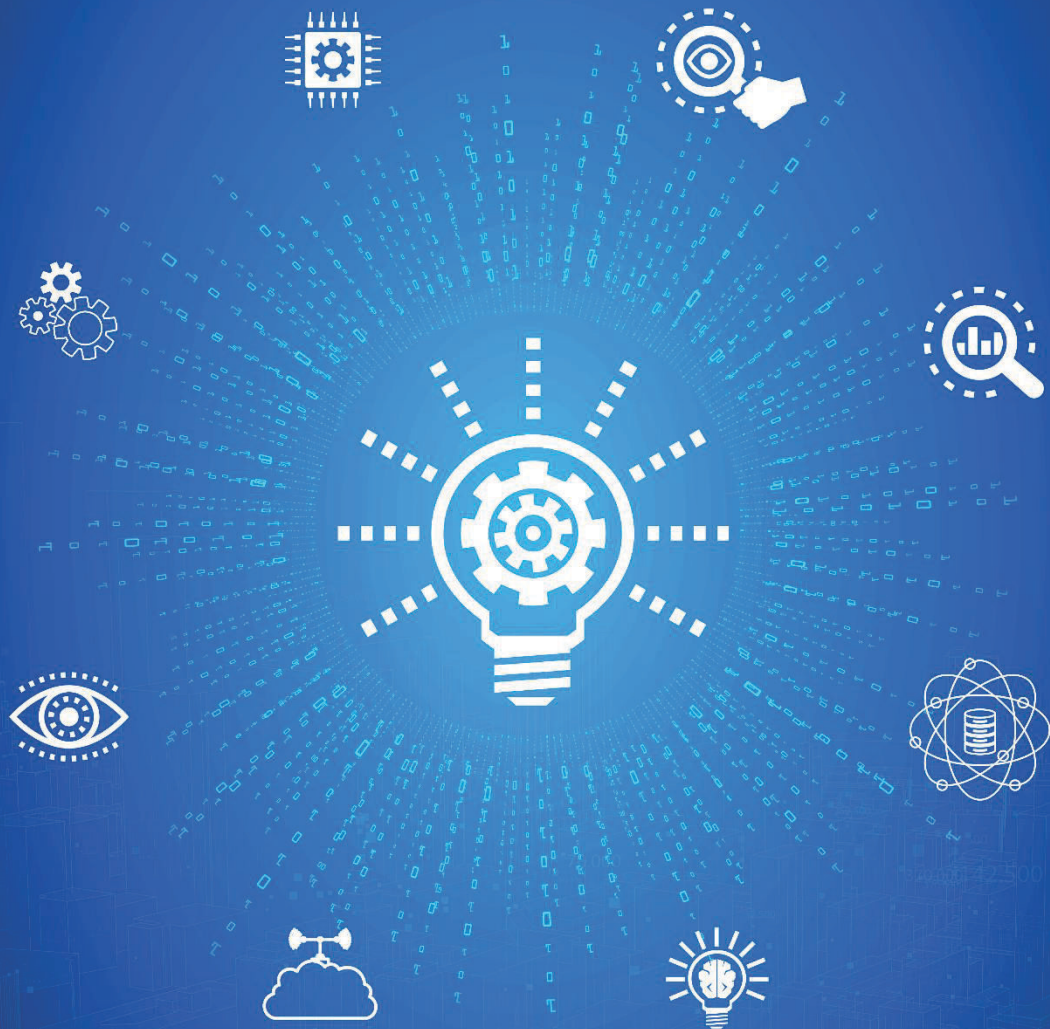


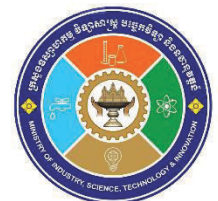
KINGDOM OF CAMBODIA
NATION | RELIGION | KING

Digital Tech Roadmap



National Council of Science,
Technology & Innovation

2023



Ministry of Industry, Science,
Technology & Innovation

Foreword

Under the visionary leadership of *Samdech Akka Moha Sena Padei Techo HUN Sen, Prime Minister of the Kingdom of Cambodia*, the Royal Government of Cambodia has demonstrated unwavering dedication and steadfast commitment to the achievement of national visions for 2030 and 2050. The government has made significant strides in fostering progress across all sectors, recognising Science, Technology and Innovation (STI) as a crucial core sector.

To advance this transformative agenda, the Ministry of Industry, Science, Technology & Innovation (MISTI) and the National Council of Science, Technology & Innovation (NCSTI) have made significant contributions by providing strategic guidance for the implementation of the National Policy on STI 2020-2030 and Cambodia's STI Roadmap 2030. During the second meeting of the NCSTI, the DigitalTech Roadmap was identified and approved as a directive national document for local and internal actors. Its purpose is to strengthen and enhance productivity in the digital sector by integrating digital technologies and offering strategic recommendations to drive diversification and value addition.

In this endeavour, I call upon the active involvement of relevant ministries, the private sector, academia, the general public, and our development partners to leverage the DigitalTech Roadmap and collectively contribute to the growth and development of Cambodia's digital landscape. By embracing digital technologies, we can empower our industries, enhance service delivery, and create new opportunities for economic prosperity and social advancement.

I would like to express my gratitude and commendation to the Steering Committee and the Sub-Committee, comprising various relevant institutions, for their unwavering dedication to developing this ground-breaking roadmap. I would also like to extend my appreciation to the leaders and officials of the General Department of STI under MISTI and the Science and

Technology Policy Institute (STEPI) of the Republic of Korea, who have been instrumental in the formulation of the DigitalTech Roadmap. *STEPI*

Phnom Penh, ១៧ July 2023
Senior Minister
**Minister of Industry, Science, Technology
& Innovation**
**and Chair of the National Council of Science, Technology
& Innovation *N.C.***



***Kitti Settha Pandita* CHAM Prasadh**

ACKNOWLEDGEMENT

The National Council of Science, Technology & Innovation (NCSTI) officially endorsed the DigitalTech Roadmap in its second meeting. This comprehensive roadmap was developed by the Ministry of Industry, Science, Technology & Innovation (MISTI), under the supervision of the General Department of Science, Technology & Innovation (GD/STI), with the invaluable support of the Science, Technology Policy Institute (STEPI) of the Republic of Korea.

First and foremost, the deepest appreciation goes to the Asian Vision Institute (AVI) and the GD/STI working group, which has worked tirelessly to research, analyse, and develop this DigitalTech Roadmap by gathering input through a series of extensive workshops and discussions with experts in the digital field, ensuring its comprehensiveness and accuracy.

A special thanks to the sub-committee members and relevant stakeholders who contributed to this effort include:

- General Department of ICT, MPTC
- General Department of STI, MISTI
- Institute of Digital Research & Innovation, CADT
- Royal University of Phnom Penh
- Department of STI Data Management, GD/STI
- Department of STI Policy, GD/STI
- Department of STI Training, NISTI
- Department of Planning Statistic and Commerce Information
- Ezecom Co., Ltd
- Quantum Engineering and Manufacturing Co., Ltd.
- Techo Startup Center
- STEP IT Academy Institute

Last but not least, heartfelt appreciation goes to the editor and translating team that reviewed, edited, and translated this document into the national language.

EXECUTIVE SUMMARY

The Digital Technology (DigitalTech) Roadmap is a strategic document that highlights the vision, goals, strategic products and services, and key technologies of Cambodia, in terms of national DigitalTech development. This roadmap aims to complement existing digital policy frameworks, roadmaps, and strategies, for the common goal of transforming Cambodia into an upper-middle-income country by 2030 and a high-income country by 2050. Given the widespread influence of DigitalTech across various industries and domains, it becomes exceptionally important to seek insights from a wide array of professionals who possess practical expertise and implicit knowledge within the local setting. Although there is a global push for digital transformation at various stages, national roadmaps for respective countries are not one-size-fits-all. Thus, a national DigitalTech Roadmap tailored to the needs of Cambodia is crucial to establishing clear steps and key milestones for the coming years.

Undoubtedly, the significance of DigitalTech in Cambodia's economy, society, and government is experiencing substantial growth. Although Cambodia's human capital and technical capacity with regard to DigitalTech is still lacking to a certain extent at the national level, there have been vast improvements over recent years, thanks to the strategic focus of the Royal Government of Cambodia (RGC). In addition, the holistic national digital transformation approach encompasses broader cultural aspects, mindsets, and behavioural patterns concerning the role of DigitalTech within society. Cambodia exhibits a high digital adoption rate, driven by its young and tech-savvy population, widespread smartphone usage, and affordable mobile data services. This has resulted in the rapid adoption of emerging technological applications on a large scale. To effectively drive digital transformation at the national level, it is crucial for the public sector, private sector, and academia to collaboratively and strategically implement their DigitalTech initiatives in a unified manner that benefits all relevant stakeholders.

This roadmap will provide a brief overview of the global and local demand, supply, and trends of DigitalTech, as well as existing digital policy frameworks and strategies moving forward. Taking into account the workshop inputs provided by sub-committee members, alongside the contextualisation of domain expertise and literature review carried out by the consulting team, the vision is established to induce DigitalTech to enhance productivity and efficiency, and to bring about innovation for socioeconomic development. This vision is underpinned by three key goals: firstly, to leverage digital literacy and Information Technology (IT) skills as a

foundation for human capital development; secondly, to diversify digital infrastructure in the national innovation system for priority sectors; and thirdly, to build a vibrant ecosystem through connectivity within digital and physical spaces. In pursuit of these objectives, strategic products and services such as digital devices, internet infrastructure, online business platforms, Science, Technology, Engineering, and Mathematics (STEM)/Digital education programmes, a digital re-skilling/upskilling programmes, public awareness events, a national data centre, and a centre of excellence have been identified. Additionally, the critical role of key technologies, including mobile devices, the Internet of Things (IoT), cybersecurity, 5G, automation systems, big data, Artificial Intelligence (AI) and machine learning, computer software, Wi-Fi 6/7, and cloud computing, cannot be understated in this transformative journey.

To ensure the successful implementation of this DigitalTech Roadmap, three key actions are recommended. These actions involve the appointment of transformational leaders who can drive change and inspire innovation, the investment in human capital development by prioritising training and skill-building, and the allocation of resources towards robust IT infrastructure to support the effective implementation and sustainability of digital initiatives.

ABBREVIATION LIST

ADB	: Asian Development Bank
AI	: Artificial Intelligence
AR	: Augmented Reality
AUS	: Australia
BAN	: Bangladesh
BHU	: Bhutan
BRU	: Brunei Darussalam
CAM	: Cambodia
CWGSTI	: Committee for Women and Girls in STI
EHRs	: Electronic Health Records
FDI	: Foreign Direct Investment
FIJ	: Fiji
GDP	: Gross Domestic Product
GI	: Global Investment
GVC	: Global Value Chain
HKG	: Hong Kong
ICT	: Information and Communication Technology
IND	: India
INO	: Indonesia
IoT	: Internet of Things
IT	: Information Technology
JPN	: Japan
KAZ	: Kazakhstan
KGZ	: Kyrgyz Republic
KOR	: Republic of Korea
MAL	: Malaysia
MEF	: Ministry of Economy and Finance
MISTI	: Ministry of Industry, Science, Technology & Innovation
MLD	: Maldives
MON	: Mongolia
MPTC	: Ministry of Post and Telecommunications
NBC	: National Bank of Cambodia
NCST	: National Council for Science and Technology

NEP	: Nepal
NSDP	: National Strategy Development Plan
PAK	: Pakistan
PHI	: Philippines
PRC	: People's Republic of China
R&D	: Research and Development
RGC	: Royal Government of Cambodia
SA	: Score Adaptation
SIN	: Singapore
SNEC	: Supreme National Economic Council
SRI	: Sri Lanka
STEM	: Science, Technology, Engineering, and Mathematics
STI	: Science, Technology, and Innovation
TAP	: Taipei, China
THA	: Thailand
TTC	: Technology Transfer Centre
VIE	: Viet Nam
VR	: Virtual Reality
WTO	: World Trade Organisation

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1. Introduction

1.1. Background

The digital revolution has transformed society and economics since the late 1980s. First came the emergence of a connected economy, marked by widespread Internet use and the deployment of broadband networks. A digital economy eventually developed as a result of an increase in the use of platforms as business models for the provision of products and services. The current trend is towards a digitalised economy, in which all economic, social, and environmental aspects incorporate digital technologies into production and consumption models (ECLAC, 2021).

In Cambodia, since the beginning of the COVID-19 pandemic in 2019-2020, the country has been pushed to its limits to utilise digital technologies in ways that were never done before in the Kingdom. Despite the hardships and complications over the last few years, Cambodia showed its resiliency and adaptability by adopting DigitalTech applications and platforms at exponential rates. The finance, e-commerce, and education sectors have transformed significantly, to name a few. The way that we communicate and interact with each other as individuals, organisations, and nations, has undergone a revolutionary paradigm shift, impacting all aspects of work and life. In hindsight, only an extreme situation, such as a global pandemic with forced lockdowns and social distancing, would create the rare opportunity for a developing country such as Cambodia to leapfrog in terms of digital adoption and maturity. Reflecting on the past five years, considering the principles of digital transformation, the evolution of digital culture, workforce, and technology, in Cambodia has been remarkable.

To achieve Cambodia's ambitious, yet attainable goals of economic development, the Kingdom will have to strengthen its understanding and capability in the field of DigitalTech. The utilisation of DigitalTech does not only involve individuals with IT or Computer Science/Engineering backgrounds, but all members of the society. As long as individuals are connected to the Internet or use mobile devices such as computers and phones, they are all considered part of the digital economy and society as consumers, operators, service providers, regulators, and more. Consequently, the roles and responsibilities of utilising digital technologies extend far beyond the demographic of IT experts. Cambodia significantly reinforced its digital transformation journey in 2018 by introducing the specific strategy commonly known as Rectangular Strategy Phase IV for "Growth, Employment, Equity, and

Efficiency: Building the Foundation Toward Realising the Cambodia Vision 2050” (MFAIC, 2018). Immense development pressure to find improved and alternative sources of economic growth propelled this digital economy ambition, while looking to achieve the goal of becoming an upper-middle-income country by 2030 and a high-income country by 2050. In response to this target, the RGC of the 6th legislature of the National Assembly stated its aim to transform the country into a digital economy by 2023 by initiating and establishing relevant strategies, policies, and regulations for digital transformation purposes (Chan, 2021).

