

A network diagram background consisting of a series of interconnected nodes and lines, with some nodes highlighted in light gray. The diagram is overlaid on a white background with a subtle geometric pattern of overlapping triangles in shades of orange, blue, and gray at the bottom.

# **Thailand Digital Economy and Society Development Plan**



# Thailand Digital Economy and Society Development Plan

1st edition

Prepared and published by



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# Executive Summary

The world is about to enter the age of digital economy and society. Digital technology is no longer a mere tool to facilitate people's work as it was in the past, but will be truly integrated into people's lives. Its transformative change will involve the very structure and forms of economic activities, production processes, trade, services and other social interactions, down to that of person-to-person. It is highly imperative for Thailand, therefore, to urgently adopt digital technology as an important growth engine to drive forward national development efforts. Specifically, digital technology can provide Thailand with solutions to many pressing challenges Thailand is facing, while creating more opportunities for further economic and social developments. This includes using digital technology to enable the country to achieve the following:

- Surpass the middle income trap, a priority target of the government's urgent national development plan, by investing in and developing existing domestic industries as well as other trending industries that include digital technology industries.
- Prepare for Thailand's entry into the ageing society where an altered demographic structure will significantly affect national productivity, requiring the use of digital technologies to assist in taking care of the aged.
- Raise competitiveness of domestic businesses, especially those small, medium and community enterprises, in various sectors -- from agriculture to production to services -- enabling them to compete effectively in the modern global arena.
- Solve chronic corruption problems by ensuring transparency in the public sector through public disclosure of information so that the public can participate in holding the government accountable for its operations.
- Adjust to and make the best of regional economic integration, especially from the arrival of ASEAN Economic Community in 2015 with its bearing on movement of goods and human resources from Thailand to the international community.
- Develop the potential of the country's human capital, including technology workers and non-technology workers, especially those in the agricultural, industrial and service sectors and the general public who must be smart, media literate and worldly-wise.
- Find solutions to social disparities, especially in income, education, healthcare, privilege, access to information, with the view to engendering a more comprehensive, equitable and fair distribution of resources and opportunities.

Being fully cognizant of these challenges and opportunities, the Royal Thai Government, through the Ministry of Digital Economy and Society, is launching a Digital Economy and Society Development Plan as a framework to utilize digital technology as a key mechanism for national economy and society development. The process involves transformation of conceptual paradigm in every sector; reform of business processes, production, trade and services; improvement of public administration efficiency; and betterment of people's quality of life. These efforts will eventually result in Thailand's prosperity, security and sustainability as stated in the government's policy.

## Vision Driving Transformation Towards Digital Thailand

Digital Thailand refers to a Thailand that can create and take full advantage of digital technology and all its potential to harness infrastructure, innovation, data, human capital, and other resources to drive national socio-economic development toward prosperity, stability and sustainability. There are four major objectives in the Digital Economy and Society Development Plan as follows:

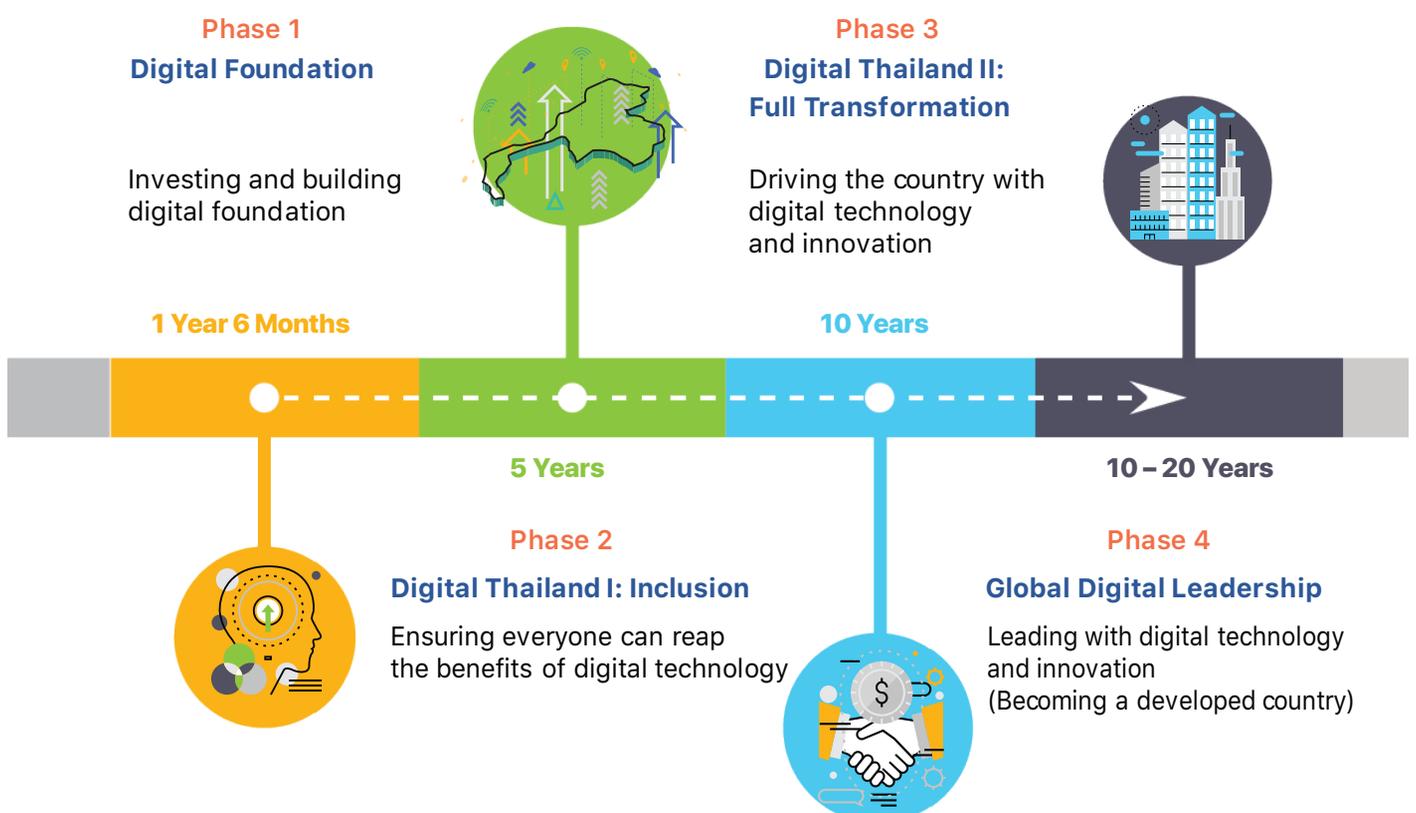


1. Enhancing Thailand’s competitiveness in the global arena by harnessing innovation and digital technology as major tools to create innovations in production and services.
2. Creating equal opportunities in society by upgrading people’s quality of life through news, information and services via digital means.
3. Reforming the paradigm of operations and services of the public sector by means of digital technology and data utilization to ensure transparency, efficiency and effectiveness.

4. Developing human capital towards the digital age by equipping every group of workers with appropriate knowledge and skills in preparation for a life and career in the digital age.

While the development of Thailand’s digital economy and society stresses the importance of long term sustainability in concordance with the country’s 20-year National Strategy, to better respond to the dynamism of digital technology the plan will also be divided into four phases as follows:

### 20-Year Thailand Digital Landscape



# Strategies for the Development of Digital Economy and Society



Six strategies are formed to achieve the vision and objectives of socio-economic developments through digital technology. They are as follows:

## Strategy 1: **Develop countrywide high-efficiency digital infrastructure**

This strategy is to provide every citizen with ubiquitous access to high-efficiency digital infrastructure. The technology to be adopted must have adequate speeds to satisfy public needs at reasonable prices that no longer present a barrier to people's access. In the long term, high-speed broadband will become a basic utility like roads, electricity and water that can be connected by everyone and to all things. This strategy consists of four programs as follows:

1. Developing high-speed countrywide broadband infrastructure that is up-to-date, stable, and responsive to needs of every sector, at fair and reasonable prices;

2. Positioning Thailand to become one of ASEAN hubs for connectivity and data exchange, serving as a route for regional data traffic and a site for housing world-class content providers;

3. Mapping out policies and plans to manage infrastructure, spectrum and future convergence of technologies in order to optimize the use of national resources;

4. Transforming telecommunication state enterprises in order to keep abreast of changes in advanced digital technology industries.

## Strategy 2:

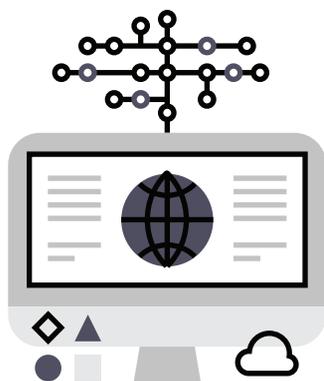
### Drive the economy with digital technology

This strategy aims at boosting the economy by enabling Thai businesses to use digital technology to decrease production cost of goods and services, to increase operational efficiency, and to develop long-term business competitiveness under the new paradigm. Moreover, emphasis will be placed on creating a digital business eco-system that enhances the competitiveness of Thai businesses, resulting in sustainable expansion of economic bases and employment rates in the future. The strategy will be driven by the following four programs:



### Strategy 3: Build an equitable and inclusive society through digital technology

This strategy is to equip Thailand with comprehensive services that, through digital technology, are thoroughly accessible to all groups of people, especially, farmers, people living in remote areas, the aged, the underprivileged and the disabled. By digital means, content and knowledge at both national and local levels are to be easily and conveniently accessed and utilized by the public. Thai people will be media literate, and tech-savvy enough to make use of digital technology with social responsibility. The strategy will be realized by five programs as follows:



1. Enhancing business competitiveness throughout the entire value chain by driving businesses to enter global digital value chains and use digital technology and data to reform their production of goods and services;

2. Increasing opportunities for agriculture as a livelihood and for online trade of community products by close cooperation of agencies from all public, private and people sectors;

3. Accelerating the launch of digital technology startups that will be important engines for driving digital economy;

4. Strengthening Thai digital technology industries, especially those that have potential and a future, so that they can innovate and compete over the long term.

1. Creating equal opportunities for access and use of digital technology by the public at large, in particular the elderly, the disabled and those living in remote areas;

2. Developing people's digital literacy, including their critical thinking skills and their ability to analyze media and information in free and open digital society;

3. Creating digital content, digital content repositories, and digital knowledge resources for lifelong learning that can be conveniently accessed by the people through all telecommunication, broadcasting and converged media channels;

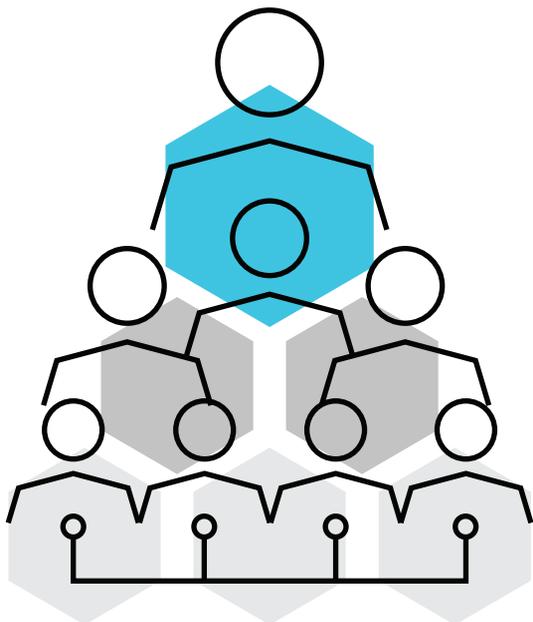
4. Increasing opportunities for students and the people to learn and acquire standard education at any age, anytime and anywhere through digital technology;

5. Increasing opportunities for the people to access modern, inclusive and equitable healthcare services by using digital technology, in preparation for the advent of ageing society.

#### **Strategy 4: Transform the public sector into a digital government**

Under this strategy, the government is committed to leveraging digital technology to improve the administrative efficiency of the central and provincial public agencies, hence converging government operations into a single entity that can deliver public services in digital forms to the people without any physical, spatial or language restraints. Besides, the future digital government will be open to public participation in determining the directions of social and economic development as well as national administration, and in proposing opinions on government operations. This strategy will be implemented through the following four programs:

1. Migrating to smart services that are driven by citizen or user needs, particularly services that target the general public, business people, and tourists;
2. Increasing efficiency and good governance in government by means of digital technology, with priority being given to the integration of investment in resources, data linkages, and operations by government agencies;
3. Promoting the release of high-value data in accordance with "Open Data" standards, thereby allowing for people and business participation in government processes;
4. Developing government service platforms that support newly developed applications or services.



#### **Strategy 5: Develop workforce for the age of digital economy and society**

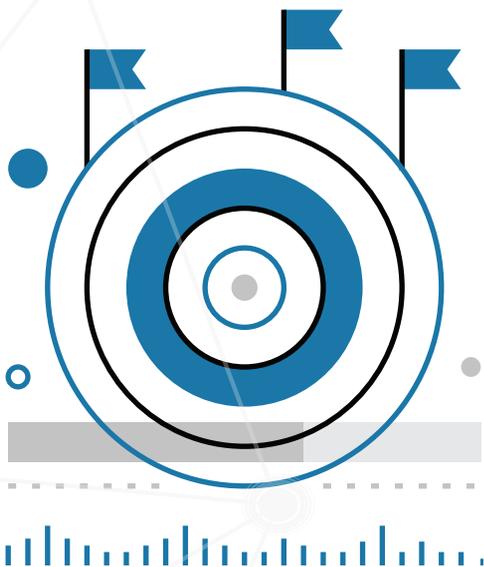
This strategy gives priority to the development of the working-age human capital in every profession and occupation -- in the public and private sectors -- equipping them with creativity and tech-savviness in their chosen livelihood. Digital technology workers will be further developed so that they will have the capability and specialized expertise in accordance with international standards, leading to the creation and employment of high-value jobs in a digital era. Three programs are earmarked for this strategy as follows:

1. Developing digital skills for workforce, including workers in both public and private sectors, in every profession and occupation, and of all age groups;
2. Promoting the development of specialized skills and expertise in digital technology professionals in the public and private sectors, preparing them for future demands;
3. Enhancing the capability of information technology executives that will enable them to harness the power of digital technology in their planning and operations and also to make use of big data in their agencies to create new value.

## **Strategy 6: Build trust and confidence in the use of digital technology**

Under this strategy, priority is given to instituting laws, regulations, rules and standards that are efficient, up to date and consistent with international standards in keeping with the growth of digital technology and its increased use in the future. This mechanism is to reduce obstacles, facilitate, and increase the efficiency of online enterprises and transactions, to ensure security and build trust, and to protect rights of every online user in every sector. The strategy will be implemented by the following three programs:

1. Updating digital standards, rules, regulations and protocols, rendering them more efficient, specifically to facilitate trade and drive socio-economic developments;
2. Amending and updating laws related to digital economy and society, in keeping with the dynamics of digital technology and social context;
3. Building public trust in digital technology and online transactions, by strengthening cybersecurity, data privacy and consumer protection.



