CAMBODIA'S ECOSYSTEM FOR TECHNOLOGY STARTUPS

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ASIAN DEVELOPMENT BANK

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Country Report No. 1
Ecosystems for Technology Startups in Asia and the Pacific

ASIAN DEVELOPMENT BANK

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Foreword

Technology-based startup enterprises—or tech startups—are an increasingly important part of the business landscape in Asia and the Pacific and, indeed, around the world. These enterprises apply new technologies to create new products or services or provide services in a new way. Many startups may not survive long, but some will succeed and make significant contributions to economic development. Tech firms such as Facebook, Google, and Amazon are now among the largest firms in the world, and tech firms including Tencent, Gojek, and Grab are also among the leading emerging enterprises in Asia. The technology and dynamism they provide are important for economic growth.

Given their growing importance, it is essential to better understand the ecosystem in which tech startups develop. They don't grow in a vacuum. They need access to finance, often from venture capital; skilled personnel including experts in both technology and business; good digital infrastructure; and a supportive government policy. A strong ecosystem is critical for turning new ideas into commercially viable businesses.

This report assesses the situation of tech startups in Cambodia with a focus on the ecosystem. It considers the extent to which the system is supportive of the growing number of startups in the country. The report focuses on four areas: agritech, edtech, healthtech, and greentech (also known as cleantech). While fintech and e-commerce startups are the most prevalent in Cambodia and other countries, these four areas were chosen because startups in these areas can not only become successful businesses but also have a strong developmental impact. They support human capital formation (education and health) and the large and largely poor rural sector (agritech) and contribute to environmental sustainability and climate change mitigation (greentech).

The report, part of a series, provides a range of recommendations for how government and other stakeholders can strengthen the ecosystem to enable tech startups to flourish in Cambodia.

Albert Park
Chief Economist
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* Ms. Ek is a consultant, BDtruS, Research and Business Consultancy, Cambodia. Other persons are ADB staff unless otherwise indicated.

Abbreviations

ASEAN	Association of Southeast Asian Nations
CADT	Cambodia Academy of Digital Technology
CGCC	Credit Guarantee Corporation of Cambodia
CPSA	Cambodia Partnership for Sustainable Agriculture
CSX	Cambodia Securities Exchange
DFAT	Department of Foreign Affairs and Trade (Australia)
GEN	Global Entrepreneurship Network
ICT	information and communication technology
IFAD	International Fund for Agricultural Development
ITC	Institute of Technology of Cambodia
KAS	Khmer Agriculture Suite
KE	Khmer Enterprise
MAFF	Ministry of Agriculture, Forestry, and Fisheries
MEF	Ministry of Economy and Finance
MISTI	Ministry of Industry, Science, Technology, and Innovation
MoC	Ministry of Commerce
MoEYS	Ministry of Education, Youth, and Sports
MPTC	Ministry of Posts and Telecommunications
PE	private equity
R&D	research and development
RGC	Royal Government of Cambodia
RIICE	Remote sensing-based Information and Insurance for Crops in Emerging economies
SAAMBAT	Sustainable Assets for Agriculture Markets Business and Trade
SERC	Securities and Exchange Regulator of Cambodia
SMEs	small and medium-sized enterprises
STEM	science, technology, engineering, and mathematics
STI	science, technology, and innovation
TSC	Techo Startup Center
TVET	technical and vocational education and training
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USO	Universal Service Obligation
VC	venture capital
YEAC	Young Entrepreneurs Association of Cambodia

Executive Summary

Cambodia is deepening the digitization of its economy and embarking on the Fourth Industrial Revolution (Industry 4.0). In that context, fostering entrepreneurship and startups is a key government priority that is being addressed at the highest policy levels. Cambodia has been described as having "a promising startup landscape" given the rise of technology (tech) startups and the emergence of multiple supporting actors in the ecosystem.

This report maps the situation of tech startups in Cambodia to identify the ecosystem support that is being provided and the constraints that remain. It focuses on startups in four specific areas: environmental technology (greentech, also known cleantech), agriculture technology (agritech), health technology (healthtech), and education technology (edtech). These areas can help to achieve social, developmental, and environmental goals, as well as economic ones.

Tech startups are hard to define. The report adopts the definition provided in Sub-Decree 102 on Digital Startup Management and Incentives, in which a startup is an entity engaged in the process of managing and developing prototype digital products or services by individuals, and which harnesses innovations under conditions of fast growth and uncertainty. The report's framework of analysis comprises six key components of the startup ecosystem: finance, government policy, human capital, digital infrastructure, incubators and accelerators, and other supporting organizations.

The study collected information from primary and secondary sources in two phases—initially in the third quarter of 2019 and then again in the third quarter of 2021 to obtain an update on the progress of ecosystem development. In the first phase, the study collected primary data and information through 40 interviews with startups, government agencies, incubators and accelerators, investors, academic institutions, and other support organizations. In the second phase, the preliminary report from the first phase was updated based on extensive comments from five key government ministries and agencies and other stakeholders that were interviewed earlier.

Tech startups emerged in Cambodia in the early 2010s. They have grown remarkably since then, increasing in number from less than 50 in 2013 to possibly as many as 300 by 2018—the exact number is hard to verify, as new startups are emerging constantly while others fail and go out of business. At the end of 2021, around 90 active startups had registered in the Startup Cambodia National

Program. Another source suggests that around 150 startups that had completed Impact Hub programs were still in operation. Most tech startups are involved in fintech, followed by media and advertising, e-commerce, development services, and digital marketplaces.

The government and other stakeholders actively support tech startups in Cambodia. Issues relating to the tech startup and entrepreneurship ecosystem are addressed in high-level policies and strategies such as the Rectangular Strategy IV; National Strategic Development Plan (2019–2023); Industrial Development Policy 2015–2025; Cambodia Digital Economy and Society Policy Framework; Science, Technology, and Innovation (STI) Roadmap; and the E-commerce Law and Strategy. Startups are also a focus of the Sub-Decree on Management of Digital New Incentives and the draft Small and Medium Enterprise (SME) Development Framework. However, there is currently no separate and distinct startup policy or road map in place. Other government initiatives, which support startups as well as more conventional small enterprises, include the Skills Development Fund, Entrepreneurship Development Fund, the government-owned SME Bank, Credit Guarantee Corporation of Cambodia, Startup Cambodia National Program, Khmer Enterprise, and Techo Startup Center.

Many nongovernment organizations also actively support the tech startup ecosystem through such mechanisms as coworking spaces, incubation and acceleration programs, mentorships, and events that expose startups to domestic and international markets. By the end of 2021, there were about 30 coworking spaces operating and around 30 incubators and accelerators run by the government, developmental partners, and the private sector. In addition, financing is provided by around 20 angel investors, venture capital firms, private equity firms, and crowdfunding platforms.

Although remarkable progress has been made in building the ecosystem, there is limited attention and support focused on the greentech, agritech, healthtech, and edtech areas. Tech startups in these areas are small and in the early stages of development but their number has grown over the past few years in spite of the coronavirus disease (COVID-19) pandemic. Among these areas, more attention and support has been given to agritech and greentech , with sector-specific incubation and acceleration programs, while there are no sector-specific incubators for edtech and healthtech.

Cambodia has many higher education institutions, but the number of graduates in science, technology, engineering, and mathematics, as well as in health science, agriculture, and extractive and natural sciences remains relatively low, thus resulting in a shortage of tech talent. Cambodia has reportedly around 50,000 digitally talented persons in the information and communication technology sector, but digital skills are reportedly only moderate and not specialized.

Startups encounter many challenges such as limited business and technical skills of their founders, inadequate networks, and lack of information about what the ecosystem can provide and what other players exist. Other challenges include tax compliance, inadequate financing, high staff turnover, and weak markets due to the low digital literacy of potential customers. New startups also need more qualified mentors. The composition of the founding team is often too homogenous (usually they have

the same skills and background), and many founders still work at a day job, limiting time spent on their innovation. Some startups that produce physical products have difficulty finding a local manufacturer.

There are many opportunities to grow startups given Cambodia's large youth population and the interest from government and other stakeholders. However, constraints to growth remain. To strengthen the ecosystem and promote startups to scale up, a startup policy or road map might be beneficial. Furthermore, there is a need to increase and attract tech talent, promote positive role models, and increase the number of mentors and the quality of mentorship. In addition, more information and better information sharing among startups and between startups and support agencies would be helpful. A stronger culture of entrepreneurship and risk taking would encourage more people to start new ventures.

Introduction

1

The global rise of technology-oriented startup enterprises (or tech startups) over the past 15 years is nothing short of phenomenal. These agile enterprises, founded by dynamic entrepreneurs, have developed new technologies to provide innovative products and services, usually by harnessing the expansive reach of the internet. Tech startups evolve into large enterprises that can change the business model of the economy, while driving productivity increase and generating substantial employment. Startups have emerged as part of—and are driving—a rapid digital transformation of economies and societies in Asia and around the world.

Given their potential importance, governments in emerging Asian economies are seeking ways to nurture startups by developing a supportive "ecosystem." This ecosystem includes financing mechanisms, notably venture capital, along with incubators, digital services providers, government policies, and others. Cambodia is trying to be part of this trend. It is deepening the digitization of the economy, fostering entrepreneurship and startups, and moving toward Industry 4.0. It has a young population that is maturing in the digital age. It has been described as having a "promising startup landscape" (Capital Cambodia 2019). The number of tech startups has risen in recent years.

This report maps the situation of tech startups in Cambodia to identify the support provided to and the constraints encountered by the ecosystem. It focuses on startups in four areas: environmental technology (greentech, also known as cleantech), agriculture technology (agritech), health technology (healthtech), and education technology (edtech). These areas have been chosen for their high social, developmental, and environmental impacts for developing countries, in addition to their economic impact. Edtech and healthtech support the development of human capital; agritech can aid poverty reduction, as many of the poor are engaged in the rural sector; and greentech promotes environmental sustainability and can help mitigate climate change.

The report is divided into six sections. Section 1 provides this introduction while section 2 gives a definition of startups, the methodology for the study, and a framework for viewing the ecosystem. Section 3 presents an overview of tech startups and describes the current situation of the four designated sectors in Cambodia, and section 4 examines the ecosystems of the four sectors. Section 5 examines the issues faced by tech startups, and the final section provides recommendations.

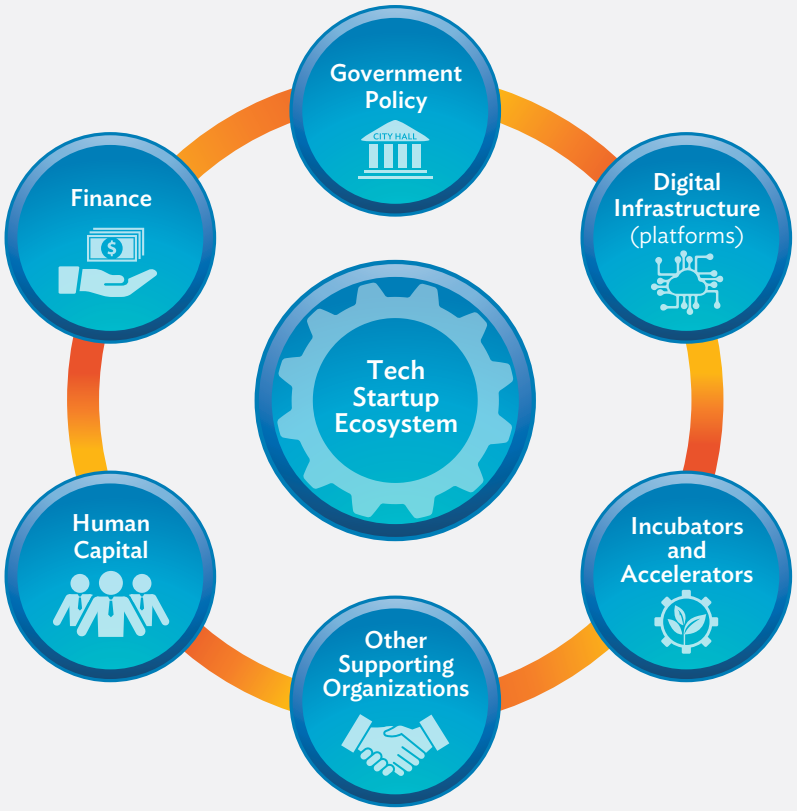
Defining Startups and the Ecosystem

2

There is no single definition for tech startups. They have been defined as "a human institution designed to create a new product or service under conditions of extreme uncertainty" (Ries 2011, 27) and an organization with a "repeatable and scalable business model" (Blank and Dorf 2012). The Cambodia Digital Economy and Society Policy Framework (2021–2035) defines a startup as an "institution or the process of establishing and managing business which harnesses the innovations in establishing business models under unclear conditions with higher risks, but with great potential to rapidly grow" (RGC 2021a, 119). Cambodia's Sub-Decree 102 on Digital Startup Management and Incentive defines a digital startup as the process of managing and developing prototype digital products or services by individuals, which harnesses innovations under conditions of fast growth or uncertainty. This study adopts the sub-decree's definition. An idea-stage startup has an idea that has not yet been transformed into a minimum viable product. An early-stage startup is in the process of building a minimum viable product and a customer base. A growth-stage startup is an enterprise that has proper management structure and products or services in the market, is making progress in company development, and has accessed venture capital (VC).

The study adopts a startup ecosystem framework that examines six key components: finance, government policy, human capital, digital infrastructure, incubators and accelerators, and other supporting organizations (Figure 1; Vandenberg, Hampel-Milagrosa, and Helble 2021). The study also considers several factors, including culture, role models and mentors, suppliers/producers, customers, training institutions, and large companies that are part of or support the tech startup ecosystem in Cambodia.

Figure 1: Research Framework



Source: Vandenberg, Hampel-Milagrosa, and Helble (2021).

