

THE STATE OF THAILAND'S DIGITAL ECONOMY AND SOCIETY DEVELOPMENT 2021

สรุปสถานะการพัฒนาดิจิทัล
เพื่อเศรษฐกิจและสังคมของ
ประเทศไทย พ.ศ.2564

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PREFACE

Today, digital technology plays a key enabling role in national competitiveness enhancement, which consequently would result either in economic prosperity or social equality. Digital advancement therefore has become one crucial indicator of a country's performance. As such, digital competitiveness ranking has been established by key international institutions.

The Office of the National Digital Economy and Society Commission (ONDE) is the main agency tasked to set the national strategy for digital development for economy and society, to be consistent with the development context of the country, current situation, potential of the country, global development context as well as the future direction of development. The ONDE therefore prioritizes development of national digital competitiveness for economy and society.



Aside from this, the ONDE also has an important mission in surveying, collecting data and following up the movements of development in digital development for economy and society. It has therefore produced this report to assemble information and summarize the situation of Thailand's digital development for economy and society for 2021. This report presents the status of the development, in both the indices ranking and important indicators set by international indicators, as well as indicators from national agencies in the related dimensions to the strategy on digital development for economy and society of Thailand

THE OFFICE OF THE NATIONAL DIGITAL ECONOMY AND SOCIETY COMMISSION

MARCH 2022

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THE REPORT TO SUMMARIZE THE SITUATION OF THAILAND'S DIGITAL DEVELOPMENT FOR ECONOMY AND SOCIETY FOR 2021 WAS DRAFTED TO REPORT ON THAILAND'S DIGITAL DEVELOPMENT IN THE ECONOMIC AND SOCIAL DIMENSIONS, INCLUDING THE OUTPUT OF WORK FROM THE GOVERNMENT AND PRIVATE SECTORS ON DIGITAL DEVELOPMENT IMPLEMENTED IN 2021. THE OBJECTIVE IS TO DISSEMINATE INFORMATION TO PERSONS CONCERNED AND THE GENERAL PUBLIC INTERESTED IN THE DIGITAL DEVELOPMENT ISSUE, AND THE DIGITAL COMPETITIVENESS LEVEL OF THAILAND. THE REPORT IS COMPOSED OF THE FOLLOWING MAIN CONTENT :

- Thinking approach from the international ranking institutions related to measuring digital development, especially IMD World Digital Competitiveness Ranking, which is the reference ranking for this report. Apart from this, it is the reflection of the effects digital competitiveness on the development of the country, using the various indicators.
- Important statistical data is used to measure the digital development status of Thailand in various dimensions, as well as analytical articles on Thai digital development, referring to the ranking made by International Institute for Management Development (IMD) for 2021.
- Future digital megatrends that affect Thailand, leading to change, challenges and opportunities for future digital development of Thailand.
- Strategy, policy, and work plans related to the country's digital competitiveness development and project results, work plans related to promotion and digital competitiveness development of Thailand

Therefore, this report provides a wide perspective for executives in both government and private sectors, policy-makers, academics, and those interested in elevating the national competitiveness level, for them to understand the digital development policy of the country, status and readiness of digital development in many dimensions, including opportunities of Thailand from future technology and development. These policies must be implemented urgently in order for Thailand to fulfill the objective of achieving **“Global Digital Leadership”**



IMPORTANCE OF THE ELEVATION OF DIGITAL COMPETITIVENESS LEVEL ON NATIONAL DEVELOPMENT

To present information and analyses on the importance of development and elevation of Thailand's digital competitiveness, indicators from the IMD World Digital Competitiveness Ranking will be used in the following areas :

2.1 CONCEPT AND FRAMEWORK

of The Institute for Management Development (IMD) and IMD World Digital Competitiveness Ranking

IMD World Digital Competitiveness Ranking (DCR)

IMD World Digital Competitiveness Ranking (DCR) is focusing on analyses of the overall digital competitiveness. This is a reflection on infrastructure, manpower, research and development capacity, as well as private sector's ability to be an important catalyst in moving ahead the economy. In 2021, there were a total of 64 countries that were evaluated, using 52 sub-indicators in 3 main areas, as follows :

1. Knowledge

Other factors such as talent, training & education, scientific concentration work

2. Technology

Other factors such as regulatory framework, capital and technological framework

3. Future Readiness

Other factors such as adaptive attitudes, business agility and IT integration

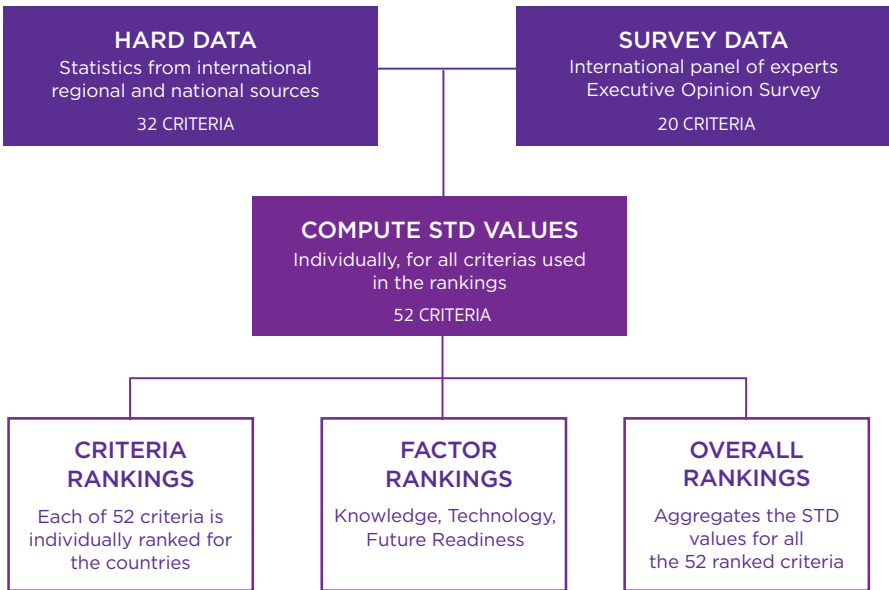
The DCR ranking will utilize a combination of secondary information and survey by the IMD, through data collection agencies from various countries. In Thailand, there is the Thailand Management Association (TMA) that collects data surveyed and transmits the secondary information to IMD.

The survey exercise of DCR index uses the IMD Executive Opinion Survey, which is a survey for business leaders and government agencies of the country. The survey is used for the World Competitiveness Ranking (WCR) of the IMD, but it will select only some questions that IMD has found to be suitable for the DCR index, to analyse and rank according to 20 out of 52 indicator.

As for secondary information, the DCR uses data from various sources,

including official data from international agencies and those collected by private agencies, such as UN, ITU, OECD, UNDP, S&P, UNESCO, WIPO, IFR, Thomson One Banker, Euromonitor, Computer Industry Almanac Inc. The process includes data collected from confidential sources. The DCR uses 32 indicator out of 52 indicator.

The ranking uses the model developed from IMD (not revealed) from all sub-indicators. The overview of the DCR is illustrated in the following chart.



Calculation for ranking of DCR¹

COMPARISON OF IMD WORLD DIGITAL COMPETITIVENESS RANKING

2.2

and other indexes that Thailand utilizes

INDEX	WORLD DIGITAL COMPETITIVENESS RANKING (DCR)	WORLD COMPETITIVENESS RANKING (WCR)	THE GLOBAL COMPETITIVE INDEX (GCI)	ICT DEVELOPMENT INDEX (IDI)	DIGITAL GOVERNMENT INDEX (DGI)	E-GOVERNMENT DEVELOPMENT INDEX (EGDI)
Global ranking	IMD		WEF	UN, ITU	OECD	UN DESA
Focus	Digital Competitiveness	Overall Competitiveness, Combining Macro and Micro Indicators		ICT Competitiveness	Digital Government Capacity	
Analytical dimension	1. Knowledge 2. Technology 3. Future Readiness	1. Economic Performance 2. Government Efficiency 3. Business Efficiency 4. Infrastructure	1. Enabling Environment 2. Human Capital 3. Markets 4. Innovation Ecosystem	1. ICT access 2. ICT use 3. ICT skills	1. Digital by Design 2. Data-driven, Acts as Platform 3. Open by Default 4. User-Driven 5. Proactive	1. Provision of Online Services 2. Telecommunication Connectivity 3. Human
Ranking interval	Annual				Annual (Recently Commenced)	Bi - annual
No.of countries	64		141	135	33	193
Research methodology	Secondary Data and Survey of Business Executives, with Specific Models					
No.of indicators	52 (2020)	255 (2020)	103 (2020)	11 (2017)	94 (2020)	156 (2020)

According to the chart above, it can be seen that the World Digital Competitiveness Ranking (DCR) is used to evaluate continuously on an annual basis. It is focused on the national digital competitiveness and also covers digital personnel development and social equality. Other indexes do not focus on evaluating digital competitiveness, therefore using the DCR index is deemed appropriate for analyzing national digital competitiveness.

The IMD has proposed a DCR model, using sub-indicators in 3 groups, namely :

- **Knowledge group**, that reflects human capital that has a role in national digital development
- **Technology group**, that reflects technology capacity in the area of investment regulation and infrastructure framework of technology
- **Future readiness group**, that reflects adaptability of private sector and digital readiness of government sector, as illustrated in this chart :



Factors and sub-factors in IMD Digital Competitiveness Ranking

	KNOWLEDGE	TECHNOLOGY	FUTURE READINESS
SUB-FACTORS	<ul style="list-style-type: none"> • Talent • Training & Education • Scientific Concentration 	<ul style="list-style-type: none"> • Regulatory Framework • Training & Education • Scientific Concentration 	<ul style="list-style-type: none"> • Adaptive Attitudes • Business Agility • IT Integration

EFFECTS OF NATIONAL DIGITAL COMPETITIVENESS ON NATIONAL DEVELOPMENT

2.3

From the analyses of indicators according to the DCR model that has factors of quality measurement, weak / leverage points to development and inappropriate context (total 32 indicator), the analysis can be summarized as follows :

ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
KNOWLEDGE			
TALENT			
1	1.1.1 Educational Assessment PISA (PISA assessment based on Mathematical)	Thai education system is still limited in area of Mathematics	Weak / Leverage points to development
2	1.1.6 Net flow of international students inbound to Thailand and outbound at the university level	Able to utilize available mechanisms to increase number	Weak / Leverage points to development and inappropriate context



ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
TRAINING & EDUCATION			
3	1.2.2 Total public expenditure on education	Outcome of analyses	Weak / Leverage points to development
4	1.2.3 Higher Education Achievement of Population	Format and measurement interval not clear, resulting in delays	Weak / Leverage points to development and quality of measurement
5	1.2.4 Pupil-Teacher Ratio in Higher Education	Measurement interval and data used by IMD may not be latest	Weak / Leverage points to development
6	1.2.5 Graduates in Science- Number of graduates in fields of IT and Communications, Engineering, Mathematics and Sciences	Number and quality of graduates do not fulfill needs of private sector	Weak / Leverage points to development and inappropriate context
7	1.2.6 Women with Degrees - female graduates who have completed university degrees	Likely to improve	Inappropriate context

ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
SCIENTIFIC CONCENTRATION			
8	1.3.1 Total Expenditure on R&D (%) at national level	Fields that heavily invest in R&D may not be directly be related to digital	Weak / Leverage points to development and inappropriate context
9	1.3.2 Total R&D Personnel per Capita	Number and quality of graduates do not fulfill needs of private sector	Weak / Leverage points to development and inappropriate context
10	1.3.3 Female Researchers	(none)	(none)
11	1.3.4 R&D Productivity by Publication at the international level	Limitations from incentives and lack of R&D manpower	Weak / Leverage points to development and inappropriate context
12	1.3.5 Scientific and Technical Employment	Limitations form lack of quality manpower according to need	Weak / Leverage points to development and inappropriate context
13	1.3.6 High-Tech Patent Grants for Thais	Limitations form lack of manpower and general R&D skills	Weak / Leverage points to development and inappropriate context
14	1.3.7 Robots in Education and R&D	Concept not relevant and lack of clear host agency	Quality of measurement

ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
TECHNOLOGY			
REGULATORY FRAMEWORK			
15	2.1.1 Starting a Business	May have issue working with government in some stage	Weak / Leverage points to development
16	2.1.2 Enforcing Contracts	Context of doing business of Thailand may directly differ with indicators. MDES may pilot in creating instruments specific to the digital business	Weak / Leverage points to development and inappropriate context
CAPITAL			
17	2.2.1 IT & Media Stock Market Capitalization	Indicator may not reflect Thai context. Concept of indicator may not cover, but Thailand may in fact have limitations of capital market	Weak / Leverage points to development and inappropriate context
18	2.2.4 Country Credit Rating	Thai economy is dependent on global economy	Weak / Leverage points to development
19	2.2.6 Investment in Telecommunications	Indicator may effect analyses in Thailand's context to be not relevant	Weak / Leverage points to development and inappropriate context

ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
TECHNOLOGICAL FRAMEWORK			
20	2.3.2 Mobile Broadband Subscribers - High-speed mobile internet broadband subscribers	Indicators may not reflect Thai context, especially changing technology numbers	Quality of measurement
21	2.3.3 Wireless Broadband	Indicators are unclear	Quality of measurement
22	2.3.4 Internet Users	Indicators may not reflect Thai context, but most of the population are not able access the internet	Weak / Leverage points to development and quality of measurement
23	2.3.5 Internet Bandwidth Speed (average speed for internet connection)	Measurement method not clear	Quality of measurement
24	2.3.6 High-Tech Exports (percentage of high-technology goods exports)	Indicator may effect analyses in Thailand's context to be not relevant, because sector in Thailand may not be digital	Weak / Leverage points to development and inappropriate context

ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
FUTURE READINESS			
ADAPTIVE ATTITUDES			
25	3.1.1 e-Participation	Substantial progress, but may not have enough participation from sectors in the overall picture	Weak / Leverage points to development
26	3.1.2 Internet Retailing	Thai context may cause low measurement in reporting	Inappropriate context. Weak / Leverage points to development and quality of measurement
27	3.1.3 Tablet Possession	Use of tablets decreased and replaced by large smartphones	Inappropriate context. Weak / Leverage points to development and quality of measurement
28	3.1.4 3.1.4. Smartphone Possession	Indicators may not reflect Thai context. Majority of the public, however, do not have real access	Weak / Leverage points to development and quality of measurement
BUSINESS AGILITY			
29	3.2.2 World Robots Distribution (ratio of ownership of industrial robots in Thailand)	Opportunity to develop Thai robot ownership to promote creation of a comprehensive robotic industry	Weak / Leverage points to development
30	3.2.6 Entrepreneurial Fear of Failure (percentage level of entrepreneurs who fear failure)	Thai context may cause difficulty in development of indicators. State may target entrepreneurs with higher opportunity	Weak / Leverage points to development

ITEM	INDICATOR	OUTCOME OF ANALYSES	SIGNIFICANT POINT
IT INTEGRATION			
31	3.3.1 e-Government	Moderate progress, but in overall picture it may lack integration among agencies	Weak / Leverage points to development
32	3.3.4 Software Piracy	Moderate progress with positive trend	Weak / Leverage points to development

Important issues:

IMPORTANT ISSUES	DEFINITION
Quality of measurement (Operational Issue)	Indicators have a process that is acceptable, although with some limitations in collecting data and evaluation, such as erroneous data, slowness and inappropriate source, for example.
Inappropriate context (Contextual Issue)	Indicators have a measurement process that is inappropriate or not conducive with the current situation.
Weak/Leverage points to development (Development Gap)	Indicators have a measurement process that is accountable and highlights national weaknesses in the digital area, as per the framework of global ranking institutions

RESULTS OF NATIONAL DIGITAL COMPETITIVENESS RANKING FOR 2021

To present the status, development and competitiveness of Thailand in the digital sector, as ranked by various institutions and important statistical data that measure the digital development status of Thailand, to reflect the competitiveness position of the country, as compared to other countries.