Emerging digital technologies involving AI, Big Data, Blockchain, IoT, and 5G, are rapidly transforming people’s lives all around the world. As such, digital transformation at the national level is inevitable, in order to enhance efficiency, increase productivity, reduce costs, and improve quality of life. However, the valuable potential of these advanced technologies is often mystified and overcomplicated by buzzwords and misconceptions, associated without much understanding or contextualisation. Looking at the big picture, one must not get distracted by fancy terminologies, in order to fully understand the true meaning of “digital transformation” and its fundamental precursors, “digitisation” and “digitalisation” (Katuu, 2022).

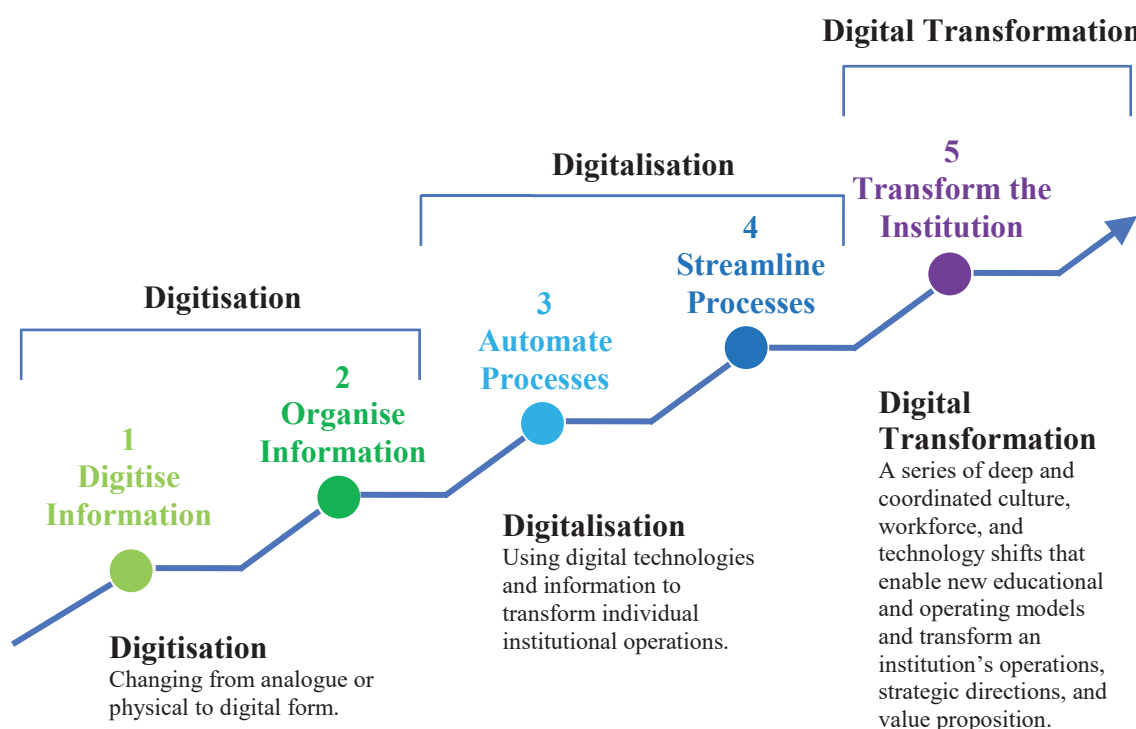


Figure 1: Digitisation, Digitalisation, and Digital Transformation

“Digitisation” is the conversion of analogue or physical information into digital representation, such as scanning a paper document – this physical object is converted into a digital file

accessible and organisable on a computer. Moreover, “*Digitalisation*” is the automation and streamlining of analogue processes and operations into digital, such as making mobile payments with a phone – instead of paying with physical cash money, transferring money instantaneously from one bank account to another via the Internet. Finally, “*Digital Transformation*” is the overall process of transforming an institution by utilising digital technologies, taking into consideration paradigm shifts in culture, workforce, and technology (Katu, 2022). In this case, the digital transformation of Cambodia would imply the strategic process of leveraging DigitalTech applications and platforms, to reach the socioeconomic goals of the nation.

1.2. Rationale

In Cambodia, where "Industry 4.0" is quickly emerging, the demand for advanced digital technologies is greater than ever. Digital technologies encompass a wide range of tools, including online resources, systems, programmes, apps, and various electronic devices like laptops, tablets, and mobile phones. These technologies serve multiple purposes, enabling electronic, social, mobile, analytics, cloud, and security services. Specifically, they include Blockchain, IoT, and radio-frequency technologies, as well as an assortment of digital tools, systems, devices, and resources responsible for generating, storing, or processing data. This data encompasses elements such as social media, online games, multimedia, and mobile phones, shaping the landscape of digital transformation (Sun, 2023). In order to fuel the digital transformation of Cambodia with the vision of becoming an upper-middle-income country by 2030 and a high-income country by 2050, a National DigitalTech Roadmap is of paramount importance. A National DigitalTech Roadmap is a visual document that reflects the digital transformation strategy of the country – the goals, initiatives, and enhancements in DigitalTech, to strive for a high-performing and digitally-driven country. This DigitalTech Roadmap will be a core visual plan for Cambodia in order to achieve the goals stipulated in a variety of digital policies and frameworks of the country, whereas its aim is to provide a well-rounded and balanced strategy for Cambodia to adopt, in terms of technical capacity development and policy options.

1.3. Objective and Scope

The objective of the National DigitalTech Roadmap is to establish an outline distinct developmental stages, and identify key technologies for Cambodia's digital transformation journey. The scope of the National DigitalTech Roadmap includes:

- **Vision Building:** Formulating a clear and inspiring vision to guide the digital transformation process in Cambodia.
- **Environment Analysis:** Conducting a comprehensive analysis of the existing digital landscape, identifying opportunities and challenges that will influence the transformation journey.
- **Strategic Products/Services driven by Innovation:** Creating innovative and impactful products and services that align with the strategic goals of the roadmap.
- **Key Technologies with Short-, Medium-, and Long-Term Goals:** Identifying essential technologies and setting specific goals for their integration across different timeframes.

The roadmap's comprehensive framework offers guidance for relevant organizations, aiding them in contributing effectively to Cambodia's overall digital transformation endeavours.

2. Demand, Supply and Trends of DigitalTech

2.1. Global Trends

According to McKinsey Technology Trends Outlook 2022 (McKinsey, 2022), report identified 14 most significant technology trends today and defined the next decade follow. The majority of these 14 technologies were defined by their common features: *Digital Technologies and Support Infrastructure*. The research team collected data on five tangible measures of activity: search engine queries, news publications, patents, research publications, and investments. For each measure, a defined set of data sources was used to find occurrences of keywords associated with each of the 14 trends, screen those occurrences for valid mentions of activity, and index the resulting numbers of mentions on a 0–1 scoring scale that is relative to the trends studied. The innovation score combines the patents and research scores; the interest score combines the news and search scores. Investment measures the flows of funding from the capital markets into companies linked to the trend. Data sources for the scores include the following:

- Patents – Data on patent filings are sourced from Google Patents
- Research – Data on research publications are sourced from the Lens (www.lens.org)
- News – Data on news publications are sourced from Factiva
- Searches – Data on search engine queries are sourced from Google Trends
- Investment – Data on market capital raises are sourced from PitchBook.

Result of research reported the state of each trend, by scoring for innovation (based on patents and research) and interest (based on news and web searches) as showing in Figure 2. Report also counted investments in relevant technologies and rated their level of adoption by organisations in Table 1.

Table 1: Summary of the Technology Trends Outlook Report (McKinsey, 2022).

Technology Trend	GI	SA
Applied AI: involves the use of machine learning models to automate tasks, improve capabilities, and enhance decision-making by solving classification, prediction, and control problems.	\$165 billions	4

<p>Advanced connectivity: such as 5G/6G cellular, low-power wireless networks, low-Earth-orbit satellites, and others, provide a multitude of digital solutions that have the potential to significantly enhance growth and productivity across various industries.</p>	\$166 billions	4
<p>Future of bioengineering: entails the convergence of biological and information technologies, which has the potential to revolutionise the healthcare industry, enhance human performance, transform food value chains, and lead to the development of innovative products and services.</p>	\$72 billions	3
<p>Future of clean energy: revolves around the adoption of sustainable solutions that contribute to achieving net-zero greenhouse gas emissions throughout the energy value chain. These solutions encompass various aspects such as power generation, storage, and distribution.</p>	\$257 billions	2
<p>Future of mobility: is focused on advancing technologies that enhance the efficiency and sustainability of transporting people and goods, both on land and in the air. These innovations aim to revolutionise transportation, making it more environmentally friendly and resource-efficient.</p>	\$236 billions	2
<p>Future of sustainable consumption: entails leveraging technology to transform both industrial and individual consumption patterns, with the goal of mitigating environmental risks, such as climate change. This shift involves adopting more eco-friendly practices and products to promote a more sustainable and responsible approach to consumption.</p>	\$109 billions	2
<p>Web3: refers to a paradigm of platforms and applications that facilitate the transition to a decentralised internet. It is characterised by open standards and protocols that prioritise the protection of digital ownership rights, granting users increased control over their data. This movement towards Web3 not only empowers individuals</p>	\$110 billions	1

with greater ownership of their digital assets but also sparks the emergence of novel business models.

Industrialising machine learning: involves the utilisation of software and hardware solutions to expedite the development and implementation processes. It also supports vital aspects such as performance monitoring, stability, and continuous improvement. By incorporating these advancements, machine learning becomes more scalable, efficient, and reliable in various industrial applications.

Immersive-reality technologies: employ sensing technologies and spatial computing to enable users to perceive the world in unique ways. This can be achieved through mixed or augmented reality, where users experience an enhanced version of reality, or through virtual reality, where users are transported to an entirely different world.

Cloud and edge computing: pertain to the distribution of computing workloads across remote data centres and local nodes. This approach aims to enhance various aspects such as data sovereignty, autonomy, resource productivity, latency, and security.

Trust architectures and digital identity: enable organisations to establish, expand, and uphold trust among stakeholders in the utilisation of their digital products and services. These architectures facilitate secure and reliable access to data and other digital assets, while also safeguarding against unauthorised access or breaches.

Future of space technologies: encompasses remarkable advancements and significant cost reductions in satellites, launchers, and habitation technologies, opening up avenues for ground-breaking space operations and services.

\$5 billions 1

\$30 billions 1

\$136 billions 4

\$34 billions 2

\$12 billions 2

<p>Quantum-based technologies: hold the potential to unleash an exponential surge in computational performance for specific problems, revolutionising networks by enhancing their security and resilience.</p>	\$3 billions	0
<p>Next-generation software development: facilitate the creation of software applications, enhancing processes and elevating software quality. These tools encompass AI-enabled development and testing, as well as low-code or no-code platforms, streamlining the development process and empowering developers to create innovative solutions.</p>	\$2 billions	1

GI: Global Investment received in year 2021. SA: Score Adaptation (0 = None, 5 = Mainstream).

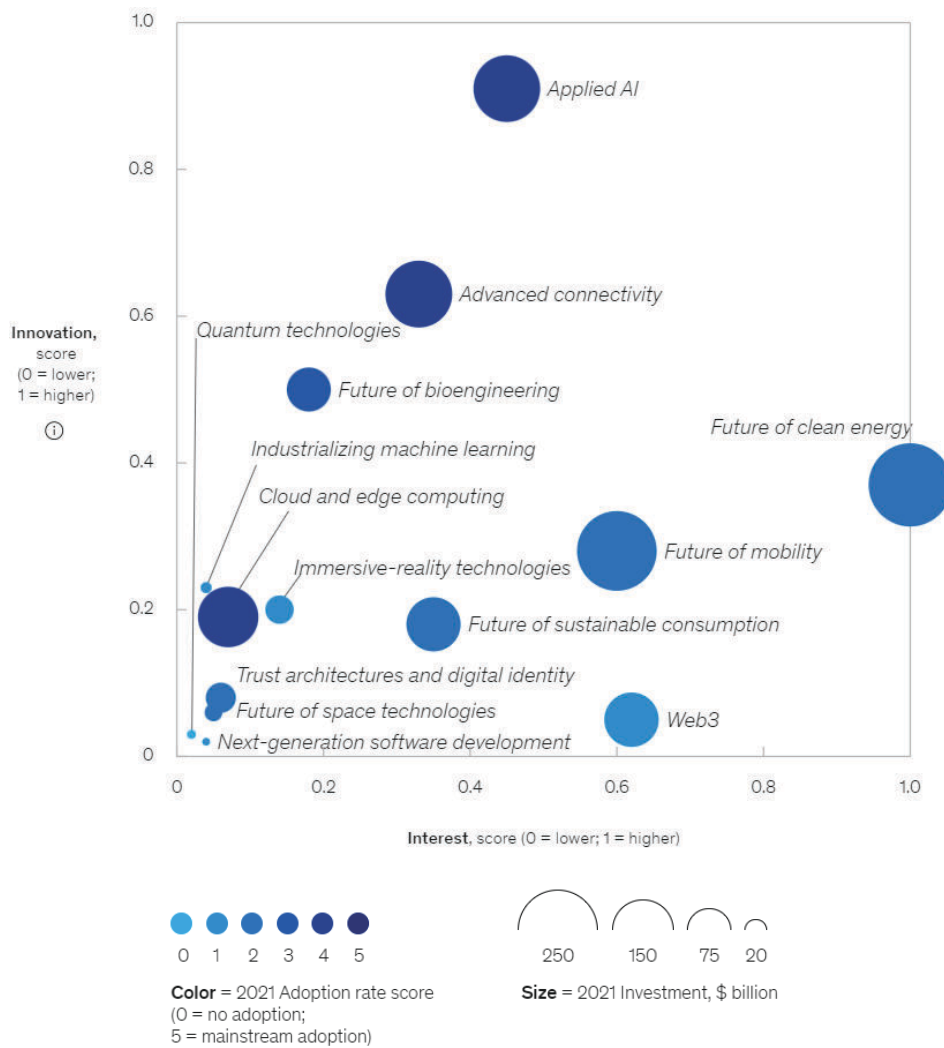


Figure 2: Technology Trends Identified by McKinsey (McKinsey, 2022).