The study collected data from both primary and secondary sources in two phases: the third quarter of 2019 and the third quarter of 2021. In Phase 1, the study team collected primary data and information through 40 interviews with startups, government agencies, incubators and accelerators, investors, academic institutions, and other support organizations and examined startups and ecosystem support in greentech, agritech, healthtech, and edtech. Because the number of active startups in these four areas is small (Table 1), a random sampling of enterprises was not practical. Key startups were interviewed in each sector to obtain qualitative insights into the support they received from the ecosystem and the constraints they faced. Since the number of incubators and accelerators is also not large, the study used a similar approach of selection for interviews. People from key government agencies and financiers of startups were also interviewed. Phase 2 of the research updated the progress of the startup support ecosystem during the coronavirus disease (COVID-19) outbreak based on government agencies' written feedback on the draft report (developed in Phase 1) and interviews with previous respondents and new stakeholders. The relevant public agencies approached by the study team agreed to share their insights. Five key government

ministries and an agency—the Ministry of Economy and Finance (MEF); Ministry of Industry, Science, Technology and Innovation (MISTI); Ministry of Posts and Telecommunications (MPTC); Ministry of Commerce (MoC); and the Techo Startup Center (TSC)—reviewed the draft report, offered extensive comments and suggestions, and pointed to key policies and programs, notably those initiated after the start of the COVID-19 pandemic in early 2020. In both phases, secondary data and information were collected from existing studies, reports, and other sources.

Table 1: Number of Active Tech Startups by Sector, 2018

Startups by Sectors	Number of Active Tech Startups
Fintech	> 50
Media and advertising	> 40
E-commerce and logistics	> 30
Development services	> 30
Digital marketplaces	> 20
Transportation	> 10
Internet of Things and hardware	> 5
Healthtech	> 5
Edtech	> 5
Agritech	< 5

Source: MSP and Raintree Development (2019, 11).

Overview

3

3.1 Tech Startups in Cambodia

Tech startups emerged in Cambodia in the early 2010s and were supported through the initiatives of CoLab's coworking space, Small World's coworking space and incubation program, Startup Weekend, and the Barcamp event. Since 2015, the startup community has grown remarkably, increasing in the number of startups and adding more support programs and organizations. From less than 50 tech startups in Cambodia in 2013 the number of startups grew to around 300 by 2018. Most of the tech startups are involved in fintech, followed by media and advertising, e-commerce, development services, and digital marketplaces (MSP and Raintree Development 2019). There are much fewer startups in edtech, healthtech, agritech, and greentech (Table 1). In late 2021, around 90 active startups had registered in Startup Cambodia's platform.[1] Since its launch in Cambodia, Impact Hub has supported around 370 startups, of which 40% were active as of the third quarter of 2021.[2] The compilation of tech startups—from incubators, accelerators (Impact Hub and EnergyLab), Startup Cambodia, TSC, and previous studies—indicates a slight increase in the number of tech startups in greentech, edtech, and health, but more significant growth for agritech between 2018 and 2021 (Table 2).

Table 2: Number of Tech Startups in Four Areas, 2021

Areas	Number of Active Tech Startups
Healthtech	> 10
Edtech	> 10
Agritech	> 10
Greentech	> 10

Source: Author's compilation from the list of Impact Hub, EnergyLab, Startup Cambodia, and Techo Startup Center.

[1] See Startup Cambodia.
[2] Interview with the representative of Impact Hub in 2021.

3.2 Current Situation of Greentech, Agritech, Healthtech, and Edtech in Cambodia

Clean energy is not a new concept in Cambodia, but the development of greentech startups is still in the nascent stage. There are market opportunities, especially in rural areas where low-income households have limited access to energy, and there is growing support from development partners to stimulate solutions for green growth. Energy demand is also rising. Green growth and technology are priority areas for the government to support sustainability (RGC 2019a). To date, there are only a few greentech startups and related support actors in Cambodia—including enterprises engaged in rural electrification, smart waste management, clean energy for agriculture, smart transportation that minimizes pollution, and smart city solutions. Greentech startups attracted more attention at the end of 2018 when an energy-specific incubator, EnergyLab, launched the Smart Energy Hackathon. Financed by the British Embassy along with Smart Axiata (a telecoms company) and the United Nations Development Programme (UNDP), the hackathon aimed to stimulate smart solutions for energy and agriculture. EnergyLab also hosted Clean Energy Week to promote innovation, new business ideas, and entrepreneurship, raising awareness of clean energy to the public through site visits, competitions, and debate among students on clean energy topics. EnergyLab also provides pre-incubation and incubation programs as well as coworking space to startups in clean energy and agriculture.[3] Furthermore, Total Cambodia, an oil and gas company, runs Startupper Total Challenge and offers opportunities for youth to develop business ideas to address energy issues. It rewards winners with seed capital, networking, and mentoring.[4]

Technology solutions for the agriculture sector tend to get less attention, and there is an untapped opportunity for agritech solutions in rural areas (MSP and Raintree Development 2019). However, the sector has gained momentum recently, especially during the COVID-19 pandemic. In the era of digitalization, technology for the agriculture sector has emerged, along with government efforts in promoting digital business and mitigating the impact of the pandemic. There is growing attention to innovative technology solutions in the agriculture sector. In 2008, the Agriculture Market Information Service of the Ministry of Agriculture, Forestry, and Fisheries (MAFF) introduced agritech solutions with support from development partners to share market price information through the telephone short message service (SMS). Several agritech projects have been initiated by development partners, including Oxfam's BlocRice, using blockchain technology

[3] See EnergyLab Cambodia. Clean Energy in Cambodia.
[4] See Total. Startupper (in Khmer).

for traceability in the rice subsector,[5] the Remote Sensing-based Information and Insurance for Crops in emerging Economies (RIICE) of the International Fund for Agricultural Development (IFAD),[6] Intel's eAgro suite farming application for digital soil testing,[7] and CGIAR's Nuru platform for big data.[8]

Since 2018, other technology-oriented solutions for agriculture have been developed, including DanChurchAid's Khmer Smart Farming app for information on the weather forecast and sustainable farming practices. Moreover, IFAD, in partnership with MAFF, developed the Chamka mobile app for access to markets, information, and technical skills. IFAD's Sustainable Assets for Agriculture Markets Business and Trade (SAAMBAT) program aims to promote technology in the agriculture value chain through the Khmer Agriculture Suite (KAS) platform. In addition, several technologies, mainly mobile apps, were developed with financial or technical support from development partners including the United States Agency for International Development (USAID), UNDP, and Interchurch Organization for Development Cooperation and were implemented by the private sector (Ek 2021). Aside from these projects, the private sector developed other agritech solutions to ease constraints on smallholder farmers and their business operations, such as traceability and marketplace apps (Ek 2021).

By 2021, the number of active agritech startups in Cambodia increased to 10. There is potential for future growth of agritech given the interest of government, development partners, large land companies, and the presence of sector-specific incubators. For instance, Impact Hub's Dak Dam Incubator and EnergyLab run hackathons and pre-incubation and incubation programs for startups in the agriculture sector. Moreover, Khmer Enterprise (KE) and TSC, which operate under the Ministry of Economy and Finance (MEF), implement the programs to support small and medium-sized enterprises (SMEs) and startups in the agriculture sector. One of the priority sectors of KE support is agriculture[9] while TSC in partnership with IFAD's SAAMBAT established KAS, a digital platform for the agriculture value chain that supports agritech startups.[10] By late 2019, one agritech raised funds from venture capital (VC) firms within and outside of Cambodia.

5 Using blockchain technology for organic rice (Oxfam. n.d.). Currently, the platform is owned by Amru Rice, a rice trading company.

6 Using the remote sensing-based information and insurance for crops. See RIICE.

7 Using Grameen Intel's farming apps (eAgro suite) for digital soil testing for smallholder farmers (Intel n.d.).

8 Nuru, a big data platform, collects agriculture sector data for planning and decision-making. It provides data-driven solutions for the agriculture sector by using artificial intelligence and advanced sensor technology. In Cambodia, Nuru built the PlantVillage platform to diagnose diseases for cassava. See CGIAR Platform for Big Data in Agriculture. PlantVillage Nuru: AI for Pest and Disease Monitoring.

9 See Khmer Enterprise.

10 Interview with the representative of TSC in 2021.

Although healthtech is in its infancy in Cambodia, it is expanding rapidly in other parts of Asia. In 2019, several healthtech events were organized. MPTC, in partnership with Metfone, a telecoms company, and the University of Health Sciences, organized the first healthtech forum to find ways to build the national healthtech ecosystem.[11] Moreover, Global South Tech, in cooperation with Impact Hub, hosted an event to stimulate innovation in healthtech and identify opportunities for startups (Ruff & Co. n.d.). In addition, Barcamp ASEAN, which is hosted in Phnom Penh, supports information sharing through technology and infrastructure for healthtech.[12] Total Cambodia runs Startupper Total Challenge, offering opportunities for young people to develop business ideas that address public health challenges.[13] So far, healthtech startups in Cambodia have platforms and apps to identify doctors and specialists, provide hospital and clinic management systems, and offer telehealth consulting services. Like agritech startups, there are not many healthtech startups in Cambodia; however, there has been a slight increase in recent years. No VC deals were made in the sector by late 2019.

With a growing education sector and interest in science, technology, engineering, and mathematics (STEM) subjects, edtech solutions have been emerging. Edtech startups in Cambodia offer platforms and apps to find universities, tutors, and mentors; provide school management and communication systems; offer e-learning; and distribute STEM education. Although the quality of education has improved, there are still gaps between urban and rural areas in terms of student access to learning materials, teachers, and tutors. Impact Hub runs SmartStart, a Young Innovator Program that aims to enable "young Cambodian university students to launch their own tech startups." The program provides seed capital of $5,000 to five winning teams; enrollment in a 6-month incubator program; and full financial support to visit Google, Facebook, and Microsoft in Singapore. One of the target areas of the program is digital education.[14] The Startupper Total Challenge also encourages pitches for the best innovative ideas in education.[15] Moreover, Barcamp ASEAN, which is hosted in Phnom Penh, supports information sharing on technologies and infrastructure for edtech startups.[16]

[11] See Metfone (2019); and National Institute of Posts, Telecommunications and ICT (now Cambodia Academy of Digital Technology (in Khmer).
[12] BarCamp ASEAN; and Digital 2020 Cambodia (2019) (in Khmer).
[13] See Total. Startupper (in Khmer).
[14] Interview with the representative of Impact Hub in 2019; see also Impact Hub Phnom Penh.
[15] Footnote 13.
[16] See BarCamp ASEAN and Digital 2020 Cambodia (2019) (in Khmer).

Although startups have offered relatively few innovative solutions to address challenges of these, the number of startups has increased in the past 3 years. It might be noted that the agritech, edtech, and healthtech areas are included in the Cambodia ICT Awards.[17] Since the introduction of the awards in 2015, there have been two edtech and one healthtech startup winners, and one healthtech product designed by a software development startup won the best product category.[18] One healthtech and two edtech startups have won the Cambodia Women in Tech Award since its establishment in 2018 (CBRD Fund 2019).

[17] The Cambodia ICT Awards 2019 hosted by the National Institute of Posts, Telecommunications and ICT (now Cambodia Academy of Digital Technology) focused on ICT Innovation (CADT 2020) and in 2021 on recognizing the best digital innovation in Cambodia (CADT 2021a).

[18] See Cambodia ICT Awards 2020 (in Khmer).

The Tech Startup Ecosystem in Four Key Sectors

4

4.1 Government Regulations and Policies

The Government of Cambodia has promoted the digital economy and Industry 4.0 in its high-level policy strategies and plans. The Rectangular Strategy IV seeks to develop the digital legal framework and strengthen digital infrastructure. It encourages the infusion of digital technology in the academic curriculum, the teaching of digital skills, the development of entrepreneurship and digital ecosystem for startups, and promotes the "digital system in business" (RGC 2019b, 30). The National Strategic Development Plan 2019–2023 is designed to strengthen mechanisms that support startups, such as reducing the time it takes to complete business registration and other procedures. The Industrial Development Policy 2015–2025 (RGC 2015) promotes entrepreneurship, productivity, creativity, and innovation by establishing a technology information center, e-learning programs, digital signature for enterprises, licenses for tech-related businesses, and a technology industry zone.

In addition, the Cambodia Digital Economy and Society Policy Framework (2021–2035) aims to build "a vibrant digital economy and society by laying the foundations to promote digital adoption and transformation in all social actors including the state, citizens, and businesses to accelerate new economic growth and promote social welfare in the new normal" (RGC 2021a, 20). Promotion of entrepreneurship and the startup ecosystem is one of the strategies for enabling digital businesses. To create new entrepreneurial businesses and the startup ecosystem, strategies focus on enhancing support mechanisms, developing the regulation framework, enabling a conducive environment for research and development (R&D) and innovation, and developing a national strategy on promoting R&D and innovation. The framework will also enhance the registration and protection of intellectual property rights and support the provision of investment incentives for accelerators in the digital enterprise ecosystem. In addition, the framework will support the establishment of an information center for startups, promote the engagement of business development services to work with startups, provide marketing campaigns for startups, and develop laws and regulations. Furthermore, the framework will promote joint development

of intellectual property rights, a financial technology (fintech) framework, and regulatory sandboxes. It will also facilitate network development through the provision of financial support and guidance and develop an incentive strategy for digital businesses (RGC 2021a).

The Ministry of Economy and Finance (MEF) is an active supporter of tech startups (Table 3). In addition to implementing the Skills Development Fund for upgrading the skills of SMEs and growth-stage startups, it has also developed Khmer Enterprise (KE), the Techo Startup Center (TSC), the Startup Cambodia National Program, SME Bank, the Credit Guarantee Corporation of Cambodia (CGCC), and online business registration.

Launched in early 2019 and transformed into a public institution in July 2020 under Sub-Decree 96, TSC runs incubation and acceleration programs for early-stage tech startups in agriculture, finance, and SME digitalization. The center also focuses on policy research support and offers mentorship on business and technical topics to 10 early-stage startups. In collaboration with IFAD's SAAMBAT program, TSC promotes digital technology for the agriculture value chain in rural areas by developing KAS.[19]

KE is an implementation unit of the Entrepreneurship Development Fund. Established in February 2019, it provides capacity upgrading in terms of incubation and acceleration, mentorship, universities, and innovation labs, training, an R&D center, and coworking space. KE also supports entrepreneurial cultural promotion by organizing national awards, an entrepreneurial portal, an annual summit, and community nights. It provides networking support and seed funding (matching grants and co-investment) to startups, prioritizing those in services, agriculture, manufacturing, and information and communication technology (ICT).[20] Working closely with local and international partners, KE has implemented more than 40 programs to build a vibrant entrepreneurial ecosystem.