KEY STATISTICAL DATA AS INDICATORS ON NATIONAL DIGITAL DEVELOPMENT

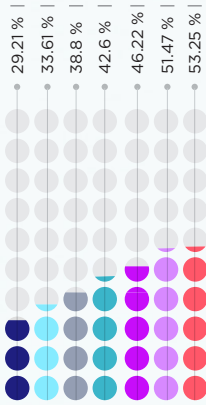
This data reflects the status of digital development in Thailand in terms of readiness and ability and level in using technology for development and promotion of digital development for the future. There are 6 important points for evaluation, as follows :

3
3.1

1. Digital infrastructure
2. Making use of digital technology for the people and society
3. Business sector and digital technology
4. Readiness of government sector in e-Government, as assessed from related indicators
5. Human resources in terms of digital workforce
6. Laws, rules and regulations that are conducive to digital development

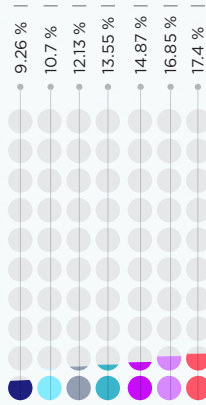
DIGITAL INFRASTRUCTURE

- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021



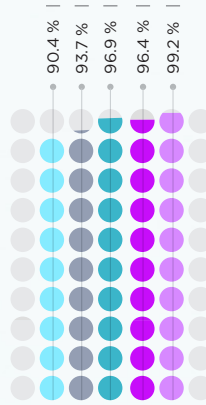
Broadband Penetration per Household (%)

Source : Broadband Penetration per Household (%), Office of National Broadcasting and Telecommunications Commission (NBTC)



Broadband Penetration per Population

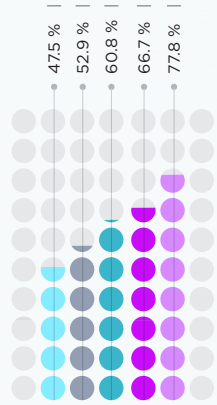
Source : Broadband Penetration per Population (%), Office of National Broadcasting and Telecommunications Commission (NBTC)



Internet Penetration through Smartphone

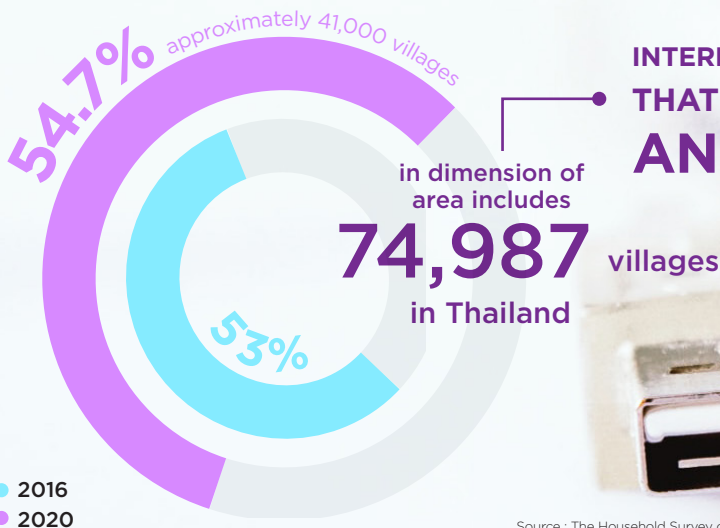
(Percentage of population aged above 6 able to use internet)

Source : The Household Survey on the Use of Information and Communication Technology, National Statistical Office of Thailand



Ratio of Population Aged above 6 Who Use internet

Source : The Household Survey on the Use of Information and Communication Technology, National Statistical Office of Thailand

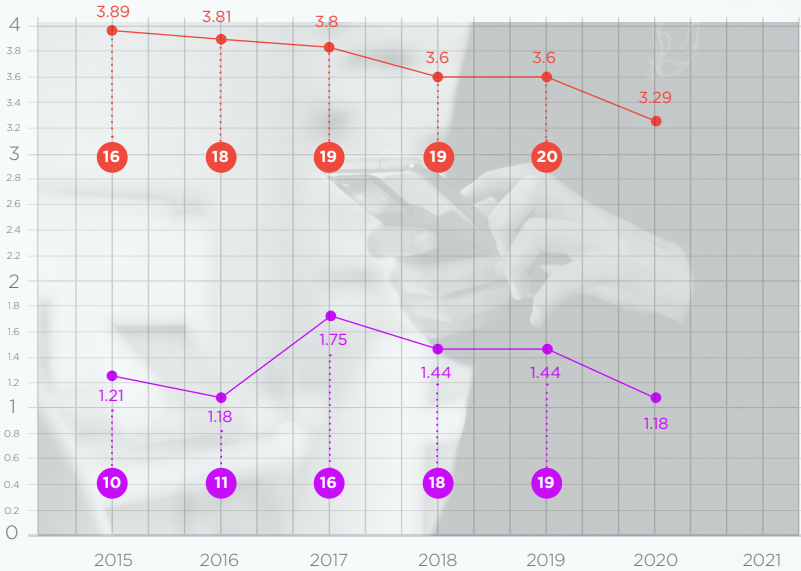


INTERNET PENETRATION THAT IS ACCESSIBLE AND EQUAL

- 2016
- 2020

Source : The Household Survey on the Use of Information and Communication Technology, National Statistical Office of Thailand

The United Nations Broadband Commission on Sustainable Development aims to reduce the price of broadband in developing countries by limiting broadband rates to lower than 2% of Gross National Income (GNI) per head by 2025. Although the percentage outlook is positive, the national ranking variable is at an opposite trend, that is, a low ranking was placed as compared to the efficiency of other countries.



*** NOTE**

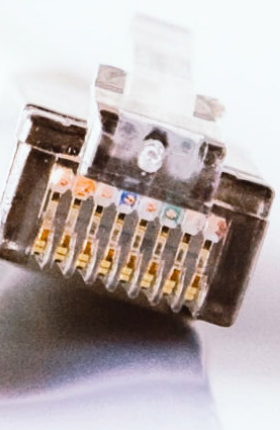
OF GNI p.c.
 ●● is the ranking of Thailand compared to **all 40 Asia & Pacific countries**

Source : The Affordability of ICT Services, The ITU/UNESCO Broadband Commission for Sustainable Development

Ability for people and organizations to access and use depends on the appropriate service rate that is affordable to income levels in Thailand

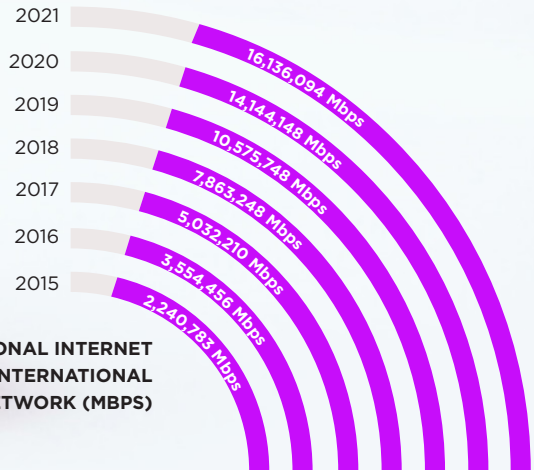
Data-only Mobile Broadband Basket 1.5 GB
 Percentage of service rate of Data-only Mobile Broadband Basket 1.5 GB as compared to GNI.

Fixed-Broadband Basket 5GB
 Percentage of service rate of Fixed-Broadband Basket 5G as compared to GNI.



Source : International Internet Bandwidth, Internet Information Research (IIR), National Electronics and Computer Technology Center (NECTEC)

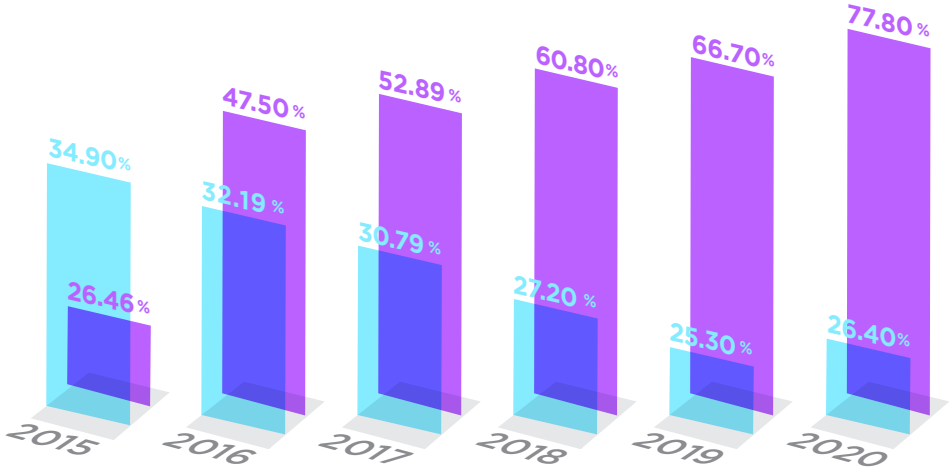
INTERNATIONAL INTERNET BANDWIDTH AND INTERNATIONAL NETWORK (MBPS)



MAKING USE OF DIGITAL TECHNOLOGY FOR THE PEOPLE AND SOCIETY*



- COMPUTER USERS
- INTERNET USERS



AGE RANGE OF MOST FREQUENT INTERNET USERS IS

15-34 YRS

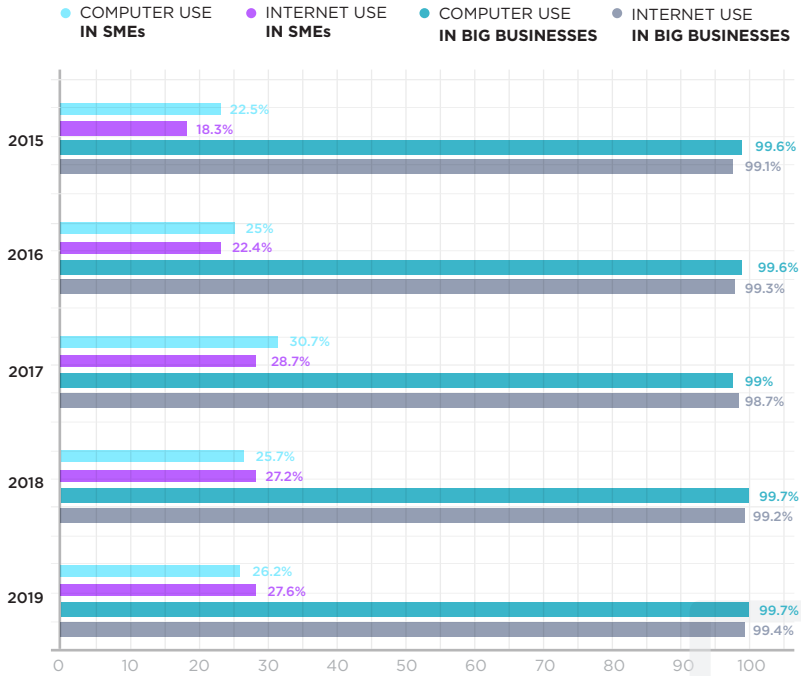


COMMUNITY ICT CENTERS AND DIGITAL COMMUNITY CENTERS HAVE BEEN CREATED BY ONDE*

IN 2021

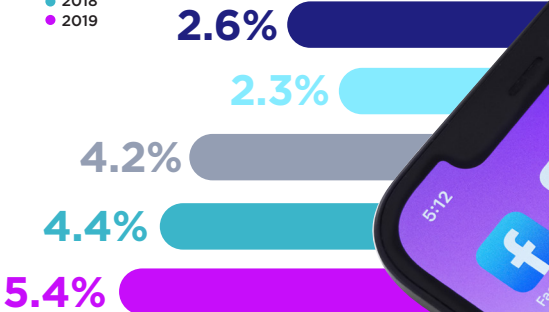
*Source : The Household Survey on the Use of Information and Communication Technology, National Statistical Office of Thailand

BUSINESS SECTOR AND DIGITAL TECHNOLOGY*



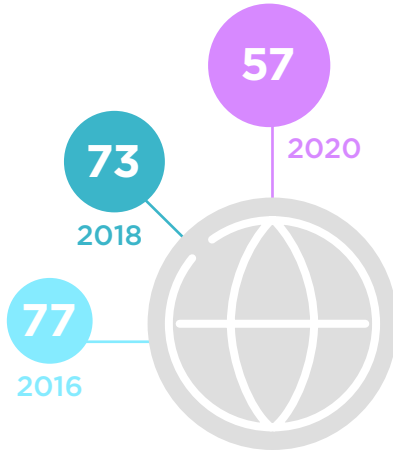
ONLINE PRODUCT SALES AMONG SMEs*

- 2015
- 2016
- 2017
- 2018
- 2019



READINESS OF GOVERNMENT SECTOR IN E-GOVERNMENT, AS ASSESSED FROM RELATED INDICATORS

- 2016
- 2017
- 2018
- 2019
- 2020



RANKING OF THAI GOVERNMENT'S READINESS

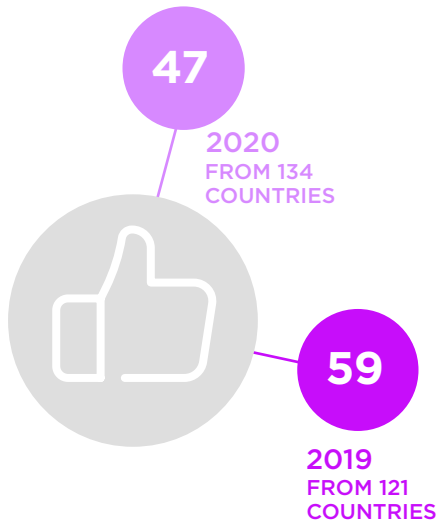
Source : E-Government Development Index (EDGI)

of 193 countries, Thailand has been ranked in a positive trend

USAGE OF ICT OF THAI GOVERNMENT

Source : Network Readiness Index (NRI)

This indicator was adapted from the Government Usage indicator in the WEF report, as in early 2019 there had been an internal organization structural adjustment and re-prioritization, so the WEF had since handed over the NRI measurements to Portulans Institute instead.