# Driving Mechanism for the Development of Digital Economy and Society

In order to build an economic and social foundation in preparation for the country's entry into the digital age, an integrated and comprehensive driving mechanism is required. Therefore, priority is given to the four crucial elements as follows:

1. The first element focuses on putting in place an urgent and concrete set of actions, consisting of prioritized activities and projects (within 1 year and 6 months). Such actions are concentrating on investment in digital infrastructure and construction of the foundation for the country's digitalization, as dictated by the 6 strategies that aim to urgently develop infrastructure readiness, digital economy, digital society, digital government, digital workforce, and institutional foundation such as rules, regulations and standards.

2. The second element aims at reforming institutional structure, leading to improved government operations in terms of forms and modus operandi, integrated cross-ministerial functions, enhanced bureaucratic efficiency, decreased government responsibilities, and decentralized public administration. Moreover, this mechanism requires the setting up of a central unit, whose functions involve formulating policies, coordinating efforts, and driving national digital agendas with unity, efficiency and maximum effectiveness.

3. The third element calls for the integration of work, budget and resources in implementing the plan. A holistic approach is required for the integration of data and operations, while a responsible agency will be designated for each mission. Rules, regulations and the budgeting system will be improved and made more conducive to joint operations of government agencies. A coordinating system will be put in place to oversee public services provided by various government agencies. Moreover, the Digital Economy and Society Development Fund will be set up to provide a funding option for relevant digital projects, over and above the regular annual government budget.

4. The last element emphasizes the need for a monitoring mechanism on progress of policy and program implementation. At regular intervals, policies and programs must be followed up, scrutinized and evaluated on a continuous basis for their viability. If problems occur in the process of policy implementation, there must be a mechanism to intervene or provide additional resources which are adequate and timely. Formative findings must be reviewed and utilized to improve implementation in a tangible manner. Besides, every sector must be given the opportunity to participate in the entire process, from consultation, to public hearing, to scrutiny, to progress monitoring, leading to public administration that prioritizes transparency and operational achievements.

## PRIORITIZING URGENT AND CONCRETE ACTIONS

### REFORMING INSTITUTIONAL STRUCTURE

### INTEGRATING WORK, BUDGET AND RESOURCES

### MONITORING AND EVALUATING PROGRESS

## Prioritized Activities and Projects During The First Phase

Prioritization of activities and projects is a prerequisite for effective and concrete implementation of the Digital Economy and Society Development Plan. The first phase of one year and six months will be devoted to putting in place digital foundation necessary for the country's further development. Some important projects may be cited as examples:

### 1. Digital Infrastructure

- Broadband project to roll out country-wide, high-speed internet networks to every village in the country;
- International connectivity project to upgrade Thailand's international connectivity infrastructure for direct connection with global Internet exchange hubs;

### 2. Digital Economy

- Community e-commerce project to strengthen grassroots economy for income generation in communities and urbanization of community markets;
- Digital transformation project to strengthen Thai business competitiveness for entry into digital trade and the global digital value chain;
- Digital clusters project to drive digital clusters under the national policy to promote special economic zones and super clusters;
- Digital workforce project to create and foster workforce for technology startups, for innovation skills and competence needed for new products and services;
- Industry promotion project to promote digital industries, including creative digital media, for entry into the world's market;

### 3. Digital Society

- Digital community centers project to expand and transform digital community centers to serve as community access points for Internet access, government services and knowledge sharing services;
- Lifelong learning project to promote lifelong learning by means of e learning and Massive Open Online Courses;
- Digital literacy project to promote useful and creative use of digital technology (digital literacy) in children, youth and the general public.

### 4. Digital Government

- Smart service project to upgrade the quality of public services through improved government procedure, integrated data and operations, and people-centric services;
- Driving for legislation related to the promotion and development of digital economy and society.

## Preamble

Under the current leadership of Prime Minister General Prayut Chan-ocha, Thailand is undergoing a substantial reform in every dimension of socio-economic development. In this connection, the government is fully cognizant of the utmost urgency to deploy digital technology as an important tool to reform Thailand for greater stability, prosperity and sustainability. In his policy statement to the National Legislative Assembly, the premier touched on his policies on digital economy and society in these terms:

“ 6.18 The government will promote the sector of digital economy and lay down the foundation that will tangibly drive digital economy forward such that it will move every sector of the economy towards global competitiveness. This involves production and trade in actual digital products including hardware, software, digital communication devices, and digital telecommunication equipment as well as use of digital technology in support of services of the financial sector and other service businesses, especially communications and entertainment. Digital technology will also be used to support industrial production and develop a creative economy. The government will improve the role and mission of responsible agencies, enabling them to take charge of the task to drive this important agenda of the nation. A national level committee will also be set up to tackle this agenda.”

For maximum efficiency, effectiveness and tangibility in its policy implementation, the cabinet resolved on September 30, 2015 to entrust the then Ministry of Information and Communication Technology (present Ministry of Digital Economy and Society) and the Ministry of Science and Technology with the task to draw up a plan for the development of the economy and society to replace the existing national information and communication technology (ICT) master plan.

The new plan is to serve as a framework for the implementation of government policies on digital economy and society. Up-to-date and diverse digital technologies will be applied to transform business processes, people's lifestyles, and government operations, resulting in economic prosperity, global competitiveness and social stability.

This Digital Economy and Society Development Plan is no novelty to Thailand. It is rather the continuation of on-going national development through digital technology, carried out by the then Ministry of Information and Communication Technology and other relevant agencies from the public and private sectors, to academia and civil society. Be that as it may, technology and socio-economic changes are racing towards the digital age. Several countries throughout the world – for instance, the United States of America, European countries, Australia, Singapore, Malaysia, and India -- are competing in developing and driving their countries by digital technology. Therefore, this particular plan is aimed at reforming Thailand to keep up with the new environment. It involves investing substantially in urgent construction of digital foundation; establishing digital economy and society that require people's active participation in accordance with the public-private-and people partnership approach; utilizing the full potential of digital innovations to drive socio-economic systems; and striving to place Thailand in the group of developed countries that have been able to use digital technology to create value and drive their socio-economic systems sustainably in the long run. The Thailand Digital Economy and Society Development Plan is guided by the following five principles:

## **1 Consistency with the direction of national development**

The plan must be consistent with and in support of the overall direction of national development. Digital technology will be applied to find solutions to problems and challenges that present-day Thailand is facing as well as anticipated challenges that may arise in the future.

## **2 Maximization of digital technology**

Every sector must be supported by the Digital Economy and Society Development Plan to make the best of rapidly changing dynamics of digital technology that affect economic and social structures positively and negatively so that Thailand can leverage digital technology for leapfrog development of economy and society.

## **3 Inclusive access for all**

The strategies and programs under the plan must support access to digital technology by every group or as many groups of the people as possible, including the poor who live in remote areas, the elderly, the disabled and other underprivileged groups. Emphasis must be placed on people participation as well as access to technology, news and information, learning media, and every form of government digital services.

## **4 Realistic planning on the basis of national readiness data**

The strategies and programs of the Digital Economy and Society Development Plan must take into account Thailand's digital readiness in several dimensions -- including infrastructure, access to and utilization of technology by the public, businesses, government agencies, industrial workforce readiness and so on -- so that all the measures mapped out by this plan can be translated into concrete implementation.

## **5 Synergy of every sector in implementation**

Translation of the plan into practice must be driven by the "public-private-and people partnership" concept that emphasizes cooperation, unity and synergy of every sector, namely the people sector, the academia, the businesses, and the government, resulting in the beneficial outcome being returned to every sector. In the case of digitalization, priority will be given to the leadership of the people sector and businesses in socio-economic development, while the government sector will serve as a facilitator that promotes and supports the people sector and businesses in parallel with the improvement of the government's own efficiency via digital means.

# **1. Thailand's Context in the Digital Age: Challenges and Opportunities**

Thailand has throughout the years attached importance to the development and use of information and communication technology as enabling technology in national development. Priority has been given to such areas as expanding ICT infrastructure -- especially high-speed broadband-- so that its coverage becomes comprehensive like other public utilities; building capacity to ensure that people become knowledgeable and able to access, develop and make use of information intelligently; promoting ICT industries so that the industries can increase their contribution to the nation's economic development; creating economic opportunities through ICT by enabling people to generate incomes and attaining a better quality of life; and increasing the use of environmental-friendly ICT in socio-economic developments.<sup>1</sup>

At present, the government is fully aware of the influence of digital technology on socio-economic development. It is both an opportunity and a challenge for Thailand to redirect the country's operations by making the most of digital technology. This chapter therefore summarizes Thailand's socio-economic challenges and opportunities, challenges from digital technology dynamics, and the present status of Thailand's digital development. They are as follows:

## **1.1 National development direction: Thailand's overall challenges and opportunities**

Rapidly changing circumstances that are taking place domestically and globally have significant impact on Thailand's development environment both now and in twenty years' time. While this changing environment presents conditions, problems and challenges that Thailand has to face and find solutions to, it also offers national development opportunities, of which the country must take advantage of. Examples of Thailand's challenges and opportunities may be cited as follows:

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<sup>1</sup> Thailand Information and Communication Technology Policy Framework (2011-2020) was approved by the Cabinet on March 22, 2010 and was subsequently used as a framework to draw up the country's 5-year master plans.

## 1) Surpassing the middle-income trap

Surpassing the middle-income trap where Thailand has been confined for quite some time. To move on to the status of a high-income country is one of the urgent development targets of the government. This could be achieved by investing in and developing both existing industries and new-trend industries, especially, digital industries.

## 2) Capacity building in agricultural, industrial and service sectors

- Enhancing Thailand's competitiveness, Thailand is still unable to progress to the group of countries that compete through innovations.<sup>2</sup> The country still relies on government and business efficiency, cheap labor, and imported capital as the main development drivers as opposed to making use of technology and information infrastructure.

- Strengthening small and medium enterprises or SMEs. While these business entities employ as much as 80.4 per cent of the local workforce, their business value accounts for only 37.3 per cent of GDP.<sup>3</sup> They are characterized by mediocre productivity as well as low access and utilization of digital technology, in comparison with large enterprises.<sup>4</sup>

## 3) Adjusting to and optimizing economic integration

- Making the most of economic groupings, especially the entry into ASEAN Economic Community in 2015, as well as other regional economic groupings that have direct impact on Thailand. The country needs to adjust itself to a multi-polar global economy, exacerbated by problems faced by the world's leading economies, including the United States of America and Japan. These factors will underpin the country's strategic drive in economic development.

- Maximizing the potential of Thailand's location at the center of the Indochinese Peninsula in Southeast Asia. Also, its rich and diverse flora and fauna form a solid foundation for agricultural production. The country counts among those that have the most diverse tourist destinations. The quality of its skilled workforce is also recognized at the international level.

## 4) Solving the problem of social disparities

Addressing social disparities which comprise many aspects, including human capital development, education, income, societal opportunities, access to benefits and public services. Inequality can take the form of digital divide or the gap between those who have access to and make use of digital technology and those who fail to access, understand or utilize ICT.

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<sup>2</sup> In ranking competitiveness of countries around the world, World Economic Forum classifies countries into 3 stages of development, namely factor-driven economies, investment-driven economies, and innovation-driven economies. Thailand is placed in the investment-driven group.

<sup>3</sup> The Office of SMEs Promotion (OSMEP). 2012, *SME Status and Economic Indicators 2012, 2013* [http://www.sme.go.th/th/images/data/SR/download/2014/07july/Lesson 1 GDP SME 2556.pdf](http://www.sme.go.th/th/images/data/SR/download/2014/07july/Lesson%201%20GDP%20SME%202556.pdf)

<sup>4</sup> The Office of SMEs Promotion (OSMEP) and Department of Intellectual Property [http://www.ipthailand.go.th/index.php?option=com\\_content&view=article&id=52&Itemid=186](http://www.ipthailand.go.th/index.php?option=com_content&view=article&id=52&Itemid=186) *Global Competitiveness Report* (<http://www.weforum.org/issues/globalcompetitiveness/index.html>)

## 5) Managing the ageing society

Managing the entry into the ageing society of Thailand and the world on a continuous basis. According to an International Labor Organization report, Thailand faces an unprecedented ageing population, in which by 2025 people over the age of 65 will account for about 20 per cent of the total population and by 2050 the percentage of the elderly will increase to 30 per cent. To cope with shifting population demographics, the country has to take into account their significant impact on productivity, future labor contribution, and the need for assistive and digital technologies to take care of the elderly.

## 6) Maximizing the potential of domestic human capital

Maximizing the potential of domestic human resources by means of digital technology. As an enabler, digital technology will upgrade the human capital, moving towards a knowledge-based society where workforce must possess the ability to use technology in production and use technology and information in their livelihoods. As for the general public, digital technology will enable access to information that help transform them into smart, media literate and worldly-wise individuals.

## 7) Solving the problem of corruption

Solving the problem of chronic corruption that impacts the country's structure and development in every dimension. In the eye of would-be foreign investors, this is the number one obstacle to investing and doing business in Thailand.<sup>5</sup> Important cases of corruption involve public procurements and annual budget expenditure.<sup>6</sup> Also, local administration organizations have the highest complaints lodged against them for their corrupt practices. It is imperative, therefore, to create transparency in the public sector through information disclosure that allows civil society to scrutinize government operations within the framework of relevant laws and regulations.

## 8) Responding to cyberthreats

Responding to new forms of emerging threats, particularly constantly evolving cyberthreats. Such threats require preparedness and capacity building of cybersecurity professionals. Skills and knowledge must be developed to protect both themselves and their organizations, mitigating risks from cyber attacks or threats as well as any subsequent damage.

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<sup>5</sup> Based on the assessment of *The Global Competitiveness Report (2013-2014)*

<sup>6</sup> <https://www.nacc.go.th>

## **1.2 Challenges posed by digital technology dynamics**

Digital technology exerts an enormous influence on every citizen's lifestyle as well as operations of businesses, public and private sectors and every civil society organization. However, digital technology undergoes rapid changes at every moment while remains unpredictable in the long run. Consequently, the digitalization of the economy and society must factor in future technological changes and their implications. Changes and their significant impact caused by digital technology may be cited in the following instances:

### **1) Exponential growth of technological changes**

In the next five years, the following technologies are expected to play important roles: new communications technology, mobile and wearable computing, cloud computing, big data analytics, Internet of Things, 3D printing, and cybersecurity. Other technologies, such as robotics and autonomous car, will also be of great import in the long term.