With the Cambodia Partnership for Sustainable Agriculture (CPSA), KE runs a 3-year incubation program to promote entrepreneurship and innovation in the agriculture sector. KE has also partnered with the Cambodia Agricultural Value Chain (CAVAC) program to improve the competitiveness and resilience of the country's agriculture sector through the Assistance Package Program, one of KE's flagship programs. The Assistance Package Program has disbursed $378,500 in two initial rounds to 27 SMEs and startups in different sectors, including agriculture

[19] Interview with the representative of Techo Startup Center in 2019 and in 2021; and written inputs from representative of TSC in 2021.

[20] Interview with the representative of MEF in 2019; and written inputs from representative of MEF in 2021.

Table 3: Government Activities in Supporting Tech Startups

Programs/Centers	Activities	Implementing Agency	Year Implemented	Priority Sector/s
Skills Development Fund	• Skills upgrading (training) for growth-stage startups	MEF	2018	• Manufacturing • ICT • Construction • Electronics • Tourism • Other high demand skills
Khmer Enterprise	• Capacity upgrading • Entrepreneurial culture promotion • Networking • Seed funding	MEF	2019	• Services • ICT • Agriculture • Manufacturing
Techo Startup Center	• Pre-incubation • Incubation	MEF	2019	• Agriculture • Finance • Technology
Startup Cambodia	• Startup nurturing programs • Community programs • Digital platform programs • Research and policy programs	MEF	2021	• Startups in all sectors
CamDX	• Online business registration	MEF	2021	• SMEs and startups in all sectors
SME Bank	• Loan	MEF	2020	• New innovative industry or manufacturing, high value added and high-tech content and others along with priority sectors of IDP
Credit Guarantee Corporation of Cambodia	• Business recovery guarantee scheme • Cofinancing guarantee scheme	MEF	2020	• Agriculture, industry, and service
Digital Innovation Center	• Incubation/acceleration • Makerspace • Co-innovation space • Event space	MPTC	2020	• Technology
Digital Technology R&D Center	• R&D on digital innovation	MPTC	2021	• Technology
Technology Business Incubation	• Training • Pitching	MISTI	2019	• Food processing
Incubation	• Training	MISTI	2020	• Agro-processing
Go4eCam	• E-commerce marketplace • Training and incubation program • SME formalization for e-commerce • Small grant • Pitching event with investors (for growth-stage startups and SMEs)	MoC	2021	• Manufacturing • Agro-processing • Green/environmentally friendly products

ICT = information and communication technology; IDP = Industrial Development Policy; MEF = Ministry of Economy and Finance; MISTI = Ministry of Industry, Science, Technology, and Innovation; MoC = Ministry of Commerce; MPTC = Ministry of Posts and Telecommunications; R&D = research and development; SMEs = small and medium sized enterprises.
Sources: Interviews conducted by author, written inputs from the ministries, and respective websites.

and ICT. The program also disbursed another $600,000 in 2021.[21] In partnership with HEKS Cambodia, KE is financing Impact Hub's Dak Dam Incubator Season 2, an agriculture incubation program supporting early-stage startups that have innovative solutions to address the challenges of the agriculture sector.[22] KE is also working with EnergyLab on the Switch to Solar Startup Hackathon program under its mandate to support the agriculture sector and solar use.[23] In response to the pandemic, in 2020 and 2021, KE received 700 SME and startup applicants, of which 59 were selected to receive grants from the government (Khmer Times 2021). So far, KE has supported more than 70 startups.[24]

In late 2021, MEF launched the Startup Cambodia National Program to promote startups and the entrepreneurship ecosystem. Startup Cambodia concentrates on four pillars: (i) connectivity of stakeholders in the startup ecosystem, (ii) collaboration of stakeholders through co-creation mechanisms, (iii) resources with the provision of comprehensive and scientific information of startups through digital platforms, and (iv) a national platform to link with similar programs in other countries. Startup Cambodia has four core programs: (i) startup nurturing through hackathons, bootcamps, incubation and acceleration, idea competitions, and STEM support; (ii) community programs, such as workshops, networking opportunities, meetings, talk shows, awards and expositions; (iii) digital platforms; and (iv) research and policy development (Tang 2021).

To help SMEs and startups access finance, the SME Bank was established. To ease business registration, MEF launched the single online business registration portal, which integrated the Cambodia Data Exchange (CamDX) platform, allowing data exchange or connection among ministries. Online registration shortens the registration process to 8 days (MISTI 2021). By late 2021, six government agencies had participated: MoC, General Department of Taxation, MEF, Ministry of Labor and Vocational Training, Ministry of Interior, and the Council Development of Cambodia.[25] MEF also developed CGCC, a state-owned enterprise, under Sub-Decree 140, which aims to improve financial inclusion and promote business growth in Cambodia.[26] The government also issued a sub-decree on tax incentives for newly registered SMEs in six priority sectors including agriculture and ICT-related R&D (RGC 2018). In 2017, MPTC developed the Capacity Building and Research and Development Fund, which is financed by 1% of the gross revenues of telecom companies, to build human capital and support tech startups. Total funding amounted to $5 million in 2017 with allocations to three

[21] Written inputs from the representative of MEF in 2021; and Chan (2020).
[22] Interview with the representative of Impact Hub in 2021.
[23] See EnergyLab.
[24] Written inputs from the representative of MEF in 2021.
[25] See Registration Service.
[26] See Credit Guarantee Corporation of Cambodia.

main activities in subsequent years (MISTI 2021, 9). The first activity focuses on building infrastructure and facilities, including a digital innovation center offering incubation and acceleration programs, makerspace, co-innovation space, an event space, and a digital technology R&D center focusing on R&D on digital innovation; the two centers are located in the Cambodia Academy of Digital Technology (CADT) and are under the Institute of Digital Research and Innovation. For the second activity, the Capacity Building and Research and Development Fund develops young talent through programs run in partnership with the private sector and universities in Phnom Penh and several provinces. For instance, the fund supports SmartStart, SmartScale, and the University Student Development Program, which promote technology and innovation among youth. Also, the fund promotes role models in the tech industry through ICT Awards and the Women in Tech Award. The fund supports 20 school labs for ICT literacy and content development for e-learning. The third activity supports R&D for data science and the Internet of Things.[27] In addition to the centers, CADT also provides the platforms to nurture digital talent and innovators through its Institute of Digital Technology, which is a public higher education institution (Sam 2021). With the initiative of MPTC, Sub-Decree 102 on Management of Digital New Incentives was approved, aiming to promote tech startups by providing incentives, training, and technical support. Moreover, the sub-decree allows MPTC to select the operators or accelerators to support tech startups that register with MPTC on finance, tax, and intellectual property (RGC 2021b). The Digital Innovation Center of CADT is responsible for implementing the digital startup support and incentive programs (CADT 2021a).

The Ministry of Industry, Science, Technology and Innovation (MISTI), in collaboration with the ASEAN Business Incubator Network, supports the Institute of Technology of Cambodia in implementing an incubation program for startups in food processing. With technical support from GIZ, MISTI has partnered with the National University of Battambang to develop the Cambodia Business Incubation for Food Production Development to support startups in innovating technology for the agro-processing sector.[28] Cambodia's Science Technology and Innovation Roadmap 2030, coordinated by MISTI and guided by the National Council of Science, Technology and Innovation, is a national strategy for science, technology, and innovation (STI) focusing on five pillars: governance, education, research, collaboration and networking, and enabling ecosystem for innovation. In the education pillar, it aims to increase the number of STEM graduates by at least 50% by 2030 and develop the technology platforms at universities and technical and vocational education and training (TVET) by 2023. It also intends to introduce

[27] Interview with the representative of MPTC in 2019; and written inputs from representative of MPTC in 2021.

[28] Interview with the representative of MISTI in 2019 and in 2021; see also National University of Battambang (2021).

science, digital, innovation, and entrepreneurship in the academic curriculum. The government will invest 1% of gross domestic product in R&D activities, and the innovation research funds will be given to researchers. To enable a conducive environment for the innovation ecosystem, the road map aims to increase access to innovation financing for SMEs and startups by analyzing the funding gap and designing alternative financing either through guarantee, debt financing, or equity financing (MISTI 2021). MISTI is also in the process of developing the SME Development Policy, which is expected to be ready in the first quarter of 2022, to support SMEs and startups in the country.[29]

In 2019, Cambodia promulgated an e-commerce law, which provides legal certainty for electronic commercial transactions, including those of startups, thereby allowing the public to have confidence in the use of electronic transactions. Additionally, the e-commerce strategy launched by the Ministry of Commerce (MoC) in 2020 aims to build the e-commerce ecosystem. One of its focus areas is the digital skills infrastructure to improve digital entrepreneurship support for e-commerce startups, especially for women and the youth. In partnership with UNDP, MoC is implementing the Go4eCam program to support SMEs in going digital and help them gain access to finance for their e-commerce business (UNDP Cambodia n.d.). Go4eCam's activities include setting up an e-commerce marketplace, training and incubation programs, SME formalization for e-commerce, small grants, and pitching events with investors for growth-stage startups and SMEs. The program aims to support e-commerce business in priority sectors such as manufacturing, agro-processing, and green/environmentally friendly products.[30]

To attract investment, the Securities and Exchange Commission of Cambodia (later renamed Securities and Exchange Regulator of Cambodia [SERC]) issued Prakas 003 in 2018 for collective investment schemes, which allows pooled investment in the country from professionals and other investors. Under the prakas (regulation), SERC also regulates crowdfunding, but allows only four transactions a year with a maximum amount of $50,000 per transaction. Prakas 005 on Public Offering of Equity Securities enables SMEs to raise capital through an initial public offering (SECC 2015) once they have complied with the following Growth Board listing criteria: an audited financial statement (1 year), a minimum shareholders' equity of $500,000, positive net income in the last fiscal year, positive operating cash flow, and a gross profit margin of at least 10%.[31]

[29] Interview with the representative of MISTI in 2021.
[30] Written inputs from the representative of MoC in 2021.
[31] See Cambodia Stock Exchange.

4.2 Finance

As of 2019, there were around 20 private equity (PE) and venture capital (VC) firms in Cambodia. Given the rise of startups in the country, some VC firms have diversified their targets to also invest in startups. Only a small number of VC firms invest in a specific sector and most of them focus on the investment readiness of tech startups regardless of sector. As many startups are at the nascent stage, most VC firms do not focus on one or a few sectors because a narrow sector range will make it difficult to find enough qualified startups for investment. Moreover, VC firms located outside of Cambodia also look for opportunities to invest in or have invested with Cambodia's startups. From 2015 to 2021, at least 25 tech startups received investment funding from different sources. At least 14 deals were publicly disclosed in 2018 (MSP and Raintree Development 2019) and at least 19 by 2021.[32] By late 2021, published information on funds raised by startups from local and internationally based VCs, PEs, and angel investors accounted for more than $20 million (Trippetts 2021).[33] Moreover, funds from large companies and grants are also available (MSP and Raintree Development 2019). Table 4 lists VC firms, PE firms, and angel investors that invest in the four sectors.

Table 4: Venture Capital Firms and Investors Targeting and Investing with Tech Startups in the Four Sectors

No.	Organization	Investment Type	Business Sectors Targeted
1	Mekong Strategic Partners (including Smart Axiata Digital Innovation Fund)	Venture capital (VC)	• Targets tech startups in all sectors • Invests in greentech, agritech, and edtech
2	OOCTANE	VC and private equity (PE)	• Targets tech startups and small and medium-sized enterprises (SMEs) mainly in logistics, e-commerce, financial services, and real estate but open to opportunities for healthtech, greentech , and edtech • Invests with startups in delivery sector (B2B Cambodia 2021)
3	Uberis Capital	VC and PE	• Targets startups in the agriculture, energy, and life improvement (health and education) sectors • Invests with startups in grocery and fresh produce distribution (fruits and vegetables) business (Firn 2021)
4	Insitor	VC and PE	• Targets startups and SMEs in clean energy, health, education, housing, and water • Invests with tech startups in transportation booking

continued on next page.

[32] See Khmerload; and Teamwave (2021).

[33] Khmerload (around $9 million); Clik ($3.7 million); ShoprunBakck ($900,000); CamboTicket ($100,000) (Li 2020); Agribuddy ($2.8 million, reported by EMC 2019); ATEC, a greentech, ($2.3 million) (PFAN n.d.); and other startups (Teamwave 2021).

Table 4 *continued.*

No.	Organization	Investment Type	Business Sectors Targeted
5	Agribusiness Booster (Abt)	VC	• Targets startups (between 1 and 2 years of operation) in the agriculture sector • Invests with agribusiness and energy startups
6	Small World Venture	VC	• Targets tech startups in all sectors • Invests with startups in agribusiness sector
7	Cambodia Investor Club	–	• Targets SMEs and startups in all sectors • Invests with enterprises in agriculture sector
8	CorCo	Angel investor	• Targets agritech and tourism tech startups • Invests with tech startups in transportation booking
9	OBOR Capital	VC	• Targets tech startups in all sectors • Invests with tech startups in logistics, retail business, transportation booking, and pet care
10	SEEVA Capital	PE	• Targets "fast-growing and market-leading companies"[a]
11	500 Startups	VC	• Targets tech startups in all sectors • Invests with tech startups in digital entertainment and real estate
12	Belt Road Capital Management	PE	• Invests with startups and SMEs in real estate sector and open to opportunities in health care and education (The Phnom Penh Post 2018) • Invests with startups in digital entertainment and real estate
13	Mistletoe Inc, based in Japan	–	• Invests with agritech startups
14	iSGS Investment, based in Japan	–	• Invests with agritech startups

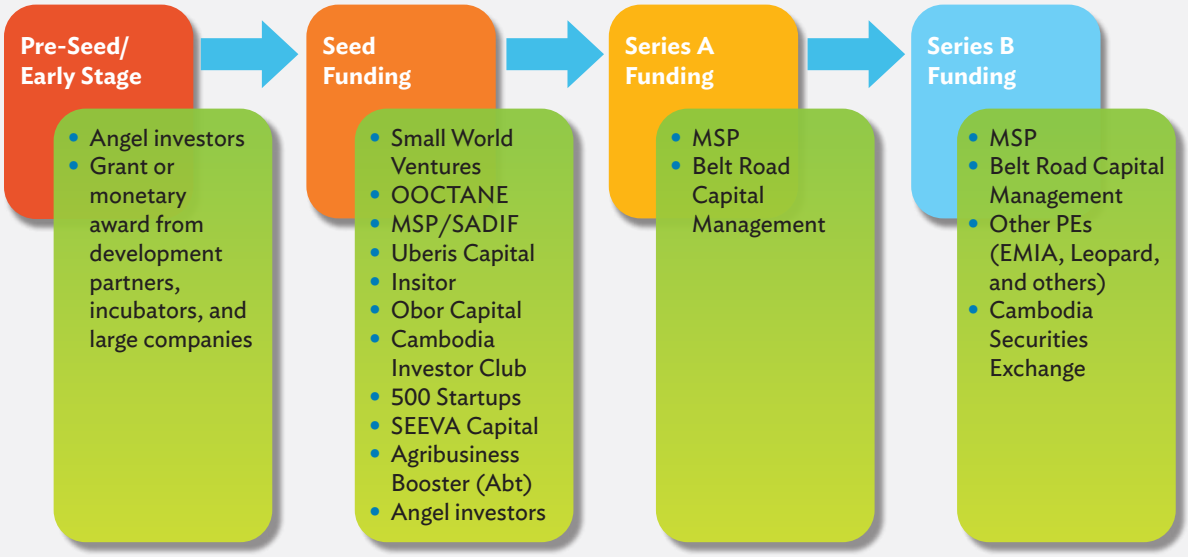
[a] See SEEVA Capital.
Sources: Interviews; MSP and Raintree Development (2019); and respective websites.