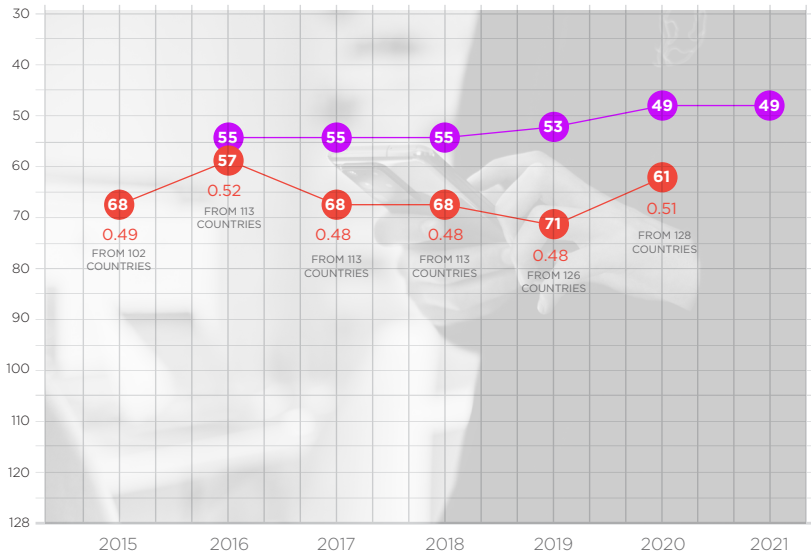


● OPEN GOVERNMENT INDEX (OGI)

Source : The Global Open Data Index, Digital Government Development Agency (Public Organization) (DGA)

● E-GOVERNMENT IN IMD DIGITAL COMPETITIVENESS RANKING

Source : World Justice Project: Rule of Law Index



Source : IMD Digital Competitiveness Thailand Ranking

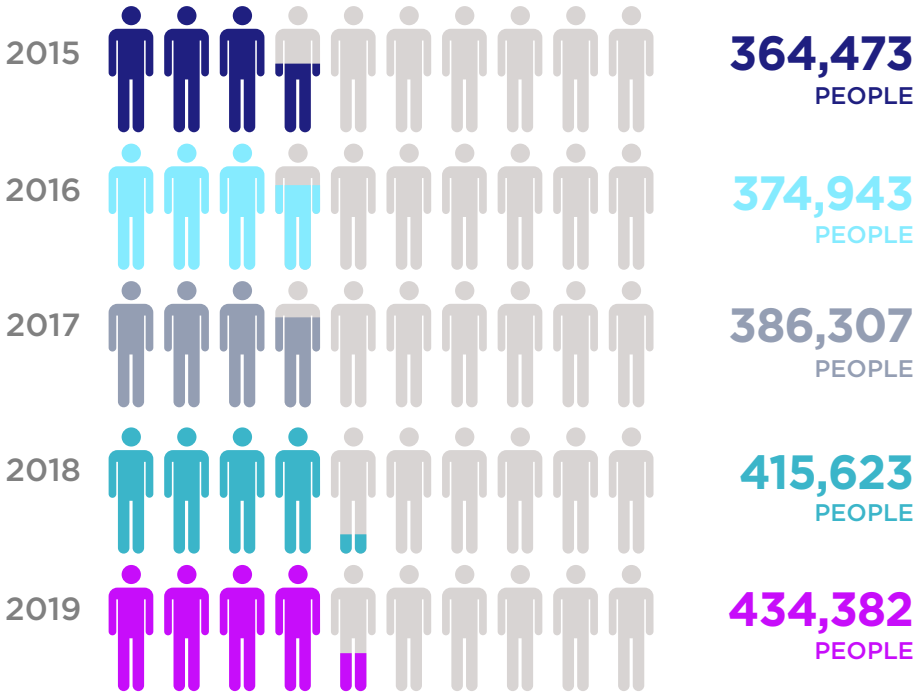


HUMAN RESOURCES IN TERMS OF DIGITAL WORKFORCE

Source : Summary of Important Results of Employees Working in Information and Communication Technology Field, National Statistical Office of Thailand

- 2015
- 2016
- 2017
- 2018
- 2019

PERSONS WORKING ON ICT (PEOPLE)



THE ICT SECTOR IS PREDICTED TO NEED INCREASING WORKFORCE FROM THAILAND'S TECHNOLOGY SECTOR

There are minimal changes in this occupation sector



Year 2015 - Report from National Statistical Office
 Year 2020 - Report from WEF (WEF Future of Jobs Reports 2020) ranked future occupations in Thailand

Source : The Future of Jobs Report, Thailand Country Profile, Electronic Transactions Development Agency (ETDA)

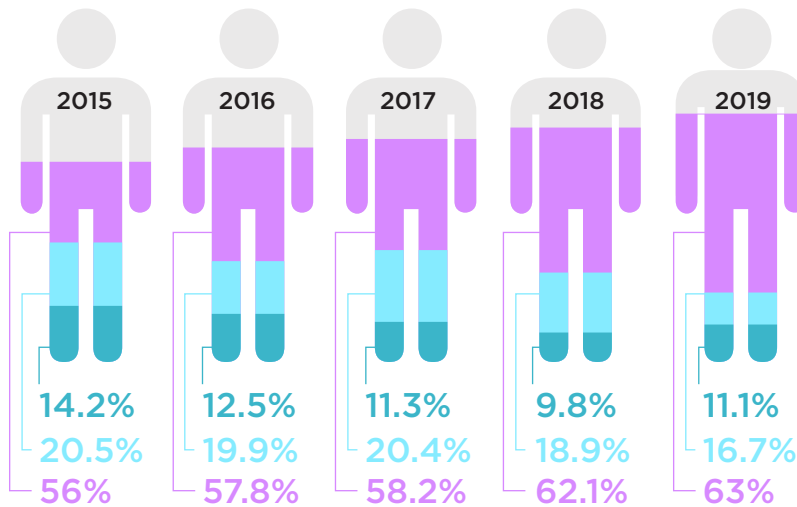
2

TOP

ICT OCCUPATION SECTORS IN THAILAND

- Information and communication technology jobs
- Technician/operators supporting ICT
- Analysts and software and application program developers

Source : Summary of Important Results of Employees Working in Information and Communication Technology Field, National Statistical Office of Thailand



2015

1. Cloud Computing Jobs Field
2. Big Data Jobs Field
3. Mobile Application and Business Solution Jobs Field

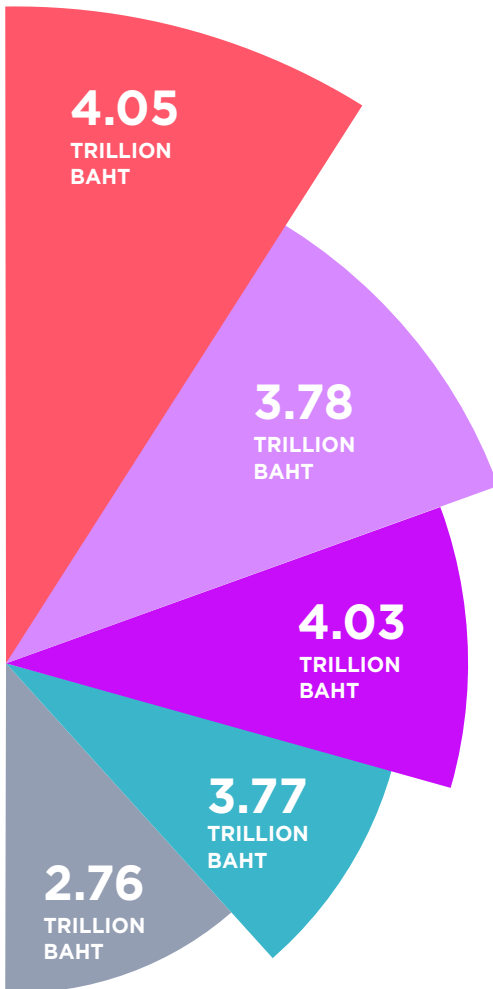
2020

1. Data Analysts and Scientists
2. Digital Marketing and Strategy Specialists
3. Big Data Specialists
4. AI and Machine Learning Specialists
5. Software and Applications Developers

LAWS, RULES AND REGULATIONS / ECOSYSTEM THAT ARE CONDUCTIVE TO DIGITAL DEVELOPMENT

Source : e-Commerce Survey in Thailand (2015), Electronic Transactions Development Agency (ETDA)

SALES THROUGH ELECTRONIC MEDIA



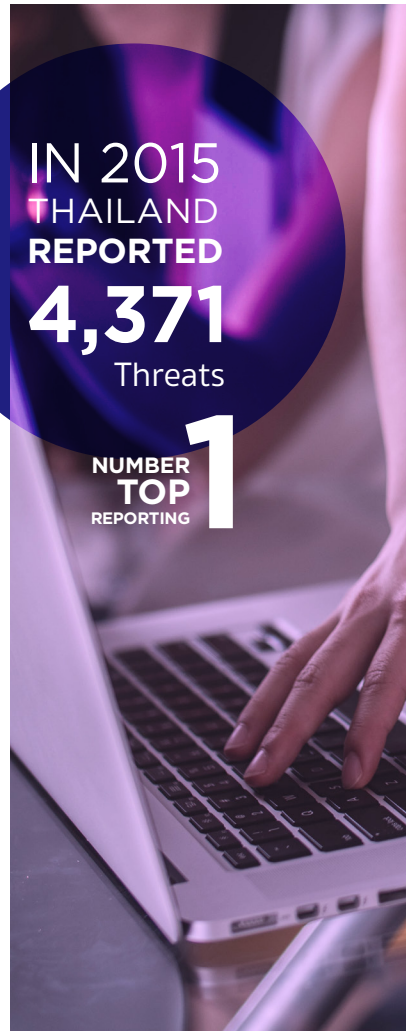
ALL TYPES OF CYBER-CRIME

IN 2015
THAILAND
REPORTED
4,371
Threats

NUMBER
TOP
REPORTING

1

- 2017
- 2018
- 2019
- 2020
- 2021



TOP TYPES OF CYBER-CRIME IN THAILAND

- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021



2559
3,797
Cases

2560
3,237
Cases

2561
2,520
Cases

2562
2,470
Cases

2563
2,250
Cases

2564
1,206
Cases

2015

MALICIOUS CODE

35.4%

2016

INTRUSIONS,
MALICIOUS CODE

26.9%

2017

INTRUSION ATTEMPTS

28.9%

2018

INTRUSION ATTEMPTS

43.9%

2019

FRAUD

40.2%

2020

MALICIOUS CODE

30.5%

2021

VULNERABILITY

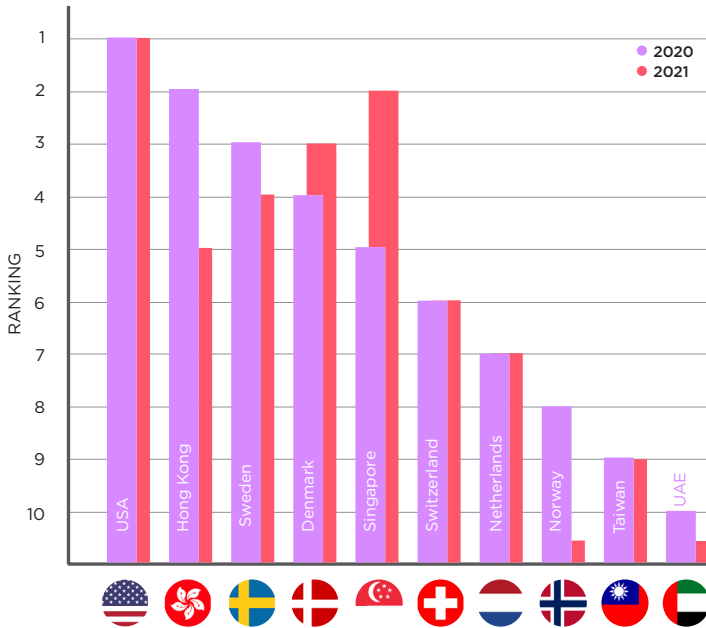
39.2%

RESULTS OF NATIONAL DIGITAL COMPETITIVENESS RANKING FOR 2021 3.2

by IMD World Competitiveness Center

In 2021, the IMD World Competitiveness Center of Switzerland ranked 64 economies according to ability in terms of digital competitiveness. The ranking of economies was based on 3 main factors, namely 1. Digital Knowledge 2. Technology 3. Future Readiness

• OVERALL PICTURE OF GLOBAL DIGITAL RANKING •

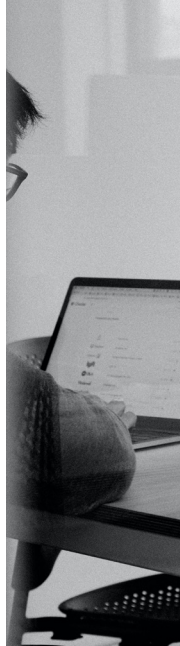


TOP 10 DIGITALLY COMPETITIVE ECONOMIES IN WORLD
(from 64 economies)



NO.1
for 4
consecutive
years(2018-2020)

Result of 2021 digital ranking found that the top 10 digitally competitive economies in the world : No. 1 is USA, which is able to maintain the top rank continuously from 2018.



THE PEOPLE'S REPUBLIC OF CHINA IS AN ECONOMY THAT SHOULD BE OBSERVED



Consumers have increasingly been more accepting of technological change in the country. The confidence of businesses in Venture Capital (VC) has made the **United States** ranked first, followed by **Hong Kong, Sweden, Denmark, Singapore, Switzerland, Netherlands, Norway, Taiwan and United Arab Emirates**, respectively. When considering the top 10 economies with the highest digital competitiveness, all 10 economies were ranked in the top 10 National Competitiveness Ranking in 2021 as well.

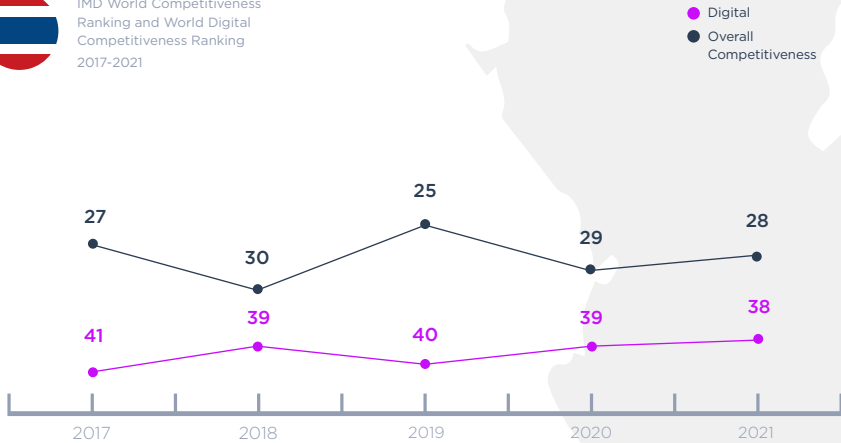
It is quite interesting that this year, there were up to 3 Asian economies that were ranked the top 10 most digitally competitive, namely Hong Kong, Singapore and Taiwan. Hong Kong and Taiwan were placed 3 positions higher than last year. Singapore, although ranked 5th in 2021, lower than 2nd last year, remains in the top 10 list.

However, **the People's Republic of China** is an economy that should be observed. Although not ranked in the top 10 most digitally competitive this year, in the past 4 years (2018-2021), the People's Republic of China has quickly moved up the rankings up 15 positions. Ranked 30th in 2018, she was 15th in 2021. This is a result of an excellent State-based Governance Model in elevating the potential on education, science, research and development (R&D) that creates commercial output, and the leadership in exporting high technology.

RANKING OF COMPETITIVENESS AND DIGITAL CAPACITY OF THAILAND



IMD World Competitiveness
Ranking and World Digital
Competitiveness Ranking
2017-2021

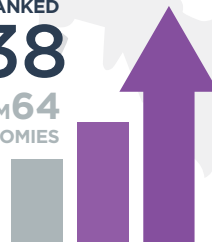


OVERALL THAILAND COMPETITIVENESS RANKING AND DIGITAL RANKING

In the 2021 ranking of Thailand's digital competitiveness, the country ranked one place higher from 2020, and placed **at 38th out of 64 economies**. This year, although the total score of 64.27 out of 100 in 2020 was decreased to 63.16 in 2021, it was in line with the general trend of 2021 when the average score was lower from 69.94 to 68.01. However, it is noted that Thailand's total score on digital competitiveness is lower than the average for 64 global economies.