### **2) Convergence of online and offline activities**

Use of new technologies or existing ones in new forms is blurring the line between physical and virtual socio-economic systems. More activities that are carried out by people, businesses or the government will migrate online, including communication, buying and selling of goods, financial transactions, learning, healthcare, public services, and so on.

### **3) Tendency to use digital technology for production rather than consumption**

In the past, people used technology mostly for communication and access to information or entertainment. The present age sees people and consumers transformed into producers by deploying digital technology for production and generation of higher incomes be the most important issue in the age of big data.

### **4) Competition on the basis of innovation**

In the digital world, competition by pricing (such as price cutting of online goods and services) is a thing of the past. Businesses that could not transform their business models, add value to their existing goods and services, or create novel goods and services to respond to market demands, will no longer be able to compete.

### **5) Increasing prevalence of smart everything**

With the advent of the new age, technologies and smart applications will be increasingly used in economic and social activities. At the people's level, such technologies will be prevalent in people's everyday lives at home, in their travelling, in healthcare, and for energy use. As for industrial use, technologies will be deployed in agriculture and factory production of goods. Digital use in disaster warning, environmental conservation and a host of activities will also be more pronounced in the future.

### **6) Data-driven competition**

A massive amount of data is now being generated by users and all kinds of sensors. The digital world is a world of data-driven competition. Big data analytics capability will become a necessity, a foundation for every organization in the public and private sectors. Besides, personal data will become very important in business operations and data privacy will be the most important issue in the age of big data.

### **7) Proliferation of cyberthreats**

Emerging concomitant cyberthreats in various forms, including harassment and abuse of users, unauthorized access to data and systems, interruption of data and systems, systems destruction, data espionage on computer systems (trade, financial or personal data), or even attacks on critical infrastructure that could cause the economy to collapse and result in damage to lives and assets. These cyberthreats evolve rapidly with advancing technologies. They often originate from abroad, making them even more difficult and complex for crime prevention or apprehension.

## 8) Change in workforce structure

Workforce structure is now undergoing a sea change, both negatively and positively. Many kinds of jobs, especially in industrial and service sectors, will be gradually replaced by more capable and more efficient digital technology (such jobs as ticket sales and financial services). At the same time, novel forms of jobs requiring higher levels of skills and knowledge will emerge, such as data scientists or specialists, cybersecurity specialists, social network specialists, digital entrepreneurs and so on. Moreover, certain type of jobs will take on a different profile. Teachers in the future may change their role, shifting focus from lecturing to facilitating learners, for instance.

# CHALLENGES POSED BY DIGITAL TECHNOLOGY DYNAMICS

These relentless and fast-paced changes of digital technology have great impact on lifestyles, forms and activities of individuals and organizations, as well as the overall economy and society. Therefore, the capability to make the most of digital technology is an important factor in national development. An assortment of countries are aware of this fact and have been investing in the development and promotion of digital technology that leads to digital economy and society. By definition, digital economy and society refer to the economy and society that rely on digital technology as a major enabling mechanism in the conduct of economic and social activities, in people's daily living, in conceptual paradigm shift, in the way people interact in society, and in the reform of business processes — including production, trade and services, and public administration — resulting in development of economic and social wellbeing. Based on major characteristics of digital technology capabilities and dynamics, Thailand's development approach to digital economy and society will emphasize the following aspects:

### 1) Use of digital technology for connectivity

Digital technology will be used as a tool to connect domestic economic and social activities with those of global communities. This connectivity leads to the sharing of resources, new ideas, and mutual benefits in a borderless manner, with every citizen in the country playing an active role and participating equally and fully.

### 2) Use of digital technology to drive innovation

The economy and society will be driven by innovation especially digital innovation for value creation, enhanced global competitiveness, and better quality of life for the people.

### 3) Use of big data for economic and social purposes

Great emphasis will be placed on the generation and optimization of big data, be it by manual recording -- such as financial data, customer data, social media data -- or by machine through the networks of Internet of things. Results from big data analytics could be used to improve operational efficiency in production and services, ultimately building the country's competitive edge in the digital age as well as improving the provision of public services for the people.

### 4) Use of digital technology for inclusion

The approach to digital economy and society will take into account the use of digital technology in a widespread and pervasive manner. This is so that every sector and group of people can participate in the creation of and the drive toward, a Thai society where everyone can become a producer and a value creator.

### 1.3 Present status of Thailand's digital development

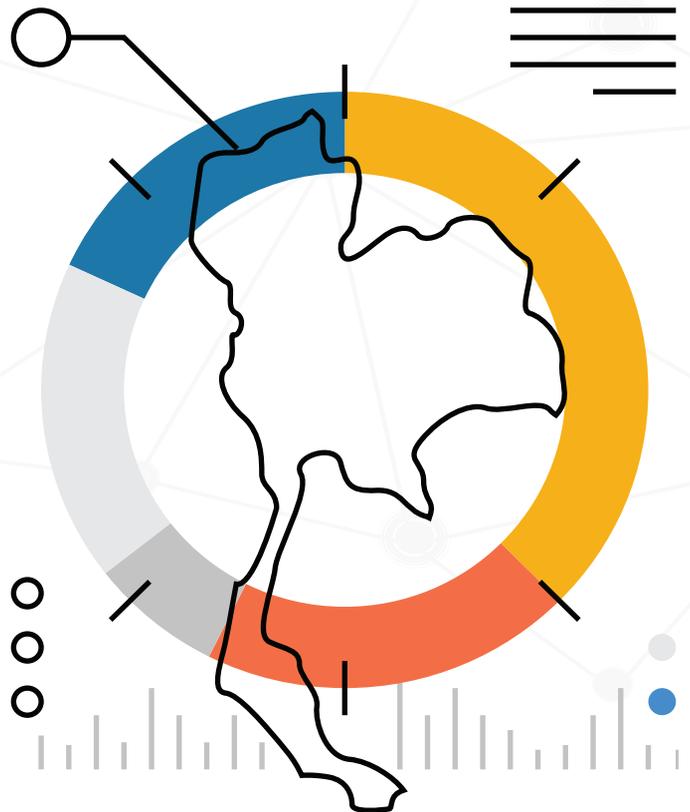
Whether and to what extent can Thailand make use of digital technology in national development depends on its present digital readiness, and its capability to develop and enhance its digital strength in the future. Consequently, in mapping out the Thailand Digital Economy and Society Development Plan, the present status of digital development must be assessed.

#### 1) Digital infrastructure development

The weakness of Thailand's digital communications infrastructure lies in its distribution and coverage, resulting in low level of access, and utilization in the people, private and public sectors. Fixed broadband penetration rates in Thailand are only 29.96 per cent of households or 8.99<sup>7</sup> per cent of the population. However, mobile broadband penetration rate is reasonably high at 52.5 per cent of the population.

When taking area into consideration, it is found that not all areas are covered by digital communications infrastructure. At the village level in particular, there are approximately 53 per cent of the 74,965 villages countrywide that are connected to broadband. The remaining villages are located in remote areas where development of adequate communications infrastructure is still lacking. Consequently, a number of important public agencies still have no access to broadband, including schools, tambon (district) health promoting hospitals, and tambon (district) administration organizations.

In addition, connectivity at both individual and organizational levels also depends on affordability. In Thailand, broadband service charge accounts for 5.8 per cent of its gross national income (GNI) while charges in neighbouring countries are much lower.



International Internet bandwidth and connectivity of international communications networks are also a good indicator of the quality of digital infrastructure. In the past decade, international Internet bandwidth in regions and countries across the globe had vastly grown in volume to meet the demands of massive data traffic generated by applications and services through broadband networks. More than 50 per cent of Thailand's total volume of international Internet bandwidth passes through such countries as Singapore, Malaysia and the United States of America that are hubs of Internet connection and data exchange as well as sites of large data centers that serve the needs of users. While Thailand is connected with neighbouring countries through terrestrial fiber optic cables and with other countries through submarine communications cables, it still has fewer international communications links than its neighbours, especially the submarine cables of which Thailand possesses only 11 (and operates only 5), with 4 landing stations.

<sup>7</sup><http://www.nbt.go.th/TTID/>

## 2) Digital technology in societal sector

Digital technology is capable of upgrading the people's quality of life in several dimensions, from creating learning opportunities, increasing incomes, and facilitating access to public services. However, Thailand's utilization rates of ICT (computer and Internet)<sup>8</sup> are still low, with only 34.9 and 39.3 per cent of computer users and Internet users respectively in 2015. Moreover, urban users (living in municipal areas) had better access than those living outside the municipalities, while most Internet users were aged between 15-34. Since fiscal year 2007, the then Ministry of Information and Communication Technology has been setting up a total of 1,980 ICT community learning centers to serve as learning centers, help bridge the digital divide and increase opportunities, and provide channels to access information for the general public. These centers nevertheless do not have a countrywide coverage so they must improve their services for higher efficiency. More ICT centers set up and run by other agencies from the public and private sectors should be incorporated.

Digital technology is also a critical enabling tool in education and learning. At present, over 30,000 schools across Thailand are still lacking Internet connection.

# DIGITAL— TECHNOLOGY IN SOCIETAL SECTOR

Besides, the number of computers and teaching/learning devices do not match the number of learners while being obsolete. Teachers are not skilled in applying technology to their teaching, resulting in their being unable to efficiently use technology in their instruction.

It should also be noted that Thailand is plagued with the problem of "content divide"<sup>9</sup> where existing digital content is neither diverse nor responsive enough to the needs of its people. This aspect of digital divide poses a serious problem, particularly with the shortage of relevant teaching/learning materials that lead to viable livelihoods (such as those related to vocational education) and materials that respond to people's needs at the grassroots level, in terms of their differing economic, social, educational and cultural realities.

It is not surprising, therefore, to find that most people still use digital technology for entertainment purposes, and fail to take full advantage of it despite their having continually widening access to digital technology via mobile devices, such as smartphones and tablets. Also, certain digital skills necessary to society must be further developed, ranging from critical thinking, to media literacy, to socially responsible usage of technology.

<sup>8</sup> National Statistical Office: Survey on household usage of information and communication technology, 2015.

<sup>9</sup> OECD, ISOC, UNESCO, (2012). *The Relationship between Local Content, Internet Development and Access Prices*.

### 3) Digital technology in business sector

Digital technology is still not widely used in businesses. Specifically, small and medium-sized enterprises (SMEs) is still using digital technology in a limited fashion. A survey conducted on usage of ICTs in enterprises by the National Statistical Office in 2015<sup>10</sup> found that only 22.5 and 18.3 per cent of SMEs (employing 1-9 persons) used computers and the Internet respectively while 99.6 and 99.1 per cent of large businesses used computers and the Internet respectively. When considering online trade in goods and services, it was found that only 2.6 per cent of SMEs sold their goods online. It is highly necessary, therefore, to encourage and promote online trade in SMEs and community enterprises, which account for most of the nation's businesses. Only then can market opportunities be opened up to Thailand's grassroots entrepreneurs that, in turn, will further strengthen the economy.

As far as digital industries are concerned, Thailand currently has a two-pronged policy to drive an S-curve economic growth. One way is to invest in already established industrial clusters in the country in order to optimize manufacturing inputs, resulting in economic growth in the short and medium terms. The other way focuses on investing in new industries in order to change the forms of goods and technology, positioning these new future industries as the new growth engines of national economic development. In this instance, the digital cluster is given the role of a major growth engine<sup>11</sup>.

In any case, the current digital industries (or ICT industries) in Thailand are facing global and domestic economic volatility. In particular, the rising minimum wages -- when compared with those in neighbouring countries such as Vietnam and Indonesia -- have resulted in relocation of production base to those countries with lower wages. Meanwhile, digital technology startups, a new economic engine to drive the country towards digital economy, are gaining popularity and attracting a great deal of attention due to their potential to apply digital technology to the setting up of new and disruptive businesses. One major problem of domestic digital technology businesses, however, is their being small or micro SMEs, with value not high enough to attract domestic or international venture capital.

### 4) Digital government readiness

In the United Nations e-Government Readiness Ranking Report of 2014, Thailand was demoted from the 92nd rank of 2012 (with a score of 0.5083) to the 102nd rank (with a score of 0.4631) out of 193 countries. It was revealed in further detail that, in 2015, government usage of ICTs was rather low, as Thailand was ranked 80th out of 143 countries in that dimension. On the other hand, in the same year of 2015, Thailand was ranked 42nd out of 122 countries by the Global Open Data Index, climbing 17 places from the 59th rank out of 97 countries in the previous year.

In addition, current government information systems are not as integrated as they should be. As it is still difficult to share and use data across government agencies, these agencies have to collect the same data separately, demanding the public to submit information repeatedly to comply with each agency's differing requirements. Resulting data also lacks uniformity, translating into time-consuming services that incur great expenses and often add no value to either the government agencies concerned or the public. Major obstacles that make the integration of government information systems difficult are several, from lack of an integrated inter-agency operating procedure, to differing data-collection requirements and data naming criteria, to diverse designed structure and format of electronic data, and to use of different communication rules for request and response between systems.

<sup>10</sup> National Statistical Office, *Summary of preliminary findings, Survey on usage of ICT in enterprises, 2015.*

<sup>11</sup> Fiscal Policy Office, [http://mof.go.th/home/Press\\_release/News2015/109.pdf](http://mof.go.th/home/Press_release/News2015/109.pdf)

## 5) Human capital development

Although the number of ICT workers in the labor market during 2011-2014 was on an upward trend, the number of 570,705 ICT workers in 2014 was accounting for only 1.49 per cent of the entire workforce of the country<sup>12</sup>. The percentage has persisted during the past four years, implying that Thailand's digital workforce is very small in comparison with that of neighbouring countries. Moreover, the top two groups of ICT workers are electronics technicians and ICT technicians respectively, both of which are considered lower-skilled ICT workforce. Meanwhile, ICT professionals account for only 11.6 per cent of ICT workforce. In this group, there are 50,934 software workers<sup>13</sup>, most of whom were programmers, while only 1,536 workers specialized in embedded technology. These figures show severe and continuous shortage of ICT personnel. Other professionals such as business analysts, software engineers, and systems engineers are also too few to meet the demand of domestic digital technology industries while the skills most in demand in the digital technology market are object-oriented design and programming.



The National Statistical Office has reported a classification of ICT fields that will be in high demand in Thailand's digital technology market in the next five years, consisting of cloud computing, big data, mobile application and business solution, for the reason that these emerging technologies can efficiently respond to the demands and usage behavior of diverse consumer groups.

Another important group of workforce are employees and entrepreneurs, who are ICT users. The proportion of employees, who use ICT in their workplace, however is not that large. These enterprises have not yet perceived the necessity of introducing the computers to their business operations. Therefore, under the present circumstances it is critical to build digital competency in entrepreneurs, especially top executives. Policy-makers on digital economy must bear in mind the need to incentivize management to adopt digital technology in their operations.