4.2.1 Investment for Early-Stage Startups (Pre-Seed and Seed Funding Rounds)

There are few sources of funds for early-stage startups in Cambodia (Figure 2). Most startups at this stage struggle to raise funds from VC firms. Without a minimum viable product some of them depend on pre-seed capital from their own funds and capital from prize money gained through a pitching competition or hackathon. Those with a minimum viable product can obtain access to seed funding from VC firms with investments ranging from $5,000 to $500,000. In order to invest with startups, VC firms inquire about the business model and about the founding team and its commitment, skills, and experience.[34] Local players include Smart Axiata Digital Innovation Fund and OOCTANE. The Smart Axiata Digital Innovation Fund initiated in 2017 is a $5 million VC fund with capital provided by Smart Axiata, Forte Insurance, and Mekong Strategic Partners. Although it does not specifically target tech startups in the four sectors defined in this study, its investment portfolio

[34] Interviews with VC firms and startups in 2019.

Figure 2: Investment Availability by Types of Venture Capital Firms



EMIA = Emerging Markets Investment Advisers, MSP = Mekong Strategic Partners, PE = private equity, SADIF = Smart Axiata Digital Innovation Fund.

Notes:

(i) Series A funding is for startups that have created a market presence, developed a customer base, and begun to generate consistent revenue with strong growth potential. The Series A round raises funds of around $3 million to $10 million (McGowan 2018; Teare 2021).

(ii) Series B funding is for startups that (a) have already gone through seed and series A funding, and (b) have created a substantial customer base and plan to grow the business to a large scale (McGowan 2018; Teare 2021).

Sources: Interviews and respective websites.

includes those sectors. The fund invested in about 10 tech startups between its founding in 2017 and 2019, with an investment of $100,000 and $500,000 each per startup. It is looking to invest in healthtech startups. OOCTANE began in 2018 and raised $55 million as of 2019 to invest in both startups and SMEs. Its priority sectors are logistics, e-commerce, financial payment services, and real estate, but it is also open to opportunities in healthtech, greentech, and edtech.[35]

Angel investors also play a role in supporting the early stage (and other stages) of tech startups. In 2016, the Mekong Business Initiative, funded by the Asian Development Bank and Australia's Department of Foreign Affairs and Trade (DFAT), hosted the Mekong Angel Investor Network Forum in Cambodia. The forum was formed for local and international angel investors to connect, share information, and learn from each other's experiences. As a result, a few deals were made between startups and international angel investors. In addition, a local angel

[35] Interview with the representative of OOCTANE in 2019.

investor network consisting of 10–20 investors and named CorCo, planned to invest in a wide range of tech startups including agriculture and tourism. CorCo's investments range from $10,000 to $100,000 per startup. Since its establishment in 2016 to 2019, CorCo has invested in only one startup because of difficulty finding more startups that were investment ready.[36] Moreover, the Cambodia Angel Investors Network was launched in 2020, to promote angel investing through the angel investment capacity development and by providing an investment gateway for individual or syndicated investments.[37]

Among the interviewed startups, three received first round (seed funding) investment from VC firms. A few were in negotiation with VC firms or angel investors as of the end of 2019.

4.2.2 Investment for Series A Startups

Although only a few VC firms offer Series A funding—for startups with a customer base, consistent revenue, and a viable business model with strong growth potential, there is growing interest from VC firms located outside Cambodia. After the first round of investment, some startups struggle to raise the second round locally as VC firms find that startups fail to reach sufficient scale, and VC firms need to diversify investment risk. Some startups have explored second-round funding opportunities abroad, including Malaysia and Singapore. At the same time, some foreign-based VC firms have invested in startups in Cambodia, such as Japan-based iSGS Investment, Mistletoe Inc., and KSK Angel Fund, which have invested in Cambodian agritech (Kunmakara 2019; Agribuddy 2018).

According to interviews with VC firms, funds are available but qualified and investment-ready opportunities are lacking. Most startup founders have limited business skills and experience, and some startups do not even keep financial records. Another challenge is that some new startups do not register their business.[38] The startups' lack of knowledge and experience in deal negotiation (including company valuation and shareholder agreements) presents another challenge for VC firms, in part because startups tend to overvalue their enterprise.[39] Owners admit that they lack a legal understanding of the due diligence process and note that it is costly for them to use legal services.

[36] Interview with an angel investor who is a member of CorCo and BDtruS, both in 2019.
[37] See Cambodia Angel Investor Network.
[38] Interviews with representatives of VC firms in 2019.
[39] Footnote 38.

4.2.3 Investment for Series B Funding

Cambodia lags behind other Southeast Asian countries in providing VC finance for startups to scale up. This is, in part, because not many tech startups are at the growth stage, let alone those in greentech, agritech, healthtech, and edtech, most of which are at the pre-growth stage. As a result, some VC firms invest in established SMEs rather than startups.

4.2.4 Alternative Financing

Despite its important role in providing alternative financing for startups, crowdfunding has a limited role in Cambodia. The concept is new, and both startups and potential investors have limited knowledge on how to implement it. TosFund, the first crowdfunding project, was launched in 2016 and completed in 2018 (BDtruS 2019). In 2019, CiC Investment was established to crowdfund startups and SMEs, although it was only open to mainly SMEs and members of the Cambodia Investor Club who are existing entrepreneurs. Additionally, the club initiated the first offline peer-to-peer lending platform in the country. However, transactions are conducted only with its members (BDtruS 2019). In 2020, Rai Capital crowdfunding platform, licensed by the Securities and Exchange Regulator of Cambodia (SERC) and a joint-venture business of Rai Capital and Goldbell Financial Services, launched its peer-to-peer lending for small businesses and individuals in Cambodia.[40] Another crowdfunding platform, KDEISROMAI, is operated by CIJD Co., Ltd. and aims to fill the financial gap in SMEs financing and raise funds for individuals and projects.[41] However, the amount raised by Cambodia-based crowdfunding platforms is small. According to Prakas 003 on collective investment schemes issued in 2018, SERC regulates crowdfunding and allows only four transactions a year with a maximum amount of $50,000 per transaction.

In addition to these local-based crowdfunding platforms, tech startups in Cambodia also raise funds from international crowdfunding platforms. For example, two Australian platforms, Pozible and Birchal, raised funds for the Cambodian greentech startup Okra Solar. The Private Financing Advisory Network, a global network of climate and clean energy financing, "mobilizes private sector investment" with a goal to unlock financial access for climate action (PFAN n.d.). It is "a multilateral public private partnership initiated by the Climate Technology Initiative and the United Nations Framework Convention on Climate Change (UNFCCC)."[42] The network raised $700,000 equity financing for a greentech startup, ATEC (PFAN n.d.).

[40] See Rai Capital; and Insider (2020).
[41] See KDEISROMAI.
[42] See UNIDO. Private Financing Advisory Network.

The government issued regulations (prakas) on public offering of equity securities, allowing SMEs to raise capital through an initial public offering by lowering the listing criteria for SMEs to attract them to the Cambodia Securities Exchange (CSX). Since 2011, eight companies have listed in CSX;[43] however, all of them are large and half are state-owned enterprises. Total market capitalization of CSX was $486 million at the end of 2018 (Amarthalingam 2019). Most SMEs and startups are unable to meet CSX's listing criteria because of poor accounting standards, weak leadership and governance, and uncertainty over their business prospects.

4.2.5 Investment in the Four Sectors

Only a few startups in the four sectors have been able to secure seed funding or Series A investment from sources inside and outside of Cambodia, including VC firms, international crowdfunding platforms, angel investors, and grants from large companies, development partners/projects, and incubators/accelerators. Table 5 shows that the interviewed greentech and agritech startups raised millions of dollars from VC firms and secured grants from donors and incubators and accelerators. Those that had received Series A funding looked for further investment abroad. The combined investment needs of these two sectors amount to more than $10 million. However, healthtech startups have not secured any funding from investors, although they were negotiating with VC firms in Cambodia and another country as of late 2019. One interviewed edtech startup secured pre-seed capital from an incubator and was able to raise seed funding from local VC firms. Further funds needed by healthtech and edtech amount to half a million dollars each.

Table 5: Funds Raised by Interviewed Tech Startups and Further Investment Needs

Tech Startups	Seed and Series A Round Investment	Grant Received		Further Investment Needs
		Expansion	Seed Capital	
Greentech (n: 4)	Over $1 million	Over $1 million	Over $15,000	Over $4 million
Agritech (n: 6)	Over $3 million	0	Over $10,000	Over $5 million
Healthtech (n: 3)	0	0	Over $10,000	Over $500,000
Edtech (n: 4)	Over $150,000	0	Over $30,000	Over $500,000

n = number of startups.
Source: Interviews conducted by the author in 2019.

[43] Five listed companies include Sihanouk Autonomous Port, Phnom Penh SEZ Plc, Phnom Penh Autonomous Port, Grand Twins International (Cambodia) Plc, Phnom Penh Water Supply Authority, DBD Engineering Plc, Pestech (Cambodia) Plc, and Acleda Bank. See CSX. List of Companies.

4.3 Human Capital

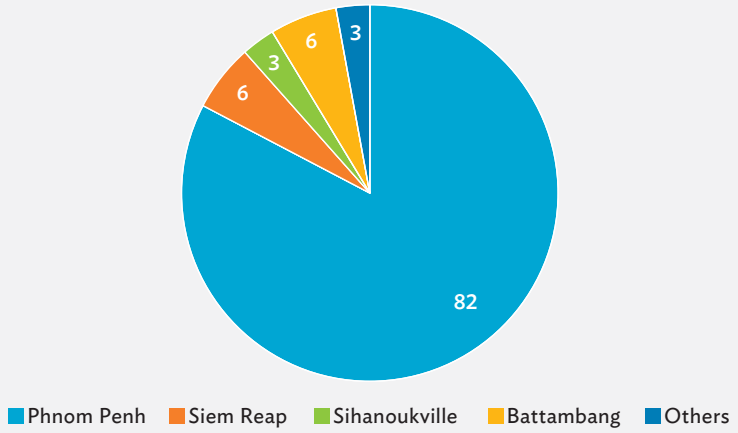
The Ministry of Education, Youth, and Sports (MoEYS) and the Ministry of Labor and Vocational Training are promoting the modernization of Cambodia's education system. As set out in the Education Strategic Plan (2019–2023), MoEYS is integrating science, technology, engineering, and mathematics (STEM) into curricula and textbooks (MoEYS 2019). So far, STEM has been incorporated in general education, higher education, TVET, incubators and accelerators, and through workshops and seminars. Through the Policy and Strategy on Information and Communication Technology, MoEYS is also integrating ICT into learning, teaching, and knowledge sharing to enhance the knowledge and skills of students in response to the 21st century world of work (MoEYS 2018, 2). The Ministry of Labor and Vocational Training adapted the Strategic Action Plan for Modernization of Technical and Vocational Education and Training 2019–2023 to modernize TVET in anticipation of labor market demand arising from the Fourth Industrial Revolution and the digital economy. One of its five prioritized areas is the promotion of research, innovation, and applied technology in TVET institutions (MLVT 2019).

Cambodia has 128 higher education institutions, of which 48 are public (MoEYS 2021). Many of these institutions offer business courses, and around 40 of them offer computer science and engineering (Figure 3). By the end of 2018, 13 universities were offering technology and entrepreneurship programs (Development Innovations 2018). Also, 52 educational institutions, of which 16 are public institutions and 36 are private institutions, offer STEM-related major courses (JICA 2016; MoEYS 2016).

In academic year 2019–2020, a total of 171,148 students were pursuing a bachelor's degree (of which 54% are female); 9,984 students were continuing with a master's degree, and 961 students were working on a doctor of philosophy (PhD) degree. Enrollment for a bachelor's degree in business accounted for 42%, while that of STEM made up 30%, of which 5% was in basic science, 9% in information technology, 8% in engineering, 5% in health, and 3% in agriculture (Figure 4).[44] For academic years 2015–2016 to 2019–2020, enrollment for a bachelor's degree in STEM increased by 8 percentage points, while those for master's and PhD degrees in STEM were lower than that of the bachelor's degree level. For a master's degree, the enrollment rate was 2% in engineering and technology, 8% in extractive and natural sciences, and 3% in agriculture. There was no enrollment in health science. Only 6% of PhD students took courses in engineering and technology, 5% in extractive and natural sciences, and 1% each in agriculture and health science (MoEYS 2021).