Services have become the backbone of the global economy. In 2019, services accounted for about two-thirds of both global GDP and FDI and provide the majority of employment (WTO, 2020). According to a report by Oxford Economics and Western Union Business Solutions in 2020 (WesternUnion, 2020), the value of international trade in services is expected to rise from \$6.1 trillion in 2019 to \$8.0 trillion by 2025. This would account for approximately one-third of the total global flows over this period. Additionally, the World Trade Organisation projects in 2019 indicate that the share of services in global trade is expected to expand by 50% by the year 2040.

Asia is the second-largest trader of digital services, with this trading segment growing faster than in other parts of the world. In 2020, amid the COVID-19 pandemic, year-on-year growth of trade in digital services in Asia and the Pacific remained resilient at a 1% increase, while other services (global tourism, travel, and distribution sectors) plummeted 38% (Liberatore, 2022). In recent years, the sectors contributing the most to Asia's growth in digital services trade are other business services and telecommunications, and computer and information services. Some Southeast Asian economies have also been driving expansion in digital services trade by posting rapid growth in digital exports, as in Cambodia, the Lao People's Democratic Republic (Lao PDR), and the Philippines. Emerging areas of further growth include e-commerce, digital transactions, demand for automation, and the remote delivery of services.

2.2. Overview in Cambodia

The Asian Development Bank (ADB) estimated that Cambodia technologies and digital businesses achieved \$470 million in revenue for 2019, according to the Asian Economic Integration Report 2021. There was an uptick in cashless payments in Cambodia, especially during the global COVID-19 pandemic, as well as the growth of financial technology (FinTech) adaptation and a push by the government for her citizens to go cashless for safety and health reasons. Broken down by sectors, e-commerce, e-service, digital media, advertising technology, transportation, and online travel accounted for 27.60%, 7.80%, 10.20%, 12.70%, 3.80%, and 37.90%, respectively. According to the National Bank of Cambodia (NBC), the market demand in Cambodia stands at approximately \$29.6 billion collectively, of which only about \$5.7 billion is filled by digital financial applications (ADB, 2021).

As of 2019, Cambodia had a young population, between the ages of 15 and 35, of about 5.69 million persons, of whom 2.88 million were women, equivalent to 36.59% of the total population and 55.97% of the total working-age population (15-64 years). This young demographic dividend is a main driver of the advancement of the DigitalTech and digital economic transformation in society through the adoption of technologies for both socioeconomic development and self-development following global trends. Cambodia is also one of the ASEAN countries, a vibrant region with large economies that is increasingly becoming an attractive destination for the development of regional and global value chains (SNEC, 2021).

As of January 2021, the number of mobile phone subscriptions across Cambodia's six operators was 21.18 million, having increased by 0.8% from the same time last year. This figure was equivalent to 125.8% of the total population of Cambodia, implying most citizens of Cambodia have multiple mobile phone subscriptions from different operators. Additionally, the number of internet users reached 8.86 million, with an increase of 1.1 million between 2020 and 2021. The internet penetration rate accounts for 52.6% of the total population. Cambodian internet users prefer to use mobile phones for accessing the internet, which is reflected in Digital 2021. Among all devices, mobile phones accounted for 52.0%, laptops and desktops for 45.9%, and tablet computers for 2.2% of total web traffic (Kemp, 2021).

Developments in IT and digitalisation have been responsible for the growing importance of trade in services. Digitalisation cuts dramatically costs and lowers barriers-to-entry, facilitating a wider range of services to be traded. Given social distancing and travel restrictions during the COVID-19 pandemic, the adoption of DigitalTech was accelerated even more as companies expanded their online presence and consumers adopted new habits, especially in the health, education, telecommunications, and audio-visual service sectors (WTO, 2020).

In Asia and the Pacific, digital services are an important component of total foreign investments. Even in Asia's digital services, the reinforcing relationship of Global Value Chain (GVC) and FDI is apparent. Cambodia (CAM) featured both a high FDI presence and a high GVC participation in digital service sectors, as shown in Figure 3. Growing FDI in those sectors could improve regional trade with integration to international production networks through various channels. Advancements in information and communication technologies and digital

platforms have reduced distance-based barriers in goods and services trade and allowed firms and businesses to integrate into global supply networks (ADB, 2021).

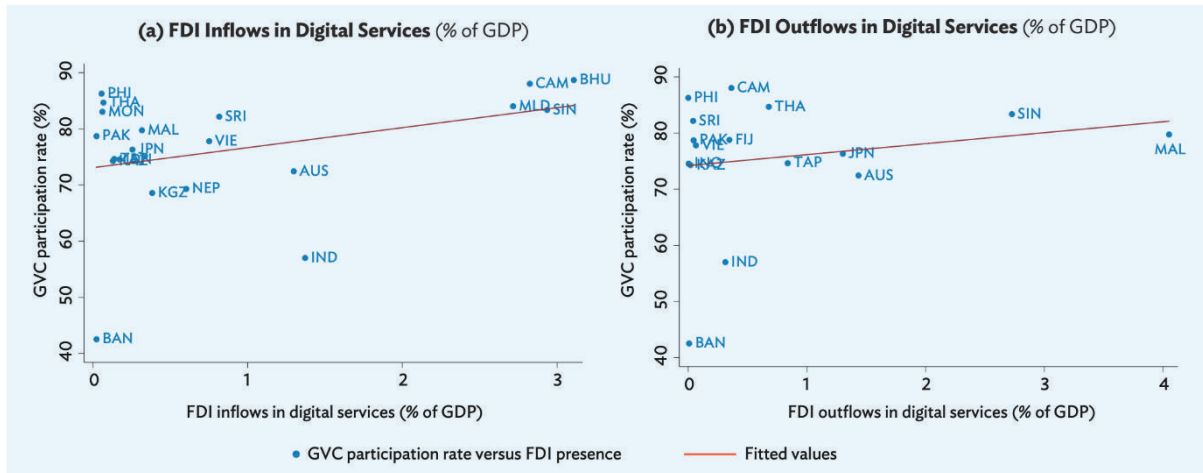


Figure 3: Scatter Plots on GVC participation and FDI—Asia and the Pacific, 2020: Asian Economic Integration Report (2022).

3. Government's supports on Digital

RGC has recognised the importance of DigitalTech and its potential to drive economic growth and development in the country. As with all other instances of innovation throughout history, the private sector moves first, and policy follows afterwards. This premise resonates even more so in the field of DigitalTech, where Moore's law (Thompson, 2006) applies – the number of transistors on a microchip doubles every two years. This phenomenon implies that computing capabilities are growing accordingly, advancing the evolution of DigitalTech applications at rates that are increasingly difficult for policies to catch up with. By the time legislative processes are complete, most technology-related policies are already obsolete, due to rapid updates and iterations of products and services. Nonetheless, policymakers are tasked with the challenging responsibility of establishing visions, policies, and strategies based on their experience, expertise, and foresight.

The digital sector has become a key driver of economic growth in Cambodia, with the government recognising its importance and taking steps to develop policy and regulatory frameworks to support its development. The Cambodian government has enacted laws related to e-commerce, cybercrime, and telecommunications and has also developed national policies related to information and communication technologies (ICT) and digital payments. These frameworks aim to provide a legal and regulatory environment that supports the growth of the digital sector and promotes innovation and entrepreneurship while also protecting the rights of consumers and businesses operating in the online space. Additionally, the government has implemented initiatives to increase access to ICT and promote the adoption of digital technologies, including the establishment of a National ICT Policy. These frameworks aim to create a safe and secure online environment for all stakeholders and ensure that the digital sector continues to contribute to Cambodia's economic growth.

3.1. Overarching Policy Frameworks

Cambodia's national development strategy for the period of 2019-2023, known as the Rectangular Strategy Phase IV (MFAIC, 2018), seeks to build upon the successes of its previous three phases and propel Cambodia towards becoming an upper-middle-income country by 2030 and a high-income country by 2050. The Rectangular Strategy Phase IV focuses on four key pillars:

- i. Human Resource Development: (a) strengthening the quality of education, science, and technology; (b) Enhancing public health and nutrition; (c) improving vocational training; and (d) civilising gender equality and social protection.
- ii. Economic Diversification: (a) improving the logistic system and enhancing transportation, energy, and digital; (b) ensuring readiness of the digital economy and industrial revolution 4.0; (c) developing the key and new source of growth; (d) promoting banking and financial development.
- iii. Private Sector and Job Development: (a) attracting foreign investment and creating jobs; (b) spreading out and instigating the public private partnership; (c) promoting small and medium enterprises and entrepreneurship; and (d) enhancing competition.
- iv. Inclusive and Sustainable Development: (a) promoting the agriculture sector and rural development; (b) strengthening urban planning and management; (c) intensifying the sustainable management of natural resources and culture; and (d) ensuring environmental sustainability and a pre-emptive response to climate change.

The Rectangular Strategy Phase IV recognises the importance of DigitalTech and innovation in driving economic growth and social development. The government plans to promote the development of the digital economy, expand internet access, and improve digital literacy. It also aims to enhance cybersecurity and data protection. The National Strategy Development Plan (NSDP) 2019-2023 (RGC, 2019) provides a comprehensive framework for implementing the Rectangular Strategy Phase IV in Cambodia. By aligning development efforts around the four pillars of the strategy, and focusing on specific targets and indicators, as well as a range of cross-cutting issues, such as DigitalTech and innovation, gender equality, and climate change.

3.2. Digital Related Policies

Digital-related policies vary from country to country, as they are influenced by a range of factors such as the country's level of economic development, political system, and cultural norms. Cambodia has developed a number of digital policies in recent years to promote the growth and development of its digital economy. The digital economy is regarded as one of the key drivers of growth. The Cambodia Digital Economy and Society Policy Framework 2021-2035 (SNEC, 2021) sets policy measures to (a) develop digital infrastructure focusing on digital connectivity, financial technology infrastructure and digital payment systems, and logistics and last-mile delivery; and (b) build trust and confidence in digital systems focusing

on responsive and effective legal frameworks and strengthening digital security management. There are 82 policy measures to strengthen the three pillars, including (a) building digital citizens focusing on digital leadership, pools of talents, and digital citizens, (b) building digital government focusing on digital government and public services, keys to boosting digital performance, and data-driven governance in the public sector, and (c) enabling digital businesses focusing on enterprise transformation, entrepreneurial and start-up ecosystems, and the digital value chains.

The Cambodia Digital Government Policy 2022-2035 (MPTC, 2022) aims to achieve ten goals, namely (a) establishing and improving digital connectivity infrastructure, (b) establishing digital payment system infrastructure for public services, (c) strengthening digital security infrastructure, (d) developing postal service infrastructure, (e) organising digital government governance, (f) digitalising government and public services, (g) developing digital human capital, (h) promoting digital research and innovation, (i) promoting collaborations with DigitalTech companies, and (j) promoting digital start-ups.

To promote and accelerate the development of science, technology, and innovation in Cambodia, the National Policy on STI 2020–2030 (NCST, 2019) was developed. The policy sets out several key goals, including developing and strengthening adequate Science, Technology, and Innovation (STI) human resources, enabling national research and development, developing and strengthening a dynamic innovation ecosystem, and instilling in society an STI culture in an inclusive manner. Additionally, Cambodia’s STI Roadmap 2030 (MISTI, 2021) has been established and covers the digital sector as one of its key areas of focus. One of the key goals of the roadmap is to increase access to affordable and high-quality digital infrastructure and services across the country. This includes expanding broadband internet coverage, promoting the development of digital applications and services, and encouraging the adoption of digital technologies in both the public and private sectors. The roadmap also emphasises the importance of developing a skilled workforce that is capable of driving innovation and growth in the digital sector. This includes promoting STEM education and training programmes for digital professionals and encouraging the recruitment and retention of talented individuals in the sector.

Besides, the priority themes to be explored in Cambodia have been defined in the National Research Agenda 2025 (MISTI, National Research Agenda 2025, 2023), where DigitalTech is the spine supporting the eight identified research missions such as local food, reliable energy supply, quality education, electronic and mechanical spare parts, cloud-based services, electricity and potable water, carbon neutrality, and digitally-enhanced health. Specifically, cloud-based service is one of the priority themes that heavily relies on DigitalTech to provide scalable, efficient, and secure solutions. DigitalTech enables the creation and maintenance of robust cloud infrastructure, allowing organisations to store and access data remotely. It facilitates the development of cloud computing platforms, enabling seamless sharing and collaboration, data backup, and disaster recovery. With DigitalTech as the backbone, cloud-based services offer numerous benefits, such as improved data accessibility, cost efficiency, and enhanced productivity. The necessary elements to achieve the research mission of cloud-based services are legal and policy frameworks, human resources, infrastructure, and collaboration. In addition, DigitalTech is also strongly involved in digitally-enhanced health to transform healthcare delivery and improve patient outcomes. Digital solutions such as telemedicine, electronic health records (EHRs), and health monitoring devices are integral to digitally-enhanced health initiatives. Telemedicine leverages digital technology to provide remote consultations, enabling patients to access healthcare services from any location. EHRs digitise patient records, enabling seamless data sharing among healthcare providers, reducing errors, and improving care coordination. Health monitoring devices, powered by digital technology, collect real-time health data, allowing for personalised interventions, early detection of health trends, and proactive disease management. The research areas prioritised for funding under this digitally-enhanced health mission include: 1) health education and prevention; 2) diagnosis; 3) medical treatment devices for patient monitoring; and 4) accessibility, health administration, and insurance. The role of DigitalTech in supporting cloud-based services and digitally-enhanced health will continue to grow. Ongoing research and innovation within these priority themes will further harness the power of DigitalTech to drive advancements, improve efficiencies, and enhance outcomes in areas such as data storage, accessibility, collaboration, remote healthcare, personalised medicine, and health data analysis.