It is crucial, therefore, that Thailand develop its human capital in both quality and quantity. Skill groups that are in demand must be developed. Digital workforce must be restructured systematically and holistically, by all relevant agencies. The readiness of digital workforce is extremely necessary, especially when the country is aspiring to become an innovation-based economy — where new professions will emerge along with the advancement of digital technology industries.

<sup>12</sup> The status of ICT workers is used to serve as a baseline for the analysis of digital workforce in the drafting process of this plan. Digital workforce per se is a new concept that requires new procedure of data collection as well as new thinking regarding workforce restructuring in an integrated manner, with all involved agencies.

<sup>13</sup> Software Industry Promotion Agency (Public Organization), Survey on software workforce, 2013.

## 6) Laws, regulations, and conditions conducive to digital development

Despite increasing volume and value of electronic transactions year on year, at 2.03 trillion Baht and 2.11 trillion Baht in 2014 and 2015 respectively,<sup>14</sup> a large number of people still do not trust online transactions, being concerned about possible online purchase frauds. Moreover, ICT advancement is inevitably accompanied by cyberthreats, which can cause damage at both personal and national levels. In 2014, statistical data compiled by ThaiCERT revealed that malicious code, or program causing malfunction and damage to computer systems, was the number one cyberthreat of Thailand, at 43.3 per cent of all cyberthreats. Also, there were as many as 4,371 computer security incidents being reported in 2015, making Thailand the country with the largest number of reported security incidents, followed by Germany and the United States of America. These cyberthreats necessitate immediate response, constant surveillance and active prevention, because they have impact on user trust in digital technology, while causing incalculable loss and damage.

At present, government agencies are providing more and more electronic public services, also known as e-services. And by means of fast-evolving digital technology, important data on public services and administration is increasingly being collected, stored and processed electronically.

Nevertheless, a number of government agencies are still unaware of the danger and impact of security breaches on computer data or systems and data privacy. The problem exists, even with the fact that the Royal Decree on Criteria and Guidelines on E-Government B.E. 2549 (2006 A.D) a subordinate law under the Electronic Transactions Act, B.E. 2544 (2001 A.D.), Section 35 stipulates that all government agencies involving in electronic transaction processes, map out policies and guidelines on data security and data privacy in their organisations in order to ensure security and reliability of electronic transactions and make electronic data legally binding in compliance with the law on electronic transactions.

In summary, considering the current status of digital development in all 6 areas above, Thailand has made significant progress. But entry into a true digital economy and society requires the country to undergo an urgent reform in technology usage and innovation, hence responding more rapidly to new challenges and opportunities in such areas as economic development, social development, reform of public administration and services, solution to corruption problems, or even development of capability to leverage new digital technologies for future

## **SOCIO-ECONOMIC DEVELOPMENT.**

<sup>14</sup> Electronic Transactions Development Agency (Public Organization), Survey on the value of electronic transactions in Thailand, 2015.

## 2. Vision and Goals

As detailed in the previous chapter, this Thailand Digital Economy and Society Development Plan has been guided by five basic principles from ensuring consistency with the direction of national development; maximizing the use of digital technology; guaranteeing inclusive access to digital technology; making realistic planning based on national readiness data and to generating synergy from every sector in a public-private-people partnership fashion in order to bring about real reforms in the economic, social and public sectors.

### 2.1 Vision for the development of digital economy and society

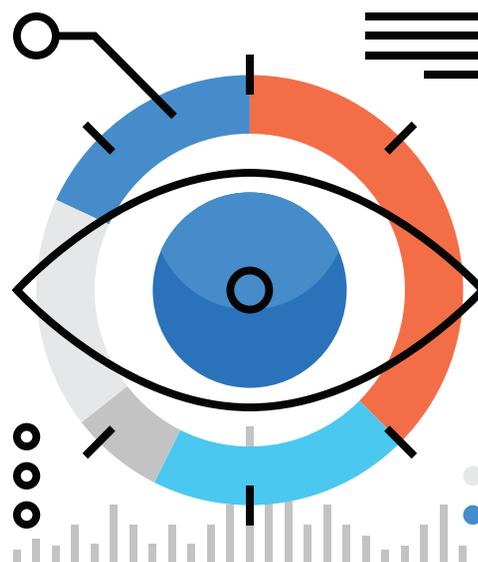
Priority is given to continuous and sustainable digitalization in keeping with the 20-year National Strategy. But in order for the plan to support the dynamics of digital technology, the digital landscape is divided into four phases, leading to successful national development as contained in the vision:

Digital Thailand refers to a Thailand that can create and take full advantage of digital technology and all its potential to harness infrastructure, innovation, data, human capital, and other resources to drive national socio-economic development towards prosperity, stability and sustainability.

### Driving Transformation towards Digital Thailand

#### 2.2 Goals and key success indicators <sup>15</sup>

The Thailand Digital Economy and Society Development Plan has set the following development goals in a ten-year time frame:

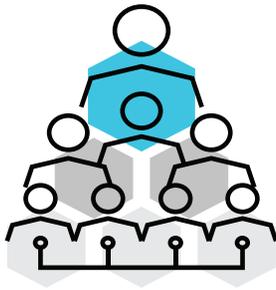


<sup>15</sup> The European Union has developed the Digital Economy and Society Index to assess the capability and evolution of a country in digital technology. Five dimensions of development are taken into account: connectivity, human capital, use of the Internet, integration of digital technology and digital public services. The application of the index is, however, still limited to countries in the EU.

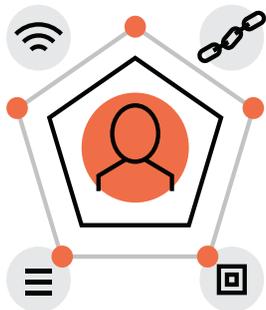
# 10-Year Goals Digital Thailand



**1. Enhancing Thailand's competitiveness in the global arena**



**2. Creating equal opportunities in society**



**3. Developing human capital towards the digital age**



**4. Reforming the paradigm of operations and services of the public sector**

## Enhancing Thailand's competitiveness in the global arena

**Goal 1:** Enhancing Thailand's competitiveness in the global arena by harnessing innovation and digital technology as major tools to create innovations in production and services.

- Thailand harnesses digital technology to develop innovation and create new businesses that can compete in the global arena.
- Digital industries play a more important role in economic and social development while achieving recognition and acceptance from international communities.
- Thai economy is strengthened from within, where grassroots businesses and SMEs deploy digital technology to strengthen business capabilities and create opportunities for global market penetration.



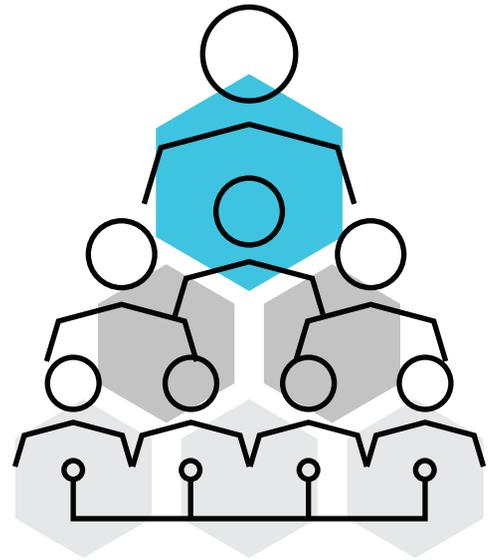
### **Indicator:**

- 1) Thailand is ranked one of the 15 most developed countries by World Competitiveness Scoreboard.
- 2) Digital industries contribute significantly to Thailand being a high-income country, with an increased share in GDP at 25 per cent.

## Creating equal opportunities in society

**Goal 2:** Creating equal opportunities in society by upgrading people's quality of life through news, information and services via digital means.

- Every group of people, especially the socially underprivileged, has equal access to digital technology and media.
- People enjoy improved quality of life by having access to information resources and public services, especially basic and necessary services, via digital technology.



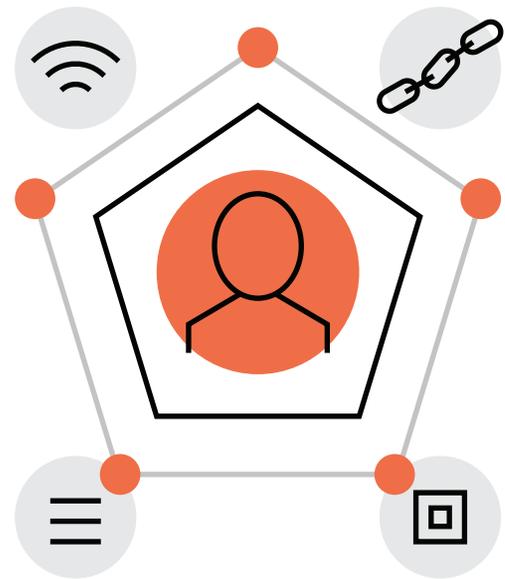
**Indicator:**

- 3) Every citizen must have access to broadband as a public utility.
- 4) Thailand is ranked one of the 40 most developed countries by the ICT Development Index (IDI).

## Developing human capital towards the digital age

**Goal 3:** Developing human capital towards the digital age by equipping every group of workers with appropriate knowledge and skills in preparation for a life and career in the digital age.

- People are capable of using and developing information efficiently, being fully aware of and knowledgeable in digital literacy.
- Digital workers in Thailand possess an international level capability and expertise while the general workforce can use digital technology in their own operations and creation.



**Indicator:**

5) Every citizen is aware of and knowledgeable in digital literacy.

## Reforming the paradigm of operations and services of the public sector



**Goal 4:** Reforming the paradigm of operations and services of the public sector by means of digital technology and data utilization to ensure transparency, efficiency and effectiveness.

- Digital technology creates a paradigm shift in the operations, administration and services of the public sector, enabling the delivery of services to the public, businesses and all sectors in a secure and efficient manner, and with good governance.

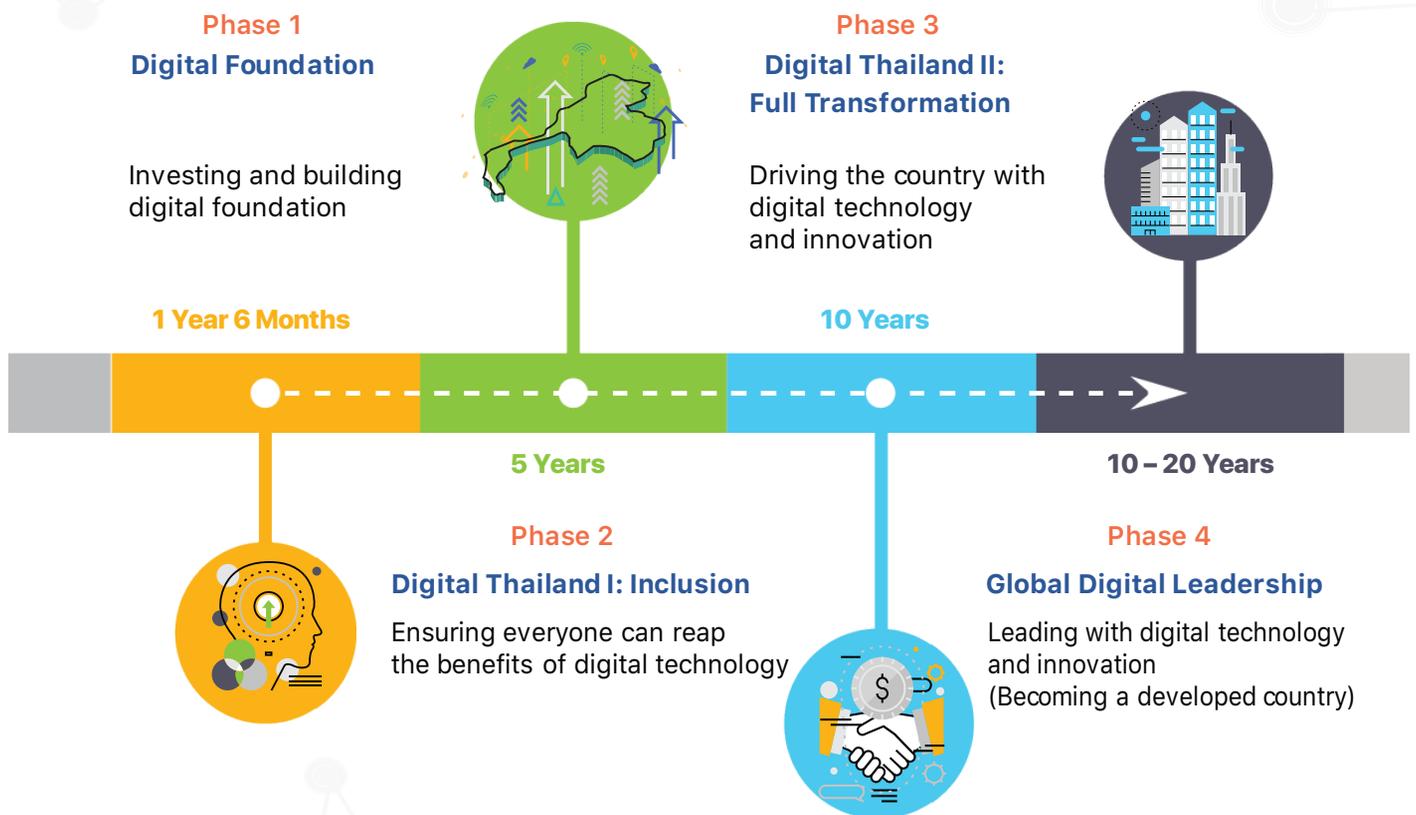
### **Indicator:**

6) Thailand is ranked one of the 50 most developed countries in terms of e-government by the UN E-Government Survey.

## 2.3 Thailand Digital Landscape

The development of digital economy and society in Thailand will focus on long-term, sustainable development, which is in consonance with the 20-year National Strategy. To better respond to the fast changing pace of digital technology, however, a digital landscape consisting of development directions and goals is mapped out in 4 phases as follows:

# 20-Year Thailand Digital Landscape



## Infrastructure

- Broadband has a countrywide coverage and serves as the basis for economic and social activities.
- Broadband is accessible to every village and connected to countries in the other regions.
- Broadband is accessible to every household and supports convergence and connectivity of all devices.
- Internet is connected anytime, anywhere, to any device seamlessly.

## Economy

- e-Transactions are smooth. SMEs, community enterprises, and farmers start migrating online. Foundation is laid for investment in digital clusters.
- Agriculture, production and services make use of digital technology, and data, in their operations. Digital technology startups and digital clusters start having a role in the Thai economy.
- Agriculture, production and services can compete on the basis of digital innovation. Thailand is connected to regional and global value chains.
- All economic activities are connected — domestically and internationally — by digital technology, leading Thailand to prosperity.