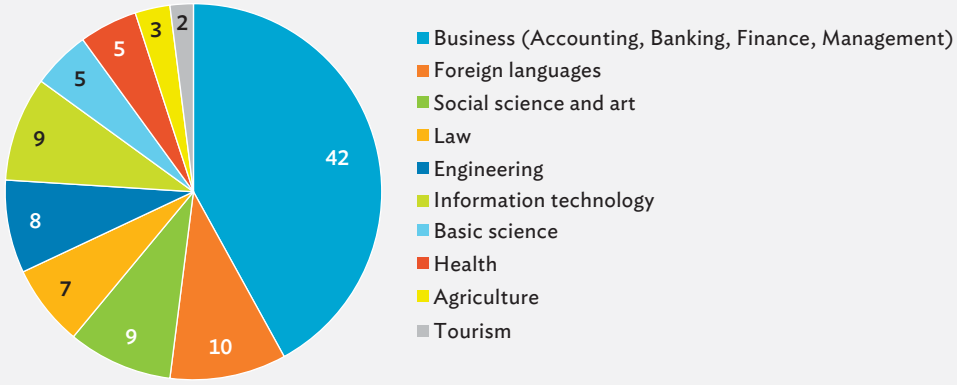
[44] The Education Congress includes the enrollment of agriculture and health in STEM (MoEYS 2021).

Figure 3: Universities Offering Computer Science and Engineering Courses
(%)



Sources: MoEYS (2016); and Ek (2017).

Figure 4: Bachelor's Degree Enrollment by Sector, 2019–2020
(%)

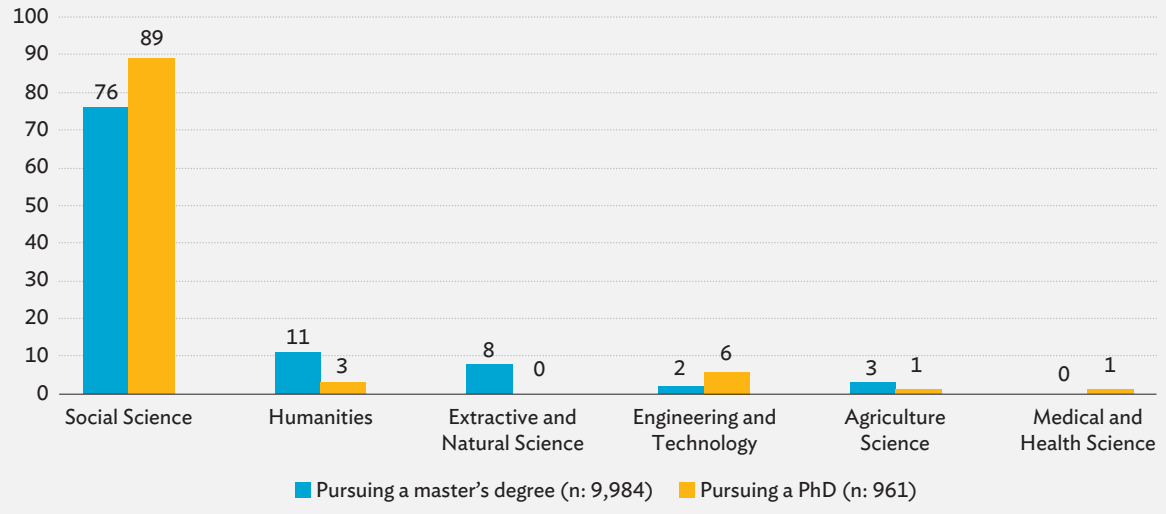


Source: MoEYS (2021).

In academic year 2019–2020, a total of 32,640 students graduated with a bachelor's degree, 3,296 with a master's degree, and 31 with a PhD. Graduates of a bachelor's degree consisted of 37% in business, and 33% in STEM comprising 6% in basic science, 10% in information technology, 8% in engineering, 5% in health, and 4% in agriculture. Only 1% graduated with a master's degree in engineering and technology and health science, and 5% and 2% in extractive and natural sciences and agriculture, respectively (MoEYS 2021).

Several higher educational institutions provide extracurricular activities to build the capacity of students in entrepreneurship and business startups. Seven institutions—National University of Management, Paragon University, Institute of Technology of Cambodia, Cambodia Academy of Digital Technology (CADT), Pannasastra University of Cambodia, Norton University, and Royal University of Phnom Penh—run innovation labs, incubation programs, or entrepreneurship hubs to support startups, mainly for university students. As shown in Figure 5, enrollment in STEM courses at the bachelor's degree level has increased over the past 5 years; however, the number of STEM graduates is not sufficient to meet the increased labor market demand in the context of Industry 4.0 and the expanding digital economy. Also, only a few students are taking natural science, agriculture, and health science courses. In addition, Cambodia has a limited number of technology experts. Incubators and accelerators have expressed difficulty in finding trainers and mentors with technology expertise for the clean/green, agriculture, health, and education sectors. Moreover, the interviewed startups stated that finding talented staff (especially with technology and technical skills) to hire was not easy, as they tend to work for large companies. Cambodia provides employment and investment opportunities for foreigners to work and invest in Cambodia without discrimination. However, most startups are not ready to employ foreigners as it is costly to do so. It is estimated that there are around 50,000 digitally talented persons in Cambodia, but the digital skills of the ICT workforce are reportedly only moderate and not specialized (RGC 2021a).

Figure 5: Share of Postgraduate Students in Academic Year 2019–2020
(%)



n = number.
Source: MoEYS (2021).

4.4 Digital Infrastructure

Cambodia has made progress in delivering basic digital infrastructure. The ratio of mobile phone subscriptions to population in 2020 was around 125%. With most Cambodians subscribing to the mobile internet, the share of subscribers to population amounted to around 98% in 2020. However, the number of fixed phone and fixed broadband users remains low. According to the Telecommunication Regulator of Cambodia fixed broadband subscriptions comprised 1.36% of the population in 2019 but increased to 1.69% in 2020 (Table 6). The low adoption of fixed broadband may have resulted from "limited availability of optic fiber in rural areas, low number of households with a computer, and the relatively low price of mobile-broadband internet compared to fixed-broadband internet" (Beschorner et al. 2018, 8).

Table 6: Key Digital Infrastructure in 2019 and 2020

Description	2019		2020	
	Number of Subscriptions	Ratio of Subscribers to Population	Number of Subscriptions	Ratio of Subscribers to Population
Mobile phone	21.67 million	130%	20.8 million	124.57%
Mobile broadband	16.12 million	97.81%	16.33 million	97.68%
Fixed phone	57,438	0.35%	49,381	0.29%
Fixed broadband	224,104	1.36%	283,508	1.69%

Note: The ratio of subscribers to population was calculated using data from the Telecommunication Regulator of Cambodia.
Source: Telecommunication Regulator of Cambodia. Statistics.

Internet speed and quality also remain low. Most mobile broadband subscribers connect to 2G and 3G services. 2G services cover around 80% of the country's total area, with a subscription ratio of 92% (Table 7). The coverage of 3G services was 66% of the total area, serving 85% of the population as of July 2020. Although 4G service was introduced, its coverage is lower, covering 60% of the area and around 83% of the population. In July 2019, several telecom companies conducted a trial of 5G service, making Cambodia the first member country of the Association of Southeast Asian Nations (ASEAN) to adopt this level of service (Turton and Onishi 2019).

Table 7: Network Coverage as of July 2020

	Coverage
Domestic fiber optical cable backbone (as of July 2019)	41,643 kilometers
Submarine cable	Asia–Africa–Europe-1 and Malaysia, Cambodia, and Thailand
People using 2G	92.3%
2G coverage areas	79.5%
People using 3G	85.2%
3G coverage areas	66.2%
People using 4G-LTE	82.5%
4G-LTE coverage areas	60.4%

Source: RGC (2021a).

The government continues to improve the digital infrastructure, including fiber optics and mobile networks, with high quality services (RGC 2019a). In 2019, Cambodia had 41,643 kilometers of domestic fiber optical cable backbone (RGC 2021a), an increase of around 60% from 2016 (UN-OHRLLS 2019). Cambodia also connects to two submarine cables, one that includes Malaysia, Cambodia, and Thailand, and the other to Asia–Africa–Europe-1, which has increased internet speed. Under its Telecommunications Law of 2015, the Universal Service Obligation (USO) was developed, financed by a 2% contribution from the revenues of telecom companies. USO aims to increase internet broadband coverage to 70% in rural areas and 100% in cities by 2020 (WTO 2018). It will also narrow digital gaps in the rural and urban areas and target an internet penetration rate of 80% (UN-OHRLLS 2019). Currently, Cambodia has been implementing USO 2.0, with a budget of $10 million for promoting the digital infrastructure and improving the ICT literacy of rural areas, schools, and SMEs.[45]

Although digital change in Cambodia has happened quickly, many challenges remain. Cambodia is ranked lowest in East Asia and the Pacific on the Digital Adoption Index, which measures the spread of technology among governments, businesses, and individuals (Beschorner et al. 2018). Moreover, the low level of digital literacy constrains digital and technological adaptation. Less than one-third of the population has basic digital skills, like using a spreadsheet, while less than 3% can connect and install new devices and only 1% can search, download, and configure software (CDRI 2020). Approximately 30% of Cambodians have basic digital skills such as internet search and using digital systems for communication and information sharing, and only around 28% of students in higher education use computers (RGC 2021a).

[45] Interview with the representative of MPTC in 2019.

4.5 Incubators and Accelerators

Around 30 incubators and accelerators in Cambodia, including government, university, and donor programs, are working to support startups (Tables 8 and 9). Several of them focus on tech startups and the rest on startups in general. Most programs are designed to support idea- and early-stage startups during the pre-incubation and incubation periods. All programs are in Phnom Penh, except for three in Siem Reap and Battambang, which are run by Impact Hub and its local partners, SHE Investments, and the National University of Battambang. In 2018–2019, the Young Entrepreneurs Association of Cambodia (YEAC) ran an incubation program in Siem Reap.[46] Of these incubators, a few programs target girls and women in the tech sector, including the programs of Development Innovations, The Asia Foundation's Women in Tech Network, SHE Investments, Technovation Cambodia, and the Cambodia Women Entrepreneurs Association's Young Women Entrepreneur Accelerator. Only a few of the many incubators and accelerators are sector-specific. Table 10 lists the sector-specific and non-specific incubators and accelerators offering support to startups in the four sectors.

Incubators and accelerators offer training, mentorship, networking opportunities, seed funding (grants), and investor linkages. Startups with the best solutions were awarded prize money, usually from pitch competitions, of between $3,000 and $10,000, which can be used as seed capital to fund their venture.[47] A few incubators and accelerators such as KE and FYT101 invest with startups. To fill the gap and enhance investment readiness, KE has partnered with Obor Capital to build startup and SME capacity on financial management, business projections, and fundraising (Cambodia Investment Review 2021; Kunmakara 2021). Unlike others, FYT101 supports tech startups from inception to initial public offering stage by providing training, mentoring, and financing. Impact Hub has partnered with UNDP to implement the Business Mentoring Certification Program and develop mentoring guidelines and curricula to improve the mentoring process.[48] The services provided by incubators and accelerators do not differ from sector-specific and non-sector-specific programs.

Among the incubators and accelerators cited above, eight (excluding TRYBE which no longer operates) target the four sectors covered by this study. EnergyLab runs Hackathon and pre-incubation and incubation programs to support startups in clean energy and agriculture. Impact Hub runs Dak Dam Incubator, which is financed by HEKS and the Swiss Agency for Development and Cooperation, to incubate agriculture startups. Additionally, Impact Hub has incubated startups to address social and environmental issues, including digital education. SHE Investments runs a

[46] Interviews with representative of incubators in 2019 and 2021.
[47] Interview with the representative of Impact Hub in 2019; see also Impact Hub.
[48] Interviews with the representatives of Impact Hub and UNDP in 2021.

Table 8: Incubators and Accelerators Supporting Tech Startups in Four Sectors

No.	Incubators and Accelerators	Year Established	Programs	Target Startups and Sectors
		Government Programs		
1	Techo Startup Center	2019	Pre-incubation and incubation	Tech in agriculture and finance
2	Khmer Enterprise (KE)	2019	Incubation and acceleration	Tech and non-tech in ICT, agriculture, manufacturing, and services
3	Digital Innovation Center	2020	Pre-incubation, incubation, and acceleration	Tech in all sectors
		Private Sector and Donor Programs		
4	Impact Hub	2015	Pre-incubation, incubation, and acceleration	Tech and non-tech in all sectors, including a program for agriculture (Dak Dam Incubator) and programs for environment and digital education
5	EnergyLab	2018	Hackathon, pre-incubation, and incubation	Tech and non-tech in energy and agriculture
6	TRYBE[a]	2017	Hackathon, pre-incubation, and incubation	Tech and non-tech in all sectors, including agriculture
7	SHE Investments	2015	Incubation and acceleration	Tech and non-tech owned by women in all sectors, including health
8	Small World	2011	Pre-incubation and incubation	Tech startups in all sectors
9	Young Entrepreneurs Association of Cambodia	2019	Incubation	Tech and non-tech in tourism, hospitality, and ICT
10	CJCC Accelerator	2018	Acceleration	Tech and non-tech in all sectors
11	BIO Accelerator of Cambodia Investor Club	2018	Acceleration	Tech and non-tech in all sectors
12	TEK4GOOD, run by The Asia Foundation	...	Incubation	Tech in all sectors
13	Angkor 500 500 Startups and KE	2020	Incubation and Accelerator	Tech startups in all sectors
14	Tiger@Mekong	...	Accelerator	Tech and non-tech startups in all sectors
15	FYT101 Fourmi Rouge, Yuanta Securities (Cambodia)	2021	Accelerator	Tech startups in all sectors
16	BLUETRIBE UNDP	2020	Incubation	Tech and non-tech startups in all sectors
17	MATCh Mekong Business Initiative	2017	Accelerator	Tech and non-tech in agriculture sector
18	Fyndi Startup Accelerator	2021	Accelerator	Tech and non-tech startups in all sectors
19	Confluences	2014	Incubator	Tech and non-tech startups in all sectors

CJCC = Cambodia–Japan Cooperation Center, ICT = information and communication technology, UNDP = United Nations Development Programme.

[a] No longer operating.

Sources: Interviews; Development Innovations (2018); and respective websites.