Therefore, Thailand must develop digital capacity to be able to compete with other countries. (Reference from IMD World Digital Competitiveness Ranking 2021)

RANKED
38
FROM 64
ECONOMIES

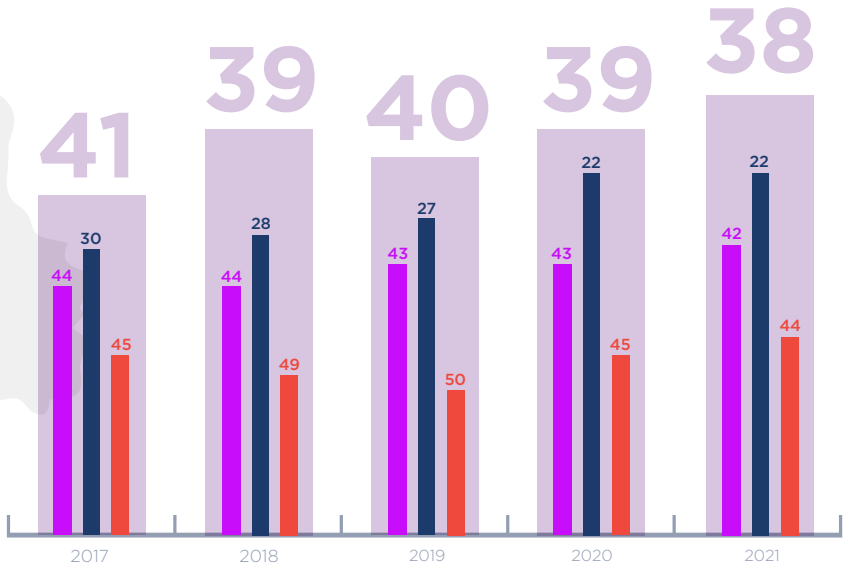


GENERAL OVERVIEW AND MAIN FACTORS

5 YEARS



- Overall
- Knowledge
- Technology
- Future Readiness



When considering Thailand's digital ranking in 3 main dimensions, it was found that the ranking improved in 2 dimensions, as compared to 2020. The dimensions improved were Digital Knowledge, moving up 1 rank from 43 to 42, and Future Readiness, moving up 1 rank from 45 to 44. Meanwhile, in the Technology dimension, the ranking remained the same at 22. It can therefore be seen that the trend for digital ranking in the 5 years (2018-2021) have all improved positively. This includes the digital ranking and ranking for the 3 main areas. The details of the 3 main areas are as follows :

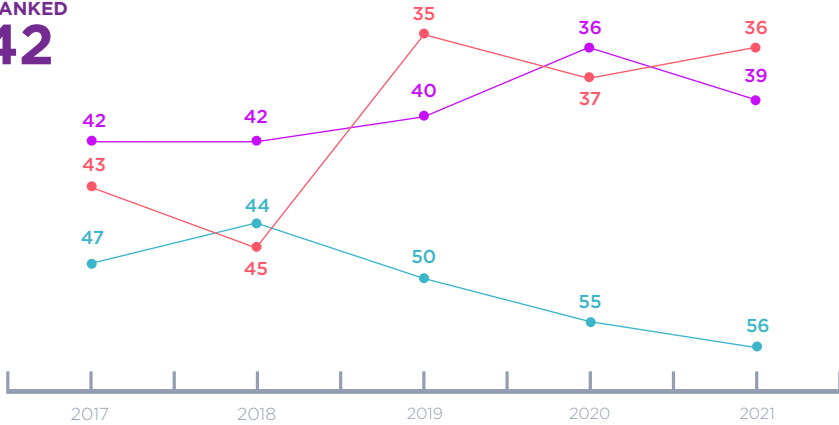
KNOWLEDGE

RESULT OF RANKING FOR DIGITAL KNOWLEDGE IN THAILAND 2021

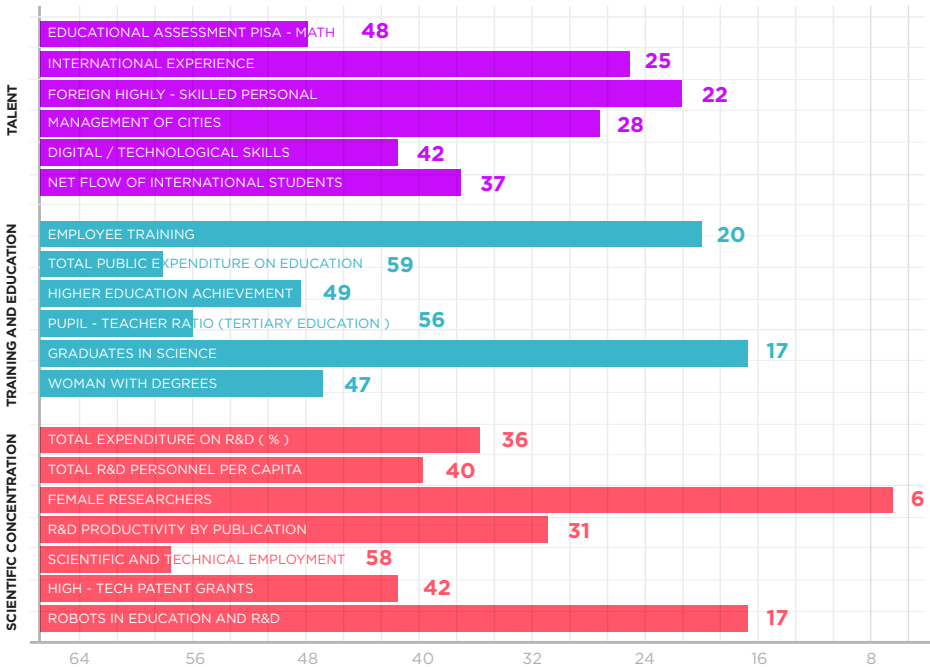
RANKED **42**

SUB-FACTORS

- Talent
- Training and Education
- Scientific Concentration



RESULT OF RANKING FOR DIGITAL KNOWLEDGE IN THAILAND





According to the IMD World Digital Competitiveness Ranking 2021, Thailand improved in its Digital Knowledge ranking in 1 position from the previous year, to number 42 due to the improvement of the ranking of one sub-factor (Scientific Concentration). The 4 indicators that have widely improved in the Knowledge dimension are as follows :

1. High-tech Patent Grants
2. Employee Training
3. Robots in Education and R&D
4. Digital / Technological Skills

For the Employee Training and Digital/ Technological Skills indicators, the modus was through a survey of opinions of business executives in Thailand. This reflects that in the past year, most organizations in Thailand gave importance to employee training as well as digital and technology skills. However, there are 3 indicators that have been

ranked lower from the past year, that is, 1. International Experience 2. Foreign Highly-skilled Personnel and 3. Scientific and Technical Employment. The International Experience and Foreign Highly-skilled Personnel indicators are derived from a survey of opinions of business executives in Thailand as well. It is understood that the lower ranking of the 2 indicators this year is due to the fact that in the past 1-2 years, the whole world, including Thailand is facing a pandemic crisis of Covid-19, which is a dire obstacle to international travel of quality personnel. Apart from this, the indicator that can be classified as **a weakness of Thailand that must be prioritized for development is Scientific and Technical Employment** that is increasing, as well as indicators in the area of education that has taken a low ranking, namely indicators on Total Public Expenditure on Education and Pupil-Teacher Ratio (Tertiary Education).

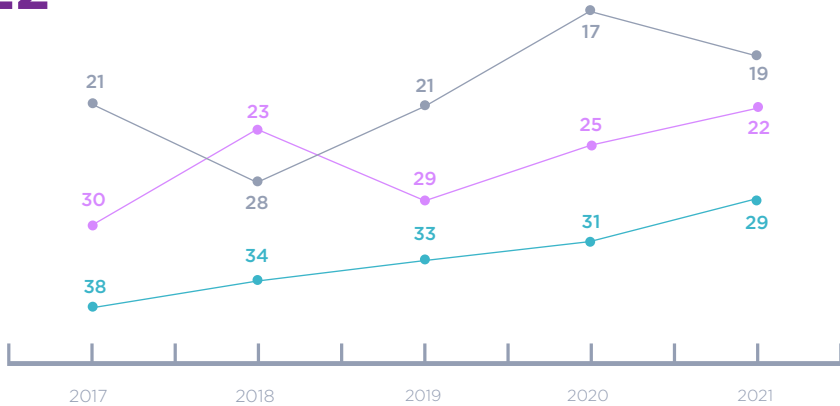
TECHNOLOGY

RESULT OF RANKING FOR TECHNOLOGY
IN THAILAND 2021

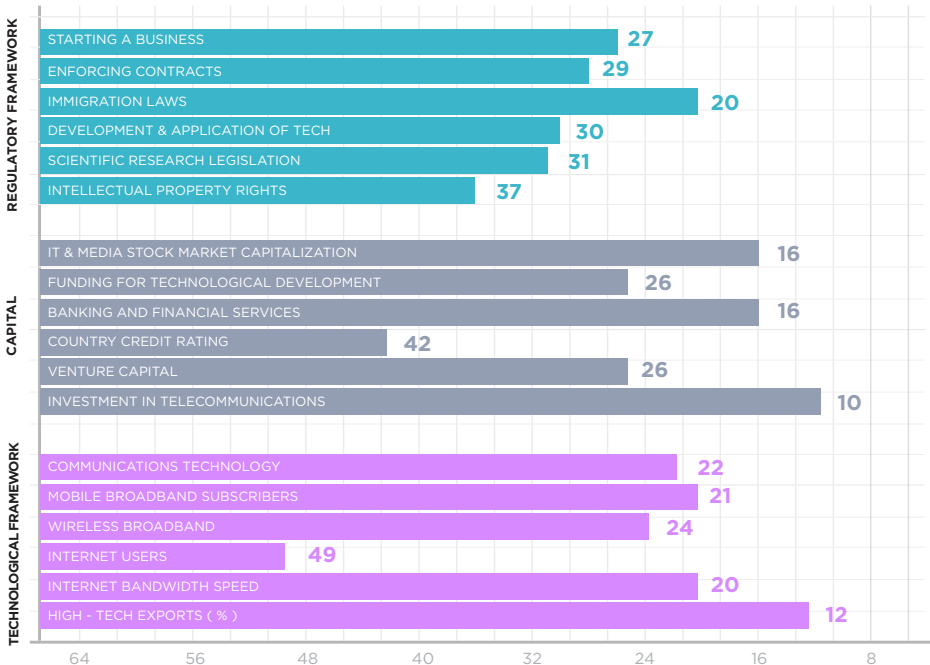
RANKED
22

SUB-FACTORS

- Regulatory Framework
- Capital
- Technological Framework



RESULT OF RANKING FOR TECHNOLOGY IN THAILAND





According to the IMD World Digital Competitiveness Ranking 2021, Technology is a main dimension that Thailand has been ranked high in terms of capacity, as compared to the 2 other dimensions (Knowledge and Future Readiness) in the past 5 years (2018-2021). The high placement has remained and Technology has been ranked at 22 since 2020. The sub-factors that have improved in ranking are Technological Framework and Regulatory Framework, with 4 indicators that have improved as follows :

1. Intellectual Property Rights
2. Internet Users
3. Investment in Telecommunications
4. IT & Media Stock Market Capitalization

For the Intellectual Property Rights indicator, the modus was through a survey of opinions of business executives in Thailand. This reflects that in the past year, **most organizations in Thailand gave importance to inventions and innovation to create new intellectual property.** The pandemic crisis of Covid-19 in the past 1-2 years has caused all sectors of Thailand -- **government, business and public, to increasingly use the internet for online activities.** The result was that the Internet Users indicator improved. Apart from this, **Thailand's capital market remains strong from the investment in digital-related sectors,** as can be seen in the higher ranking of 2 indicators, the Investment in Telecommunications and IT & Media Stock Market Capitalization.

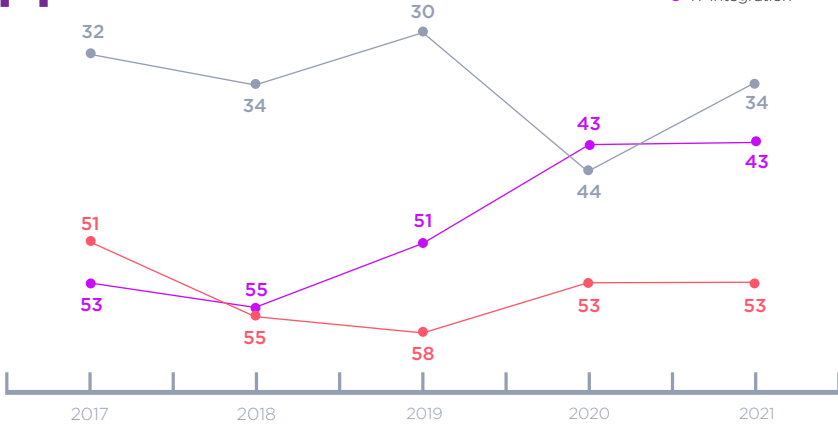
FUTURE READINESS

RESULT OF RANKING FOR FUTURE READINESS IN THAILAND 2021

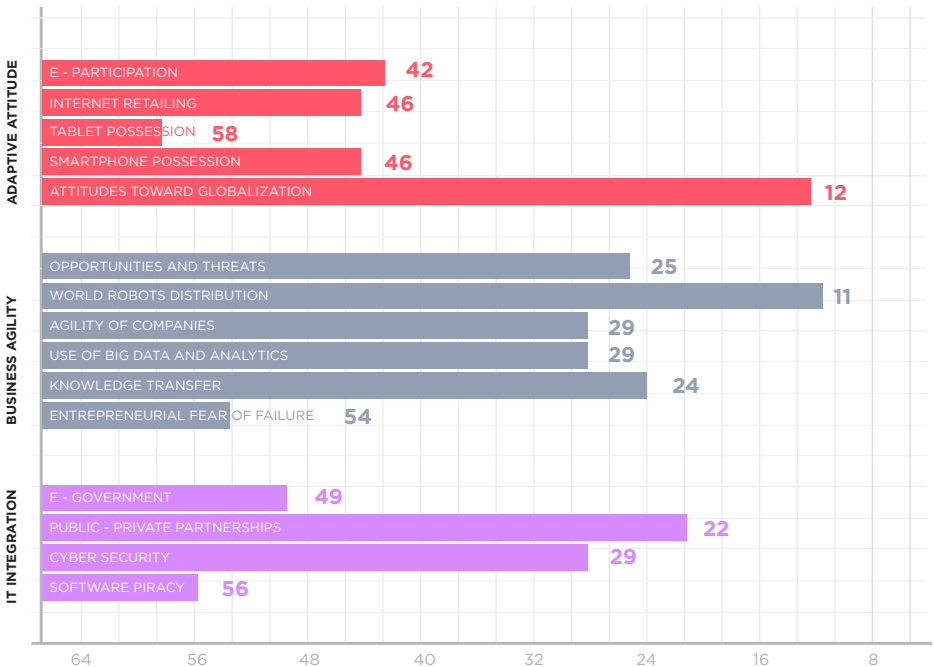
RANKED
44

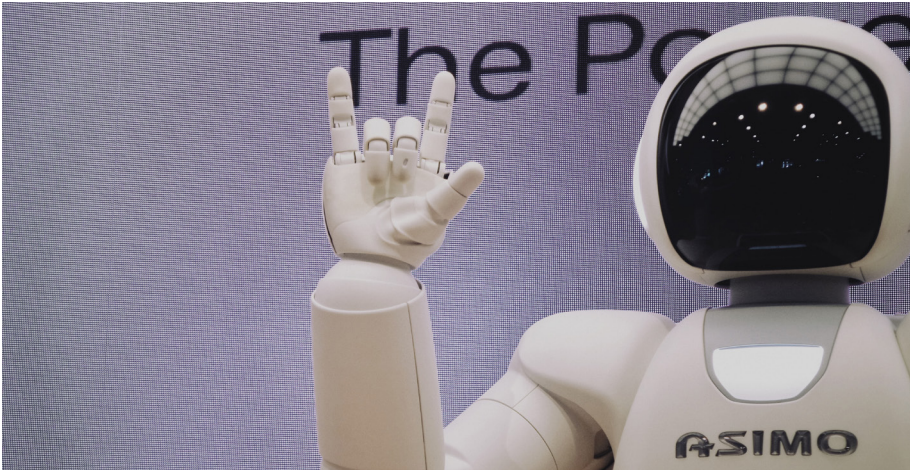
SUB-FACTORS

- Adaptive Attitude
- Business Agility
- IT Integration



RESULT OF RANKING FOR TECHNOLOGY IN THAILAND





According to the IMD World Digital Competitiveness Ranking 2021, Future Readiness is one main dimension that Thailand has lower capacity as compared to the other 2 remaining dimensions (Digital Knowledge and Technology) in the past 5 years (2018-2021). However, in 2021, the Future Readiness capacity of Thailand improved up 1 position to be ranked 44th, as a result of the Business Agility sub-factor. The 4 indicators that greatly improved for Future Readiness were mostly the Business Agility sub-factors, as follows :

1. Opportunities and Threats
2. Agility of Companies
3. Use of Big Data and Analytics
4. Knowledge Transfer

All 4 indicators are derived from opinions of business executives in Thailand. This reflects that in the past year, most

organizations in Thailand gave importance to business agility when facing the Covid-19 pandemic, by searching for new business opportunities arising from the crisis and using Big Data technology to analyse data to be more useful to business, as well as promoting exchange of knowledge in the business sector.