## Society

- Every group of people has access to broadband and basic public services on a comprehensive and equitable basis.
- People have confidence and trust in the use of digital technology and have access to services in such areas as education and lifelong learning, information, and healthcare.
- People make good use of technology and information in every activity of their daily life.
- The country has no digital divide. Communities utilize digital technology to develop their own localities.

## Government

- Government agencies are connected in their operations. Inter-agency data are integrated.
- Government operations are integrated and run as a single entity.
- Government provide services that are driven by people's needs, open its data and encourage people's participation.
- Thailand becomes a regional leader in e-government for both public administration and public services.

## Human Capital

- Workforce (in every field) has digital skills that are acceptable by both domestic and international markets.
- Workforce can now work online in a borderless manner. Foreign digital specialists come to work in Thailand.
- High-value work is created. Thailand has sufficient workforce of specialized digital skills to meet market demand.
- Thailand becomes one of the regional hubs for digital workforce, in both general and specialized fields.

## Trust

- A set of comprehensive digital legislation is enacted. Agencies responsible for the digitalization of economy and society start going through reform.
- Thailand has a business environment that is conducive to digital transactions, with facilitating tools as well as standards.
- Legislation or regulation that poses obstacle to digital trade and transactions is removed.
- Thailand becomes one of the model countries for the development and revision of digital rules and regulations.

## Phase 1 (1 year and 6 months) Digital Foundation

### Thailand invests in the foundation for the digitalization of economy and society.

#### Infrastructure dimension:

Thailand will launch public broadband service to 10,000 communities and broadband service to villages countrywide. Investment is readied for a high-speed telecommunication network that sufficiently connects Thailand to other countries in the region via both terrestrial and submarine routes.

**Economic dimension:** Domestic economy will be strengthened and adjusted for balance by making existing business operations more efficient and frictionless. Business groups that have not yet utilized digital technology will be encouraged to enter digital economy, particularly SMEs and community enterprises.

**Social dimension:** Every citizen, especially those residing in rural areas and the underprivileged, will have access to broadband and public services via diverse channels, without physical or spatial constraints. Awareness will be raised so that people will acquire digital literacy, rendering them skilled enough to use digital technology in a creative and responsible manner. Educational institutions and local organizations providing public services throughout the country will be connected to broadband and make use of digital technology.

# 1 YEAR 6 MONTHS

**Government dimension:** Government administration will be systematically transformed into digital government. Electronic documents will increasingly replace paper documents. Digital resources will be shared for maximum efficiency. Data and resources will be integrated, leading to connected government and standardised government service platforms that are connected, accessible, and interoperable.

**Human capital dimension:** Capacity will be built to equip domestic workforce with digital skills that are of international standards and acceptable to domestic and international labor markets. The target workforce here will include both digital specialists and general workforce who must become digitally competent.

**Trust dimension:** Laws and regulations that are conducive to digital economy and society will be launched. In particular, laws relating to the promotion and development of digital economy will become effective, leading to institutional restructuring and establishment of new agencies that will be responsible for driving drive the digitalization of economy and society in a tangible manner.

## **Phase 2 (5 years) Digital Thailand Inclusion Every sector in Thailand participates in the digital economy and society, as prescribed by the government's public-private-and-people partnership approach.**

**Infrastructure dimension:** Thailand will have a countrywide coverage of high-speed broadband networks, both wired and wireless, that are accessible to every village. Thailand will also become a regional hub of data connection and exchange, having standard data centers in every region of the country as well as housing data centers operated by major data service providers. Moreover, the transition from analog to digital radio and television broadcast will be fully completed in this phase, with a comprehensive digital broadcast network covering all service areas.

**Economic dimension:** Growth in the agricultural, industrial and service sectors will be fueled by digital technology and data utilization. The sectors will be prepared for further development that will transform their existing production to a fully automated process. Besides, innovation-driven entrepreneurs or technology startups will start playing a more important role in driving forward the country's economic growth.

**Social dimension:** People will have access to broadband and to basic public services through digital channels. They will also make full use of digital technology in multi-dimensional development. Particularly in learning, digital technologies will be employed as tools in teacher and curricular development as well as in self-learning. Lifelong learning media contents will be developed to fit the context and lifestyle of local villagers. In addition, digital technology will be deployed to promote healthcare for both people living in urban settings and those living in remote rural areas, or where there is shortage of doctors.

**Government dimension:** In this phase, government agencies will be connected and the inter-agency integration of data will be completed. Government executives will be able to access data at every level and are able to take advantage of big data analytics in their planning and decision-making, rendering the process accurate and timely. Public services will be driven by citizen's needs, built with universal design, and delivered more and more through a single window. For the business sector, the government will support business operations with integrated

Data and services, innovative services, and improved government administration. With regards to the people's sector, electronic means will allow people to participate in policy decisions in a convenient and timely manner. People will also be given opportunities to access data that are security-protected, privacy-protected, and open to scrutiny, leading to government operations that adhere to the principles of transparency and accountability.

**Human capital dimension:** Thailand will restructure digital workforce to step up capacity building in response to the context of digital economy and society with changing employment and work culture. Because digital technology is borderless and conducive to global businesses being conducted via the Internet, it will engender business innovations that require more foreign digital specialists working in Thailand.

**Trust dimension:** Laws and regulations that are conducive to digital economy and society will be in place. Regulations and government operating procedure will be improved to make e-business in Thailand convenient, fast, reliable and at reduced cost. E-logistics will make movement of goods more efficient while the payment system will evolve to support financial transactions in Thailand that will have become convenient, fast, efficient and reliable, through immediate exchange of data. Also, laws that are essential and supportive of digital economy policies will be fully enforced.

## Phase 3 (10 years) Full Transformation

**Thailand becomes Digital Thailand, where digital innovation is used as a key development tool and utilized to its fullest potential.**

**Infrastructure dimension:** Thailand will have state-of-the-art digital infrastructure, comparable to that of developed economies. Broadband will become a public utility like roads, electricity and water supply. With wired networks that supports convergence reaching every household, broadband services can be accessed anywhere, anytime by users or by anything that needs connection. Core communications networks will be connected internationally through diverse technologies that can support unlimited and increasing volume of usage. Distance and speed will no longer pose an obstacle to international connection. Most of user data will be stored at data centers on Internet networks and made available to be retrieved and moved at any time, independent of technology or service providers. Digital broadcast, with countrywide coverage, will be completely converged and transmitted through several forms of media by diverse technologies.

**Economic dimension:** Thailand will become a hub of digital trade and investment. Industries will have leveraged digital technology to improve their operational efficiency, heading towards smart factories in the age of Industry 4.0. In the agricultural sector, large and small holdings throughout the country will also be transformed into smart farms. Meanwhile, Thailand's SMEs will become innovation-driven enterprises (IDEs) through their adoption of digital technology and will claim their position in the global economy.

**Trust dimension:** Laws and regulations will be conducive to the development of digital economy and society. In the 10-year term, any law or regulation that obstructs digital trade and investment will be removed. Laws, rules, and regulations will be revised on a continuous basis in support of Thailand's entry into the global economy.

**Social dimension:** Every group of people, especially the underprivileged, the elderly, and the disabled, will be able to access public services anywhere, anytime through digital technology. A volume of knowledge will be created through the consolidation and digitization of local and national data and can be accessed and utilized by people conveniently and creatively. Digital technology will also be used as a tool to conserve and disseminate Thai values, as well as to store and add value to indigenous knowledge in the long term. Meanwhile, people will become media literate and skilled in utilizing digital technology with social responsibility. Through digital technology, they will also participate in determining, designing, developing and driving local and national development.

**Government dimension:** The government's operating procedure will be completely digitized. Inter-organizational operations and data will be integrated in a "one government" fashion. People will be connected in order to access information and to participate in determining the directions of public administration, as well as socio-economic development agendas. The government will assume an active role in transforming the conventional form of public services into automated public services that adhere to universal design principles and correspond to individual user's circumstance and need, without the user having to submit a specific request to the government. In this phase, government policy and decision making will be powered by up-to-date data, big data analytics and people participation.

**Human capital dimension:** Digital workforce restructuring is a long-term and continuous undertaking that will bear fruit in 10-20 years' time. With appropriate preparations, Thailand will be able to produce adequate workforce with advanced digital skills for such high-value jobs that respond to the country's new economic and social context. During this period, workers with skills and professions that can handle novel forms of operations will be more in demand, especially those who specialize in building networks of automated systems and smart devices. Thailand will also have in place an ecology of digital workplace -- that allows new generation of highly skilled, and highly specialized workers to work mobile and share resources -- to help drive activities that add value to the economy and society.

## Phase 4 (10-20 years)

### Global Digital Leadership: Thailand to become a developed country, capable of using digital technology to create economic and social values in a sustainable manner

**Infrastructure dimension:** The infrastructure of digital technology development is constantly and rapidly changing and the digital future is hard to predict. Ten years from now, however, digital technology will presumably no longer be a new phenomenon as it will have been widespread and accessible to all groups of people. These people will become familiar with and be able to use digital technology automatically, without feeling its existence, to the extent that it will virtually become the fifth basic need in people's daily living. Without digital technology, all functions will be totally disrupted.

**Economic dimension:** Thailand's economy will be efficiently linked to the global economy by digital technology in several aspects, e.g. trade, production, investment, and employment. Digital technology will have enabled Thailand to escape the middle-income trap and join the group of high-income developed countries. However, digital technology development may result in extensive replacement of manpower by robots and 'smart' systems in the production processes of the manufacturing and service sectors.

**Social dimension:** Thailand will shift its development paradigm from centralization to decentralization for local development, in parallel with the establishment of modern digital technology infrastructure like that of developed countries. More modern technology will replace the existing digital infrastructure while digital services will be further developed to accommodate access and usage by all, anywhere, at any time, via a variety of smart devices. The use of digital network services for long-distance communication can be accomplished as if it were of a short-distance form. An enormous volume of data will be stored in data centers or data storage facilities that are scattered all over the network, virtually everywhere, and can be accessed instantly as needed.

**Government dimension:** Digital technology will be leveraged to converge government functions so they run as if belonging to a single organization (one government) and, hence, transforming the government into a smart, agile, and transparent sector. The role of future government will change, from being the creator of public services to the facilitator that assists the private and people sectors in creating public services. This so-called peer-to-peer public services are based on the universal design concept whereby everyone can access the services without physical, geographic, and linguistic limitations. The role of government during this last phase will be limited to that of a facilitator or regulator, overseeing peer-to-peer services to ensure fairness and civic engagement in public administration and management. Moreover, Thailand's success in becoming one government will make Thailand a leader in digital government, in both public administration and public services, in the ASEAN region.

**Human capital dimension:** By making preparations for the development of human resources and new employment structure in the previous phases, Thailand will be ready for and become one of the digital workforce hubs in ASEAN. Concurrently, with easier movement of workforce, digital workers in Thailand will become diversified. On the one hand more foreign digital experts and manpower will come to work in Thailand, but on the other more of Thailand's own digital experts will move to work for companies located in other countries.

**Trust Dimension:** Laws, rules, and regulations that contribute to the development of digital economy and society will have been put in place. In ASEAN, Thailand will become a model leader, developing and revising digital laws, rules and regulations on a concrete and continuous basis.

### 3. Strategies for the Development of Digital Economy and Society

In order to propel Thailand's digital development towards the Digital Thailand vision and the four-phased digital landscape, six interrelated strategies have been defined under this Digital Economy and Society Development Plan. Under each strategy, goals have been clearly defined to facilitate monitoring and progress assessment, and implementation plans have been drawn as described below:



### “Develop countrywide high-efficiency digital infrastructure”

means rolling out digital infrastructure that is efficient, accessible to and usable by all the people so that it plays a foundational role in leveraging the country's economy and society with digital technology toward becoming Digital Thailand. The key elements of the digital infrastructure comprise information technology, telecommunication, and broadcast infrastructure. Such elements will be up-to-date and of high quality. They must also have adequate capacity, cover all areas, and can provide ongoing services in order to support communication, connectivity, exchange of information, trade and commerce, public and private services, and various activities that will contribute to the country's economic wealth and social stability, hence preparing Thailand to become a future digital hub.

Strategy 1 therefore will create modern digital infrastructure that anyone can access and make use of. Good quality services will be accessible anywhere, at any time, via broadband connection that can accommodate users' demands. The charges for broadband services must also be affordable and no longer presents a barrier to access. In the future, high-speed broadband infrastructure will be a basic utility just like roadways, electricity, and water that can be connected to just about all everything.

## Goals

### 1) Broadband Internet network will reach every village.

- Broadband service will be available in every village within two years (2017).
- 90 per cent of users in municipalities of every province and economic zone can access broadband service at a speed no less than 100 Mbps within three years (2018).
- 95 per cent of schools, Tambon (sub-district) health promotion hospitals, local administration organizations and digital community centers can access broadband service at a speed no less than 30 Mbps within five years (2020).
- Mobile broadband services will be accessible and available to the public, covering all villages, communities and tourism sites within two years.

### 2) Broadband subscription rate will not exceed 2 per cent of the gross national income (GNI) per capita.

### 3) Thailand will become an international connectivity and data exchange hub.

- Thailand will have Internet Exchange Points (IXP) that will make Thailand the connectivity hub of the upper ASEAN region within two years.
- International content providers will invest in establishing data centers in Thailand within three years.

### 4) Digital television and radio broadcast networks with countrywide coverage will be launched.

- Countrywide digital television network will cover all areas in the country within one year.
- Digital radio service will be available within three years.



## Implementation Plans

**1. Developing countrywide broadband infrastructure that is modern, stable, and capable of meeting the demands of all sectors, at reasonable and fair prices, in order to create equal opportunities for accessing and utilizing all forms of digital technology.**

**1.1** Rolling out countrywide broadband services by using appropriate technology. The government will support the basic demands from educational institutions, Tambon health promotion hospitals and digital community centers and also provide public Internet service for communities.

**1.2** Encouraging operators to share telecommunication infrastructure, broadcasting networks, and other facilities in order to optimize communication resources and reduce duplicate investments. Network architecture will be designed to enable seamless open access that can provide quality and universal services to the public. New entrant operators will also be promoted to compete in the last mile market, for both wired and wireless services.

**1.3** Revising and amending laws, rules, and regulations as well as creating coordination mechanisms to facilitate the right-of-way application process. A central agency, or a common utility commission, will be established to bring together all public agencies responsible for infrastructure development to collaborate in an effective manner.

**2. Positioning Thailand to become one of ASEAN's hubs for connectivity and data exchange by creating a conducive environment, providing a pathway for regional data traffic and housing major world-class content providers.**

**2.1** Allocating sites for telecommunication infrastructure, facilities, and appropriate environment and amending relevant laws to attract investment in world-class large data centers and digital business and innovation incubators, in response to the demands of both domestic and global digital economy.