Table 9: Universities Supporting Tech Startup Programs and Activities

No.	University	Location	Programs/Activities	Target Startups and Sectors
1	Social Innovation Lab of National University of Management	Phnom Penh	Business Model Competition and Mekong Challenge	Mainly tech in all sectors, but the selection criteria include solutions for energy, health, and agriculture
2	Smart-Techno Innovation Lab of Institute of Technology of Cambodia (ITC)	Phnom Penh	Incubation program, including training, mentoring, networking, and competition	Tech and non-tech in all sectors, including agro-processing
3	Techno Incubation Space of ITC	Phnom Penh	Incubation program, including training, mentoring, networking, and competition	Startups in STEM and agro-processing
3	Innovation Lab/MIS Lab of Paragon University	Phnom Penh	Space and peer-to-peer mentoring	Tech and non-tech in all sectors
4	Electronics and Electrical Engineering Lab and BOOMCAMP Incubation of Norton University	Phnom Penh	Incubation program	Tech and non-tech in all sectors
5	Student Senate and Business Club of Pannasastra University	Phnom Penh	Student clubs and business club with mentors	Tech and non-tech in all sectors
6	Puthisastra University	Phnom Penh	National business plan competition, hackathons, and makerthons	Tech and non-tech in all sectors
7	Cambodia Business Incubation for Food Production Development (CBI-Food) of University of Battambang	Battambang	Incubation	Tech and non-tech in food/agro-processing
8	University-Industry Cooperation Center of Royal University of Phnom Penh (RUPP)	Phnom Penh	Entrepreneurship, incubation, job employability, job placement, business planning, marketing	Tech and non-tech in ICT, energy and food
9	National Incubation Center of Cambodia of RUPP and ITC[a]	Phnom Penh	Incubator	Tech startups in all sectors

MIS = management information system; STEM = science, technology, engineering, and mathematics.
[a] See Royal University of Phnom Penh; and Sokhavuth (2021).
Sources: Interviews; Development Innovations (2018); Ek (2017); RUPP (n.d.).

health incubator, although it supported existing clinics and nurses instead of healthtech startups. Moreover, the Mekong Agriculture Technology Challenge (MATCh) Startup Accelerator, initiated by the Mekong Business Initiative in 2017, supported agritech startups in Cambodia, the Lao People's Democratic Republic, Myanmar, and Viet Nam, to promote agricultural transformation.[49] The National University of Battambang

[49] See MATCh; and MBI (2018).

Table 10: Incubators and Accelerators Targeting Specific Sectors

Organization	Sectors	Programs	Activities
EnergyLab[a]	Energy and agriculture	Hackathon, pre-incubation and incubation	Training/workshop, mentorship, networking, seed funding (grant), and investor introduction
Techo Startup Center	Agriculture	Incubation and acceleration	Training/workshop, mentorship, networking, and investor linkage
Impact Hub	Agriculture, environment, and digital education	Incubation	Training/workshop, mentorship, networking, seed funding (grant), and investor linkage
Khmer Enterprise	Agriculture and clean energy	Incubation and acceleration	Training/workshop, mentorship, networking, grant and co-investment
SHE Investments	Health	Acceleration	Training/workshop, mentorship, and networking,
CBI-Food	Food/Agro-processing	Incubation	Training/workshop, and mentorship
MATCh	Agriculture	Acceleration	Training, mentoring, and monetary award
Techno Incubation Space	Energy	Incubation	Training, mentoring, and competition

CBI-Food = Cambodia Business Incubation for Food Production Development.
[a] Unlike EnergyLab in other countries, EnergyLab Cambodia did not invest in startups by late 2019.
Source: Interviews conducted by author and respective organization websites.

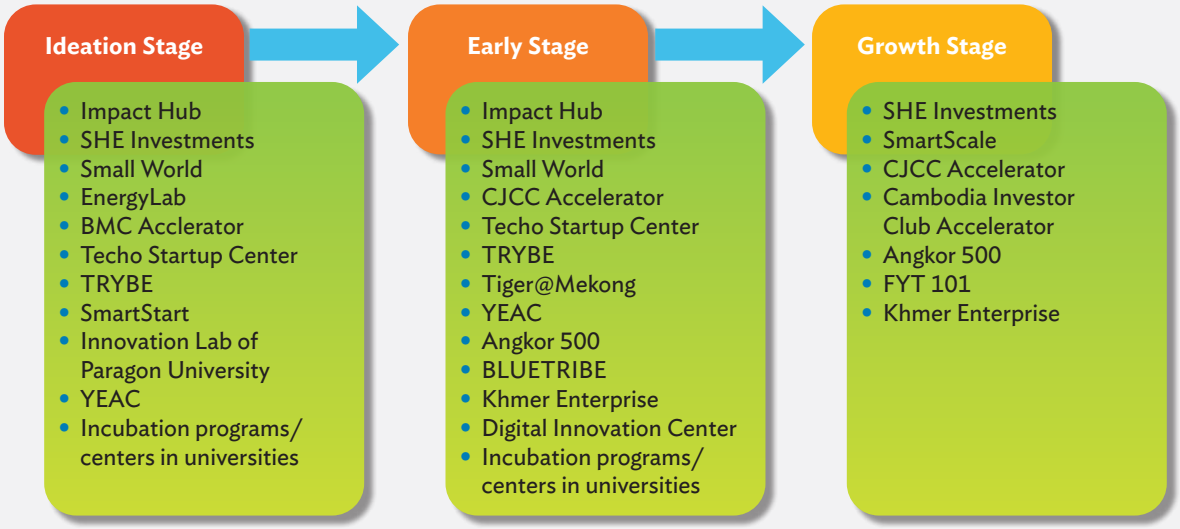
in partnership with MISTI also runs the Cambodia Business Incubation for Food Production Development, to support startups in food and agro-processing. Likewise, the Institute of Technology of Cambodia operates the Smart Techno Innovation Lab for agro-processing. Techo Startup Center (TSC) runs incubation and acceleration programs for agritech startups. In partnership with IFAD's SAAMBAT program, TSC established the Khmer Agriculture Suite (KAS), which is a digital platform for the agriculture value chain. KE also supports the tech startups in the designated sectors. As mentioned above, one of its priority sectors is agriculture. KE has partnered with CPSA in running incubators for the agriculture sector and with CAVAC in supporting agritech startups and SMEs. It also partners with EnergyLab in promoting clean energy for the agriculture sector. Techno Incubation Space targets startups in the energy sector.

Other incubators and accelerators do not target specific sectors, but they support the four sectors covered in this study. For instance, the National University of Management's Social Innovation Lab runs the Business Model Competition Startup Accelerator to help early-stage tech startups validate their business ideas. The criteria in selecting the winning teams include business ideas in greentech, healthtech, and agritech. The accelerator mainly provides training on business skills and offers technical skills through mentorship. However, given the limited expertise in the skills area and minimal involvement of human resources from large companies, incubators and accelerators have difficulty finding

qualified and professional trainers and mentors, especially those with technology skills.[50] As a result, programs have mentors with nonbusiness or no technology background who often cannot give in-depth advice. Almost all incubators and accelerators build the capacity of idea- and early-stage startups; however, only a few target startups at the growth stage (Figure 6). The lack of supporting actors for the growth stage is one of the barriers for tech startups. In this sense, there is a lack of connecting support programs that flow continuously from pre-incubation and incubation to growth and acceleration. Several supporting organizations run pre-incubation, incubation, and acceleration programs, but they are one-off programs designed to address solutions based on the objectives of sponsors or donors. Only a few incubators offer connected programs from hackathon to pre-incubation and incubation. According to the interviewed tech startups, they struggle at the growth stage due to a lack of supporting actors and networks. The lack of accelerators supporting the growth stage may be a result of the insufficient readiness of Cambodian startups and the shortage of highly skilled, talented, and competent professionals.

All interviewed startups joined at least one incubation program. Some of them found these programs useful in validating their business idea, developing the business model, and understanding (and pitching to) investors' needs. They also reported that they had opportunities to network with investors, other startups, and policy makers. On the other hand, some startups found the training content too broad and lacking in depth for developing skills, especially on innovation, technology, and accessing markets. They also reported their need for connections and qualified mentors, including those with a business background, to help them grow.

Figure 6: Supporting Organizations by Stage of Startups



BMC = Business Model Competition, CJCC = Cambodia–Japan Cooperation Center, YEAC = Young Entrepreneurs Association of Cambodia.
Sources: Interviews conducted by author; and Development Innovations (2018, 21).

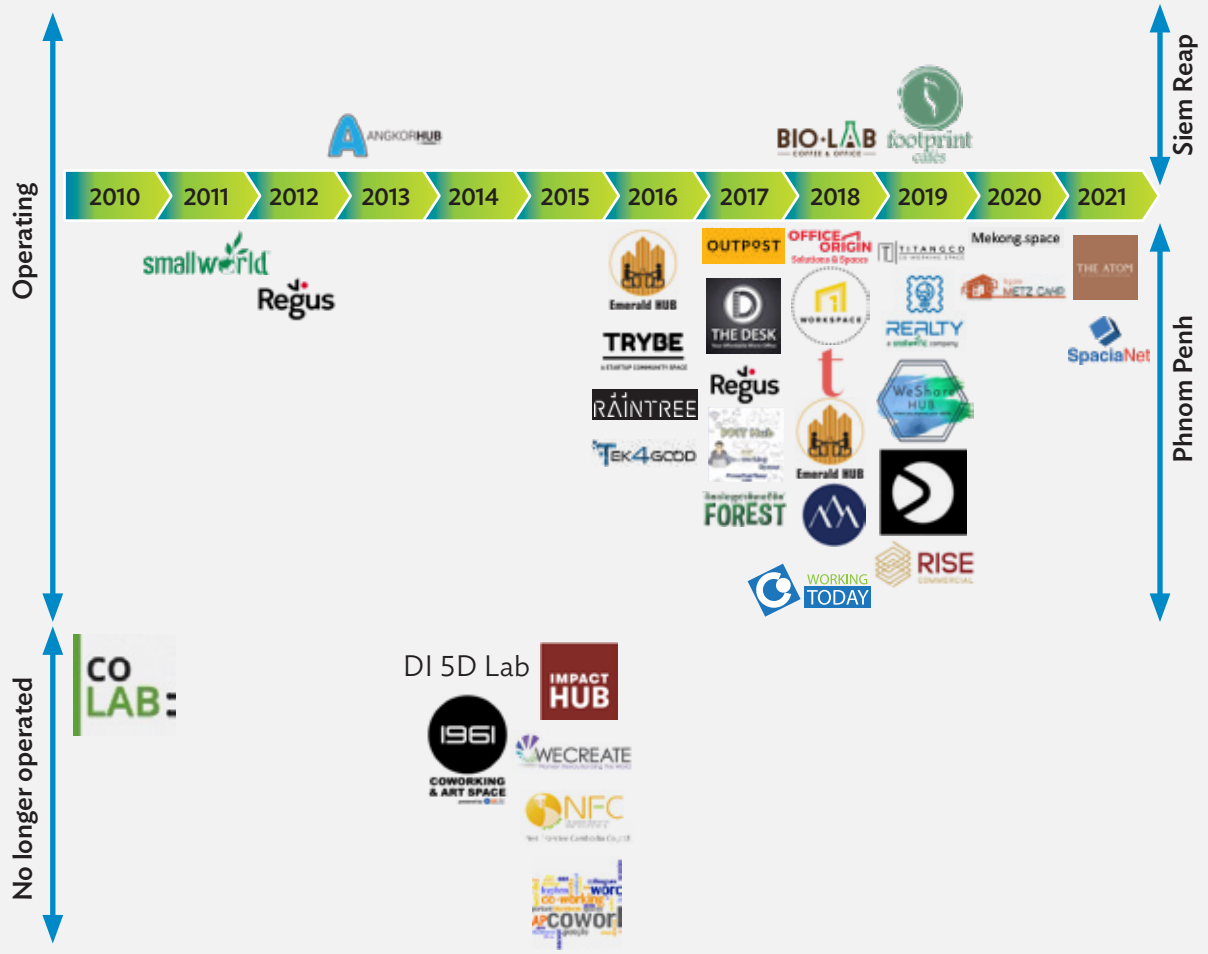
[50] Interviews with representatives of incubators and accelerators in 2019 and 2021.

4.6 Other Supporting Organizations

4.6.1 Coworking Space

Coworking space was first provided in 2010. By 2021, there were around 30 active coworking spaces in the country, most of them in Phnom Penh and three in Siem Reap (Figure 7). None of the coworking spaces target startups in a specific sector. The government-backed KE and Digital Innovation Center also provide coworking space and co-innovation space (technology) for startups, respectively.[51]

Figure 7: Coworking Space in Cambodia



Sources: MSP and Raintree Development (2019); Ek (2017); and Coworker.

[51] Interview with the representative of MPTC in 2019.

Coworking space plays an important role in bridging the gap for startups that are unable to afford high office rental fees. Such space offers startups not only physical but also virtual offices. Among the interviewed startups, only one held office in a coworking space and uses it to network and gain access to mentors. Some startups do not have either a physical or virtual office in the coworking space but use the incubation center's space while attending the program. Tech startups engaged in production or manufacturing (e.g., smart products for agriculture and environment sectors) generally rent larger spaces at lower cost (than at coworking sites) where they can set up office and production areas.

4.6.2 Training Institutions

Some organizations tailor their training program to startups by offering innovation and technology skills development, among them Arrowdot, Technovation Cambodia (funded by USAID), Liger Leadership Academy, E2STEM Cambodia, ArcHub Phnom Penh, DataU Academy, and The Asia Foundation's TEK4GOOD and Women in Tech Network (Table 11). Technovation Cambodia also promotes technology among girls aged 12–18 by building capacity in coding and business skills.[52] None of these programs are sector-specific.

Table 11: Training Institutions and Programs

No.	Organization	Year Established	Training Programs
1	Technovation Cambodia	2014	Technology and entrepreneurship (ideation [finding business ideas], coding, business plan, and pitching)
2	Liger Leadership Academy	2012	Technology; entrepreneurship; and science, technology, engineering, and mathematics (STEM)
3	E2STEM Cambodia	2017	Technology and STEM
4	Arrowdot	2012	Robotics and electrical engineering
5	ArcHub PNH	2013	3D printing and training and Bootcamp for Design Challenge, makerthons
6	DataU Academy	2019	Data science, analytics and data visualization, big data in machine learning, etc.
7	TEK4GOOD and Women in Tech Network of The Asia Foundation	...	Training, mentoring, and events with speakers to share experiences

Sources: Interviews conducted by author; Development Innovations (2018); and DataU.

