%20Ecosystem%20Roadmap%202021-2030.pdf); Ministry of Economy of Malaysia. (n.d.). Unleashing the Full Potential of Malaysia's Startup Ecosystem. KL20 Action Paprt. https://www.ekonomi.gov.my/sites/default/files/2024-04/KL20_Summit_2024.pdf; Stegmann, H., Fingerle, B., Rohr, J. von, & Vasiksiri, W. (2023, December 13). Getting Ready for Business: Firming up Thailand's Startup Ecosystem. Boston Consulting Group. <https://www.bcg.com/publications/2023/getting-ready-for-business-firming-up-thailands-startup-ecosystem>; Kidd, T., Wibowo, S., & Lee, M. Y. (2023, November 15). Indonesia Venture Capital Report 2023. Bain & Co. <https://www.bain.com/insights/indonesia-venture-capital-report-2023/>; InCorp Indonesia. (2024, June 19). Indonesian startup outlook for 2024. InCorp Indonesia. <https://www.cekindo.com/blog/indonesian-startup>; National Innovation Council Vietnam, & Do Ventures. (n.d.). Vietnam Innovation and Technology Investment Report 2023. National Innovation Council Vietnam. <https://nic.gov.vn/en/thu-vien-kien-thuc/bao-cao/bao-cao-doi-moi-sang-tao-va-dau-tu-cong-nghe-viet-nam-2023/>; KPMG. (n.d.). Vietnam 2024 Outlook: The Investor's Guide to Growth. <https://kpmg.com/vn/en/home/insights/2024/03/vietnam-2024-outlook-the-investor-guide-to-growth.html>; Oundjian, A., Cua, J., Lim, R., Badillo, K., Varona, F., Ikink, J., Mantecon, B., & Elizalde, C. (2024, March 20). Philippines Venture Capital Report 2024. Boston Consulting Group. <https://www.bcg.com/publications/2024/philippines-venture-capital-report-2024>; Canto, J., Renz, F., & Villanueva, V. (2024, March 7). The Philippines Economy in 2024: Philippines. McKinsey & Company. <https://www.mckinsey.com/ph/our-insights/the-philippines-economy-in-2024-stronger-for-longer>; KPMG. (2024, February 27). Investing in the Philippines. <https://kpmg.com/ph/en/home/insights/2024/02/investing-in-the-philippines.html>
40. PricewaterhouseCoopers. (2022, October 1). Tech start-up funding trends and outlook: Singapore. PwC. <https://www.pwc.com/singapore/financial-services/venture-hub/tech-startup-funding-trends-and-outlook.html>; Goh, T. (2024, April 24). Funds raised by Singapore's early-stage emerging tech start-ups up 59% in 2023. The Straits Times. <https://www.straitstimes.com/business/companies-markets/funds-raised-by-singapore-s-early-stage-emerging-tech-start-ups-grew-59-in-2023>; Ministry of Science, Technology and Innovation (Malaysia). (n.d.). (rep.). Malaysia Startup Ecosystem Roadmap 2021-2030: SUPERcharging The Way To Our Shared Future. Retrieved from [https://www.mosti.gov.my/wp-content/uploads/repository/penerbitan/2021/\(SUPER\)%20Malaysia%20Startup%20Ecosystem%20Roadmap%202021-2030.pdf](https://www.mosti.gov.my/wp-content/uploads/repository/penerbitan/2021/(SUPER)%20Malaysia%20Startup%20Ecosystem%20Roadmap%202021-2030.pdf); Ministry of Economy of Malaysia. (n.d.). Unleashing the Full Potential of Malaysia's Startup Ecosystem. KL20 Action Paprt. https://www.ekonomi.gov.my/sites/default/files/2024-04/KL20_Summit_2024.pdf; Getting Ready for Business: Firming up Thailand's Startup Ecosystem. Boston Consulting Group. <https://www.bcg.com/publications/2023/getting-ready-for-business-firming-up-thailands-startup-ecosystem>; Kidd, T., Wibowo, S., & Lee, M. Y. (2023, November 15). Indonesia Venture Capital Report 2023. Bain & Co. <https://www.bain.com/insights/indonesia-venture-capital-report-2023/>; InCorp Indonesia. (2024, June 19). Indonesian startup outlook for 2024. InCorp Indonesia. <https://www.cekindo.com/blog/indonesian-startup>; National Innovation Council Vietnam, & Do Ventures. (n.d.). Vietnam Innovation and Technology Investment Report 2023. National Innovation Council Vietnam. <https://nic.gov.vn/en/thu-vien-kien-thuc/bao-cao/bao-cao-doi-moi-sang-tao-va-dau-tu-cong-nghe-viet-nam-2023/>; KPMG. (n.d.). Vietnam 2024 Outlook: The Investor's Guide to Growth. <https://kpmg.com/vn/en/home/insights/2024/03/vietnam-2024-outlook-the-investor-guide-to-growth.html>; Oundjian, A., Cua, J., Lim, R., Badillo, K., Varona, F., Ikink, J., Mantecon, B., & Elizalde, C. (2024, March 20). Philippines Venture Capital Report 2024. Boston Consulting Group. <https://www.bcg.com/publications/2024/philippines-venture-capital-report-2024>; Canto, J., Renz, F., & Villanueva, V. (2024, March 7). The Philippines Economy in 2024: Philippines. McKinsey & Company. <https://www.mckinsey.com/ph/our-insights/the-philippines-economy-in-2024-stronger-for-longer>