**2.2** Promoting investment in and sharing of infrastructure resources, including domestic core networks and international terrestrial and submarine cable networks, to ensure adequate capacity for connectivity with neighboring countries. Multiple routes are also promoted in order to provide stable and uninterrupted international communication services, that meet domestic demands and the demands of neighboring countries in the ASEAN region, on a free and equitable basis.



**3. Mapping policies and plans to manage for infrastructure, spectrum reform and release, and future technological convergence and amending relevant laws to support the use of the country's resources with efficiency and quality that meets international standards and in keeping abreast of technological changes in telecommunication, television and radio broadcasting, and convergence technologies. The policies and plans will also take into consideration the current and future demands of infrastructure as well as infrastructure management in a crisis.'**

**3.1** Formulating policies and infrastructure management plans to support the growth in the Internet of things and convergence of technologies at present and in the future.

**3.2** Mapping policies on management of satellite communication, including the use of satellite orbits and the provision of satellite data services, in order to ensure competition in accessing geostationary orbits as well as development of lawful satellite data services.

**3.3** Setting forth policies on infrastructure and the use of spectrum to ensure proportionate and adequate allocation for commercial activities, public service provision, security affairs, and crisis management.

**3.4** Amending relevant laws, particularly those governing regulation, to create net neutrality and support convergence of technologies and services. Such laws are to be in line with international standards while also keeping up with changes in telecommunication and broadcasting technologies.

**4. Transforming telecommunication state enterprises in order to keep abreast of changes in advanced digital technology industries.**

**4.1** Formulating policies to spin off state enterprise business units with good prospects as commercially competitive organizations.

**4.2** Upgrading telecommunication state enterprises through management and reform mechanisms that will render them efficient, resilient, and transparent in order to produce value from the existing state-owned assets.

**“Drive the economy with digital technology”**

refers to the application of digital technology for the development of Thailand's economy, enabling the business sector to reduce production cost of goods and services, increasing business operation efficiency, and laying a foundation for new business competition in the long run. In order to promote digital economy, a digital business ecosystem needs to be created at an accelerated rate. The emphasis will be on upgrading and developing competitiveness of the business sector that will result in a sustainable expansion of economic base and employment in Thailand.

Strategy 2 will accelerate digital economy with emphasis on creating a digital business ecosystem in tandem with digital infrastructure development and commercial utilization of digital technology. At the same time the business sector, especially small and medium-sized enterprises and startups, will be urged to recognize the importance and need to use digital technology to its full potential to improve business operations. With regard to community economy, digital technology will connect local communities to global markets and create value added for local goods.

**Goals****1) Competitiveness of Thai businesses will be increased by using digital technology.**

- Value of domestic goods and services produced by SMEs will increase to 50 per cent of GDP.
- SMEs' productivity will increase from the use of digital technology.

**2) SMEs in agricultural, industrial, and service sectors will leverage digital technology to compete regionally and globally.**

- Proportion of SMEs and community enterprises that sell products online will increase by 20 per cent.

**3) SMEs can innovate and are more skilled in technology usage.**

- Thailand will be placed in the top 30 of the Global Competitiveness Index in terms of technological readiness and innovation.

**4) Digital sector will contribute at least 25 per cent to the country's GDP.****5) Thailand will become one of the regional leaders in digital industries.**

- The value of Thailand's digital industry will be among the top three in the region.
- Investments in domestic digital industry will be increased.

## Implementation Plans

### **1. Enhancing business competitiveness in order to create economic value added by using digital technology to reform business practices throughout the value chain.**

**1.1** Driving SMEs, community enterprises, and grassroots economic groups to enter into trade and business by making use of digital technology, digital and other support systems -- such as the e-payment system.

**1.2** Accelerating the use of digital technology to connect Thailand's digital trade with that of other countries throughout the entire value chain, so that Thailand will become part of the global value chain. This is to be achieved by speeding up the use of digital technology in business for internal organization management, value chain management, and to expedite the creation of a central product database that connects to and is compatible with international product standards.

**1.3** Putting in place measures to promote the utilization of digital technology and data in the reform of manufacturing and service processes, thereby modernizing the business sector, including agriculture, industry, and services. Such promotion measures may focus on autonomous software application, smart factory, smart agriculture, and big data analytic, that will increase production efficiency and reduce production cost.

### **2. Increasing economic opportunities for farmers and community enterprises by using digital technology, through close cooperation of agencies from all public, private and people sectors.**

**2.1** Multiplying the results of digital technology utilization in community businesses, such as community enterprises and community cooperatives, to generate income. The emphasis will be on the development of the people's online trading skills countrywide as well as the use of technology to publicize various services offered by communities (e.g. tourism, alternative medicine, etc.), and also on transfer of knowledge through technology to create new job opportunities.

**2.2** Accelerating the integration of digital technology into farming communities. This includes development of farmer's registration system; development agricultural knowledge management systems; use of technology for farm area management, water management, production planning, and accounting; improvement of transportation and logistics system for more efficiency. More accelerating measures may also include the use digital technology to develop standard-conforming products, carry out marketing activities, and enable food traceability.

**2.3** Establishing an extensive logistics system that reaches out to all communities to manage the transportation of community goods and raw materials. In addition, e-payment mechanisms will be promoted to enable reliable financial transactions at reasonable prices, in order to facilitate community businesses.

### **3. Accelerating the launch of digital technology startups that will be important engines for driving digital economy.**

**3.1** Supporting the ecosystem that contributes to the growth of digital technology businesses with good prospects. This includes measures such as provision of funds or joint funding; establishment of one-stop business facilitation center; provision of facilities that contribute to business innovations and further development of digital technology. Other measures are to raise awareness and understanding of innovation business models in public and private sectors, and to amend relevant laws and regulations.

**3.2** Funding large-scale service innovation platforms that will encourage disruptive business models by digital technology, such as a service platform that connects smart devices and a platform that facilitates the use of open data for commercial applications.

**3.3** Consolidating cooperation in the development and transfer of knowledge for sustainable development of digital technology and innovation, including the ability to build on and create digital technology and innovation that are appropriate to and in alignment with the context of the country's development.

### **4. Strengthening digital industries and enhancing their future competitiveness**

**4.1** Providing support for research and development in digital technology and innovation to strengthen digital industries and other target industries contributing to the country's economic development.

**4.2** Stimulating digital investment and engagement in digital technology businesses from domestic and foreign entrepreneurs, through public private partnership. Promotional measures include facilitation of movement for specialists; provision of investment incentives, and creation of the environment conducive to investment in digital technology industries of the future.

**4.3** Providing support for the registration of digital technology products and services with the Thai Innovation Database to promote market opportunities, allowing the public sector to buy Thai products and services systematically.

**4.4** Providing support for the establishment of open business intelligence centers to promote utilization of business data analytics and commercialization of open data. Such data that can be analyzed for business operation include market value and export value, for example.

**4.5** Promoting high-potential digital industries of the future. These digital industries will serve as production bases for other manufacturing and service industries in the economy, rendering them ready for advanced operation in the future.

**“Build an equitable and inclusive society through digital technology”**

means developing Thailand for people of all groups, especially farmers, people living in remote areas, the elderly, the underprivileged, and the disabled, so that they can access and make use of public services via digital technology. Content and knowledge at local and national levels will be gathered and digitized so that the public can access and make use of digital information easily and conveniently. People will be aware of news and information and have digital literacy skills to utilize digital technology with social responsibility.

Strategy 3 aims at creating quality digital society and reducing the gap arising from people’s lack of opportunities to access the infrastructure, lack of knowledge and understanding of digital technology, and lack of access to news and information from unaffordable digital technology. The strategy attaches importance to the development of smart, literate, and socially responsible citizens so that digital technology will be used creatively. With digitally ready infrastructure and digitally ready citizens, digital technology will ultimately become a tool for improving the quality of life of all groups of people through digital services.

**Goals**

**1) People of all groups, especially those living in remote areas, the elderly and the disabled, will be able to access and make use of digital technology.**

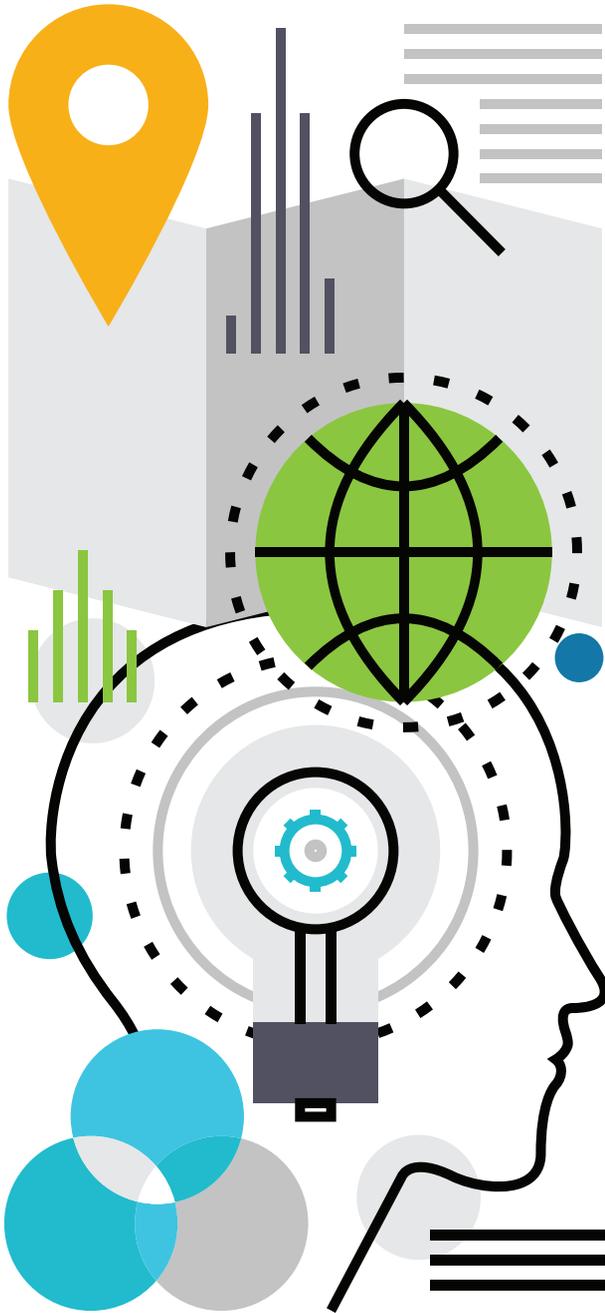
- Digital community centers with connecting devices and free Wi-Fi connectivity will be available at all Tambon (sub-district) countrywide.
- By the year 2020, at least 25 per cent of people aged 50 years and over will become Internet users.
- People of all groups (especially the underprivileged in terms of geographic and physical limitations) can have access to public services without geographic, time, and language constraints.

**2) All Thais will become digitally literate and can make creative use of digital technology.**

**3) People can access education, healthcare, and essential public services by digital means.**

- People of all ages countrywide can access Massive Open Online Courses (MOOCs).
- People from all geographic locations can access health information and basic consultation services.
- People from all geographic locations can access one-stop public services related to their daily life, through every phase of their life from birth to death, through digital technology.

## Implementation Plans



### **1. Creating equal opportunities for access and use of digital technology by the public, in particular the elderly, the disabled and those living in remote areas.**

**1.1** Using digital technology or assistive technology to provide support for the disabled and requiring that public sector content, websites, applications, and digital services be developed according to the principles of universal design.

**1.2** Expanding community ICT centers to cover all sub-districts and transforming them into digital community centers that, through integration with central and local public agencies, can offer the people comprehensive services, such as serving as access points to digital public services, offering online business and occupational learning, and providing space for community economic and social activities. These services will also put emphasis on such areas as education, agriculture, healthcare, commerce, tourism, citizens' rights and social welfare.

## **2. Developing people's digital literacy, including their critical thinking skills and their ability to analyze media and information in free and open digital society.**

**2.1** Increasing people's digital literacy especially in the elderly, the disabled, and the underprivileged through capacity building provided by digital community centers and partner agencies. Basic digital literacy standards for various groups of people will also be set.

**2.2** Promoting good practices in the digital world with various measures that include placing digital literacy in educational curricula at all levels, assessing digital literacy in accordance with clearly defined criteria, and launching extensive digital literacy campaign. The measures will put emphasis on the ability to analyze media and information, to use technology with social responsibility, and to avoid violation of intellectual property rights.

**2.3** Creating mechanisms to real-time monitor online media and information that is classified as harmful content and refer it to responsible agencies for disseminating correct to the public. Harmful content may include misinformation on food and drugs, child pornography, disinformation, fear-mongering news, etc.

## **3. Creating digital content, digital content repositories, and digital knowledge resources for lifelong learning that can be conveniently accessed by the public through all telecommunication, broadcasting and converged media channels.**

**3.1** Tasking agencies that are content owners to speedily digitize data, information, news, and knowledge under their responsibility. Such content must be accessible to and can be searched by the public. Mechanisms to allow the public or businesses to make further use of such resources will also be added. Digitized content may include important official documents, raw data, statistics, livelihood-related materials, cultural heritage, indigenous knowledge, and entertainments.

**3.2** Creating and promoting national and local digital knowledge resources to serve as reliable sources of knowledge for Thai people. Measures include creating a network of knowledge resource developers, providing funding for implementation, verifying the credibility of content and knowledge, and integrating diverse knowledge resources to facilitate easy access by the public.

**3.3** Encouraging the private and people sectors to produce digital content that are useful to the public, such as digital content created through social responsibility programs by private organizations or indigenous knowledge content developed by locals and communities. The content must also take into account social diversity, from language and culture to physical conditions, geographic locations, and economic status, as well as the country's position as member of ASEAN and the international community.

**3.4** Developing a platform to collect information, knowledge and capabilities of individuals such as retirees, community scholars, academics and volunteers and to serve as a forum for experience sharing, community learning, and knowledge transfer from generation to generation and from community to community. This measure will ultimately lead to sharing and caring in the country's economy and society.

#### **4. Increasing opportunities for students and the people to learn and acquire standard education at any age, anytime and anywhere through digital technology.**

**4.1** Integrating digital technology into schools in remote and marginal areas such as those that are hardly accessible, at border areas, or in conflict zones. Such technology as solar power technology, telecommunication and broadcast technology, and online learning tools will be used in an integrated environment conducive to learning and education of students, people, and communities.

**4.2** Developing and promoting Massive Open Online Courses (MOOCs). These courses will cover supplementary curricula in elementary and secondary school systems, vocational school curricula, and higher education curricula whereby learners can undertake cross-institutional studies, ASEAN-related curricula, and lifelong learning curricula on various topics of public interest. Mechanisms to facilitate cooperation among public agencies, private organizations and people will also be created to scale this mission up to the national level.