[52] Interview with the representative of Technovation Cambodia.

4.6.3 Large Companies, Development Partners, and Other Stakeholders

Large companies also support tech startups by providing both technical and financial support (Figure 8). The involvement of large companies has increased over the past few years. Smart Axiata, with its partners, run some programs that contribute to the ecosystem such as SmartStart, SmartSpark, and SmartScale, which also focus on digital education and the environment. In partnership with Forte Insurance and Mekong Strategic Partners, the Smart Axiata Digital Innovation Fund invests in tech startups. The fund supports some university-based incubators through the provision of facilities or equipment. Total Cambodia organizes Startupper Total Challenge for startups with innovative solutions in energy, health, and education.[53] In partnership with Impact Hub, Toyota runs Toyota Impact Challenge for startups addressing issues on smart cities, environment, road safety, and transportation. Cellcard, a telecoms company, runs the Cellcard Lab in partnership with Impact Hub to incubate and accelerate tech startups.[54] These programs provide seed grants to selected startups. Additionally, Metfone has organized an event promoting healthtech, and the ISI Group has invested in tech startups. ABA Bank is engaged in promoting the tech startup ecosystem by sponsoring the startup event and pre-incubation program, Startup Day, thus allowing startups to visit its office and share experiences with the bank's Digital Banking Division (ABA Bank 2019). The bank also partners with TSC for the development of financial technology and allows tech startups under TSC to access its PayWay Sandbox environment for testing innovative ideas and products (ABA Bank 2020). Wing has formed a partnership with KE to unlock financial access for startups and SMEs and with TSC to allow startups to use Wing's "cutting-edge digital payment platform" (Wing 2021). Acleda Bank sponsored a startup event organized by TSC (ABC 2020). Other companies such as Ezecom, a telecoms company; and Grab, a ride hailing and delivery service, also support the tech startup ecosystem in the country.[55]

Although these companies have been active in supporting tech startups, the majority of large companies do not want to cooperate or partner with startups. According to interviewed investors and startups, large companies are reluctant to be business partners, either as suppliers or customers, because they perceive startups to be volatile and risky.

[53] See Total. Startupper (in Khmer).
[54] See Cellcard.
[55] Hough (2018); and Ezecom.

Figure 8: Large Companies Supporting Startups in Cambodia

Source: Author.

In addition to large companies, development partners also support the ecosystem (Figure 9). Such partners include the British Embassy, UNDP Cambodia, Swisscontact, CAVAC (funded by DFAT), Cambodia Partnership for Sustainable Agriculture (CPSA), GIZ, Konrad Adenauer Stiftung, Oxfam, Heirnich Boll Stiftung Cambodia, SwitchAsia, Cambodia Climate Change Alliance,[56]and HEKS, which have provided financial support to incubators and accelerators. All of them support tech startups that bring innovative solutions to the agriculture and environment sectors to achieve social development goals. In addition, Development Innovations (funded by USAID) and The Asia Foundation work directly with tech startups, providing training and mentorship and partnering with incubators and accelerators. Japan International Cooperation Agency and the International Labour Organization (ILO), in partnership with MoEYS, organized the Entrepreneurship Day for Youth (ILO 2020). The ILO, in partnership with CPSA, initiated the Enterprise Agriculture Cooperative Incubation Programme to promote the agriculture sector (ILO 2021). The Korea International Cooperation Agency has supported the Institute of Technology of Cambodia in operating technology and innovation incubation.[57]

[56] British Embassy, Konrad Adenauer Stiftung, Oxfam, Heirnich Boll Stiftung Cambodia, SwitchAsia, Cambodia Climate Change Alliance fund EnergyLab. See also EnergyLab.

[57] See ITC.

Figure 9: Donor Organizations Supporting Startups in Cambodia

Source: Author.

The Innovation Fund of the United Nations Children's Fund (UNICEF), a global program, has supported tech startups with innovative solutions in Cambodia (UNICEF Innovation Fund n.d.). The United Nations Industrial Development Organization (UNIDO) in cooperation with KE and TSC is promoting tech startup exposure through an awards program (Vannak 2021). Furthermore, the USAID-funded Pact Cambodia through its WE Act Program supported Impact Hub and the Young Entrepreneurs Association of Cambodia (YEAC) in accelerating startups.[58] Global Entrepreneurship Network (GEN) Cambodia,[59] in partnership with GEN Accelerates, is promoting an enabling environment for startups through policy advocacy and by organizing startup events.[60] In addition, the Mekong Business Initiative, funded by the Asian Development Bank and DFAT, is enhancing the ecosystem through activities that include organizing regional startup competitions on tourism and agriculture, and UN Volunteers supports YEAC in development of the incubation program in Siem Reap.

Many events are organized to increase awareness and promotion of tech startups, such as Startup Weekend and Barcamp. In 2019, Barcamp, in partnership with Seedstars, hosted a regional camp to increase awareness and build the capacity of startups in technology, innovation, and entrepreneurship. The event provided opportunities for tech startups to network with international investors. Seedstar also partnered with MPTC to implement Lean Launchpad, which provides skills training for mobile app development to children aged 8 to 12.[61] KE and TSC have organized many events, including training, networking, and awards, to enhance the capacity of startups. In addition to local exposure, startups can introduce themselves on the international stage through events and programs supported by the government, development partners, incubators, accelerators, and large companies. These include visits to Silicon Valley and tech giants such as Microsoft, Google, and Facebook. Startups are increasingly attracting the attention of both online and offline media who report on their activities and tech startup trends—these media include Gaek, KhmerTimes, Phnom Penh Post, and Sabay. Startup Cambodia, a newly established platform of the government, also maps the startup ecosystem in the country and provides a searchable database for startups and relevant stakeholders. A number of research think tanks and development partners have conducted research related to startups, including the Cambodia Development Research Institute, Asian Vision Institution, Swisscontact, Mekong Business Initiative, Asian Development Bank, and others.

[58] See WE Act.
[59] GEN Cambodia is an affiliate organization of Global Entrepreneurship Network based in the United States.
[60] Interview with the representative of GEN Cambodia in 2019 and 2021.
[61] Interview with the representative of MPTC in 2019.

Challenges Facing Tech Startups and Areas for Improving the Ecosystem

5

5.1 Challenges Facing Tech Startups

The interviewed startups initiated their businesses because of market opportunities, personal experiences, or working experiences. Founders come from three types of background: (i) those with no professional or business experience; (ii) employees with some years of working experience; and (iii) those that are existing entrepreneurs. Startups that are run by those with work or business experience tend to perform better as they are able to address challenges and develop a proper business strategy. The founders with no experience are mainly students.

Aside from the different technical skills required, greentech, agritech, healthtech, and edtech startups face relatively similar challenges as other sectors. There are both common and different challenges for early- and growth-stage tech startups as well as those with and without experience.

The common challenges reported by both early- and growth-stage startups include the following: (i) limited information on rules and regulations; (ii) difficulty in finding highly skilled staff, mainly in ICT and engineering, and high staff turnover because of perceived job insecurity and preference for working in large or stable companies; (iii) limited networks, a lack of qualified mentors, and weak technology support; and (iv) startups' lack of trust in mentors owing to concerns about sharing their business ideas for fear of confidentiality breach and another startup taking up their idea. Additional challenges are (v) limited digital knowledge of prospective customers and clients and the latter's unwillingness to adopt new technology; (vi) lack of cooperation or assistance from large companies that are reluctant to be business partners as they perceive startups to be new, volatile, and therefore risky; (vii) difficulty finding local manufacturers to produce the physical products—for instance, interviewed greentech startups claimed they could not find local suppliers with the digital capacity to produce their products; and (viii) lack of skills to deal with VC firms and other investors, including understanding of business valuation, legal investment issues, and the due diligence process—interviews with VC firms reveal that startups tend to overvalue their businesses.

On the other hand, startups also face different challenges depending on their particular stage of growth. Several early-stage startups reported difficulties raising funds, while those that had not, used prize money from pitching competitions and bootstrapping (from own funds or from family and friends) as seed capital. Sometimes founders work without receiving a salary, and some do not spend on office rent by working from home. Other early-stage startups have limited knowledge of financial projections and business planning, and a lack of a sound business plan typically leads to a shortage of working capital and becomes a barrier to business growth. Although included in an incubation program, early-stage startups with no professional experience have insufficient knowledge in developing a business and revenue model and inadequate business and entrepreneurship skills. However, these do not matter much for those who have experienced running a business. Investors are attracted to startups with a promising business model and a strong team.

Early-stage startups tend not to approach VC firms and instead wait for VC firms to take the initiative. This inactive approach stems from the fact that they have no idea where to approach VC firms and how much capital they need, given the absence of a business plan and financial projection. Also, some have not registered their business, which is a requirement of institutional investors.

In contrast, growth-stage startups tend to be proactive in finding venture capital; especially for first-round investment. Based on their experience of working with VC firms, startups get to know what VC firms are looking for and how they work. Unlike locally owned startups, those owned by foreigners have a broader network which makes them better equipped to access investment opportunities.

The composition of the founding team is another challenge for early-stage startups. In many cases, the team is composed of members with the same background and with no business or technical knowledge. These startups are also constrained by time and a lack of commitment to move the idea forward, especially dealing with the uncertainty of doing business. Some founders struggle to balance their work or school commitments with developing the venture.

Lacking in their knowledge of tax compliance, early and growth-stage startups indicate that they struggle also in this area. In fact, tax compliance is one of the main reasons tech startups do not register the business. Other barriers to scaling up are the small number of acceleration programs and the lack of supporting actors for growth-stage startups. Additionally, startups are also constrained by the absence of makerspace (to develop ideas, designs, and prototypes) and a culture of shame around failure (Impact Hub unpublished).

Table 12: Challenges of Tech Startups to Scale in the Startup Stage

Startup Stage	Support Programs	Source of Funds	Challenges
Ideation stage	Competition, hackathon, and pre-incubation	Bootstrapping and prize award	• Composition of founding team • Team commitment
Early stage	Incubation	Angel investors, venture capital firms, crowdfunding, and prize award (from incubation programs)	• Product–market fit • Limited technical and business skills • Limited information • Limited capital • Team commitment
Growth stage	Accelerator	Private equity, initial public offering, and crowdfunding	• Technology upgrade • Limited capital

Source: Author based on interviews.

5.2 Areas for Improvement of the Tech Startup Ecosystem

Cambodia's high youth population, the large number of internet and mobile phone subscriptions, and strong support from the government and other supporting actors give startups many opportunities for growth. However, some issues need to be addressed to build a strong ecosystem for startups to scale. This section analyzes these areas for improvement, based on the results of interviews with government agencies, incubators and accelerators, development partners, and startups in 2019 and 2021 as well as information obtained from the desk review.

Table 13: Areas for Improvement of the Ecosystem

Challenges	Ongoing Support	Stakeholders	Remaining Issues
Lack of startup policy and regulations	Rectangular Strategy Phase IV (RSIV), National Strategic Development Plan (NSDP) 2019–2023, Industrial Development Policy (IDP) 2021–2025	Royal Government of Cambodia (RGC)	No stand-alone policies or regulations for startups
	Digital Economy and Society Policy Framework (2021–2035)	RGC	
	Prakas on Management of Digital New Incentives	Ministry of Posts and Telecommunications (MPTC)	
	Science Technology and Innovation Roadmap 2030	Ministry of Industry, Science, Technology, and Innovation (MISTI)	
	Single portal for business registration	Ministry of Economy and Finance	
	E-commerce law and strategy	Ministry of Commerce	

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Table 13 *continued.*

Challenges	Ongoing Support	Stakeholders	Remaining Issues
Lack of tech and technical talent in human resources	Promote STEM in school curriculum	Ministry of Education, Youth, and Sports (MoEYS) and Ministry of Labor and Vocational Training (MLVT)	Lower number of enrollment and graduation in STEM than market demand Lack of highly skilled digital and specialized human resources
	Digital Innovation Center, Digital Tech Center, higher education institutions specialized in digital technology	Cambodia Academy of Digital Technology/MPTC	
	ICT-related training	Private training institutions	
Lack of positive role models to inspire the younger generation	Award to recognize champion entrepreneurs and media coverage	MPTC, Khmer Enterprise (KE), Techo Startup Center (TSC), Young Entrepreneurs Association of Cambodia (YEAC) and Junior Chamber of Commerce (JCI), CEO Master Club, EuroCham, and media	Limited icons and disconnect or mismatch between role models and startups
Lack of qualified mentors	Guidelines for mentors and mentor clubs	Impact Hub and SHE Investments	No concrete mentor guidelines and curriculum that can be widely used No national mentoring framework and certification The current guideline and curriculum development is still in the early and learning-by-doing stage[a]
	Develop mentoring guidelines, curriculum, and certification (expected to be completed by February 2022)	Impact Hub and UNDP	
	Mentoring curriculum for Cambodia by adopting the standard of ASEAN mentoring (in the process)	YEAC	
Tech startup directory or list of tech startups	Startup Cambodia (platform) – List startup companies in the platform	TSC	No continuous update of the number of active tech startups or startup database
Lack of investment-ready startups	Training, mentoring, coaching, and networking	Government initiative programs (KE and TSC), incubators, accelerators, development partners, and universities	Limited number of scalable startups or startups that grow fast and steadily Unregistered business and startups' limited knowledge of financial projections, market, business and revenue models, and strategies in dealing with investors