Additionally, the Mapping Research and Innovation in the Kingdom of Cambodia (MISTI, 2023) highlights Cambodia's strong commitment to using STI as a driving force for sustainable and inclusive development. The government is determined to achieve its ambitious vision for 2030 and 2050 by investing in STI and involving various stakeholders, such as the public and

private sectors, higher education and research institutions, and civil society. To support these efforts, based on these developments and the report's analysis, the following recommendations are proposed as priorities: 1) Continuously invest in and strengthen the STI system, introducing missing components and enhancing existing institutions; 2) Establish a “Committee for Women and Girls in STI” (CWGSTI) to promote and empower women in STI and engineering; 3) Create research and development (R&D) and innovation funds aligned with the upcoming Technology Transfer Law to support research and innovation in Cambodia; 4) Improve and evaluate existing STI instruments and infrastructure; 5) Foster dynamic regional and rural innovation systems by encouraging partnerships and collaborative projects; 6) Facilitate the creation, diffusion, and utilisation of knowledge, technology, and innovation by promoting new and existing innovation intermediaries and service providers; 7) Implement a diaspora programme; 8) Invest in the development of quality, metrology, and standardisation infrastructure, offering internationally recognised certification across sectors; 9) Establish a national Technology Transfer Centre (TTC); 10) Enhance STEM curricula to cultivate high-level capabilities and skills among students; and 11) Implement measures to attract girls to STEM subjects and increase women's participation in research and STI-driven entrepreneurship.

Aside from the previously mentioned ministries, most of the other government ministries and agencies in Cambodia are also developing or already implementing their own digital transformation strategies. To elaborate, they are either developing their own internal strategies for digital transformation or complying with the digital government strategies laid out by the RGC, with support from MEF and MPTC. Each government ministry or agency has been tasked to establish their own digital transformation units to implement varying levels of digital transformation based on their technical capacity and financial budget.

To effectively implement the policy frameworks, it is important to identify policy challenges and gaps essential for DigitalTech applications, develop policy support mechanisms or ecosystems, support strategic products and key technologies that meet the needs of the rapidly evolving industries, and better align and build synergies between the existing policies and strategies relevant to the digital economy, society, and government.

4. Technology Roadmap Development Process

The digital transformation of Cambodia is a crucial step towards the country's economic and social development. To reach this, a well-planned and comprehensive national DigitalTech Roadmap is necessary, which presents a pathway to drive the digital transformation of Cambodia at the individual, organisational, and national levels. Although the presence of DigitalTech applications is growing rapidly across all sectors, they are fragmented for the most part. As such, a national DigitalTech Roadmap with clearly established steps is essential for the Kingdom to consolidate all initiatives and efforts in a synergistic approach. The roadmap will include fundamental stages and objectives that the government, private sector, and academia should strive towards in terms of DigitalTech development. By having a common vision and achievable goals in the context of Cambodia's current environment analysis, strategic products and services and key technologies can be extrapolated for the roadmap.

Figure 4 shows the five steps to developing a comprehensive DigitalTech Roadmap for Cambodia. The first step is to define a vision and goals for the digital sector in Cambodia for the next eight years. This includes identifying the essential technologies required to develop the sector globally and contribute to the growth of the national economy. The second step involves conducting an environmental analysis that considers social, technological, economic, environmental, and political concerns. This analysis will help identify drivers, opportunities, and threats in the DigitalTech sector. In the third step, potential functions, strategic products, and services are identified. The expert committees then score the priority products and services to determine the final selection. The fourth step involves identifying key technologies that can drive the DigitalTech Roadmap vision building for Cambodia. Again, the expert committees rank the important technologies to choose the priority key technologies. Finally, a technology roadmap is charted with timeframes ranging from short to long-term. This roadmap will provide a clear and concise plan for the government, private sector, and academia to work towards achieving the digital transformation goals of Cambodia with innovation as the foundation.

These five steps provide a structured and systematic approach to developing a comprehensive DigitalTech Roadmap for Cambodia. By following these steps, Cambodia can create a thriving digital ecosystem that benefits all its citizens and contributes to the country's economic and social development.

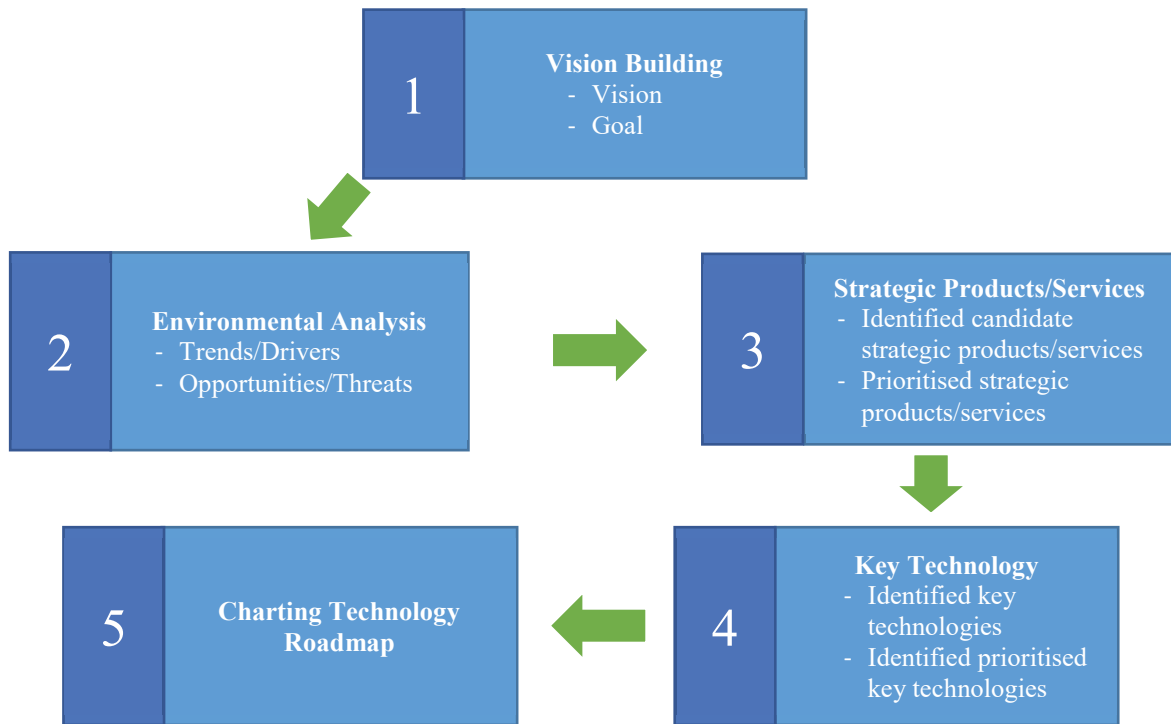


Figure 4: National DigitalTech Roadmap development process

5. DigitalTech Roadmap Development

5.1. Vision and Goal

Vision:

To induce DigitalTech to enhance productivity and efficiency and to bring about innovation for socioeconomic development.

Goals:

- 1) Leverage digital literacy and IT skills as a foundation for human capital development;
- 2) Diversify digital infrastructure in national innovation system for priority sectors; and
- 3) Build vibrant ecosystem through connectivity within digital and physical spaces.

5.2. Environment Analysis

The use of STEEP analysis to identify drivers of DigitalTech is a useful approach to understanding the broader societal and environmental factors that can influence the adoption and diffusion of digital technologies. Table 2 outlines how the vision and goals are aligned with the environmental drivers, opportunities, and threats.

Specifically, one of the key factors to consider in the environmental analysis is the social environment. Social factors are crucial in achieving the vision of promoting economic growth and development as well as ensuring equality and inclusivity in society. The level of digital literacy and the acceptance of DigitalTech in society can impact the adoption and success of the vision. Furthermore, it is critical to consider how digital technologies impact employment and societal norms. Youth, employment, skills development, adequate skills and understanding of the benefits of technology, increased participation of women, advanced knowledge of digital skills in rural areas, and lifelong learning opportunities for all age groups are among the drivers identified by experts, providing policymakers and stakeholders with valuable insights in promoting sustainable and inclusive development.

Additionally, the technological environment is influenced by a range of factors, including mobile and internet technologies, e-commerce, artificial intelligence, research and development, infrastructure and accessibility, and grid development to support technology adoption. The availability of digital infrastructure and access to technology can impact the ability to achieve the vision. For instance, regions with better internet connectivity and

advanced digital infrastructure are likely to be more successful in leveraging DigitalTech to enhance productivity and efficiency.

In analysing the situation, it is essential to consider the economic environment. The drivers of economic growth, which have been extensively discussed, include the emergence of tech start-ups, increased foreign investments, the proliferation of digital businesses, the advent of e-banking and e-payment systems, greater access to funding for innovation and new technology solutions, expanded possibilities for connecting with investors, and the availability of funding opportunities from government and international organisations. All of these factors play a crucial role in shaping the economic environment of a DigitalTech Roadmap, and should be taken into account when developing a strategy for its implementation.

Environmental factors should not be overlooked in the analysis. The environmental impact of DigitalTech, including its carbon footprint, waste generation, and resource depletion, should be considered. While DigitalTech has the potential to enhance productivity and efficiency, it can also contribute to environmental degradation. Therefore, sustainable practices must be incorporated into the use of DigitalTech.

Political factors such as government policies, regulations, and political stability also affect the investment in and adoption of DigitalTech. Governments can create an enabling environment by implementing policies that promote the adoption of DigitalTech. Some of the key political factors that can influence the digital sector are:

- **Policies and Legal Frameworks:** The government's policies and legal frameworks related to DigitalTech can have a significant impact on the industry's growth and success. Examples of such policies and frameworks include the National Policy on STI 2020-2030, Cambodia Digital Economy and Society Policy Framework 2021-2035, Cambodia's STI Roadmap 2030, and the National Research Agenda 2025.
- **Stable Political Situation and Supportive Political Environment:** A stable political situation and supportive political environment that encourages the development and adoption of DigitalTech can attract investors and create a conducive business environment.

- **Transparent and Clear Legislation:** Clear and transparent legislation related to DigitalTech can provide clarity for investors and reduce uncertainty. This legislation can cover areas such as data protection, intellectual property, and cybersecurity.
- **Benefits for Investors and Implementers of Tech Solutions:** Governments can provide benefits and incentives for investors and implementers of tech solutions to encourage investment in DigitalTech. Examples of such benefits include tax support, legal support, and other financial incentives.
- **Digital Government Tools and Opportunities:** Digital government tools and opportunities that ensure easy and fast services for citizens can create demand for DigitalTech and encourage its adoption. Such tools include e-government services, online platforms, and digital identity verification systems.

Consequently, environmental analysis is essential to consider the opportunities and threats in the external environment, including technological, economic, social, political, environmental, and legal factors. The group discussions were held among stakeholders to identify opportunities and threats, as shown in Table 2. By doing so, appropriate strategies can be developed to align the vision with the external environment and ultimately achieve the desired results.

Table 2: Vision, goals and opportunities and threats of DigitalTech in Cambodia

Vision	<i>“To induce DigitalTech to enhance productivity and efficiency, and to bring about innovation for socioeconomic development”</i>				
Goals	<ol style="list-style-type: none"> 1. Leverage digital literacy and IT skills as a foundation for human capital development 2. Diversify digital infrastructure in national innovation system for priority sectors 3. Build vibrant ecosystem through connectivity within digital and physical spaces 				
Drivers	<p>Social:</p> <ul style="list-style-type: none"> • Youth • Employment • Skill development • Sufficient skills and understanding of the benefits of technology • Increase female participation • Advance knowledge of digital skills in rural areas • Offer life-long learning opportunities for all groups, including elderly people • Include people with disabilities 	<p>Technological:</p> <ul style="list-style-type: none"> • Mobile and internet reach • E-commerce • Artificial Intelligence • Internet • Research and Development • Infrastructure and accessibility for everyone • Close the gap between rural and urban areas in accessing technology • Ensure access to affordable devices • Grid development 	<p>Economical:</p> <ul style="list-style-type: none"> • Tech start-up • Foreign investment • Digital Business • E-banking • E-payment • Access to funding to support innovation and new technology solutions • More possibilities to connect with investors • Funding opportunities from government and international organisations 	<p>Environmental:</p> <ul style="list-style-type: none"> • Land and natural resources • Climate change • Environmental sustainability 	<p>Political:</p> <ul style="list-style-type: none"> • Policies and legal frameworks (e.g., DES, STI roadmap, etc.) • Stable political situation and supportive political environment that encourage DigitalTech • Transparent and clear legislation • Benefits for investors and implementers of tech solutions such as tax support, legal support, and others • Digital government tools and opportunities that

					ensure easy and fast services for citizens
Opportunities & Threats					
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> • Higher youth population (2/3 under 35) • High demand with high salary in the market • Many services providers • Higher adoption starting from banking sector • Higher adoption and innovation • Open economy, higher attraction to investors, cheap labour • Abundant resource availability • Many endorsements and drafting from all related ministries • Youth learn fast and are tech-savvy • Larger number of users • Technology aspect, founding • Strong Collaboration (ASEAN and Mekong Country) 					
<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> • Limited technology training/awareness to the youth • Availability of skilled workforce • Lack of infrastructure and quality of services • Consumer protection • Lack of investment and sustainability • Sanctions (EBA withdrawal) • Climate change with low resilience among local people • Awareness to public, implementation, and investment • Security • Customer security • Protection, ethic of AI using, too fast development of technology 					

5.3. Products and Services

After conducting an environmental analysis of the DigitalTech Roadmap, a set of strategic products and services have been identified as key drivers for the success of the DigitalTech sector. These strategic products and services are **digital devices, internet infrastructure, a national data centre, STEM/Digital education, digital re-skilling/upskilling, online business platforms, public awareness events, and centres of excellence**. According to experts and consultants, the identified products and services have been specifically designed to cater to the needs of businesses, consumers, and society as a whole. It has been determined that each of these products and services is vital for achieving the vision of inducing DigitalTech to enhance productivity and efficiency and bring about innovation for socioeconomic development.