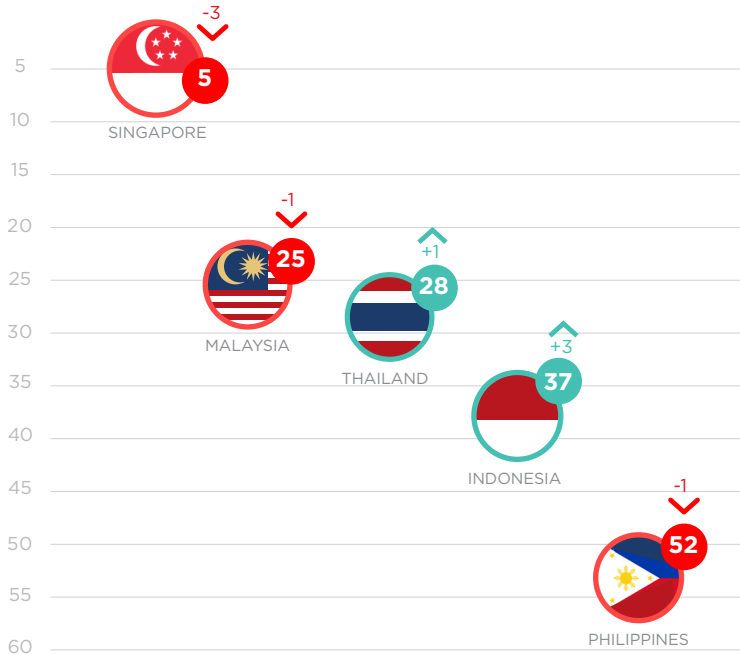
However, **the indicator that has been ranked lower in the past year is Public-Private Partnerships**, which is derived from a survey of opinions of Thai business executives in the past year. The joint investment between the public and private sector may decrease as a result of the Covid-19 pandemic. Apart from this, the indicator that can be classified as **a weakness of Thailand that must be prioritized for development is Software Piracy**. Thailand was ranked quite low as compared to the 64 global economies.

THAILAND AND ECONOMIES IN THE ASEAN REGION

There are only 5 economies, namely, Thailand, Indonesia, Malaysia, Singapore, and the Philippines, were ranked by the IMD. The economy that was ranked highest in ASEAN for digital competitiveness in 2021 remained Singapore as usual, followed by Malaysia, Thailand, Indonesia, and the Philippines, respectively. In 2021, most ASEAN economies had

lower competitiveness rankings, as compared to 2020. Singapore dropped down the most at 3 ranks, but was still able to digital competitiveness level in the global top 10 (5th place globally). Malaysia and the Philippines were down one place each in the ranking, Indonesia improved 3 ranks and Thailand improved up one rank.

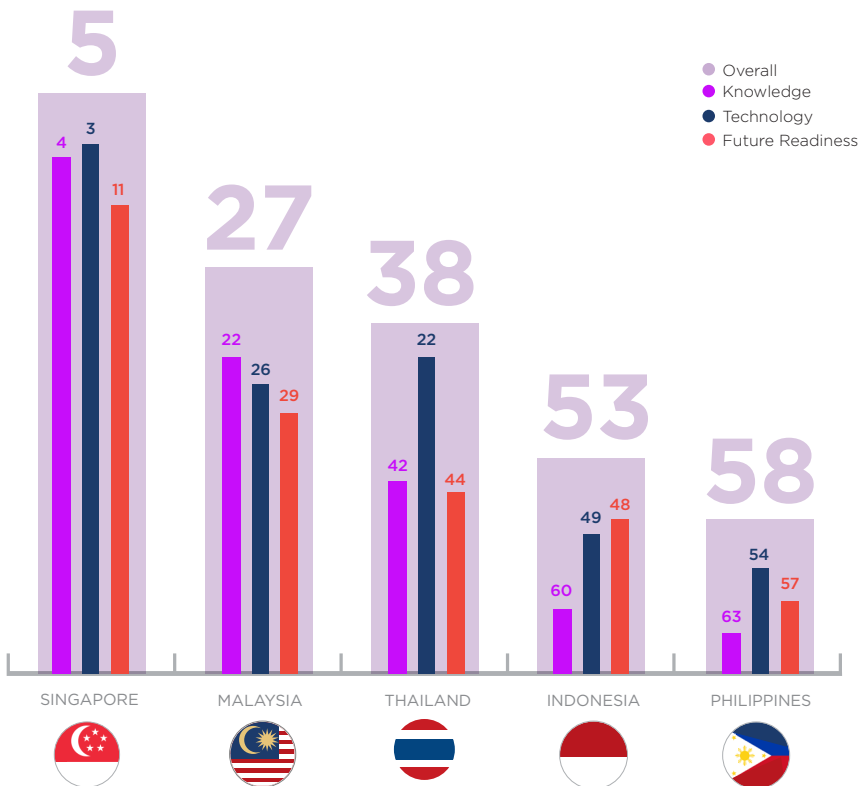
• RESULT OF OVERALL RANKING IN ASEAN • IMD WORLD COMPETITIVENESS RANKING 2021



5 ASEAN ECONOMIES RANKED IN 2021 BY IMD

When considering the main factors, Singapore is an economy that has been ranked very high, followed by Malaysia in the top 30 in each area. In the area of technology, Thailand is ranked 2nd after Singapore. In the remaining sub-factors on Digital Knowledge and Future Readiness, Thailand is ranked far lower than Singapore and Malaysia, which reflects that **Thailand must prioritize and expedite skills development for personnel, as well as maximize future readiness more quickly.** This will develop further the country's digital competitiveness in the future.

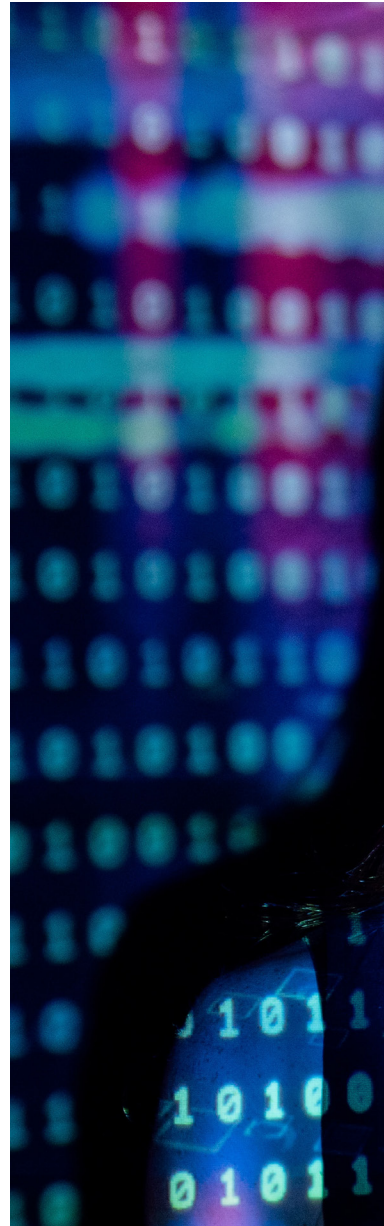
• RESULT OF DIGITAL RANKING IN ASEAN •
IMD WORLD DIGITAL COMPETITIVENESS RANKING 2021



I SUMMARY

The development of digital competitiveness of Thailand is a challenge that requires the cooperation of all sectors, government, private sector and public. The main point from the digital competitiveness ranking of IMD in 2021 is that the highest ranking economies in the last 4 years (2018-2021), such as the United States, reached such mark because of the consumer attitudes that accept technological change in the country, as well as confidence of businesses in Venture Capital-VC. As for the People's Republic of China although not ranked in the top 10 this year for digital competitiveness, in the past 4 years (2018-2021) it has moved up rapidly 15 places, from 30th in 2018 to 15th in 2021. This is a result of an excellent State-based Governance Model in elevating the potential on education and science and research and development (R&D) that creates commercial output, and the leadership in exporting high technology.

For Thailand, it is good news that in the past 5 years (2018-2021), the general ranking for digital competitiveness and 3 main dimensions have been gradually and continuously improving. The technology dimension is one that is a strong point, and it has been ranked higher than the other dimensions (Digital Knowledge and Future Readiness). On the other hand, Future Readiness is the dimension that Thailand has been ranked lowest in the past 5 years (2018-2021). In 2021, the digital competitiveness ranking of Thailand improved slightly 1 rank, now at 38th overall. This was a result of the adaptation of sectors of society in using more digital technology for activities as we faced the Covid-19 pandemic crisis, as well as better business confidence. Many digital indicators derived from surveys of opinions of business





executives have ranked higher, and is thus a reflection of this improvement.

Apart from this, the indicator that can be classified as a weakness of Thailand from this year's digital ranking, that must be prioritized for development is Public-Private Partnerships and Scientific and Technical Employment. Also included are indicators that Thailand ranked low, such as Total Public Expenditure on Education and Software Piracy, which Thailand was ranked quite low as compared to the 64 global economies.

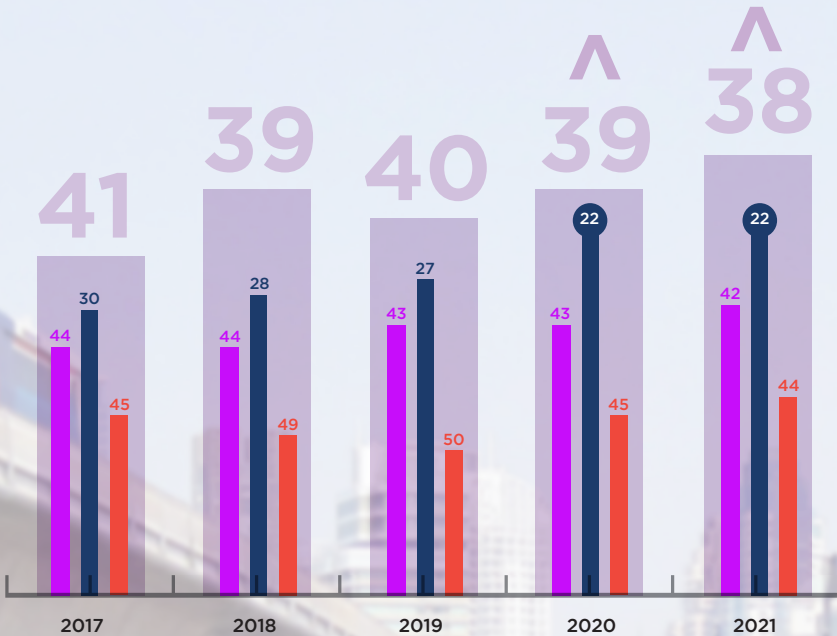
It is therefore necessary to build awareness of the objectives, direction and conscientiousness for the development and mobilizing of the country together in the digital area. This would take communication and complementary action in a continuous and long-term approach, and at the same time there must be flexibility and adaptability according to the situation and new facts.

THAILAND'S RANKING AS COMPARED TO OTHER COUNTRIES AND COMPARATIVE BENCHMARKS ON VARIOUS ISSUES **3.3**

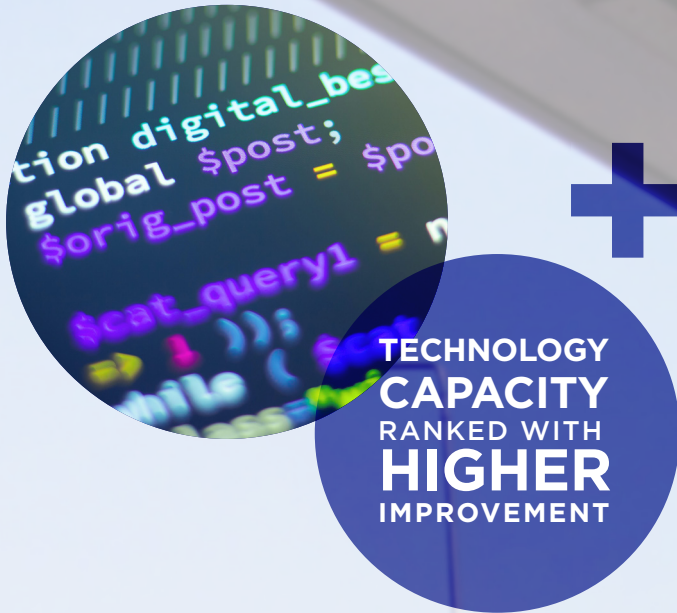
Thailand was ranked 38th out of 64 economies for digital competitiveness and was ranked 42nd, 22nd, and 44th in the dimensions of Digital Knowledge, Technology and Future Readiness, respectively.



- Overall
- Knowledge
- Technology
- Future Readiness



RESULT OF DIGITAL COMPETITIVENESS RANKING OF THAILAND IN PAST 5 YEARS (2017-2021)



The overall picture of the elevation of Thailand's digital competitiveness, from the study of digital competitiveness rankings in the past 5 years (2018-2021) has found that :

Overall ranking has not changed in terms of the 3 main dimensions. The Technology dimension improved visibly in the past 5 years, while the other 2 main dimensions (Knowledge and Future Readiness) have not changed substantially but had slight improvements.

The digital competitiveness ranking according to the IMD report of the past 5 years (2018-2021), in the various dimensions and details of factors, has found as follows :

KNOWLEDGE

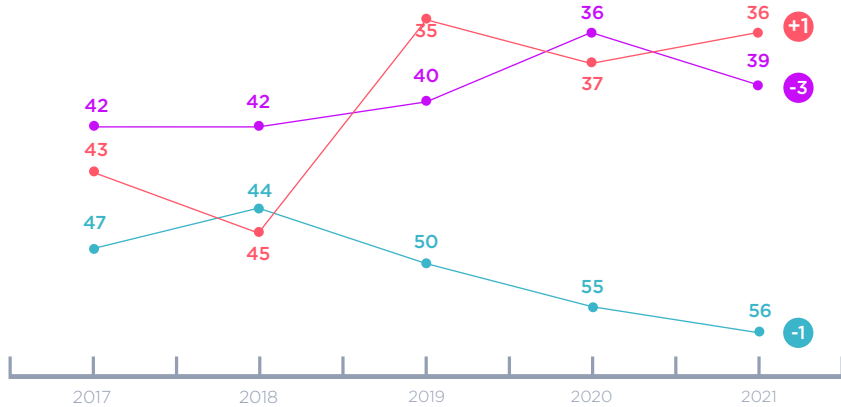
RESULT OF RANKING FOR DIGITAL KNOWLEDGE
IN THAILAND 2021

RANKED

42

SUB-FACTORS

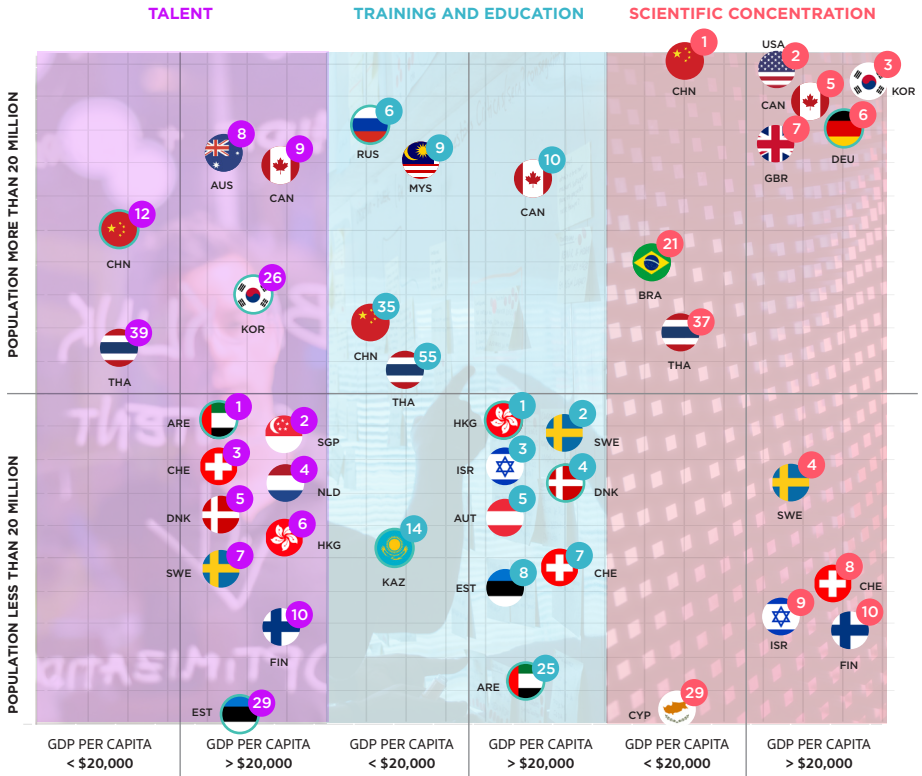
- Talent
- Training and Education
- Scientific Concentration