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Table 13 *continued.*

Challenges	Ongoing Support	Stakeholders	Remaining Issues
Limited large funding round due to small number of funders or private equity (PE) firms for growth-stage startups	Interest from PEs and venture capital firms (VCs) inside or outside of Cambodia	Mekong Strategic Partners, emerging markets investment advisors, Leopard, Belt Road Capital Management, and PE firms located outside Cambodia	Not many local-based PE firms (see section 4.2) Few market opportunities for investment – small number of growth-stage startups
	Initial public offering	Securities and Exchange Regulator of Cambodia	Higher requirements than startups' capacity
Limited support organizations for growth-stage startups	Training, networking, investor matching or linkage	KE, Cambodia–Japan Cooperation Center accelerator, Cambodia Investor Club accelerator, Angkor 500, SHE Investments	Most incubation programs support early-stage startups and accelerator programs for SMEs Lack of continuous or connected programs to support scaling up of growth-stage startups Lack of experts or stakeholders to provide support and resources
Lack of information on regulations, market, service providers	Startup Cambodia National Program, sharing information on regulations, stakeholders in the ecosystem, and other research studies (launched in December 2021) – targeting startups	TSC	Although publicly informed, some platforms are not widely known by startups
	KhmerSME platform, sharing information relating to regulations, market, financing, and technology. Transfer and export–import (launched in 2021)–targeting SMEs	MISTI	
	YEAC's Business Information Center and SHE Investments' Ngeay Ngai, sharing rules and regulations and other information	YEAC and SHE Investments	
Disconnect between tech startups and customers due to the low digital literacy skills	Promoting digital literacy at schools – digital skills in the curriculum and school labs for ICT literacy	MPTC, MoEYS, and MLVT, MISTI, universities and schools, Smart Axiata	Digital skills gaps in rural and urban areas and by gender–women tend to have lower digital literacy skills than men. The current literacy level of the youth does not meet labor market demands; therefore, "serious specialized training before they become efficient and productive" is required (UNDP 2020, 9)

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Table 13 *continued.*

Challenges	Ongoing Support	Stakeholders	Remaining Issues
	Promoting digital literacy, digital citizens, business, and government as addressed in RSIV, NSDP 2019–2023, Digital Economy and Society Policy Framework (2021–2035)	RGC	
	Digital literacy training for tourism sector (Sivutha 2021); promote digital literacy in e-commerce (e-commerce strategy)	Ministry of Tourism and Ministry of Commerce	
	Digital literacy and internet safety initiative training and programs; especially during COVID-19	Development partners (Heuisler 2020), Smart Axiata, SHE Investments	
Lack of culture risk or culture of shame	Promote entrepreneurship mindset	KE, incubators and accelerators	Shame around the failure and conservative approach of startups
Limited cooperation/ connection among supporting organizations	Cooperation between some supporting organizations in service provision and/or event organization	All supporting organizations	Cooperation is weak and absent a lead coordinator

ASEAN = Association of Southeast Asian Nations; COVID-19 = coronavirus disease 2019; ICT = information and communication technology; SMEs = small and medium-sized enterprises; STEM = science, technology, engineering, and mathematics; UNDP = United Nations Development Programme.

[a] Interview with the representative of UNDP in 2021.

Source: Author.

Recommendations

6

The government and other stakeholders have been active in supporting tech startups. As well, international VC firms, incubators, and accelerators have entered the Cambodian market. Although remarkable progress has been made to build the tech startup ecosystem, little attention has been focused specifically on greentech, agritech, healthtech, and edtech. Tech startups in these areas are at the infancy stage. So far, many supporting mechanisms have been introduced, including coworking space, incubation and acceleration programs, mentorship, and events, to expose startups to domestic and international markets. Also, various sources of funds have been made available to startups. However, many challenges remain, including improving the investment readiness of startups, establishing more efficient rules and regulations, creating additional information-sharing channels, deepening digital literacy, facilitating better stakeholder coordination, developing more tech talent, providing greater mentoring quality, and stimulating a richer risk-taking culture.

1. Rules and regulations: Develop a supportive regime.

i. Develop a tech startup policy or road map.
ii. Include startups in the government's overall policy agenda and in policies and regulations related to business and entrepreneurship.
iii. Expedite the sandbox regulation, and establish a startup sandbox that provides an enabling environment to test, leverage, and commercialize their innovative technologies.
iv. Expedite the regulatory framework for innovative research and development (R&D) for startups, and link R&D for startups with the industry.
v. Set up central and regional (e.g., located in special economic zones in the provinces) science, technology, and innovation (STI) parks, including parks for specific sectors, that foster knowledge spillover from established businesses to startups.
vi. Encourage universities and research institutions to spin off their tech innovations into commercial startups.
vii. Co-invest and provide investment incentives (tax incentives or risk-sharing mechanisms) to venture capital and other investment firms that invest in tech startups, particularly growth-stage startups, in priority sectors like

agriculture; in other sectors such as environment, education, and health; and in sectors that need innovative tech solutions to unlock opportunities and inclusion and create social impact, for instance, in greentech, edtech, healthtech, and inclusive fintech.

viii. Ease SERC regulations on collective investment schemes by increasing the amount of funds raised per transaction (currently $50,000) and the number of transactions per year (currently four), and introduce a prudent policy to address risk.

ix. Enhance the implementation of Prakas 102 to encourage early-stage startups to register their businesses. Consider waiving the registration fee for tech startups.

x. Develop an official and harmonized startup definition to provide clarity and coherence for policy makers and policy implementers.

xi. Foster improved interministerial cooperation by assigning clear roles to each ministry and agency for startups, and assign a leadership and coordinating role to one ministry.

xii. Develop sub-targets for the SME Bank and the Entrepreneurship Development Fund for their support of innovation and technology uptake. The sub-targets would be specific to sectors, such as greentech, healthtech, and edtech.

2. Improve and attract technical talent.

i. To attract and improve human resources, the government should explore the possibility of establishing a startup visa program, enhance incentives for capacity building of advanced tech skills, and further support STEM in the education system.

ii. Encourage large companies to allow their technical human resources to act as mentors to startups.

iii. Offer internship and apprenticeship programs with industry for students to absorb technology and learn skills.

iv. Increase the number of students enrolled in STEM subjects.

v. Promote best practice startups and showcase them to students to inspire them to work for startups.

3. Promote positive role models.

i. Continue current startup awards and exposure programs at the local and international stages.

ii. Encourage startups to apply for awards and recognition programs.

iii. Provide networking platforms and opportunities for startups and successful entrepreneurs to interact and exchange experience, knowledge, and advice.

iv. Enhance networking among startup alumni of incubators and accelerators for them to support and inspire each other.

v. Promote awareness of successful startups and showcase them to inspire students and new entrepreneurs.

4. Improve mentoring quality and increase the number of qualified mentors.

i. Improve the mentoring curriculum and methodologies used by incubators and accelerators.
ii. Certify mentors, based on rigorous criteria.
iii. Provide a platform for matching mentors and startups from which startups can select the right mentor who can meet their needs and help them grow.
iv. Establish mentor networks and allow incubators and accelerators access to the network so that mentors can be shared among startups.
v. Expand mentor training programs to increase the number of certified mentors.

5. Develop or improve the startup database.

i. Develop a comprehensive startup database—possibly by expanding the MPTC's startup database or the Startup Cambodia platform.
ii. For the database, compile a full list of tech startups from the existing the MPTC database and Startup Cambodia platform, as well as from CamDX, incubators and accelerators, business associations, and other sources.
iii. Ensure the database includes tech startups in agriculture, clean/green, education, and health sectors, as well as common areas such as fintech and e-commerce.
iv. Ensure the database is regularly updated so it can act as a current e-directory of startups.

6. Improve the investment readiness of tech startups.

i. Develop and enhance high-quality acceleration programs, possibly engaging foreign accelerator programs. Enhance sector-specific incubators and accelerators for agritech and greentech and develop (new) sector-specific incubators and accelerators for healthtech and edtech.
ii. Design connecting support programs (pre-incubation, incubation, and acceleration) instead of providing one-off programs. There should be a series of programs to support startups at different stages. Avoid broad, general training and support that do not meet specific needs.
iii. Enhance the current makerspace (to share ideas, designs, and prototypes) and R&D centers. Create a startup sandbox for testing and validating technology.
iv. Further develop incubators and accelerators and regional tech hubs in the provinces to support more tech startups from outside the capital city.
v. Provide a platform for matching investors and startups.
vi. Link startups to business development service providers, consulting firms, and tech experts.
vii. Organize regular and one-off events—such as competitions, hackathons, innovation, and tech exhibitions, locally and internationally.

7. Encourage startups to register their business.

i. Enhance the implementation of Prakas 102 to promote business registration of early-stage startups by widely disseminating the Prakas and having clear guidelines for the application of and criteria for qualified startups to avail of the incentives and support offered under the Prakas.

ii. Expedite the participation of other government agencies that oversee business for other sectors, such as MAFF and MPTC, in CamDx (online business registration). As of December 2021, only six government agencies have participated, including MoC, General Department of Taxation, MEF, Ministry of Labor and Vocational Training, Ministry of Interior, and Council Development of Cambodia.

8. Strengthen information sharing.

i. Better inform startups of the existence of current information-sharing platforms (TSC's Startup Cambodia, MISTI's KhmerSME, MEF's National Trade Repository of Cambodia, YEAC's Business Information Center, and SHE Investments' Ngeay Ngeay).

ii. Promote current information platforms among incubators, accelerators, innovation hubs, and business associations, who in turn, can disseminate the information to their startup members.

iii. Develop and promote awareness of the central platform for information sharing by moving the current platforms to one place. The central platform should be user friendly and easily searchable.

iv. Enhance the quality of information and ensure it is up to date.

v. Consider providing, on platforms, additional information such as the following:
   a. Investor mapping, including the profiles of angel investors, VC firms, and PE firms (e.g., with details on investment amounts, targeted sectors, investment criteria, and their existing investments);
   b. List of incubators, accelerators, and training institutions, including their profile, target sector, and contact details; and
   c. List of business development service providers, consulting firms, and technical experts that offer services for startups, with their profile and contact details.

9. Improve digital literacy skills.

i. Encourage the development of digital citizens, digital business, and digital government as outlined in the Digital Economy and Society Policy Framework.

ii. Further promote digital and technology access among youth by enhancing and strengthening current government programs including mainstreaming digital and technology literacy in the national education curriculum, expanding e-learning, and promoting digital adoption in business.

iii. Expand current digital literacy programs to the rural areas and increase internet quality in those areas.
iv. Establish tech hubs in the provinces for startups to test and validate innovative technology as well as impart know-how and digital skills, particularly to young people and girls and women.
v. Set digital literacy targets for women by further encouraging them to develop and apply tech in their daily work and business operations.

10. Promote a risk-taking culture.

i. Promote entrepreneurial culture by building capacity of youth entrepreneurship and encouraging an entrepreneurship mindset.
ii. Exchange knowledge and experience with international startups to promote an understanding that failure brings opportunity for betterment.
iii. Foster entrepreneurial and innovation culture through startup days, fairs, campaigns, and competitions supported by government, the private sector, and academic institutions.

11. Improve the coordination and/or connection among supporting organizations.

i. Allocate government funds to grow the ecosystem, fostering collaboration among supporting organizations such as incubators and accelerators, universities, research institutions, innovation hubs, and industry.
ii. Designate a single hub, through a new or existing entity (e.g., KE, TSC, or other), to coordinate all supporting actors in the ecosystem (e.g., government agencies, incubators and accelerators, innovation and tech hubs, information-sharing platforms, industry, research institutions, academic institutions, and investors, to work together toward strengthening the ecosystem.
    a. Provide updates on progress, challenges, and solutions.
    b. Cooperate and partner with startups from different incubators and accelerators (e.g., sharing mentors or trainers, and sharing experience and knowledge).
iii. Increase networking among government agencies, industry, and academic institutions to bring about innovation for tech startup.

Appendix: List of Respondents

No.	Organization	Name
	Government Agencies	
1	Ministry of Posts and Telecommunications (MPTC)	H. E. Kan Channmeta
2	Ministry of Industry and Handicraft (MIH)	Chhea Layhy
3	Ministry of Economy and Finance	Chea Kok Hong
4	Ministry of Commerce	H. E. Samheng Bora
5	National Bank of Cambodia	Ouk Sarat
	Incubators/Accelerators	
6	Impact Hub	Abigail Perriman
7	Techo Startup Center	Taing Nguonly
8	EnergyLab	Bridget McIntosh
9	SHE Investments	Celia Boyd
10	YEAC Incubator	Bun Sambath
	Venture Capital/Angel Investors	
11	Mekong Strategic Partners (MSP)	Kem Bora
12	Uberis Capital	William Prothais
13	Small World Venture Capital	Thul Rithy
14	OOCTANE	Tapas Kuila
15	CiC Investment	Lem Chansamrach
16	CorCo Angel Investor Network	Cheang Sopheak
	Academic Institutions	
17	National University of Management (NUM)	Stephen Paterson
18	Paragon International University	Sok Oudom Deth
19	Institute of Technology of Cambodia (ITC)	In Sokneang
20	National Institute of Posts, Telecoms and ICT (NIPTICT), under MPTC	Be Chentra

No.	Organization	Name
	Supporting Organizations	
21	Global Entrepreneurship Network (GEN) Cambodia	Sok Piseth
22	Barcamp	Be Chentra
23	Technovation Cambodia	Pen Voneat
	Startups	
	Healthtech	
24	First Womentech Asia (FWTA)	Pong Limsan
25	SpeakOut	Teng Kimsorng
26	Meet Doctor Cambodia	Tongyi, Deth, Sopharith, and Panha
	Edtech	
27	Edemy (Located in Kandal province)	Srun Sovan/Pheng Meassak
28	Sers Chborng	Siek Boromey
29	SALA (invested by Smart Axiata)	Sok Leap
30	Tos Rean	Koun Bunthorn
	Agritech	
31	E-Camfarm	Nika and Kosol
32	Agribuddy Cambodia	Andrew Durke
33	Rat Hunter	Leang Chanthy
34	Agritech Project	Lam Kimsung
35	Smart Farm Assistance	Meng Sreylin
36	ITALAB	Phon Sovatna
	Greentech	
37	Okra Solar (funded by Smart Axiata)	Louis Jolivet
38	SmartBin Cambodia	Kim Chanamrithvatey
39	SunLa	Sao Malen
40	Jisder	Lon Sochetra
	Development Partners	
41	UNDP	Nou Virak
42	Cambodia Partnership for Sustainable Agriculture	Chan Sereiratha

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Cambodia's Ecosystem for Technology Startups

Technology-based startup enterprises are an increasingly important part of the business landscape in Asia and the Pacific. By applying innovative technologies to create new products and services, they can make a significant contribution to economic development while generating social and environmental benefits. However, to survive and then thrive, tech startups require an enabling ecosystem that includes supportive government policy, adequate access to capital, skilled personnel, and quality digital infrastructure. This report assesses the current ecosystem for tech startups in Cambodia, focusing on four sectors: agriculture, education, health, and climate change. The report discusses challenges facing tech startups in these sectors and provides recommendations.

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