**4.3** Creating online learning and educational content with copyright licenses or those under other open systems, like the Creative Commons, and online libraries of such online content. Training courses are organized for teachers and those interested in acquiring online content production skills, so that the content will be further developed in both formal and informal educational systems.

**4.4** Promoting the development of integrated databases for academic record registration countrywide, which can be accessible by the public under the established conditions and criteria so that people can make use of their information for occupation and lifelong development. The system will also serve as the country's sources of human resource information.

#### **5. Increasing opportunities for the people to access modern, inclusive and equitable healthcare services by using digital technology, in preparation for the advent of ageing society.**

**5.1** Integrating electronic health record systems for countrywide connectivity. The public will be able to access and manage their personal health information to facilitate their receiving medical treatment, including treatment in case of emergency.

**5.2** Promoting appropriate applications of digital technology in an integrated manner in such areas as telemedicine, consultation and knowledge sharing, health surveillance and warning. Applications of new-model technology will also be promoted to support good health and wellness or to reduce health problems of people, especially those living in remote areas, mothers and their children, the elderly, and the disabled.

**5.3** Prioritizing the formulation of policies and plans on the use of digital technology in preparation for entry into the ageing society, through integration with all agencies involved in the fields of healthcare, digital technology, science and technology, and social development.

### **“Transform the public sector into a digital government”**

means deploying digital technology to systematically improve management efficiency of central and provincial public agencies in order for Thailand’s public sector to completely become a digital government. Public sector services -- or public services -- will be digitized and driven by people or user needs, whereby anyone can access the services without physical, geographic, and language limitations. Then, in the next phase, functions of all public agencies will be converged and delivered as if run by a single organization. Also, the public sector will start assuming the role of facilitator in the provision of peer-to-peer public services by the private and people sectors, and in accordance with the universal design principles. The people, on the other hand, will have a role in defining the social and economic development and public administration/ governance, and can fully express their views on the performance of the government. Strategy 4 therefore focuses on applying digital technology to work processes and service provision of the public sector, aiming to initiate reform in order to offer public services with efficiency, accuracy, speediness and convenience.

Public sector services noted by good governance and their ability to offer users one-stop comprehensive service through automatic data linkage will be created. Disclosure of public information that does not affect privacy rights of individuals and national security will be carried out following the collection, storage, and exchange processes that comply with acceptable standards. Importance is attached to cybersecurity and data security.

Also, public service platforms will be created so that the private sector or individual developers can make use of public information and services to further innovate services -- and hence generate revenue for the economy.

### **Goals**

#### **1) Government services will meet the demands of people and businesses with respect to convenience, speed and accuracy.**

- At least 79 paperless smart services will be deployed within one year.
- Business facilitation platform will be put in place, with a system to support business operations during the beginning phase.

#### **2) People will be able to access public sector information conveniently and sufficiently to ensure transparency and civic participation.**

- Thailand will move up 10 places in the Corruption Perception Index.
- Thailand will move up 10 places in in the e-Participation rankings of the UN e-Government Index.

#### **3) Digital government infrastructure will be put in place, integrating data collection and database management in the public sector to avoid duplication of work and support linkage of governmental functions as well as efficient provision of public services.**

- An e-Gov law will be enacted, putting in place policies and strategic plans for digital government, ensuring digital service standards, data protection and data security in the public sector, and monitoring mechanism for compliance with such plans and standards.
- Government shared infrastructure and data center services will be launched via Government Information Networks (GINs). G-Cloud and MailGoThai (a central email system for public sector communication) services will also be provided.

## Implementation Plans

### 1. Migrating to citizen-driven smart services

**1.1** Developing smart services by converting traditional public services into a digital format that allow users to select a choice service from a variety of devices. The services will then be further developed to become automated and comply with the principles of universal design. They will also be designed to correspond with users' demands, such that service users need not submit specific requests or applications to the authorities concerned. For example, parents of a new born child do not need to report the birth of their child, as the system will automatically link data from the hospital to the civil registration database and send a birth certificate to the parents. The digitized public services can lead to service innovations on traditional public services, or creation of entirely new services, without having to adhere to traditional service provision procedures, and will offer opportunities to private or independent developers to join the service development processes.

**1.2** Developing services that offer convenience to the public, businesses, and tourists as appropriate to the life cycle of each group. Services for the general public will focus on supporting people's activities throughout their whole life in such areas as lifelong learning, quality of life, and career and livelihood (focusing on farmers in the phase). Other services will also be provided to meet the demands of the people, businesses or service users to ensure their wellbeing and to serve as a foundation for socio-economic development that will further prepare the country for the integration into ASEAN and the global community.

**1.3** Developing a support system to facilitate licensing processes by the public sector, while consistently adhering to the criteria, methods, and conditions for such licensing. In possible cases a system will also be put in place to support an abandonment of the licensing regime or to replace such regime with other measures (as prescribed by the Licensing Facilitation Act, B.E. 2558 (2015)), in order to curtail the use of discretionary powers by officials.

**1.4** Strengthening the security of e-service provision by the public sector to ensure people's trust and confidence in using such services.

**1.5** Preparing for transformation to peer-to-peer public service provision, whereby the people or the private sector become both providers and consumers of services, with the public sector taking the role of facilitator to ensure fairness to all parties.

### 2. Increasing efficiency and good governance in government with digital technology

**2.1** Sharing digital resources with maximum efficiency. Duplicated investment will be reduced through the implementation of an enterprise architecture framework as well as data and resource integration.

**2.2** Linking and integrating government functions and data within and across organizations so they appear like those of a single organization (one government) to improve government administration processes and develop citizen-driven services that can be accessed without physical, geographic or language limitations.

**2.3** Developing back office platforms for government agencies to support the systematic transformation of every government administration process into “digital by default.” This includes replacing paper documents with electronic versions to reduce procedural steps and increase efficiency in government operations, both in public service provision and in management. The government’s back-office systems must also have the capacity to completely support electronic data exchange.

**2.4** Making preparations for a massive increase in the amount of data, in both data storage and data analytical capability. Big data technology will therefore be promoted to add value to the existing data. Cybersecurity and data security measures must also be put in place.

**2.5** Upgrading the knowledge and skills of government personnel to correspond with the functions of digital government. Personnel in the public sector must be able to use digital technology in their work processes to the extent that they will ultimately move from being users to becoming innovators who are capable of doing higher value jobs, or becoming entrepreneurs who can make use of digital technology to build up new businesses.

### **3. Promoting the release of high-value data to the public, thereby allowing for civic participation in government processes, in order to pursue the goal of becoming “Digital Thailand.”**

**3.1** Promoting disclosure, collection, exchange and integration of data in public and private sectors, in accordance with Open Data standards, in order to create economic and social value from turning such data into innovative products and services.

**3.2** Developing databases and datasets that link data from all government agencies, regardless of ownership. Such data will be disclosed to the public to bring about service innovation and create economic and social value. For example, the civil registration database, containing personal data of individuals from birth to death, can be used for lifelong human resource planning. Other useful datasets include academic records, health records for universal healthcare development, farmer registration, and litigation records.

**3.3** Structuring administration processes and service provision in the public sector in such a way that the people and businesses can participate in policy formulation and become an integral part of decision-making processes that arises from social convergence. Public monitoring of government activities will also lead to transparency and hence fewer corruption problems.

### **4. Developing government service platforms that support the delivery of basic public services by every government agency, via new applications or new forms of services.**

**4.1** Promoting integration of data and services among government agencies. For example, a single form can be used to facilitate communication or transactions with the public sector, while optimizing the use of limited resources. Data integration needs not follow traditional working processes, nor does it have to be implemented using the same models and standards as long as such integration can be achieved through innovation.

**4.2** Promoting the development of common platforms that supports further service development, cross-function integration, and large-scale adoption by users, and therefore create new models for sharing and collaboration in the public sector. These platforms will facilitate the transformation of basic transactions and services by all agencies in both public and private sectors to provide more convenience, speed, and safety in service usage as well as provision. Such basic services are needed in various fields including smart energy, environmental monitoring and surveillance, common travel pass, e-certification service, e-authentication, e-payment, logistics, translation, and so on.

Develop workforce for the age of digital economy and society

“Digital workforce development” refers to the development of the working-age human capital in every profession and occupation, equipping them with creativity and tech-savviness in their chosen livelihood. This includes the development of digital technology skills in workforce in both public and private sectors, engaged directly in the field of digital technology and in other professional fields, so that their levels of knowledge, competency and proficiency will match international standards.

With such quality workforce, high-value jobs can be created to help propel the country’s development in the digital age. Strategy 5 aims at developing digital workforce to meet job demands in the digital economy, placing emphasis on the groups of general workers, who are the driving force of economic productivity, and those of digital specialists. As for the general public, equally important is that preparations must be made for them to enter the digital workforce as well.



## Goals

- 1) Digital professionals, especially in areas where there is shortage of manpower or in areas important to digital innovation development, will be developed in both quantity and quality.**
- 2) By 2020, digital technology development will generate 20,000 job positions, including new forms of employment, new professions and new businesses.**
- 3) Workforce in all sectors will have digital know-how and skills, as befit their professions and occupations.**

## Implementation Plans

**1. Improving digital skills of workforce in every occupation and profession in the labor market in both public and private sectors. Both working-age and retired populations will undergo capacity-building that enables them to use digital technology creatively and smartly in their respective careers or even to generate new income, thus leading to value-added products and services that keep up with market demands.**

**1.1** Developing digital know-how, skills, and knowledge that answer the needs of the industrial sector or the economy. This will be accomplished by promoting the learning of digital skills via the Massive Open Online Courses (MOOCs) that can cater to diverse learning requirements of working-age groups, business groups, or any interested parties.

**1.2** Developing interdisciplinary skills, such as digital technology skills, computational thinking skills, design process skills, service innovation skills, and skills in digital entrepreneurship. This will ultimately lead to the development of new businesses, the type that is powered by digital technology and high-value workers.

**1.3** Establishing centers for transfer of knowledge in innovation and digital technology. Skills will be enhanced through learning and hands-on practice programs, which are jointly developed by the public, private, academic sectors. For example, on-the-job training in private organizations as part of the educational curricula will be promoted, with emphasis on the curricula that are in demand for the development of future digital industries.

**1.4** Training legal professionals involved in the drafting and enforcement of laws, rules, regulations, and orders in digital literacy. These professionals must be knowledgeable and have expertise in the use of digital technology in the justice system, for example.

**1.5** Developing skills and attitude of public sector workers so that they can make use of digital technology while keeping abreast of technological changes. These workers will contribute to their organizations being modern, capable of delivering public services with speed and accuracy.

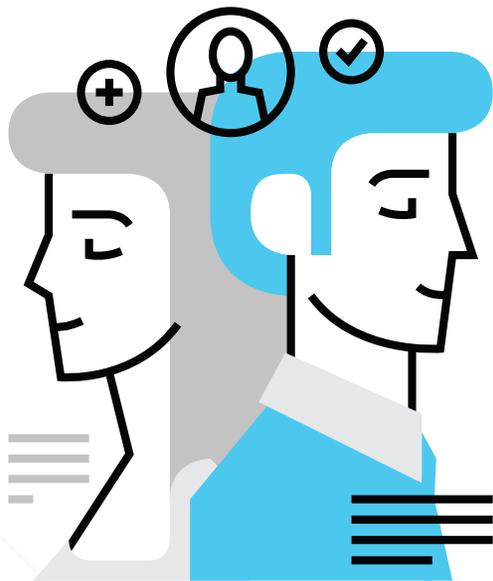
**2. Promoting the development of specialized skills and expertise needed for the digital age in digital technology professionals in the public and private sectors.**

**2.1** Facilitating import of foreign specialists with skills that are in demand by creating appropriate environment for them as well as relaxing work permit requirements for foreigners wishing to work in Thailand. Trade liberalization will also be utilized to facilitate movement of digital workers with advanced skills and specialization from ASEAN members and other countries across the world.

**2.2** Improving the quantity and quality of digital specialists in high-tech sectors to ensure their knowledge and skills are on par with international standards. Support will be given to formal and non-formal educational institutions to include curricula in the fields that the demand still exceeds the supply, such as big data analytics, automation, advanced software architecture design and service science, and information system security. The teaching/learning of digital technology at all educational levels will be streamlined in order to focus on both practical skills and theoretical knowledge.

**2.3** Creating specialist networks in Thailand and the ASEAN region. Emphasis will be put on exchange of technical knowhows and new skills among local and international experts, at both organizational and individual levels. Cooperation programs will include exchange of specialists, transfer of technology and knowledge, and joint research and development in innovation and digital technology.

**2.4** Mapping a digital workforce development plan to support Thailand's digital workforce development, at all levels, in the educational, public, and business sectors. The plan will be in line with the trends in employment requirements, nature of employment, amount of manpower required, and work values in the digital field in the future. In the educational sector in particular, the plan must emphasize the teaching of skills, such as computational thinking and program coding in elementary and secondary school curricula, that will prepare Thailand's next generations for the long-term future.



### **3. Enhancing the capability of information technology executives.**

**3.1** Building capability of chief executive officers (CEOs) of public agencies in formulating strategic plans to apply digital technology to their missions, in the manner that is consistent with their organization architecture. They should also be able to create value from their respective agency's data as well as cross-agency data linkage, for the benefit of the public.

**3.2** Creating a network of chief information officers and chief data officers of public agencies to facilitate the exchange of information on strategic planning processes and to monitor the progress of new digital technologies that will have impact on organizational development. This includes the concept of information management in the digital era that leads to cross-organizational integration of work functions, modernization of organization, and creation of services that can respond to user needs quickly, accurately and economically.

### Build trust and confidence in the use of digital technology

“Build trust and confidence in the use of digital technology” refers to the provision of standards, laws, rules, regulations and protocols -- that are efficient, up to date, and in line with international norms -- to propel the country towards digital economy and society. Emphasis will be placed on ensuring security, building trust and protecting rights in order to help online users in every sector to conduct their activities with more ease and efficiency, and less obstacles. A holistic and integrated approach for the implementation of this strategy will also be taken in order to support growth of digital technology in the future.



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Strategy 6 focuses on building security and trust in online business transactions among business operators, workers, and service users. As security and trust constitute a foundational component that supports the country's transformation in the digital age, it is imperative that the public sector play a key role of facilitator for all sectors. Critical missions highlighted in this strategy will cover issues related to standards, personal data and privacy protection, and cybersecurity.

## Goals

### 1) People and businesses will have complete trust and confidence in online transactions.

- The number of Internet users engaged in online transactions will increase steadily and the value of e-commerce will increase by no less than 4 per cent per year.

### 2) Digital rules, laws and regulations will be updated to meet the demands of the digital age.

- Data Protection Act and (amended) Computer-related Crime Act will be enacted and enforced within three years.

### 3) Internationally accepted data standards will be implemented to support data integration and utilization for transactional purposes.