41. Hoppe, F., Baijal, A., Olsen, T., & Akhtar, U. (2019, October 30). Fulfilling Southeast Asia's Digital Financial Services Promise. Bain & Co. <https://www.bain.com/insights/fulfilling-southeast-asias-digital-financial-services-promise/>
42. DukeNUS Centre for Technology and Development. (n.d.). Our Ecosystem. DukeNUS Medical School. <https://www.duke-nus.edu.sg/cted/our-ecosystem>
43. A*StartCentral. (n.d.). Advancing the growth of your startup. Agency for Science, Technology and Research Singapore. <https://www.a-star.edu.sg/enterprise/innovation-platforms/a-startcentral/for-entrepreneur>
44. Hummingbird Bioscience. (2021, May 18). Hummingbird Bioscience raises US\$125 million in series C financing: Hummingbird Bioscience. Hummingbird Bioscience | Precision Medicine. Precision Therapies. <https://hummingbirdbioscience.com/hummingbird-bioscience-raises-us125-million-in-series-c-financing/>
45. The Straits Times. (2020, July 2). Novo Holdings to set up Asia Office in Singapore to focus on investments in life sciences sector. <https://www.straitstimes.com/business/companies-markets/novo-holdings-to-set-up-asia-office-in-singapore-to-focus-on-investments>
46. Flagship Pioneering. (2023, November 7). Flagship pioneering expands into Asia-Pacific region, with regional... [https://www.flagshippioneering.com/news/press-release/flagship-pioneering-expands-into-asia-pacific-region-with-regional-hub-in-singapore-andnC3%A9-andonian-joins-flagship-to-lead-apac-region](https://www.flagshippioneering.com/news/press-release/flagship-pioneering-expands-into-asia-pacific-region-with-regional-hub-in-singapore-and%C3%A9-andonian-joins-flagship-to-lead-apac-region)
47. Badan Pusat Statistik Indonesia, Statistik Karet Indonesia 2021 (2022). Retrieved from <https://www.bps.go.id/en/publication/2022/11/30/d5b4f514cb426ec27abeebd0/indonesian-rubber-statistics-2021.html>.
48. Business Indonesia. (2023, April 26). Agritech has massive potential in Indonesia. <https://business-indonesia.org/news/agritech-has-massive-potential-in-indonesia>
49. The Business Times. (2022, January 11). Indonesia's eFishery raises US\$90m in series C round co-led by Temasek. <https://www.business-times.com.sg/startups-tech/startups/indonesias-efishery-raises-us90m-in-series-c-round-co-led-by-temasek>; Taufik, S. (2023, July 7). Indonesian agritech firm eFishery confirms raising \$200m series D. Tech in Asia. <https://www.techinasia.com/indonesian-agritech-firm-efishery-confirms-200m-series-d>; Sri, D. (2022, January 27). Indonesian fishery platform nets \$30m in Vertex-led round. Tech in Asia. <https://www.techinasia.com/indonesian-fishery-platform-nets-30m-vertexled>
50. Armstrong, M., & Japlon, E. (2021, October 27). Kumu raises series C led by General Atlantic, aims to create the world's largest participatory social network with over US\$100m total funding to date. General Atlantic. <https://www.generalatlantic.com/media-article/kumu-raises-series-c-led-by-general-atlantic-aims-to-create-the-worlds-largest-participatory-social-network-with-over-us100m-total-funding-to-date/>
51. Cordon, M. (2021, October 5). Axie Infinity developer raises \$152m from a16z, others. Tech in Asia. <https://www.techinasia.com/axie-infinity-developer-raise-150m-andreessen-horowitzled>
52. Duong, J. (2021, June 10). White Book on Vietnamese Esports 2021 published. Hanoi Times. <https://hanoitimes.vn/white-book-on-vietnamese-esports-2021-published-317698.html>
53. Thang, P. V. (2024, March 13). Vietnam's game market potential to be unlocked. Theinvestor. <https://theinvestor.vn/vietnams-game-market-potential-to-be-unlocked-d9006.html>
54. Intel Newsroom. (2024, April 15). Updates: Intel's 10 largest construction projects. Intel. <https://www.intel.com/content/www/us/en/newsroom/news/updates-intel-10-largest-construction-projects.html>
55. EU-ASEAN Business Council, & APC Worldwide. (2024). (rep.). Thailand Health Roadshow: Better Health Today for Tomorrow. Retrieved from <https://www.eu-asean.eu/wp-content/uploads/2024/01/EU-ABC-Thailand-Health-Roadshow-Report-3-January-2024.pdf>.