Digital devices and internet infrastructure are critical components for enabling connectivity and access to information, which are fundamental for the functioning of the DigitalTech sector. The online business platform streamlines the process of starting a business and supports the development of e-commerce. STEM/Digital education and digital re-skilling/upskilling are designed to promote the growth and development of skilled workers in the DigitalTech sector, which are essential for the sector's sustainability and competitiveness. Public awareness events help to promote awareness and understanding of the sector, which is essential for attracting investors, customers, and skilled workers. The national data centre and centre of excellence support the development and implementation of innovative DigitalTech by providing research and development support, testing and evaluation services, and training and education programmes. These facilities provide a reliable and secure environment for data storage, processing, and analysis. The centre of excellence is a hub for innovation, research, and development that supports the creation of new digital products and services.

While the above strategic products and services were identified as essential for the success of the DigitalTech sector, other strategic products and services were also considered in group discussions. These included *decentralised financial systems, start-up support programmes, free online educational resources in Khmer, consumer protection enforcement, and hardware development centres*. These products and services have the potential to significantly contribute to the growth and development of the DigitalTech sector and should be given due consideration in the implementation of the DigitalTech Roadmap. Decentralised financial systems can drive

financial inclusion and provide alternative payment systems that are secure and efficient. Start-up support programmes can provide essential resources and support to entrepreneurs and start-ups, promoting innovation and entrepreneurship. Free online educational resources in Khmer can provide individuals with access to high-quality education and training resources, enabling them to acquire the skills needed to succeed in the digital economy. Consumer protection enforcement is important to building trust and confidence in the DigitalTech industry and ensuring that consumers are protected from fraud and abuse. Hardware development centres can drive innovation in hardware design, enabling the development of cutting-edge technologies and products that can drive growth and development in the DigitalTech sector.

The strategic products and services identified through this environmental analysis provide a solid foundation for the growth and development of the DigitalTech sector. However, it is essential to continuously monitor and update these products and services to keep up with the fast-changing digital landscape. Moreover, it is crucial to take into consideration the interdependencies among these products and services and to create an ecosystem that supports their development and implementation.

5.4. Key Technologies

Based on the strategic products and services, the groups then proceeded to propose key technologies that would be essential for the development of the aforementioned strategic products and services. The highest-scoring key technologies were for **Cybersecurity, 5G, Automation Systems, Big Data, AI and Machine Learning, Computer Software, Wi-Fi 6/7, and Cloud Computing**. The evaluation criteria for these technologies are indicated in Table 3 and Figure 5. The significance of these key technologies either implied their role in developing the identified strategic products and services or their utility in relation to the strategic products and services. As such, it would be beneficial to explore their complementary nature in the context of Cambodia. Rather than striving to leverage the most advanced technologies, each nation should evaluate its current stage of technical capacity and implement its digital transformation strategy in a feasible and practical manner.

Specifically, Table 3 reveals important insights regarding the evaluation of various technologies based on their importance and feasibility scores. AI & Machine Learning (T1), Cloud Technology (T5), IoT (T7), and Cybersecurity (T8) emerge as the most promising

technologies, with high scores for both importance and feasibility indicating its significant value and practicality. Big Data (T2) received a high importance score, indicating its significance, but its feasibility score was relatively low, suggesting potential challenges in its implementation. 5G (T9) and Wi-Fi 6/7 (T10) share the same score of 7/10, suggesting moderate importance and feasibility. Although both technologies have potential, there may be some limitations or obstacles to their implementation. Other technologies, like Quantum Computing (T4) rank relatively lower with a score of 5/10, indicating moderate importance but low feasibility. The practical implementation of this technology is challenging and may require further advancements.

Table 3: Evaluation of Technologies

Technologies	Code	Evaluation Criteria		Sum
		Importance	Feasibility	
AI & Machine Learning	T1	5/5	5/5	10/10
Big Data	T2	5/5	2/5	7/10
Blockchain	T3	4/5	5/5	9/10
Quantum Computing	T4	4/5	1/5	5/10
Cloud Technology	T5	5/5	5/5	10/10
AR/VR	T6	3/5	3/5	6/10
IoT	T7	5/5	4/5	9/10
Cybersecurity	T8	5/5	4/5	9/10
5G	T9	4/5	3/5	7/10
Wi-Fi 6/7	T10	3/5	4/5	7/10

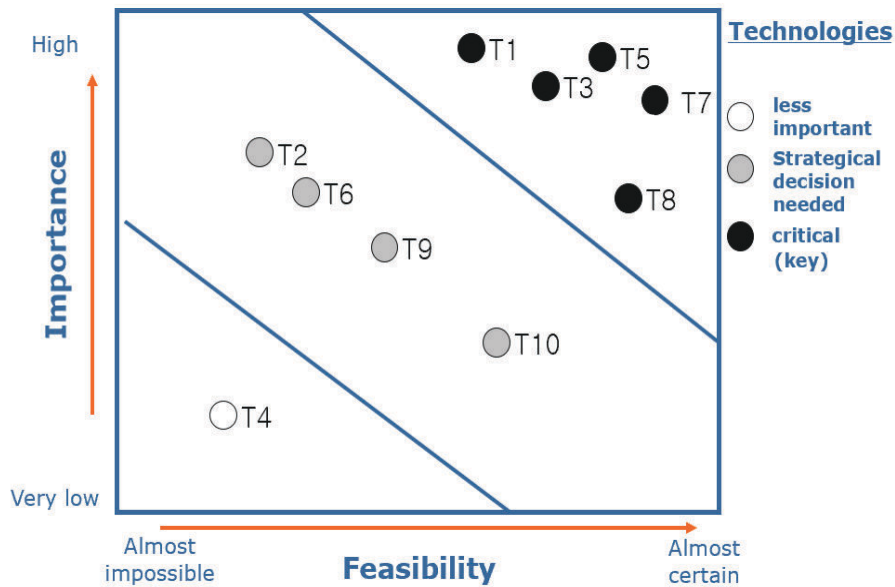


Figure 5: Importance and Feasibility of Technologies

5.5. Charting

The chart, as illustrated in Figure 6, indicates the relations between vision, direction, strategic products/services, and key technologies, based on the workshop findings and group consensus. Strategic products/services and key technologies are ranked from highest to lowest score, from top to bottom. In addition, it shows the evolution of thought from the established vision, breaking into clear and concise components to be considered and implemented. As observed through the chart, many of the components overlap, showing their heavily interconnected nature. In order to avoid confusion, implementing agencies should explore each individual relation in detail, as its implications may vary from case to case.

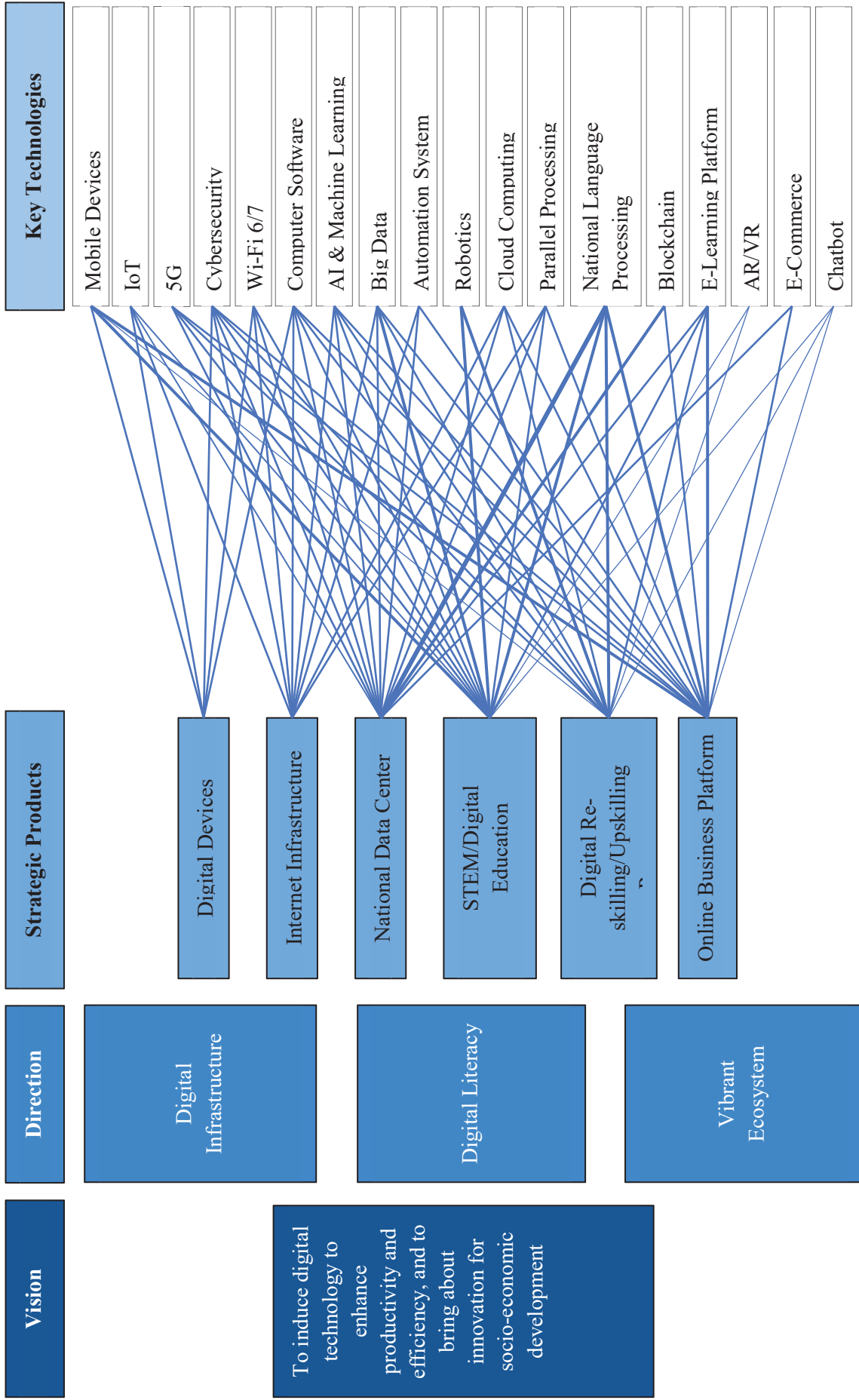


Figure 6: Matching of Vision, Direction, Strategic Products, and Key Technologies.

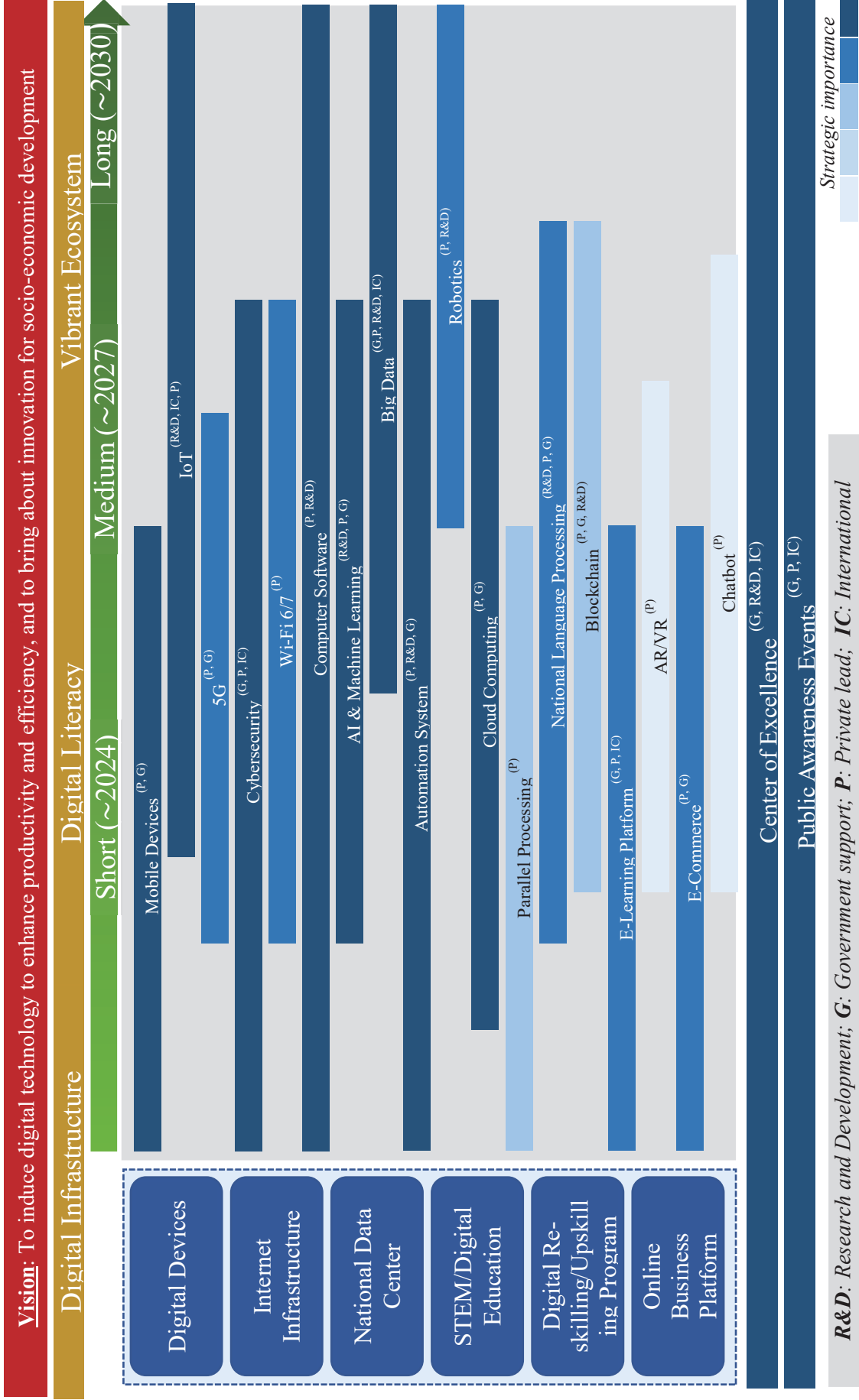


Figure 7: Roadmap of Key Technology Supporting Strategic Product/Function (2023-2030).