- Domestic and international business operations will be carried out with convenience and speed and at the lower cost of digital transactions.
- License processing will take less time, in line with those of leaders in the World Bank's Ease of Doing Business Index, within two years.
- Data and e-document standards will be put in place to enable data exchange and integration among public agencies, and between public agencies and private organizations.
- Thailand's ranking in the Ease of Doing Business Index will move up at least five places within three years.

# Implementation Plans

**1. Creating an ecosystem conducive to business activities and to quality of life. Through the provision of standards, rules, regulations, and protocols that are up-to-date and efficient, security and trust will be strengthened to facilitate trade and use of digital technology in both economic and social sectors. The public sector will also initiate the removal of obstacles in all business and social activities.**

**1.1** Putting in place appropriate facilities for doing business online that will boost user confidence in order to connect business operations within the country and between countries through common standards recognized by the parties involved. Examples of these facilities range from a product code system that conforms to international standards, a trusted data pool, an e-payment system, an e-health system, an integrated e-trade system, a trade messaging system generating e-invoice that can be used as legal evidence, to rules and regulations for the application and usage of the Internet of Things (IoT) in the manufacturing sector (Industrial Internet.)<sup>16</sup>

**1.2** Amending laws to recognize e-documents so that the public and private sectors do not require paper copies for business transactions and that e-documents will be admissible as legal evidence.

**1.3** Reducing the steps in licensing procedures, the number of required licenses, the volume of documents, and the processing time for transactions both in the public and private sectors.

**1.4** Creating mechanisms and incentives for self-regulation among business operators. Follow-up measures are also put in place to monitor and evaluate their competitiveness in a continuous manner.

**1.5** Defining interoperability standards for linking, analyzing, synthesizing and making use of data. This involves data identification and data structure for exchange of data, rules and conventions for data naming, rules and conventions for document structure design, and common standards that can link trade, payment, and tax data, for instance.

**2. Amending and updating laws related to digital economy and society, in keeping with the dynamics of digital technology and social context.**

**2.1** Enacting relevant laws that keep abreast of digital technology advancement and comply with international standards to support the deployment and utilization of digital technology in a tangible manner. Such laws include cybersecurity and data privacy laws as well as intellectual property law that promotes and incentivizes innovation.

**2.2** Accelerating the improvement of intellectual property protection mechanisms that support digital advancement and correspond with international commitments and practices while motivating the use of intellectual property created by Thais and genuine and legal computer software.

**2.3** Enabling people and stakeholder organizations to participate in legislative processes, from drafting, developing, scrutinizing, to revising laws governing digital technology. This signifies a starting point of communication between the government and such stakeholders in the decision making of public policies that have impact on the people.

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<sup>16</sup>Based on the popularity survey on the application of IoT in 2015, smart home and Industrial Internet were ranked first and fifth respectively. Gartner and Cisco also predicted that Industrial Internet had the highest IoT application possibility. Moreover, other systems that will be especially useful for farming in remote areas include smart supply chain that provides a solution for tracking goods in transit and smart agriculture that helps run and monitor agricultural activities.



**2.4** Assigning all involved agencies to put the Digital Economy and Society Development Plan into implementation in a tangible manner. This will be accompanied by periodic and continuous evaluation, examination, follow-up review, and assessment for fitness of purpose. Resources will also be allocated to bring about desired achievements.

### **3. Building public trust and confidence in digital technology and online transactions.**

**3.1** Strengthening ICT security to boost trust and confidence of businesses and the general public in online communication and transactions. For instance, an efficient and secure payment system that meets user needs will be provided.

**3.2** Defining measures and practical guidelines for service providers in the public and private sectors in providing protection of users' individual rights and data privacy, in support of future growth of digital technology. Practical guidelines to protect users of mobile commerce, smart phones or social media must be provided, for example.



# **BUILDING PUBLIC TRUST AND CONFIDENCE IN DIGITAL— TECHNOLOGY AND ONLINE TRANSACTIONS.**

**3.3** Defining appropriate measures that comply with international standards to monitor and respond to cyberthreats, especially those for protection of critical infrastructure -- such as electricity and financial infrastructures -- to ensure sufficient trade and investment security. This involves the installation of networks to exchange cyber threat information, a response center for cyber incident reporting, and law enforcement mechanisms that efficiently prevent and suppress criminal offences that impact digital security. Promotion of cybersecurity awareness and literacy is also an important issue that must be carried out on an on-going basis.

**3.4** Creating systems and mechanisms for protection of consumers engaged in online transactions. For example, effort will be made to promote, prepare and strengthen key public agencies, enabling them to work efficiently with other agencies involved. Processes for online dispute resolutions must be established. In most situations, emphasis will be placed on the business sector's ability to self-regulate, with good governance, transparency, and accountability, in line with the standards certified by public authorities, although in certain cases co-regulation would be opted for to ensure regulatory efficiency.



#### 4.1 Prioritized activities and projects during the urgent phase (1.5 years)

To lay down Thailand's foundation in preparation for changes induced by the application of digital technology, the Ministry of Digital Economy and Society has launched activities and projects for the urgent phase of implementation (one year and six months), with emphasis on investment in digital infrastructure and development of digital foundation, as summarized below.

##### 1) Digital infrastructure

- High-speed Internet infrastructure will be rolled out to cover all villages countrywide. People will enjoy broadband access and communicate via broadband services, universally and equitably. High-speed Internet networks will upgrade Thai people's quality of life, providing them access to education, health, and other public services. Competitiveness of the private sector will also be strengthened, thus contributing to Thailand's sustainable development in the future.

**Key executing agency:  
Ministry of Digital Economy and Society**

- Upgrading Thailand's international connectivity infrastructure by linking directly to global Internet data exchange hubs. The network will have stability and enough capacity to meet the country's demands. The cost of international connectivity borne by Internet service providers in Thailand will be reduced to be competitive with those of neighboring countries, resulting in lower subscription rates for users. Thailand will also raise its profile to become one of the Internet data exchange hubs or digital hubs in the ASEAN region in the future.

**Key executing agency:  
Ministry of Digital Economy and Society**

##### 2) Digital Economy

- Strengthening grassroots economy. This will be achieved by offering more opportunities for community income generation; upgrading livelihood; and developing community business from selling just local products to developing quality products and services. Rural markets will be expanded towards urban areas by providing opportunities for locals in the community to learn how to do business via e-commerce.

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Ministry of Interior,  
Provincial/ Tambon  
Administration Organizations**

- Increasing competitiveness of Thai businesses, especially SMEs through the application of digital technology.

- Developing and improving business processes at the organizational level. The business sector is encouraged to use such digital technologies as the Enterprise Resource Planning System (ERP), the Supply Chain Management System (SCM), and the Inventory Management System, to increase operational efficiency and reduce operating cost. Thai businesses will be also given support to move from traditional business to e-business and make preparations to modernize their production and service provision processes with digital technology so that they are ready to enter the age of Industry 4.0.

- Developing mechanisms to boost confidence in Thai products. A database to link Thailand's trading system to the global supply chain will be developed. Businesses will be encouraged to understand, as well as recognize, the importance of product codes and Thai product standards.

- Supporting digital technology and media industries in their endeavor to create Thai intellectual property while penetrating overseas markets.

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Ministry of Culture**

- Driving the development of digital clusters in line with the national policy to promote the special economic zones and super clusters. The goal is to provide more trade and investment opportunities for digital technology industries of the future through a promotion scheme within the digital clusters. These clusters will serve as a foundation for knowledge sharing and technology transfer among various players, from the public sector, the private sector, educational institutions, domestic research and development agencies, to important global digital technology businesses. Also, through partnership with global industry leaders under the Smart Thailand initiative, Thailand will also work towards becoming one of important regional players for digital technology outsourcing.

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Ministry of Science and Technology.**

- Creating and fostering workforce for technology startups. Workers will be equipped with the skills and competence to further develop innovations and create new models of products and services that keep up with digital growth. More employment opportunities in digital technology industries will also be created.

**Key executing agency:  
Ministry of Digital Economy and Society**

### 3) Digital Society

- Developing a network of digital community centers. The existing ICT community learning centers will adopt a new model that provides digital services and economic and social information to the community and community enterprises. The centers will collect community's information to facilitate the exchange of knowledge among communities and support decision making in public administration. Learning activities for economic purposes will be organized continuously, including the setting up of online shops, the improvement of local products and services, and the use of digital media for communication and public relations.

These activities will be carried out in tandem with the management of a lifelong learning environment that offers learning opportunities anywhere, at any time, and on any device. The people will be digitally literate and make use of digital technology for their career development and their livelihood, ultimately becoming the foundation for sustainable development.

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Ministry of Education,  
Ministry of Interior,  
Provincial/ Tambon  
Administration Organization**

- Promoting opportunities for all groups of people to have access to a new model of lifelong learning through Massive Open Online Courses (MOOCs). People in marginal areas without electricity, Internet connection, and mobile phone signals will also have better opportunities to access sources of knowledge and information.

**Key executing agencies:  
Ministry of Education,  
Ministry of Digital Economy and Society,  
Ministry of Science and Technology,  
  
Ministry of Interior,  
Provincial/ Tambon  
Administration Organizations**

- Promoting creative use of digital technology with social responsibility. Campaigns will be carried out to reinforce digital skills of the people, including children and youths in and outside the educational systems, teachers and parents, as well as the disabled, the underprivileged, and the elderly. The goal is for the people to access, gain knowledge on, and make use of digital technology safely, creatively, ethically, and with awareness of its impact on society, empowering them to become digital citizens of the future.

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Ministry of Education.**

- Creating a liveable and safe city by integrating all existing CCTVs in Phuket province and video analytical technology to proactively prevent crimes. Also to be developed in the province are a real-time traffic reporting system, a real-time bus arrival information system, deployment of digital technology for traffic discipline enforcement, and development of smart command centers.

**Key executing agencies:  
The Phuket Provincial Office,  
Ministry of Digital Economy and Society.**

#### 4) Government services

- Upgrading the quality of government services
  - Reforming operations in the public sector by deploying digital technology to support smart services for the people in accordance with the Licensing Facilitation Act, B.E. 2558 (2015 A.D).
  - Integrating data and operations in the public sector to support the delivery of government policies and measures via mobile communication devices.
  - Facilitating people access to government services, including making it easy for entrepreneurs to set up business and reducing paper copies of documents required from the public seeking government services.
  - Driving for legislation related to the promotion and development of digital economy and society

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Office of the Public Sector  
Development Commission**

- Simplifying procedures in licensing and processing applications from the public with the view to reducing obstacles and increasing efficiency in service provision by the government sector. This will be done by reducing the number of steps and complicated documents, making such process faster and more transparent.

**Key executing agencies:  
Government agencies  
offering public services,  
Office of the Public Sector  
Development Commission,  
Integration of government services  
concerning the implementation  
of 63 major services  
(in accordance with the Licensing  
Facilitation Act, B.E. 2558)**

- Driving for the enactment of legislation that serves as a foundation for institutional restructuring. This entails establishment of necessary agencies and enforcement of rules and conventions that build trust in conducting transactions through digital technology.

**Key executing agencies:  
Ministry of Digital Economy and Society,  
Office of the Council of State,  
Office of the National Broadcasting  
Telecommunications Commission**

## 4.2 Driving mechanism for institutional restructuring

The application of digital technology helps facilitate public administration and public services. In turn, the role of the public sector will undergo a transformation, from being a massive hierarchical structure characterized by rules and regulations, chains of command, clear-cut control processes, and monopoly of public services, to the sector that has enhanced its efficiency and effectiveness to deliver quality public services that are fast, transparent and comprehensive through diverse channels -- that are no longer restrained by place and time. In order to translate the policy on the development of digital economy and society into concrete and continuous implementation, the driving mechanism requires integration of inter-agency operations, both in the public and private sectors, as well as civic participation in reviewing and monitoring such policy and implementation. Consequently, improvement of government operating models and procedures will require inter-ministerial integration of operations, increased bureaucratic efficiency, reduced government role, devolution of bureaucratic authorities, resulting in fewer procedural steps, shorter operating time and restricted discretionary powers of government officials.

For an integrated operation to effectively drive the development of digital economy and society, central agencies must be set up to formulate policies and to coordinate and drive the process in a unified manner. The number of these specialized agencies should correspond to the missions that existing agencies could not carry out under the existing legal framework to reduce redundant and /or overlapping missions while responding to rapidly changing digital industries and innovations. In addition, the newly established agencies ought to be compact with flexible organizational structure.

They should also be goal-oriented rather than process-oriented, run by flexible and independent administrative systems, and not hampered by rules, regulations, practices and orders of the bureaucracy or state enterprises. Their devolved nature will allow their staff to work to the fullest of their potential, while being free and authorized to make decisions under a supervised and accountable framework to deliver quality work with efficiency. The staff of such agencies will also be incentivized by reasonable remunerations and welfare benefits, especially if they are experts in specific fields.



### **4.3 Mechanism for integrating and allocating operational budget and other resources**

Unlike past practices, every concerned organization, especially government agencies, must integrate their operations into a unified whole to create a balanced and efficient working mechanism. Each task must be designated to a responsible agency while all agencies work jointly or in conjunction with one another in order to maximize government resources. When personnel in every agency, both government and private, work in conjunction with one another, they can reduce overlap/ redundancy of effort and at the same time make full use of data that each of them possesses, thus maximizing their limited resources, cutting operational costs, facilitating each other, and speeding up their work.

Furthermore, the integration of public-services to deliver more efficiency and better quality can be achieved through the revision of rules, regulations, and budgeting systems, rendering them more conducive to joint operations by government agencies while creating a coordinating system for government service providers. Examples of such tools include the Royal Decree on Authorization, B.E. 2550 (2007A.D.) and the Licensing Facilitation Act, B.E. 2558 (2015 A.D.).

Also, for this purpose, information technology must also be leveraged to connect/ exchange collected data owned by various government agencies so that such data can be further analyzed, combined, and utilized for the provision of inter-ministerial public services.

To effectively drive the digital economy and society projects at a speed, in keeping with digital technology dynamics, the government requires certain flexibility in the form of an alternative funding mechanism. Apart from the expenditure budget, a digital economy and society development fund should be set up in support of such operations. The fund, however, must be run with thorough oversight and provide transparency and accountability to all concerned and the general public.

### **4.4 Follow-up mechanism on policy and program implementation**

It is necessary to monitor, review and evaluate program implementation on a continuous basis in order for the Digital Economy and Society Development Plan to achieve its goals under limited budget, so that its effects can be multiplied to reach targeted socio-economic sectors as required and as appropriate. If obstacles and problems arise while policies are being translated into practice, a supporting mechanism or more allocation of resources must be provided as necessary and in a sufficient and timely fashion. Results from the follow-up can be used as feedback for revision and improvement so that the program can continue effectively.



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