RESULT OF RANKING FOR DIGITAL DIMENSION IN THAILAND
IN PAST 5 YEARS (2017-2021)

- In the past year, Digital Knowledge improved from the previous year by one rank. Thailand is currently ranked at 42 due to the minor improvement in sub-factor on Scientific Concentration.
- The Training and Education sub-factor is considered one of Thailand's weaknesses, especially in the past 3 years when the ranking fell in 2021 by 6 positions to number 55 out of 66 global economies.
- Female Researcher (ranked 6th) is one strong indicator, while the weak indicators include Total Public Expenditure on Education (ranked 59 th), Pupil-Teacher Ratio (Tertiary Education) (ranked 56th) and Scientific and Technical Employment (ranked 58th).
- Aside from this, under the Knowledge dimension there are still other indicators that were ranked substantially low, as compared to other economies around the worlds, as follows :
 - Educational Assessment PISA-Math (ranked 48th)
 - Higher Education Achievement (ranked 49th)
 - Women with Degrees (ranked 47th)
 - Total R&D Personnel per Capita (ranked 40th)
 - High-Tech Patent Grants (ranked 42th)

According to the IMD World Digital Competitiveness Ranking 2021, the picture chart above is an analytical comparison using the factors of



ANALYTICAL COMPARISON OF THAILAND'S DIGITAL COMPETITIVENESS IN THE KNOWLEDGE AREA RANKED THAILAND IN THE TOP 10 GLOBALLY AND AS A COUNTRY WITH A POSITIVE TREND AND EXPONENTIAL GROWTH IN THE PAST 5 YEARS

population and GDP per capita. It was found that:

- From the 3 sub-factors of the Knowledge area, most of the group of countries with satisfactory ranking were in the group with GDP per capita more than 20,000 USD and a population of less than 20 million people, especially in the sub-factor on Training and Education where the highly ranked countries are those with long-standing education management and foundation including continuous development of educational content, resulting in quality population and high income.
- For countries with populations and GDP in the same group as Thailand as seen in the picture chart, namely China; for the sub-factor on Training and Education, namely Russia, Malaysia and China; and for the sub-factor on Scientific potential, namely China and Brazil.

COMPARISON OF THAILAND'S DIGITAL COMPETITIVENESS TO OTHER COUNTRIES ACCORDING TO 3 FACTORS IN THE KNOWLEDGE DIMENSION

1. TALENT It was found that the top 10 economies in this sub-factor were mostly those with populations under 20 million with GDP per Capita above 20,000 USD. The economies with a positive trend for the past 5 years were China, South Korea, Estonia and United Arab Emirates. Thailand was ranked 39 out of a total of 64 global economies for this sub-factor.

2. TRAINING The top 10 economies in this sub-factor were mostly those with populations under 20 million with GDP per Capita above 20,000 USD. The economies with a positive trend for the past 5 years were China, Russia, Kazakhstan, Hong Kong SAR, Denmark and United Arab Emirates. Thailand was ranked 56 out of a total of 64 global economies for this sub-factor, which can be considered low. It is interesting that Malaysia, categorized in the same group as Thailand with population more than 20 million with GDP per Capita less than 20,000 USD, is ranked 9 out of 64 (from 8th place in the 2020 ranking) which is considered quite good for this sub-factor.





3. SCIENTIFIC CONCENTRATION

From last year's ranking, it was found that the top 10 economies in this sub-factor were dispersed among those with GDP per Capita above 20,000 USD, both with populations over and under 20 million. Thailand was ranked 36 out of a total of 64 global economies for this sub-factor. Germany was ranked better from the 5 year trend.

From the above information, it can be summarized that from the ranking of sub-factors, be it on potential of personnel, training and education, and science, Thailand is considered to have low competitiveness when compared to other countries. It is therefore necessary to continuously develop and elevate capacity in related areas.

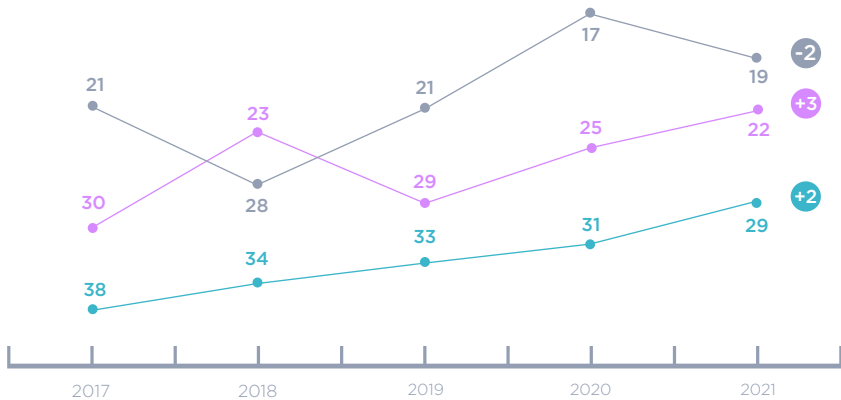
TECHNOLOGY

RESULT OF RANKING FOR TECHNOLOGY
IN THAILAND 2021

RANKED
22

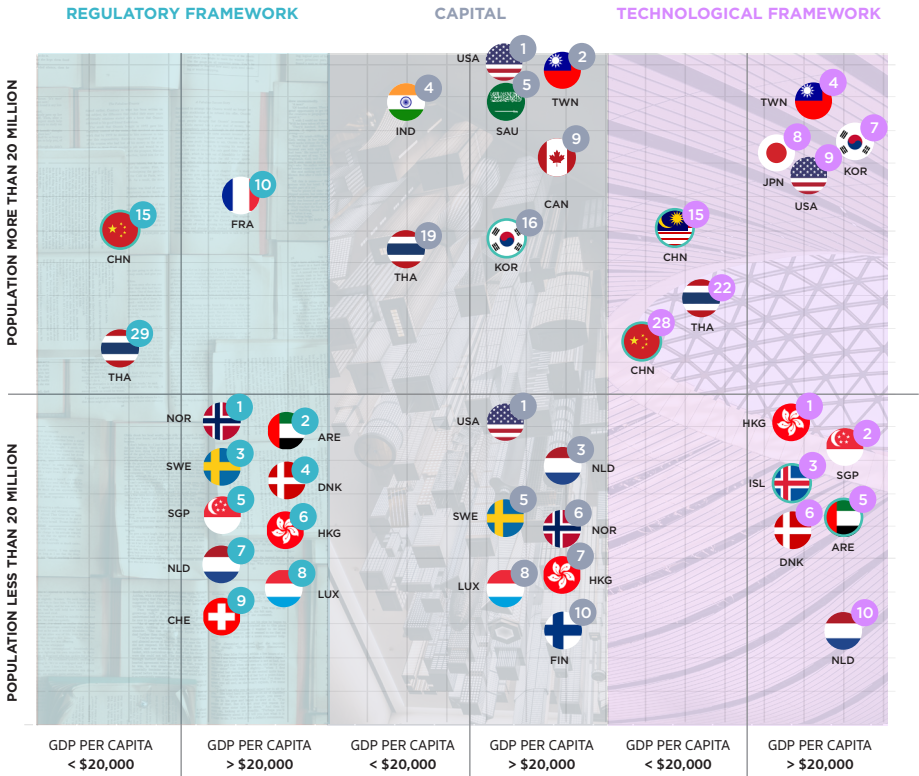
SUB-FACTORS

- Regulatory Framework
- Capita
- Technological Framework



RESULT OF RANKING FOR TECHNOLOGY IN THAILAND
IN PAST 5 YEARS (2017-2021)

- Technology is a dimension that Thailand has high competitiveness, as compared to the 2 other main dimensions, Digital Knowledge and Future Readiness in the past 5 years (2018-2021). Thailand has maintained the same rank for Technology dimension from 2020, ranked at 22.
- The sub-factor Regulatory Framework has improved in the past 5 years, although in 2020 the ranking dropped 8 places. However, from the latest ranking, Thailand was placed 2 ranks higher.
- The sub-factor Capital and Technological Framework did not see substantial change and was positioned in mid-level ranking in the past 5 years. In 2021, the ranking was adjusted minimally, with Capital ranked lower by 2 places and Technological Framework ranked higher by 3 places.
- There were 4 indicators that moved up the ranks in the Technology dimension, namely 1) Intellectual Property Rights 2) Internet Users 3) Investment 4) IT & Media Stock Market Capitalization.
- The indicators that were Thailand's strengths include Investment in Telecommunication (ranked 10th) and High-Tech Export (%) (ranked 12th), while there were 2 other indicators under the Technology dimension that were ranked low



ANALYTICAL COMPARISON OF THAILAND'S DIGITAL COMPETITIVENESS IN THE TECHNOLOGICAL FRAMEWORK AREA RANKED THAILAND IN THE TOP 10 GLOBALLY AND AS A COUNTRY WITH A POSITIVE TREND AND EXPONENTIAL GROWTH IN THE PAST 5 YEARS

compared to other global economies, namely Intellectual Property Rights (ranked 37th) Country Credit Rating (ranked 42nd) and Internet Users (ranked 9th).

and smaller populations, such as European countries, most of which have set targets and strategic national digital plans in parallel with national plans in advanced for many years.

- From the 3 sub-factors of the Technological framework area, most of the group of countries with satisfactory ranking were in the group with GDP per capita more than 20,000 USD and a population of less than 20 million people, especially in the sub-factor on Legal framework in digital where the highly ranked countries are those with high income
- For countries with populations and GDP in the same group as Thailand as seen in the picture chart, and as a top 10 ranked country, or those ranked to have improved exponentially in the Legal framework sub-factor in digital, are namely China; for the sub-factor on capital market, namely India; and for the sub-factor on Technological framework, namely China and Malaysia.

COMPARISON OF THAILAND'S DIGITAL COMPETITIVENESS TO OTHER COUNTRIES ACCORDING TO 3 FACTORS IN THE TECHNOLOGY DIMENSION

1. REGULATORY FRAMEWORK It was found that the top 10 economies in this sub-factor were mostly those with populations under 20 million with GDP per Capita above 20,000 USD. The economy with a positive trend for the past 5 years was China (ranked 15th). Thailand was ranked 29th out of a total of 64 global economies for this sub-factor.

2. CAPITAL The top 10 economies in this sub-factor were mostly those with GDP per Capita above 20,000 USD and populations both under and over 20 million. The economy with a positive trend for the past 5 years was South Korea (ranked 16th). Thailand was ranked 19th out of a total of 64 global economies for this sub-factor, which can be considered of high capacity. India, categorized in the same group as Thailand in terms of GDP per Capita and population, is ranked 4th for this sub-factor.





3. TECHNOLOGICAL FRAMEWORK

From last year's ranking, it was found that the top 10 economies in this sub-factor are those with GDP per Capita above 20,000 USD, both with populations over and under 20 million. Malaysia (ranked 15th), China (ranked 28th), United Arab Emirates (ranked 5th) and Iceland (ranked 3rd) were in improved positions based on the 5-year trend. Thailand was ranked 22 out of a total of 64 global economies for this sub-factor, which is considered good for this sub-factor.

From the above information, it can be summarized that from the ranking of Regulatory Framework, Capital, or Technological Framework, Thailand is considered to have high competitiveness when compared to other countries. However, there remains a gap and space for further development of capacity in other sub-factors.

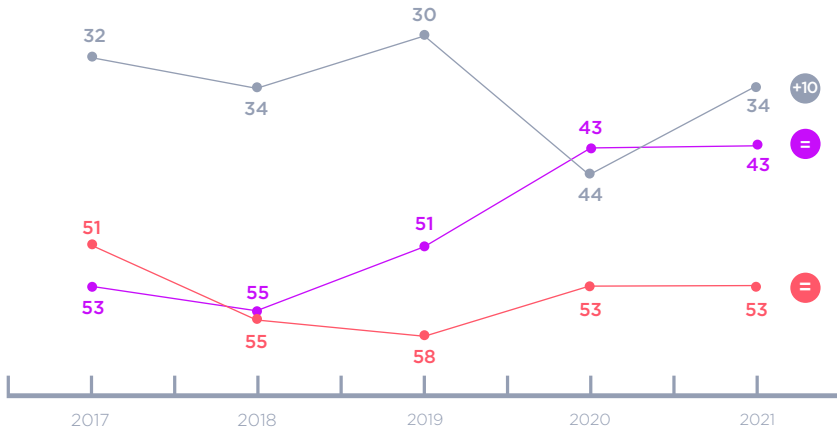
FUTURE READINESS

RESULT OF RANKING FOR FUTURE READINESS
IN THAILAND 2021

RANKED
44

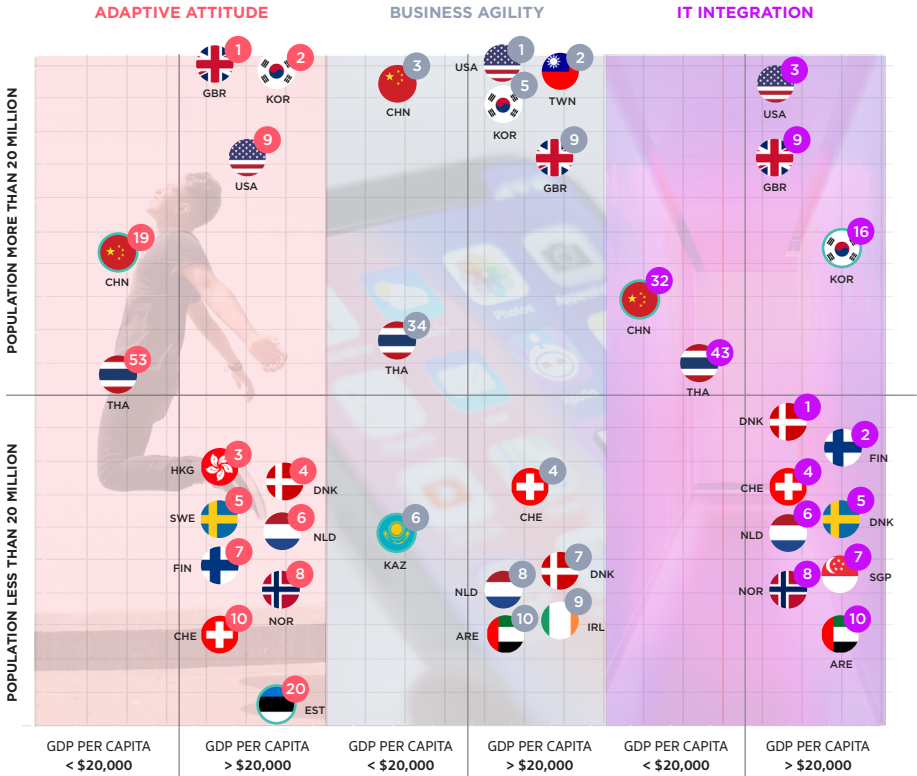
SUB-FACTORS

- Adaptive Attitude
- Business Agility
- IT Integration



RESULT OF RANKING FOR FUTURE READINESS IN THAILAND
IN PAST 5 YEARS (2017-2021)