Figure 7 depicts the most visual strategic activities and key technologies to be adopted for this DigitalTech Roadmap with the vision to induce DigitalTech to enhance productivity and efficiency, and to bring about innovation for the socioeconomic development of Cambodia. Building digital infrastructure, digital literacy, and a vibrant ecosystem are central to achieving not only this roadmap's vision but also transforming the digital economy and society, which is also in line with the national digital policy framework. To actually realise this endeavour, efforts must be collectively, from all key relevant stakeholders, paid towards leveraging, if not bringing about structural changes, to the key products and services identified in the previous session, including digital devices, Internet infrastructure, a national data centre, STEM/digital education, digital reskilling and upskilling programmes, and online business platforms, illustrated at the left of the charting roadmap. In tandem with the strategic products and services, the complementary key technologies, colour-coded in terms of strategic importance from light to dark blue, over short-, medium-, and long-term timeframes are then outlined for the implementing agencies, referring to this roadmap, to implement their digital transformation strategies within the specific timeline indicated in the chart, incrementally. With hindsight, Cambodia shall promote the utilisation of digital devices, including mobile devices such as personal computers, tablets or smart phones, in the short term, as they are the prerequisite to enabling digital transformation to occur. In the medium to long term, the IoT can fully harness the existing digital devices available. For the Internet infrastructure, cybersecurity stands at the forefront among others. Cambodia shall commit to strengthening its security capacity over the Internet and cyberspace as a whole. Wi-Fi 6/7 shall provide benefits in the medium term to enable reliable and high-speed internet connections and big data transfers in various applications. In the meantime, Cambodia shall have enough capabilities to develop computer software embedded with the latest technologies, including AI, big data, and machine learning, all of which are strategically important over the medium to long run as these technologies have the potential to leverage automation and robotics for a wide range of applications ranging from manufacturing to the service sector. Natural language processing is also a crucial technology as it enables the ability to analyse data in local languages. To utilise the full potential of these technologies, establishing a national data centre must be the direction that Cambodia shall pursue. STEM, digital education, and digital upskilling and reskilling programmes shall be in place for leveraging digital literacy amongst Cambodian citizens, as they could lay a firm

foundation and make a path for digitally enabled society. E-learning platforms and technology such as VR/AR could provide an immersive experience to students on an equitable basis, meaning no one is left behind for the opportunity to access a high-quality education. Last but not least, online business platforms, including e-commerce platforms, shall be promoted in Cambodian society as they could, to some extent, enhance the vibrant digital business ecosystem, which in turn would accelerate the adoption of digital nationwide in their production lines and businesses for the business sector and in their daily lives for citizens.

Digital has the potential to transform the economy and society due to its invasive nature in many sectors. However, it is merely a tool if not fully utilised. Raising awareness about digital among firms, manufacturers, or service providers shall be ceaselessly promoted by building trust and the right perception of digital. Many firms in Cambodia have the perception that digital adoption is difficult and expensive. It might be true, but compared to the benefits it provides in return, digital adoption is truly a must for firms and citizens to stay competitive and relevant. Due to the fast changes in digital and technology as a whole, centres of excellence or research-intensive centres on digital must be established to keep strengthening the digital capacity of the country.

6. Conclusion and Recommendations

6.1. Conclusion

The vision of inducing DigitalTech to enhance productivity and efficiency, and to bring about innovation for socioeconomic development is a powerful and forward-thinking aspiration. This vision sets the stage for a transformative journey that prioritises leveraging digital literacy and IT skills as a foundation for human capital development. By focusing on diversifying digital infrastructure in the national innovation system for priority sectors and building a vibrant ecosystem through connectivity within digital and physical spaces, this vision aims to create a thriving digital ecosystem.

To achieve these goals, a range of strategic products and services have been identified, including digital devices, Internet infrastructure, a national data centre, STEM/digital education, digital re-skilling/upskilling programmes, online business platforms, public awareness events, and centres of excellence. These offerings play a crucial role in supporting the vision and goals by providing the necessary tools, resources, and platforms to foster innovation, connectivity, and digital transformation.

Furthermore, key technologies have been recognised as the driving force behind the realisation of this vision. Cybersecurity, 5G, automation systems, big data, AI and machine learning, computer software, Wi-Fi 6/7, and cloud computing emerged as the highest-scoring technologies. These technologies serve as the backbone of the digital ecosystem, ensuring secure and efficient operations, enabling advanced data processing and analysis, and facilitating seamless connectivity.

By aligning the vision, goals, strategic services/products, and key technologies, the pathway to achieving a digitally empowered society becomes clear. The focus on human capital development, diverse infrastructure, vibrant ecosystems, and cutting-edge technologies will undoubtedly propel societies towards increased productivity, efficiency, and innovation. As we embrace the digital age, it is through such visionary approaches that we can create a better future for all, fostering socioeconomic development on a global scale.

In conclusion, this roadmap does not aim to compete with or contradict other existing strategies or policy frameworks, but rather to complement and provide support from different perspectives, with the ultimate goal of contributing to Cambodia's digital economy, society, and government.

6.2. Recommendations

DigitalTech will undoubtedly continue to play a vital role in the development of Cambodia's digital economy, society, and government in the coming years. Pre-COVID, the Kingdom's economic growth showed no signs of slowing down, boasting one of the highest GDP growth rates in the region. Fast forward to today, and Cambodia has shifted towards the integration of digital applications and platforms into everyday life. In terms of digital adoption, the Kingdom has leapfrogged years ahead, out of necessity and survival. This forced acceleration has enhanced Cambodia's post-COVID economic recovery, which relies heavily on improved interconnectivity and efficiency.

At the individual level, citizens have become consumers of technology on a daily basis. In the long run, this will progressively contribute to improving the digital literacy of the population, correspondingly raising the level of market education with regards to DigitalTech applications. This societal shift will contribute to increasing the overall productivity and efficiency of the nation, from the bottom-up. Furthermore, exposure to digital platforms might inspire the next generation of Cambodians to pursue tech-related careers, as IT and digital skills grow more in-demand to meet the industrial needs of the Kingdom. From an organisational perspective, there is often a requirement of leadership, human capital, and infrastructure, to implement digital transformation. First, leaders with general management skills and experience are often intimidated by IT-related work, as it seems overly technical and outside their field of expertise. Moreover, IT professionals typically lack the leadership or soft skills to effectively manage an IT department within an organisation. As such, this dilemma creates gaps in knowledge and experience in bringing both technical and non-technical team members together on the same page. Second, there is a general shortage of IT human capital, which makes it challenging for organisations to fully leverage the potential of DigitalTech. Although there has been an increased focus on STEM and ICT education at the national level, reaping these benefits will take significant time. In the meantime, there is natural competition for IT human capital between organisations. This often leads to staff poaching and high turnover, which, in the long

term, is unsustainable and counter-productive at both organisational and national levels. Third, core IT infrastructure is essential for any large-scale digital transformation. However, the relatively high cost of IT infrastructure is often a limitation for organisations. The budget allocation for more traditional infrastructure or equipment usually outweighs that for IT infrastructure. Furthermore, organisations would require additional technical expertise to manage, maintain, and utilise them properly.

As the entire society pushes forward in the digital era at the individual, organisational, and national levels, policymakers will be responsible for establishing the overall vision, goals, strategic products and services, key technologies, and policy recommendations in the context of a national DigitalTech strategy. Hence, this DigitalTech Roadmap has been developed under the co-design and develop and multi-stakeholders' mechanisms, contextualised by the domain expertise from various sectors, including government agencies, universities and research institutions, the private sector and literature reviews conducted by the consulting team. The vision of this roadmap is “to induce DigitalTech to enhance productivity and efficiency, and to bring about innovation for socioeconomic development” with the goals consisting of leveraging digital literacy and IT skills, building a sound digital infrastructure, and developing a vibrant ecosystem enabling digital business in the country. To this end, contextual analysis has been conducted to identify opportunities and threats taking into account Social, Technological, Economic, Environmental, and Political aspects, namely STEEP analysis. Strategic products and services were then derived based on a consensus-building framework. Key technologies were introduced with consideration of their strategic importance, economic impact, and potential for success within a certain timeframe.

This **DigitalTech Roadmap** lays out the DigitalTech adoption strategy to guide all relevant ministries and key stakeholders in the ecosystem to take their respective roles in order to achieve the goal of inducing DigitalTech to enhance productivity and efficiency, and to bring about innovation for socioeconomic development, and subsequently transfer Cambodia to a digital economy and society. Below are some recommendations for relevant organisations in Cambodia to implement their respective digital transformation strategies:

- i. **Appoint Transformational Leaders** at the organisational level do not necessarily need to have technical expertise in IT. Digital transformation is not purely technical but rather about culture, the workforce, and technology as a whole. For top-level leadership, digital

literacy is more important than IT expertise. The key leadership characteristic to stimulate any transformation is to inspire and motivate a team to shift in terms of mindset and behaviour.

ii. Invest in IT Human Capital

All organisations expect digital transformation, but this responsibility is often dumped on a limited IT team that is understaffed and/or underpaid. There is no clear distinction between digital transformation and IT support, which leaves most IT staff overwhelmed with routine support tasks such as setting up computers, fixing printers, and setting up online meetings. As such, organisations must invest in sufficient IT human capital with diverse expertise and clear roles in networking, data, security, development, support, etc. If digital transformation is truly the top priority of an organisation, the budget allocation towards IT human capital should reflect that accordingly.

iii. Invest in IT Infrastructure

Budget allocations for IT infrastructure should not be seen as costs or expenses but as crucial investments. In order to maximise the utilisation of DigitalTech applications, organisations must first build a strong foundation in terms of network, servers, databases, cloud, applications, etc. Limited financial resources are often an obstacle to investing in IT infrastructure. Therefore, organisations should develop short-, medium-, and long-term budget strategies to plan and prioritise IT infrastructure investment in terms of fundamental importance.

iv. Utilise Science, Technology & Innovation

STI contributes to the development of not only the digitally related sector but also society as a whole. They provide solutions to problems, create the scientific knowledge of humankind on natural and societal phenomena, create new products and services to tackle the societal challenges, and improve the quality of life of individuals and the whole community.

v. Keep Update Digital Strategies and Policies

Digital is known to change very fast from generation to generation. The government and policymakers do not have luxurious time to wait 2 or 3 ways to roll out the policies and strategies. Digital strategies and policies at the organisational and national level need to be timely and highly relevant and be able to keep up with this change before those technologies become obsolete.

vi. Enhance Education and Training System on Digital

Education and training on digital shall be consistently promoted to effectively respond to the fast changes of digital and to avoid the negative impacts posed by digital transformation strategies. Reskilling and upskilling schemes shall be in place to ensure sustainable and inclusive development and guarantee that no one is left behind.

vii. Promote collaboration and networking

Collaboration and networking are essential for success in many sectors, especially in the digital ecosystem. Enhancing collaboration and networking among key actors in the ecosystem will ensure the building of a vibrant digital ecosystem in Cambodia. Effective collaboration and networking require a genuine interest in others, a willingness to learn, and a commitment to building relationships over the long term.