56. Mahidol University Faculty of Medicine Siriraj Hospital. (2021, December 16). Siriraj Jointly Launched "Siriraj World class 5G smart hospital" with NBTC & Huawei - Siriraj. SIRIRAJ - Faculty of Medicine Siriraj Hospital Mahidol University. Bangkok Thailand. Established 1888. <https://www2.si.mahidol.ac.th/en/news-events/siriraj-jointly-launched-siriraj-world-class-5g-smart-hospital-with-nbtc-huawei/>
57. Khurshid, A., Paleja, R., & Tan, B. (2023). (rep.). Singapore student startup ecosystem report academic year 2022-23. Protege Ventures. Retrieved from https://ink.library.smu.edu.sg/iie_research/7/.
58. Kotha, R., (Bala) Vissa, B., Lin, Y., & Corboz, A. (2022). Do ambitious entrepreneurs benefit more from training? Strategic Management Journal, 44(2), 549–575. <https://doi.org/10.1002/smj.3438>
59. Strebulaev, I. A., & Dang, A. (2024). The Venture Mindset: How to make smarter bets and achieve extraordinary growth. Portfolio/Penguin.
60. Harper-Anderson, E. (2011). Incubating success: Incubation best practices that lead to successful new ventures. <https://doi.org/10.13140/RG.2.1.2732.6881>
61. Etzkowitz, H. (2013). Anatomy of the entrepreneurial university. Social Science Information, 52(3), 486-511. <https://doi.org/10.1177/0539018413485832>
62. Etzkowitz, H. (2003). Research groups as 'quasi-firms': The invention of the entrepreneurial university. Research Policy, 32(1), 109-121. [https://doi.org/10.1016/S0048-7333\(02\)00009-4](https://doi.org/10.1016/S0048-7333(02)00009-4)
63. Shah, S. K., & Pahnke, E. C. (2014). Parting the ivory curtain: Understanding how universities support a diverse set of startups. Journal of Technology Transfer, 39(5), 780-792. <https://doi.org/10.1007/s10961-014-9336-0>
64. Nelson, A., & Byers, T. (2010). Challenges in university technology transfer and the promising role of entrepreneurship education. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.1651224>

65. Lerner, J., & Nanda, R. (2020). Venture capital's role in financing innovation: What we know and how much we still need to learn. *Journal of Economic Perspectives*, 34(3), 237-261. <https://doi.org/10.1257/jep.34.3.237>
66. Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance. *Academy of Management Journal*, 43(5), 925-950. <https://doi.org/10.5465/1556420>
67. NST Business. (2023b, March 16). Khazanah launches future Malaysia programme under Dana Impak to spur local start-up ecosystem: New straits times. NST Online. <https://www.nst.com.my/business/2023/03/889860/khazanah-launches-future-malaysia-programme-under-dana-impak-spur-local>
68. McKinsey & Company. (2022, November 16). Improving Thailand's capital market competitiveness and efficiency. <https://www.mckinsey.com/featured-insights/future-of-asia/countries-and-regions/southeast-asia/southeast-asia-perspectives/improving-thailands-capital-market-competitiveness-and-efficiency>
69. Bailetti, T. (2012). What technology startups must get right to globalize early and rapidly. *Technology Innovation Management Review*, 2(5), 5-16. <https://doi.org/10.22215/timreview/614>
70. Tay, T. W. (2021, June 1). Uncovering the NOC mafia, which is way bigger than you think. Tech in Asia. <https://www.techinasia.com/visual-story/noc-mafia-bigger>
71. Sanchez-Burks, J., Brophy, D., Jensen, T., Milovac, M., & Kagan, E. (2017). Mentoring in startup ecosystems. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3066168>
72. Universiti Brunei Darussalam Industry IEO. (n.d.). Expert Directory. UBD Innovation and Enterprise. <https://innovation.ubd.edu.bn/experts/expert-directory>
73. Singapore Management University Institute of Innovation and Entrepreneurship. (n.d.). Mentors. Mentors | Institute of Innovation & Entrepreneurship. <https://iie.smu.edu.sg/mentors>