- Future Readiness is a dimension that Thailand has low competitiveness, as compared to the 2 other main dimensions, Digital Knowledge and Technology in the past 5 years (2018-2021). In 2021, Thailand has improved in ranking by 1 place for the Technology dimension from 2020, ranked at 44.
- The sub-factor IT Integration has improved exponentially in the past 5 years, by 8 places. The sub-factor Adaptive Attitude was ranked low and did not see substantial change in the past 5 years. In 2020, the ranking improved by 5 places. The sub-factor Business Agility was ranked better in 2021, but when viewed in the 5-year trend, the change was only minimal.
- The indicators that were Thailand's strengths include Attitudes Toward Globalization (ranked 12th) and World Robot Distribution (ranked 11th), while there were indicators that were weaknesses, namely Tablet Possession (ranked 58th) and Software Piracy (ranked 56th). There were other indicators in the Future Readiness dimension that were not ranked high in 2021, namely
 - e-Participation (ranked 42nd)
 - Internet Retailing (ranked 46th)
 - Smartphone Possession (ranked 46th)
 - Entrepreneurial Fear of Failure (ranked 54th)
 - E-Government (ranked 49th)



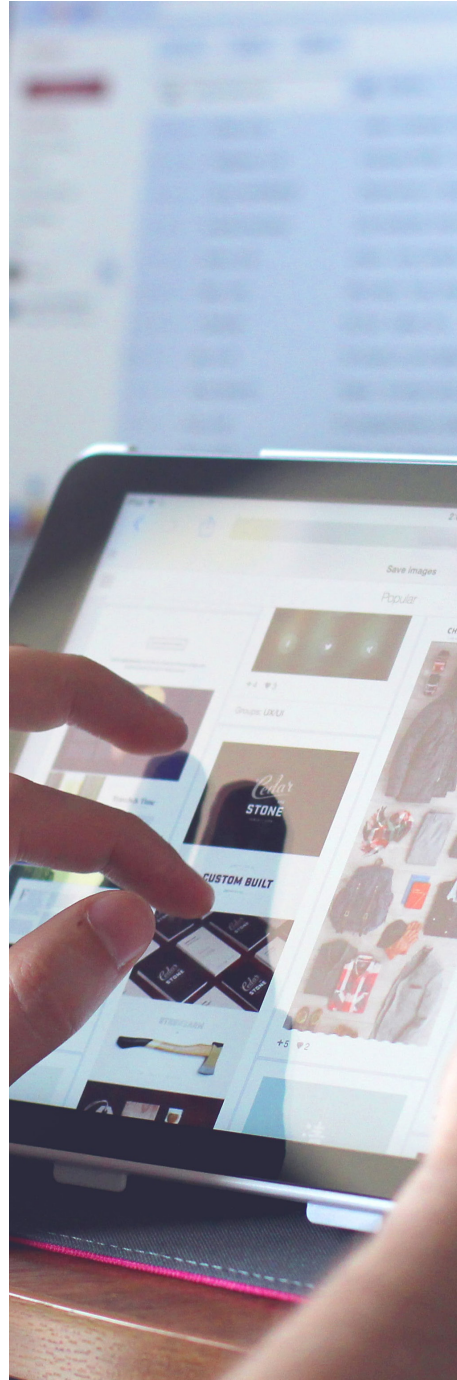
ANALYTICAL COMPARISON OF THAILAND'S DIGITAL COMPETITIVENESS IN THE FUTURE READINESS AREA RANKED THAILAND IN THE TOP 10 GLOBALLY AND AS A COUNTRY WITH A POSITIVE TREND AND EXPONENTIAL GROWTH IN THE PAST 5 YEARS

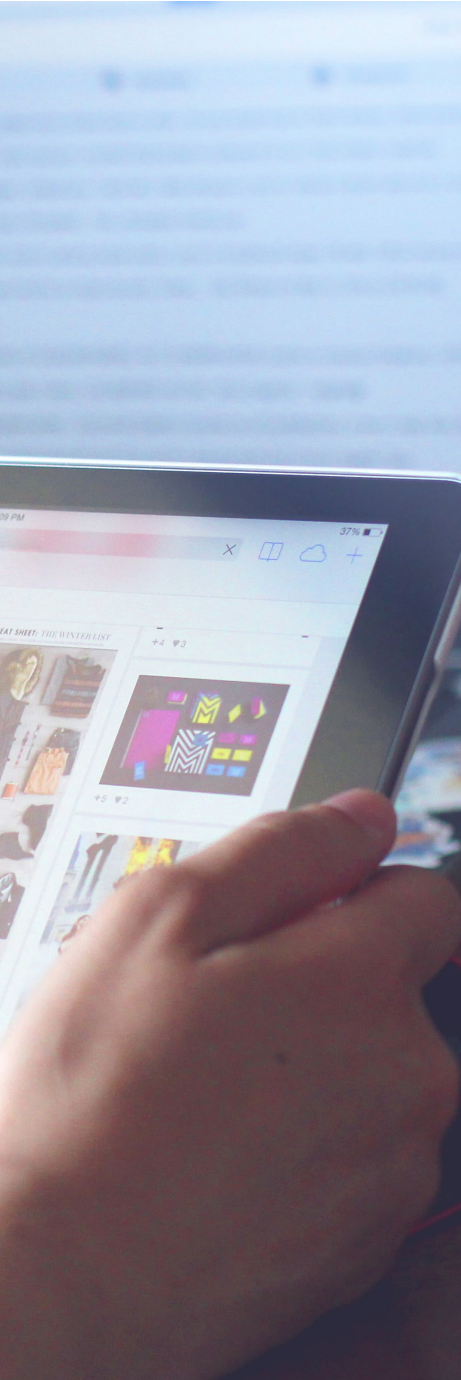
- From the 3 sub-factors of the Future readiness area, most of the group of countries with satisfactory ranking were in the group with GDP per capita more than 20,000 USD and a population of less than 20 million people, especially in the sub-factor on Adaptive attitudes and integration of digital technology, where the highly ranked countries are those with high income and smaller populations. The countries in this group have succeeded as owners of technology and adding value to the economy, which is a result of national strategizing with a clear target and prioritizing as well as the continuity factors.
- For countries with populations and GDP in the same group as Thailand as seen in the picture chart, and as a top 10 ranked country, or those ranked to have improved exponentially in the Adaptive attitudes sub-factor in digital, is China, which is also applicable to the sub-factor on Business agility and sub-factor on Digital technology integration.

COMPARISON OF THAILAND'S DIGITAL COMPETITIVENESS TO OTHER COUNTRIES ACCORDING TO 3 FACTORS IN THE TECHNOLOGY DIMENSION

1. ADAPTIVE ATTITUDE It was found that the top 10 economies in this sub-factor were mostly those with populations under 20 million with GDP per Capita above 20,000 USD. The economy with a positive trend for the past 5 years was China (ranked 19th). Thailand was ranked 53 out of a total of 64 global economies for this sub-factor, which is considered low capacity.

2. BUSINESS AGILITY The top 10 economies in this sub-factor, like the Adaptive Attitude sub-factor, were mostly those with populations under 20 million with GDP per Capita above 20,000 USD. There were no global economies with a positive trend for the past 5 years. Thailand was ranked 34 out of a total of 64 global economies for this sub-factor, which can be considered moderate level. The 5-year trend has indicated that Kazakhstan has exponentially improved in ranking, and is placed 6th this year.





3. IT INTEGRATION It was found that the top 10 economies in this sub-factor, except the United States of America, had populations under 20 million and GDP per Capita above 20,000 USD. The economies with a positive trend for the past 5 years were South Korea (ranked 16th) and China (ranked 32nd). Thailand was ranked 43 out of a total of 64 global economies for this sub-factor, which is considered low capacity.

From the above information, it can be summarized that from the ranking of sub-factors, be it on Adaptive Attitude, Business Agility or IT Integration, Thailand is considered to have low competitiveness when compared to other countries. It is therefore necessary to continuously develop and elevate capacity in related areas.



CHANGING SITUATION AND DIGITAL CHALLENGES FOR THE NATION



TRENDS AND MOBILIZING FACTORS, GLOBAL MEGATRENDS AND MAIN MOBILIZING FACTORS THAT EFFECT THAI DIGITAL DEVELOPMENT



GLOBAL MEGATREND

4.1

The Covid-19 pandemic created an exponential demand for use of higher technology. It also increased pressure on technological development. Not long ago, we saw the use of important technology in the wider picture, with Covid-19 as the catalyst. The result was an effect on other livelihood of the world population, which expanded beyond health and public health. The consumer behavior changed from the fact that life could not return to normal, or a **New Normal** after the crisis.

The interesting global megatrends are as follows :

MEGATREND 1

THE WORLD AFTER COVID-19.

The severity of a global pandemic such as Covid-19 has caused wide repercussions throughout, while making changes in the way we live individually, as a community and nationally, as well as organizations that are not able to use the old ways any longer. This crisis was a catalyst to bring in technology to facilitate the ways of life and expand efficiency and speed of organizations in acting with important and developed technologies used to answer the needs or solve problems and challenges arising from the crisis. These include Artificial Intelligence (AI), Radio Frequency Intelligence (RFID), Cloud Computing, 3D Printing, allowing machines to communicate among themselves through the internet or Internet of Things (IoT), as well as Quantum Computing which is faster than the current computer by 100 million times, data analytics & Big Data, Blockchain, Touchless & Frictionless solutions, 5G Technology, Facial Recognition and Metaverse, as examples.

These technologies have already begun to play a role and will create significant change to life after Covid-19, and to marketing and businesses. The world has fully entered into the digital era, and the Metaverse is now ever closer to reality than before.



MEGATREND 2

CHANGES IN ECONOMIC POWER

Asian countries, especially China, will rise up to be the new global power. The tension between Eastern and Western powers will have an effect on the political agenda, global trade and changing influence. Coupled with the Covid-19 pandemic, countries were adversely affected economically. This has caused the need to revitalize the economy and society in the country through the use of monetary and financial tools. Indicators have shown that global public debt has increased. Many governments are in the budget deficit situation and many countries have had to rely on external assistance.



MEGATREND 3

CHANGES IN CLIMATE

Inclement and unpredictable weather adversely affects the global food production system, especially in food production areas such as tropical zones in developing countries, causing food price to rise. It also causes risks of floods in low-lying areas because of the rising global sea levels, depleting coastal resources from severe erosion. The number of marine animals also reduce from increased ocean acidity. Turbulent weather conditions have caused damage to the ecosystem and biodiversity. Apart from this, the changing weather conditions have exacerbated the spread of seasonal

diseases, which is likely to worsen, and it also contributed to newly emerging and re-emerging diseases in many areas of the world. Hot weathers cause some disease carriers to increase rapidly, especially mosquitoes, flies and mice. The spread of diseases affects society. These adverse situations have caused adverse effects on life and property, causing those who live in flood areas to move to relocate. The problem also caused is access to quality food and malnutrition, especially among low-income group.

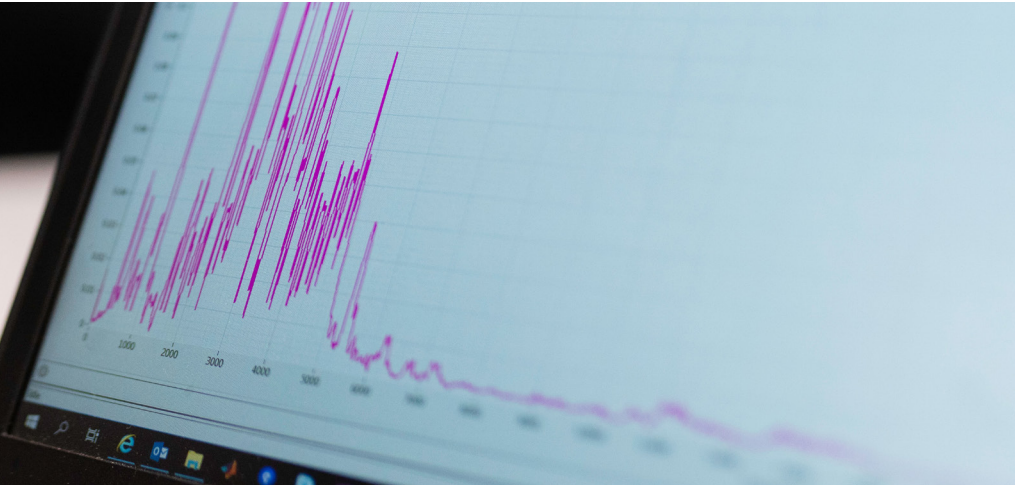


MEGATREND 4

GLOBAL EFFORTS TO DECREASE GREENHOUSE GAS

Since the late 19th century, the global warming situation has been worsening and continues to be a concern because of the main factor that carbon dioxide methane and other gases were released into atmosphere since the Industrial Revolution. There is currently no sign that this will be reduced. The Paris Agreement was jointly agreed by 197 parties to the UN Framework Convention on Climate Change (UNFCCC) to limit global warming to not over 2 degree Celsius, when compared to pre-Industrial Revolution. The global

community must jointly reduce the net global greenhouse gases emissions to zero, in order to be able to control global temperature increase to not exceed degree 1.5 Celsius in 2050. This will be a reflection of global efforts to clearly reduce greenhouse gas emissions. At present, the volume of emissions in most developing countries is in a rising trend. Such situation means that there is possibility that developing countries will be pressured even more in the future to seriously reduce greenhouse gas emissions.



MEGATREND 5

RENEWABLE ENERGY AND ELECTRONIC VEHICLES

The progress of battery technology leads to the development of the electricity generation from renewable energy. In addition, important factors also include the discovery of modern automobiles that is powered by electricity from batteries or hydrogen fuel cells to address the need to produce electricity from alternative energy and the use of modern automobiles that have an increasing trend globally. In 2019, the cost used in producing electricity from alternative energy, composed of bio-energy, geo-thermal energy hydropower, solar power and wind power, is on a downward trend in a level equal to or lower than electricity costs from fossil fuels. In the meanwhile, the volume of usage of electric vehicles worldwide,

from private vehicles, is still expanding from the past year. It is forecasted that electric markets will take a larger market share up to one third of the world in the next 10 years.

MEGATREND 6

URBANIZATION

In the future, most people will live in cities. The infrastructure and various businesses will cater to and facilitate living. Public services will expand and affect the investment in building public transportation systems to easily connect suburbs to city centers without limitations. The concept is urban design to be suitable to the livelihood of people in the future. The need of people in the future will differ from the present, such as Smart City and job and housing balance, for example.

MEGATREND 7

FUTURE OF WORK

The interconnectivity of global supply chain (micro-supply chain) comes from the advancement of the digital network that has made communication and transportation seamless (borderless logistics). Resource Utilization is also another factor. These factors have created a business model that is able to acquire supplies needed, no matter where located globally and no matter what volume needed. The production line can be quickly adjusted according to the needs of the customer and small units (small lot) can be produced in future production. Businesses will adjust hiring according to production needs or use manpower as needed at each particular time. This makes the hiring system flexible, and adjustable according to the situation or able to handle unexpected crisis. The use Artificial Intelligence and automated technology to work with humans will make machines play a greater role in

easing work load of humans and lead to the era that robots and machines communicate with each other and production that does not rely on manpower. Some types jobs would gradually disappear and some new types will emerge to replace the old ones through this automated system, especially jobs that require repetition or with set procedure. These factors result in the need for skilled workers, with specific skills related to technology, such as robotic engineers and artificial intelligence specialists. The entry into the aged society is likely to increase the jobs in the medical and health industry. The interest in environmental issues has resulted in green jobs being increasingly more important in the job market. All these have resulted in the creation of new types of jobs and the labor skills needed that are irreplaceable by technology and machines.

MEGATREND 8

CHANGES IN GLOBAL DEMOGRAPHICS

There will be changes in global population. The UN has predicted that there will be an increase in the number of people by over 1 billion by 2030, with the expansion of markets, and by 2050 the UN predicted that 80 percent of the global population aged over 60 will live in developing countries.