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Annex1: Committee Members



ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ

ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
Ministry of Industry, Science, Technology & Innovation
លេខ: ០៧៣ MISTI/២០២២

សេចក្តីសម្រេច
ស្តីពី

ការបង្កើតគណៈកម្មការដឹកនាំ និងសម្របសម្រួលដល់ការអនុវត្តគម្រោង
អភិវឌ្ឍផែនទីបង្ហាញផ្លូវសម្រាប់បច្ចេកវិទ្យាថាមពល
បច្ចេកវិទ្យាទេសចរណ៍ និងបច្ចេកវិទ្យាឌីជីថល

ទេសរដ្ឋមន្ត្រី រដ្ឋមន្ត្រីក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍

- បានឃើញរដ្ឋធម្មនុញ្ញនៃព្រះរាជាណាចក្រកម្ពុជា
- បានឃើញព្រះរាជក្រឹត្យលេខ នស/រកត/០៩១៨/៩២៥ ចុះថ្ងៃទី០៦ ខែកញ្ញា ឆ្នាំ២០១៨ ស្តីពីការតែងតាំង រាជរដ្ឋាភិបាលនៃព្រះរាជាណាចក្រកម្ពុជា
- បានឃើញព្រះរាជក្រឹត្យលេខ នស/រកត/០៣២០/៤២១ ចុះថ្ងៃទី៣០ ខែមីនា ឆ្នាំ២០២០ ស្តីពីការតែងតាំង និង កែសម្រួលសមាសភាពរាជរដ្ឋាភិបាល
- បានឃើញព្រះរាជក្រមលេខ នស/រកម/០៦១៨/០១២ ចុះថ្ងៃទី២៨ ខែមិថុនា ឆ្នាំ២០១៨ ដែលប្រកាសឱ្យប្រើ ច្បាប់ស្តីពីការរៀបចំនិងការប្រព្រឹត្តទៅនៃគណៈរដ្ឋមន្ត្រី
- បានឃើញព្រះរាជក្រមលេខ នស/រកម/០៣២០/០០៩ ចុះថ្ងៃទី២៦ ខែមីនា ឆ្នាំ២០២០ ដែលប្រកាសឱ្យប្រើ ច្បាប់ស្តីពីការបង្កើតក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
- បានឃើញអនុក្រឹត្យលេខ៤៨ អនក្រ.បក ចុះថ្ងៃទី៦ ខែមេសា ឆ្នាំ២០២០ ស្តីពីការរៀបចំនិងការប្រព្រឹត្តទៅរបស់ ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
- យោងលិខិតលេខ ០០៣ ឧបន ចុះថ្ងៃទី១២ ខែមករា ឆ្នាំ២០២២ ស្តីពីលទ្ធផលកិច្ចប្រជុំលើកទី៧នៃក្រុមប្រឹក្សាជាតិ វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
- យោងលិខិតចាត់តាំងសមាសភាពឱ្យចូលរួមក្នុងគណៈកម្មការដឹកនាំ និងសម្របសម្រួលដល់ការអនុវត្តគម្រោង អភិវឌ្ឍផែនទីបង្ហាញផ្លូវសម្រាប់បច្ចេកវិទ្យាថាមពល បច្ចេកវិទ្យាទេសចរណ៍ និងបច្ចេកវិទ្យាឌីជីថល របស់បណ្តា ក្រសួង-ស្ថាប័នពាក់ព័ន្ធ
- យោងតាមសំណូមពរការងារចាំបាច់របស់ក្រសួង

សម្រេច

ប្រការ១.-

ត្រូវបានបង្កើតគណៈកម្មការដឹកនាំ និងសម្របសម្រួលដល់ការអនុវត្តគម្រោងអភិវឌ្ឍផែនទីបង្ហាញផ្លូវសម្រាប់ បច្ចេកវិទ្យាថាមពល បច្ចេកវិទ្យាទេសចរណ៍ និងឌីជីថល ដែលមានសមាសភាព៖

១. ឯកឧត្តមសាស្ត្រាចារ្យបណ្ឌិត ឆែម គាតវិថី រដ្ឋមន្ត្រីប្រតិភូអមនាយករដ្ឋមន្ត្រី និងជាអគ្គនាយករដ្ឋមន្ត្រី
ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ ប្រធាន

ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
៤៥ មហាវិថីព្រះនរោត្តម សង្កាត់ផ្សារថ្មី៣
ទណ្ឌដីរាជ្យ ភ្នំពេញ ១២២០៥ (ព្រះរាជាណាចក្រកម្ពុជា)

ទទួកាល់យងកឧត្តមកិត្តិសេដ្ឋាបណ្ឌិត ទេសរដ្ឋមន្ត្រី
ទូរស័ព្ទលេខ: (៨៥៥) ២៣ ២១១ ៧៧៥
អ៊ីមែល: misti.sm@cabinet@gmail.com

២. ឯកឧត្តមបណ្ឌិត ហ៊ុល សៀងហេង	អគ្គនាយកនៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	អនុប្រធាន
៣. ឯកឧត្តមបណ្ឌិត កង ច័ន្ទតារាវ័ត្ត	អនុរដ្ឋលេខាធិការក្រសួងប្រៃសណីយ៍ និងទូរគមនាគមន៍	សមាជិក
៤. ឯកឧត្តម ណេប សាមុត	អគ្គនាយកនៃអគ្គនាយកដ្ឋានគ្រប់គ្រងឧស្សាហកម្ម ទេសចរណ៍នៃក្រសួងទេសចរណ៍	សមាជិក
៥. លោក ជា ណារិន	អគ្គនាយករងនៃអគ្គនាយកដ្ឋានថាមពល នៃក្រសួងអី និងថាមពល	សមាជិក
៦. លោកបណ្ឌិត ទ្រី សុផល	អគ្គនាយករងនៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិកអចិន្ត្រៃយ៍

ប្រការ២.-

គណៈកម្មការដឹកនាំ និងសម្របសម្រួលដល់ការអនុវត្តគម្រោង មានតួនាទី និងភារកិច្ចដូចតទៅ៖

- ធានានូវការសិក្សារបស់គម្រោង ត្រូវបានបន្ស៊ី និងគិតគូរច្បាស់លាស់ជាមួយនឹងយុទ្ធសាស្ត្រពាក់ព័ន្ធនានា
- ធានានូវការសិក្សារបស់គម្រោង និងប្រើប្រាស់ធនធានបានយ៉ាងល្អនិងគ្រប់ជ្រុងជ្រោយ រាប់ទាំងមូលដ្ឋាន ចំណេះដឹងក្នុងប្រទេស និងក្នុងតំបន់
- ផ្តល់យុទ្ធសាស្ត្រក្នុងការអនុវត្ត និងជួយដោះស្រាយបញ្ហានិងហានិភ័យនានាក្នុងពេលអនុវត្តគម្រោង
- ពិនិត្យនូវវឌ្ឍនភាព និងសម្របសម្រួលជាមួយថ្នាក់ដឹកនាំជាន់ខ្ពស់ និងក្រសួង-ស្ថាប័នពាក់ព័ន្ធនានា
- ពិនិត្យ និងផ្តល់យោបល់លើ សេចក្តីព្រាងកម្រងសំណួរសម្រាប់ការធ្វើអង្កេតនិងលទ្ធផលដែលទទួលបាន
- ពិនិត្យ និងផ្តល់យោបល់លើវិធីសាស្ត្រនានាដែលដាក់ឱ្យប្រើប្រាស់ក្នុងគម្រោង
- ណែនាំអំពីឱកាសដើម្បីទទួលបានប្រយោជន៍ និងសារៈសំខាន់ជាអតិបរិមាពីលទ្ធផលនៃការសិក្សាគម្រោង។

ប្រការ៣.-

ត្រូវបានបង្កើតអនុគណៈកម្មការចំនួន៣ ដើម្បីទទួលអនុវត្តគម្រោងខាងលើតាមបច្ចេកវិទ្យា ដូចមានសមាសភាព ខាងក្រោម៖

ក. អនុគណៈកម្មការអភិវឌ្ឍន៍ផែនទីបង្ហាញផ្លូវសម្រាប់បច្ចេកវិទ្យាថាមពល៖

១. លោក ជា ណារិន	អគ្គនាយករងនៃអគ្គនាយកដ្ឋានថាមពល នៃក្រសួងអី និងថាមពល	ប្រធាន
២. ឯកឧត្តម នុត អ៊ិនវណ័រ	អគ្គលេខាធិការរងគណៈកម្មការវិនិយោគកម្ពុជា នៃក្រុមប្រឹក្សាអភិវឌ្ឍន៍កម្ពុជា	សមាជិក
៣. លោកស្រីបណ្ឌិត ត្រី ណាល់លីស	អគ្គនាយករងនៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
៤. លោក តាំង ម៉េងអៀង	ប្រធាននាយកដ្ឋានសេដ្ឋកិច្ចបែតុង នៃអគ្គនាយកដ្ឋាន គោលនយោបាយនិងយុទ្ធសាស្ត្រ នៃក្រសួងបរិស្ថាន	សមាជិក

៥. លោកបណ្ឌិត ស្រីន បញ្ញាវិទ្ធិ	ប្រធាននាយកដ្ឋានគោលនយោបាយវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋាន វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិកអចិន្ត្រៃយ៍
៦. លោកស្រីបណ្ឌិត លី សុខនី	ប្រធាននាយកដ្ឋានសហប្រតិបត្តិការវិស័យវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
៧. លោកបណ្ឌិត ជាតិ សុផល	ប្រធាននាយកដ្ឋានតាមដាន ត្រួតពិនិត្យ និងវាយតម្លៃ ការអនុវត្តគោលនយោបាយវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
៨. លោក ស៊ាន វិទ្ធិ	ប្រធាននាយកដ្ឋានស្តីទី នៃនាយកដ្ឋានបណ្តុះបណ្តាល វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃវិទ្យាស្ថានជាតិ វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
៩. លោក វ៉ាន់ សីហៈគីរី	នាយករង ផែនការយុទ្ធសាស្ត្រ និងគម្រោងការ នៃអគ្គិសនីកម្ពុជា	សមាជិក
១០. លោកបណ្ឌិត ជ័យ ចាន់អឿន	ព្រឹទ្ធបុរសរងមហាវិទ្យាល័យវិទ្យាសាស្ត្រ នៃសាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ	សមាជិក
១១. លោក តេង សារឿន	អនុប្រធាននាយកដ្ឋានសេវាកម្មផលិតកម្ម នៃអាជ្ញាធរអគ្គិសនីកម្ពុជា	សមាជិក
១២. លោក ឈាង លីហួរ	ប្រធានផ្នែកគ្រប់គ្រងការអភិវឌ្ឍថាមពលថ្មីនៃក្រុមហ៊ុន TOTAL ENERGY កម្ពុជា	សមាជិក
១៣. លោកបណ្ឌិត អ៊ូ ចំរុង	ប្រធានផ្នែកគ្រប់គ្រងទូទៅនៃនាយកដ្ឋានបច្ចេកទេសជាន់ខ្ពស់ នៃក្រុមហ៊ុន SCHNEITECH CO.,LTD	សមាជិក
១៤. លោក ជឿន ក្រឹម	ប្រធានផ្នែកលក់ នៃក្រុមហ៊ុន VP-SMART TECHNOLOGY	សមាជិក
១៥. លោក ច្រឹង ការុនីន	និយោជិត នាយកដ្ឋានផែនការយុទ្ធសាស្ត្រ និងគម្រោងការ នៃអគ្គិសនីកម្ពុជា	សមាជិក
ខ. អនុគណៈកម្មការអភិវឌ្ឍផែនទីបង្ហាញផ្លូវសម្រាប់បច្ចេកវិទ្យាទេសចរណ៍៖		
១. ឯកឧត្តម ណេប សាមុត	អគ្គនាយកគ្រប់គ្រងឧស្សាហកម្មទេសចរណ៍ នៃក្រសួងទេសចរណ៍	ប្រធាន
២. ឯកឧត្តម អាំង សុវណ្ណវិធាន	អគ្គនាយករងអភិវឌ្ឍន៍ទេសចរណ៍ និងសហប្រតិបត្តិការ អន្តរជាតិ នៃក្រសួងទេសចរណ៍	សមាជិក
៣. ឯកឧត្តម ឆាយ យុនឡុង	អគ្គនាយករងគ្រប់គ្រងឧស្សាហកម្មទេសចរណ៍ នៃក្រសួងទេសចរណ៍	សមាជិក
៤. ឯកឧត្តម ហុង សុហួរ	ទីប្រឹក្សារបស់មជ្ឈមណ្ឌលកម្ពុជា ៤.០	សមាជិក
៥. ឯកឧត្តម គឹម សេរីជ្ជ	ប្រធាននាយកដ្ឋានគ្រប់គ្រងសេវាស្នាក់ទេសចរណ៍ និងម្ហូបអាហារ នៃក្រសួងទេសចរណ៍	សមាជិក

៦. លោក សេង ប៊ុនឡឿន	ប្រធាននាយកដ្ឋានរៀបចំដែនដីនៃអគ្គនាយកដ្ឋានរៀបចំដែនដី និងនគរបនីយកម្ម នៃក្រសួងរៀបចំដែនដី នគរបនីយកម្ម និងសំណង់	សមាជិក
៧. លោក អឿន មករា	ប្រធាននាយកដ្ឋានផែនការ ស្ថិតិ និងសរុប នៃក្រសួងវប្បធម៌ និងវិចិត្រសិល្បៈ	សមាជិក
៨. លោកបណ្ឌិត ហេង សុភាព	ព្រឹទ្ធបុរសមហាវិទ្យាល័យទេសចរណ៍ និងបដិសណ្ឋារកិច្ច នៃសាកលវិទ្យាល័យជាតិគ្រប់គ្រង	សមាជិក
៩. លោកបណ្ឌិត សុខ គឹមឈិន	ព្រឹទ្ធបុរសមហាវិទ្យាល័យសេដ្ឋកិច្ចកសិកម្ម និងអភិវឌ្ឍន៍ជនបទ នៃសាកលវិទ្យាល័យភូមិន្ទកសិកម្ម	សមាជិក
១០. លោក ម៉ម វ៉ាសនា	ប្រធានមន្ទីរទេសចរណ៍កម្ពុជា	សមាជិក
១១. លោក ឆែម សិរីភិរិលៀម	ប្រធានមជ្ឈមណ្ឌលសេដ្ឋកិច្ចឌីជីថល ប្រកបដោយបរិយាប័ន្ននៃវិទ្យាស្ថានចក្ខុវិស័យអាស៊ី	សមាជិក
១២. លោក ជា ឡុងដា	នាយកប្រតិបត្តិក្រុម BOOKMEBUS CO.LTD	សមាជិក
១៣. លោក ឡាយ គឹមសួរ	អនុប្រធានសមាគមសហគ្រិនវ័យក្មេងកម្ពុជា	សមាជិក
១៤. លោក ហេង ជលសា	តំណាង ក្រុមហ៊ុន LASMILE	សមាជិក
១៥. លោកបណ្ឌិត សេង ទូច	អនុប្រធាននាយកដ្ឋានគោលនយោបាយវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិកអចិន្ត្រៃយ៍
១៦. លោក ប៊ុ សំណាង	អនុប្រធាននាយកដ្ឋានផ្ទេរបច្ចេកវិទ្យា នៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
១៧. កញ្ញា តាំង ចាន់ស្មី	ប្រធានការិយាល័យ នាយកដ្ឋានសហប្រតិបត្តិការវិស័យ វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋាន វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
១៨. លោក ផែន សំអឿន	ជំនួយការព្រឹទ្ធបុរស មហាវិទ្យាល័យពាណិជ្ជកម្ម និងសេដ្ឋកិច្ចនៃសាកលវិទ្យាល័យបញ្ញាសាស្ត្រកម្ពុជា	សមាជិក
១៩. កញ្ញាបណ្ឌិត ពេ ចិន្តា	មន្ត្រីនាយកដ្ឋានស្រាវជ្រាវ និងអភិវឌ្ឍន៍បច្ចេកវិទ្យា នៃវិទ្យាស្ថានជាតិវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក

គ. អនុគណៈកម្មការអភិវឌ្ឍន៍ផែនទីបង្ហាញផ្លូវសម្រាប់បច្ចេកវិទ្យាឌីជីថល៖

១. ឯកឧត្តមបណ្ឌិត កង ច័ន្ទតារាវិញ្ញ	អនុរដ្ឋលេខាធិការក្រសួងប្រៃសណីយ៍និងទូរគមនាគមន៍	ប្រធាន
២. ឯកឧត្តម នាង ម៉ៅ	អគ្គនាយកនៃអគ្គនាយកដ្ឋានបច្ចេកវិទ្យាគមនាគមន៍និងព័ត៌មាន នៃក្រសួងប្រៃសណីយ៍ និងទូរគមនាគមន៍	សមាជិក
៣. ឯកឧត្តមបណ្ឌិត សំ សិទ្ធិសេរី	ប្រធានវិទ្យាស្ថានស្រាវជ្រាវនិងនវានុវត្តន៍ឌីជីថល នៃក្រសួងប្រៃសណីយ៍ និងទូរគមនាគមន៍	សមាជិក

ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
 ៤៥ មហាវិថីព្រះនរោត្តម សង្កាត់ផ្សារថ្មី៣
 ខណ្ឌដូនពេញ ភ្នំពេញ ១២២០៥ (ព្រះរាជាណាចក្រកម្ពុជា)

ទទួកាល័យឯកឧត្តមកិត្តិសង្ខាបណ្ឌិត ទេសរដ្ឋមន្ត្រី
 ទូរស័ព្ទលេខ: (៨៥៥) ២៣ ២១១ ៧៧៥
 អ៊ីមែល: misti.smcabinet@gmail.com

៤. ឯកឧត្តម យឹម ប្រសិទ្ធិប្បទូ	អគ្គនាយកក្រុមហ៊ុនខ្លួនបឺម អេនជីនាវ៉ែង អេន មេនូហ្វេកធីវីង ឯ.ក និងជាសមាជិកគណៈប្រឹក្សាយោបល់វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ របស់ក្រុមប្រឹក្សាជាតិវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
៥. លោក កៀន តាក់	សាកលវិទ្យាធិការរងនៃសាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ	សមាជិក
៦. លោកស្រី សេង មូលីកា	ប្រធាននាយកដ្ឋានគ្រប់គ្រងព័ត៌មានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋាន វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
៧. លោក គន់ ឌីវ៉ង់	ប្រធាននាយកដ្ឋានផែនការ ស្ថិតិ និងព័ត៌មានពាណិជ្ជកម្ម នៃក្រសួងពាណិជ្ជកម្ម	សមាជិក
៨. លោក ចាន់ទី ពិសាល	ប្រធានមជ្ឈមណ្ឌលស្រាវជ្រាវគោលនយោបាយឌីជីថល នៃវិទ្យាស្ថានស្រាវជ្រាវនិងនវានុវត្តន៍ឌីជីថល នៃបណ្ឌិត្យសភាបច្ចេកវិទ្យាឌីជីថលកម្ពុជា	សមាជិក
៩. លោកស្រី LEE Yun Nii	អគ្គនាយិកាប្រតិបត្តិក្រុមហ៊ុន អ៊ីប៊ីខេម	សមាជិក
១០. លោកបណ្ឌិត សៀវ សុខលី	អនុប្រធាននាយកដ្ឋានគោលនយោបាយវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋាន វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
១១. លោកបណ្ឌិត ចិន សុវណ្ណ	អនុប្រធាននាយកដ្ឋានគ្រប់គ្រងព័ត៌មានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃអគ្គនាយកដ្ឋានវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិកអចិន្ត្រៃយ៍
១២. កញ្ញា ហូ សុភាស៊ីង	ប្រធានការិយាល័យ នៃនាយកដ្ឋានបណ្តុះបណ្តាលវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍ នៃវិទ្យាស្ថានជាតិវិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍	សមាជិក
១៣. លោក ស្រី លីហ៊ុល	បុគ្គលិកស្រាវជ្រាវនៃមជ្ឈមណ្ឌលបណ្តុះបណ្តាលវិទ្យាសាស្ត្រ «តេជោ»	សមាជិក

ប្រការ៤.-

- អនុគណៈកម្មការអភិវឌ្ឍន៍ផែនការបង្ហាញផ្លូវបច្ចេកវិទ្យាទាំង៣នេះ មានតួនាទី និងភារកិច្ចដូចតទៅ៖
- ទទួលអនុវត្តការងារទៅតាមទិសដៅដែលបានដាក់ចេញដោយគណៈកម្មការដឹកនាំ និងសម្របសម្រួល ដល់ការអនុវត្តគម្រោង
 - សម្របសម្រួល ប្រមូល និងផ្តល់ធាតុចូលនានាតាមក្រសួង-ស្ថាប័ន ឬអង្គភាពសាមីដែលពាក់ព័ន្ធនឹងការ សិក្សារបស់គម្រោងទៅតាមរបៀបវារៈនៃការអនុវត្ត
 - ធានានូវសង្គតិភាពព័ត៌មាន និងទិន្នន័យដែលទទួលបាន និងផ្តល់ជូន និងទទួលស្គាល់ដោយក្រសួង-ស្ថាប័ន ឬអង្គភាពសាមី
 - សម្របសម្រួលការងារទាំងបច្ចេកទេស និងរដ្ឋបាលនៅតាមក្រសួង-ស្ថាប័ន ឬអង្គភាពសាមី
 - ពង្រឹងសមត្ថភាពបន្ថែមលើវិស័យ តាមរយៈសិក្ខាសាលា និងវគ្គបណ្តុះបណ្តាលនានា ដែលរៀបចំដោយគម្រោង

ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
 ៤៥ មហាវិថីព្រះនរោត្តម សង្កាត់ដំរីឃ្នុំ
 ខណ្ឌដូនពេញ ភ្នំពេញ ១២២០៥ (ព្រះរាជាណាចក្រកម្ពុជា)

ទទួលបានឯកឧត្តមកិត្តិសេដ្ឋាបណ្ឌិត ទេសរដ្ឋមន្ត្រី
 ទូរស័ព្ទលេខ៖ (៨៥៥) ២៣ ២១១ ៧៧៩
 អ៊ីម៉ែល៖ misti.s/cabinet@gmail.com

- ជាមន្ត្រីបង្គោលតាមក្រសួង-ស្ថាប័ន ឬអង្គការសាមីសម្រាប់ការអនុវត្តសកម្មភាពនានារបស់គម្រោង
- ទទួលអនុវត្តការកិច្ចផ្សេងទៀតដែលបានដាក់ចេញដោយគណៈកម្មការដឹកនាំ និងសម្របសម្រួលគម្រោង។

ប្រការ៥-

ពេលប្រធានគណៈកម្មការដឹកនាំ និងសម្របសម្រួលដល់ការអនុវត្តគម្រោង អវត្តមាន ឬមានករណីចាំបាច់ ប្រធានគណៈកម្មការដឹកនាំនិងសម្របសម្រួលដល់ការអនុវត្តគម្រោង អាចផ្តល់សិទ្ធិជូនអនុប្រធាន ដើម្បីដឹកនាំការប្រជុំ តាមការប្រគល់សិទ្ធិពីប្រធាន។

ប្រការ៦-

សមាជិកគណៈកម្មការ និងអនុគណៈកម្មការនីមួយៗ ត្រូវចូលរួមប្រជុំតាមការអញ្ជើញរបស់ប្រធាន និងទទួល ខុសត្រូវតាមបន្ទុកការងារដែលបានបែងចែក។ ប្រធានអនុគណៈកម្មការនីមួយៗ ត្រូវរាយការណ៍ការងារជាប្រចាំ និងតាម ការចាំបាច់ ជូនប្រធានគណៈកម្មការដឹកនាំ និងសម្របសម្រួលដល់ការអនុវត្តគម្រោង។

ប្រការ៧-

នាយកទុក្ខកាល័យ អគ្គនាយក អគ្គាធិការ ប្រធានមជ្ឈមណ្ឌល គ្រប់អង្គការពាក់ព័ន្ធ និងសាមីខ្លួន ត្រូវទទួល បន្ទុកអនុវត្តសេចក្តីសម្រេចនេះ ចាប់ពីថ្ងៃចុះហត្ថលេខាតទៅ។

ថ្ងៃ ច័ន្ទ ៧ កក្កដា ខែ កញ្ញា ឆ្នាំ ២០២២ ចត្វាស័ក ព.ស.២៥៦៦
ធ្វើនៅរាជធានីភ្នំពេញ ថ្ងៃទី ១៨ ខែ កក្កដា ឆ្នាំ ២០២២

លោករដ្ឋមន្ត្រី
រដ្ឋមន្ត្រីក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា
និងទំនាក់ទំនង A.C



កិត្តិសេដ្ឋាបណ្ឌិត ចម ប្រសិទ្ធ

កន្លែងទទួល៖

- ទីស្តីការគណៈរដ្ឋមន្ត្រី
- គ្រប់ក្រសួង-ស្ថាប័នពាក់ព័ន្ធ
- គ្រប់ថ្នាក់ដឹកនាំក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
- ដូចប្រការ៧
- ឯកសារ-កាលប្បវត្តិ

ក្រសួងឧស្សាហកម្ម វិទ្យាសាស្ត្រ បច្ចេកវិទ្យា និងនវានុវត្តន៍
៤៥ មហាវិថីព្រះនរោត្តម សង្កាត់ផ្សារថ្មី៣
ខណ្ឌដូនពេញ ភ្នំពេញ ១២២០៥ (ព្រះរាជាណាចក្រកម្ពុជា)

ទុក្ខកាល័យឯកទត្តមកិត្តិសេដ្ឋាបណ្ឌិត រដ្ឋមន្ត្រី
ទូរស័ព្ទលេខ៖ (៨៥៥) ២៣ ២១១ ៧៧៥
អ៊ីមែល៖ misti.sr@cabinet@gmail.com

Annex 2: Visions and Goals

Visions	Goals
<p>1. A digitally literate society and economy by 2035 or 2030</p>	<ul style="list-style-type: none"> • Minimise the digital device • Public service digitalisation • Digitalisation in the rural areas • More contribution from the private sector • Cyber security and data protection • Inclusion of digital curriculum in all schools
<p>2. Increasing the productivity and connectivity</p>	<ul style="list-style-type: none"> • Build infrastructure and connectivity • Increase digital literacy • Research & Development • Entrepreneurship and Innovation
<p>3. DigitalTech that is relevant locally and competitive internationally, dynamic and adaptive to the changing world, and focused on the positive impact for the country and the people (relevant and competitive, dynamic and adaptive, bringing positive impact)</p>	<ul style="list-style-type: none"> • Evolution: positive evolution for digital citizens, digital government, and digital business • Inclusion: inclusion for everyone in digital era: elderly, rural, people with disabilities and female • Knowledge hub: focus on skills and access to technology to support tech advancement for everyone

Annex 3: Strategic Products/ Services Scores

Products/Services	Code	Evaluation Criteria			Sum
		Economic Impact	Strategic Importance	Potential for Success	
Access to Digital Devices (including computer labs and makerspaces in schools)	1	57	58	52	167
Internet Infrastructure (fiber optic cables, routers, switches, satellites, etc.)	9	59	58	50	167
Online Business Registration Platform (transparent and clear closure process for companies)	6	56	55	52	163
STEM Focus in Education System (teacher training and student extra-curricular activities)	3	56	57	49	162
Re-skilling/Up-skilling Agency for Professionals (to connect training providers with businesses to support digital skills)	4	54	54	48	156
Raising Public Awareness on Digital Technology (via news, social media, events, etc.)	5	51	53	48	152
National Data Center (store public and private sector data securely)	12	50	54	46	150
Center of Excellence (regional technology transfer and talent pool)	13	50	51	47	148
Decentralized Financial Systems (blockchain-based)	11	53	49	44	146
Startup Support Programs (incubation and accelerator programs)	7	51	48	45	144
Free Online Educational Resources in Khmer (online access for fundamental digital skills)	2	50	49	39	138
Consumer Protection Enforcement (one point of contact online)	8	49	48	41	138
Hardware Development Center (PCB Assembly)	10	45	45	42	132

Annex 4: Key Technologies Scores

To induce DigitalTech to enhance productivity and efficiency, and to bring about innovation for socioeconomic development					
Score scaling from 1 to 5 1= Not at all Important 2= Slightly Important 3= Moderately Important 4= Very Important 5= Extremely Important					
Key Technology	Strategic Importance	Criteria			Sum
		Feasibility			
		Short-term 2024	Middle-term 2027	Long-term 2030	
Cybersecurity	45	42	44	45	176
5G	44	41	42	44	171
Automation Systems	39	35	43	44	161
Big Data	42	31	38	42	153
AI & Machine Learning	40	31	39	42	152
Computer Software	40	38	37	37	152
Wifi 6/7	40	33	40	38	151
Cloud Computing	38	33	37	39	147
Robotics	35	31	37	42	145
IoT	40	32	36	36	144
Natural Language Processing	35	32	37	38	142
Blockchain	35	31	34	39	139
AR/VR	32	29	32	35	128
Chatbot	28	29	33	32	122
Parallel Processing	31	26	33	32	122
Quantum Computing	30	21	26	30	107