The global population will also become more aged and become an ageing society. There will be fewer younger people in the global population. The important effects of these factors are the expenditure burden for healthcare and the consumer needs that are changing the food industry.

MEGATREND 9

HEALTHCARE AND NURSING

The statistics of fatalities from non-communicable chronic diseases worldwide is as high as 41 million people per year, or 71% of all fatalities worldwide. This is a result of the present way of living and health habits. It is also the main cause of death for Thais (75%) or around 320,000 people per year. The non-communicable chronic diseases found most are as follows : stroke, heart attack, respiratory diseases, diabetes, and high blood pressure. Non-communicable chronic diseases are difficult to cure and also costly. If there is no proper management, it will become a financial burden for the sick as well as a monetary burden in the long term for the country.

The spread of Covid-19 since 2020 was a catalyst for food businesses, healthcare and tourism to adapt and elevate cleanliness and sanitary standards in services to be of international standard. It also built awareness in preventative healthcare and the benefit of healthy food and products and related equipment. The use of technology for healthcare has also grown, such as diagnosis and monitoring health through smart phone applications, sensory equipment worn and equipment with health indicators to measure blood pressure, sugar level, EKG, as examples. At the same time, the collection and management of big data and the development of artificial intelligence for managing biometrics will advance monitoring and analyses of health. It can also be used for the benefit of health services and health personnel management, and control the spread of newly emerging diseases in the future.



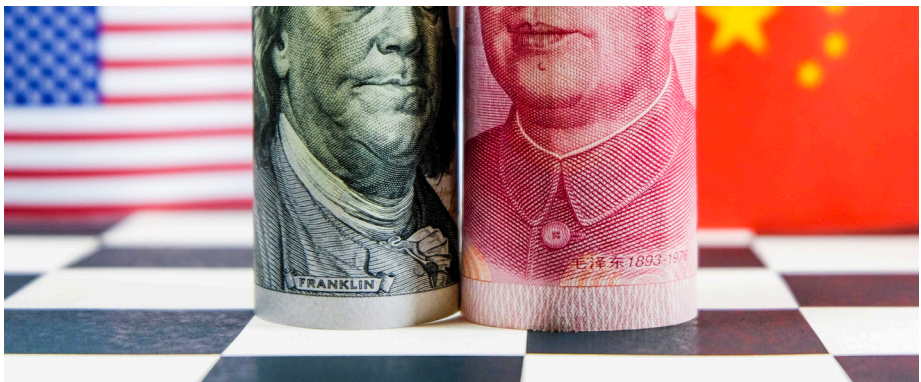
EFFECTS OF CHANGING GLOBAL TRENDS ON THAILAND

1

CHANGES IN GLOBAL POWER AFFECTS THAI ECONOMY

There are increasingly more complexities and severity as a result of changes in the global power structure which affects countries that highly depend on foreign countries. Thailand is one such example that clearly depends on China and the United States in many areas, such as for exports. The exports from Thailand to China and the United States is high when compared to overall exports. From the latest data as of end of 2020, the combined value is almost one third of all exports, with 13% to China and 15% to the United States. Thai tourism is highly dependent on Chinese tourists up to 27.9% of all tourists, and this dependency has been long and continuous. At present, China has shifted its policy to one of self-reliance and promotion of domestic travel within China itself. This adds to the vulnerability of Thai

tourism which is vital to the Thai economy (income from foreign tourists is 11.3% of GDP in 2019) and is concerned with over 7.5 million labor force and Foreign Direct Investment (FDI) that Thailand relies on direct investment, especially from the United States in a high value and continuous manner. From the latest data as of end of 2020, the investment stands at 6.2% although the trend in the past years is on a decline. Investment from China, on the other hand, is increasing and continuous. Therefore, if the conflict between the two superpowers expand and Thailand is forced to choose economically, these sectors will be greatly affected, no matter which side is chosen. Those who stand to lose benefits will vary among the sectors that are either related to China or the United States.





2

THAILAND AND RISKS IN MISSING THE TECHNOLOGICAL ADVANCEMENT TRAIN

In the past, creation of innovation and technological transfer from foreign countries was limited, especially electronic products and cars that Thai businesses are often hired to produce, but are not the direct owners of such technology. This is reflected in the proportion of value-added that Thailand can create in the export of 5 main industries. This is considered in the mid-level as compared to neighboring countries, especially for high-technology products (computers, electronics and chemicals) and moderate technology products (cars and parts). The vulnerability from the dependence on foreign platforms, particularly for purchase of products and services, of Thai consumers is at a very high level. For example, a survey found that there is a low ratio of Thais

using Thai platforms, when compared with foreign platforms. This is a signal that the Thai platform business sector must adapt to bring consumers back to use its services.

3

THAILAND AND RISKS IN CLIMATE CHANGE

Environmental issues, particularly global warming and climate change adversely affects Thailand because the agricultural sector is important to the national economy and society. Apart from this, Thai industries concentrated in flood risk areas, as caused by rising sea levels, and is a factor that affects the decision of foreign investors.



4

THAILAND IN THE GLOBAL FOOD SYSTEM

The measures to control the spread of Covid-19 pandemic infection has slowed down the transportation and logistics systems, making consumers worldwide become more aware of the supplies in markets that are close by. This may shorten the global value chain and create closer regional connectivity. Thailand is highly dependent on exports and in the social structure of Thailand, there are over 6.08 agricultural families across the country. The agricultural sector may have received opportunity from the pandemic in the form of incoming new-generation labor who have returned to their original domicile. But the drought issue and other structural problems of the agricultural sector may make the opportunities harder to realize and benefit from, if the problems in the structural area and manufacturing process are not addressed. The export sector is met with challenges from the Covid-19 prevention measures, environmental problems, including inclement weather and global warming, adversely affecting agricultural production. In addition, household debt for Thai farmers remains at a high level.

5

THAILAND IN THE DEMOGRAPHIC CHANGE AGENDA TOWARDS AN AGEING SOCIETY

In merely the past 20 years, Thailand has completely transformed from an Ageing Society to an Aged Society. In the future, it is likely that Thailand will become a Hyper-aged Society, with a large portion of the population being aged (over 20% of the population). This situation has affected the Thai economic structure in many areas, such as the vulnerability of Thai labor. From data received from almost 10 million social security insurers in 2019, the proportion of labor force aged over 50 increased threefold in the span of less than 20 years. It increased from 3.4% in 2002 to 9.9% in 2019 and was an increase in all industries. The result was that of foreign labor inflow into a Thailand that is an ageing society and with shortage in labor. The dependence on technology has added to this, but there is still a need for capable human resources who have knowledge and skills in general work that machines cannot replace, but that also come with increasing health care costs.

6

NEW VIEWPOINT
ON PUBLIC HEALTH

The pandemic sparked interest among the population in health behavior and sanitary standards. Although in the past, the Thai health system was ranked among the top of the world in terms of handling the health crisis, the issue of public health remain important in placing pressure on various economic activities and changes in consumer behavior.



7

COVID-19 CRISIS AN
EFFECTS ON THAI ECONOMY
AND SOCIETY

Thailand's economic engine is too reliant on certain industries, such as the very high reliance on tourism and services sector and international trade. The pandemic control policy caused international and inter-provincial borders to be closed. The economic activities were put on hold and economic costs became steep. The household level economy faced problems of severe debt from the pandemic crisis. There is also statistical data which suggests that Thai households have begun to not pay debts on time. Bad debts have increased and non-performing loans have been highest in the past 6 years. This is especially true among the younger generation of borrowers, the group with a large portion of debts and bad debts even before the pandemic crisis. This group is also key in mobilizing the country's economy in the future. Aside from this, the economic impact widens the economic disparity in society and may bring to conflict and disunity in Thai society.



DRAFT 13TH NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN

The draft 13th National Economic and Social Development Plan includes the topic of global megatrends which will affect the economy and society of various countries. This includes Thailand, for at least 5 years, which corresponds to the timespan of the Plan covering 5 years from 2023-2027. The Plan aims to restart Thailand in a new chapter towards an economy that builds value. The Plan is for a society that moves forward in a sustainable manner by creating opportunities and reducing technological risks, reducing economic and social disparities, eradicating limitations that deteriorate the country's capacities, and reducing environmental impacts and climate change.

SITUATION AND ISSUES ANALYSES **4.2** IMPORTANCE OF MEGATRENDS OR RELATED ISSUES THAT THAILAND SHOULD GIVE PRIORITY TO

The spread of the Covid-19 pandemic since end of 2019 is a significant event that has necessitated disease prevention and control measures that states have had to force behavioral change of people and businesses worldwide. This has caused the inevitable adjustment of economic structures in many countries. Thailand was also severely affected, as it depended highly on tourism, and the numbers of arrivals went down to zero for a long period of time. Other continuous industries that connect the value chain were also affected in the long term, in turn affecting business entrepreneurs and the majority of the

public, especially the agricultural sector that has a large number of labor and receive low income.

However, the spread of Covid-19 created important opportunities for the Thai digital sector because the pandemic forced digital transition in many sectors and organizations. This is especially true in organizations that have embarked on minor changes or are hesitant on the transition from the old format, causing them to immediately change. Many organizations have been successful in this transition, but many were not able to adapt and had to close down.



NEW
NORMAL

In society, a Digital Divide occurred, with a picture of a clear disadvantage from those who are inaccessible, students who cannot access the internet or online educational devices, and people in general who cannot access the state's digital measures such as compensation and related to vaccines, as examples.

At present, the effects of Covid-19 continue to make continuous change and has created new conditions, or the so-called New Normal. This new condition remains vague and is differentiated in each country. Covid-19 is one among many factors that has enabled significant

change, both domestic and international and has effected digital development for Thai economy and society. If the many significant changes are analyzed and the trend of important world events is still volatile, the following hypothesis can be made :

SHORT TERM < 2 YEARS

THAILAND'S SUDDEN TRANSITION TO DIGITAL

Thailand has been continuously adopting digital technology, from the consumer level, use in business sector, and in the government sector. The sudden transition is clearly relevant in only some sectors, such as the media industry and e-commerce, as examples. The Covid-19 pandemic situation caused rapid change in general in many industries, thereby causing disparity on access and adaptability of those who are not ready, both the public and businesses. This has created many direct effects on competitiveness.

These changes have without doubt highlighted the role of digital in the stage of transition. Many sectors have completely changed, and although the pandemic situation has improved in some instances, the use of digital technology has not reduced. Therefore, building justice and sustainable digital competitiveness, meaning digital development and reduction of dependency, is an important and necessary task and policy.

REHABILITATION OF COUNTRY IN NEW NORMAL AND DEPENDENCY ON DIGITAL

The Covid-19 pandemic situation is likely to be prolonged and there is no indication when it will end, although the situation seemed to improve in some instances. This has prompted many governments, including Thailand, to set the “New Normal” policy so that the economy and other national structures are able to function and live with Covid-19. However, the pandemic control measures have to be maintained. Such include Social Distancing in almost all activities, and the use of digital technology or platforms as core of operations like financial transactions and government services. There is a need to develop and build the New Normal that is suitable for Thailand. The most suitable characteristics may also not be a permanent template.

SHORT TERM < 2 YEARS

WORLD LACKS LEADERSHIP AND CONFLICT BETWEEN WORLD POWERS

The rise of a new global power from Asia created challenges on global leadership of the West. This has caused conflict and symbolic dispute between groups of countries, such as European Union, United States, China, Russia, France, United Kingdom, for example. The leadership of the world remains vague in its composition, and it is difficult to determine which country will lead the world in which aspect. On the opposite side, the world needs leaderships that has clarity in addressing issues like climate change, pollution, and pandemics. The lack of leadership makes problem solving and addressing challenges in disunity and slow, potentially causing problems and turning into a crisis in the future.

BEGINNING OF EFFECTS ON AGEING SOCIETY

The entrance of Thailand into a fully ageing society have caused clearer effects, especially the lack of labor force and loss of labor, both skilled and manual labor. Thai labor now has a higher average age and will not be able to perform manual labor. This has resulted in lower labor productivity for many years. Aside from this, the ability to adapt and build skills of younger labor remains a challenge for Thailand. The search for replacement labor from neighboring countries also began to have more limitations, such as events that are not peaceful, as well as development progress in neighboring countries. The solution for Thailand may lie in the use of digital technology to increase labor productivity, especially those Thai labor of the younger generation, such as through the use of robotic and artificial intelligence technologies. The customized use of such technology must incorporate skills of usage and development to reduce risks of dependency on foreign technology.

SHORT TERM < 2 YEARS

FRAGILITY OF THAI SOCIETY AND NEED FOR CHANGE

Political conflict arises from a conflict of ideas, and this has existed in Thai society for a long time. At present, the trend is that it will be more severe and there will be stronger calls for change. In the past decade, Thais have the tendency to continuously shift from conservative values to liberal values. This is in line with global trends and changes. The conflict of ideas, however, has resulted in less trust and confidence within Thai society. Any activity that requires support from a large number of people in order to make change would be difficult, making many activities delayed or not able to carry forward. These conditions make Thailand's competitiveness lower. Thailand still has not carried out clear political action to develop security to solve the problems. In particular, accepting different ideas existing together in one society under mutual respect is something that remains to be seen in Thai society.

MANAGING NATURAL DISASTERS THROUGH DIGITAL

At present, climate change has caused more severe natural disasters in Thailand, especially floods and droughts, and PM2.5 pollution, for example. In the past, Thailand has begun to use digital technology to manage these problems, and results have been seen in many locations, for example, water management, fire early warning and weather alerts. The next challenge is in expanding the results and operating in some local levels, up to national, and subsequently ASEAN region in the future.

Aside from this, international pressure has prompted all countries to join the efforts in reducing the global environmental problems, especially carbon emission which may affect mid-term policies. For example, it will affect policies regarding agricultural areas, transportation systems, and renewable energy. These changes use digital technology as a basis.

MEDIUM TERM 2-5 YEARS

ADJUSTING THAILAND'S ECONOMIC STRUCTURE AND REVITALIZATION OF THAI ECONOMY THROUGH DIGITAL

Sudden changes in many dimensions and in a short period of time has prompted Thailand to restructure the economy, such as in the reduction of economic dependence from outside the country, elevating some industries to be in a higher economy, reformatting the tourism sector, digitalization of various industries, advancement of logistics and rail, as well as domestic consumer trends in the country, the ASEAN region and other important markets of Thailand. The aim is to move forward the policy to be more concrete as much as possible. However, it remains for Thailand to restructure the economy in a way that seriously utilizes digital competitiveness. This is because, when considering short-term development, Thailand still lacks digital capacity that is in the development upstream level. Thailand also has limitations in terms of the private sector's capacity in building value-additions from digital, as well as high dependence on technology and foreign platforms.

ADAPTING WAY OF THINKING, BELIEFS AND VALUES IN THAI SOCIETY

In the medium term, it is a transitional period of value changes for the majority of Thai people towards a new way of thinking, according to the trends of beliefs of the world population. The newer generation will become executives in the government and business sector, and therefore there will be changes and more clarity in many issues, especially in the government sector that has the power to make policy for change. The government sector, however, still has many difficulties and there must be improvements of law and old regulations. The mechanisms in the Thai bureaucracy is not very flexible for certain tasks, so there must be gradual change.

MEDIUM TERM 2-5 YEARS

MOVING INTO A FULLY AGEING SOCIETY

Thailand's policy on ageing society may see change, and it will be with more clarity and widespread. This includes the proportions of elderly labor, young labor, foreign labor and success rate of using technology and business model changes to increase productivity. There will be organizations or industries that will be able to adapt, and those who are not able to. The government sector must promote the policy on competitiveness and security in depending foreign countries in a balanced manner.

Apart from this, on the social side, Thailand is in the process of adjusting important systems to be able to handle an ageing society for example, the public health sector, education and welfare. The point that must be taken precaution is the efficiency and effectiveness of the system, whether it can answer to the needs of society or not. The dependence on products and some services from foreign countries, such as medical services and equipment, created national challenges in producing enough replacement products. This may cause financial burdens from caring for the elderly.

Thailand is able to implement policy that uses ageing society in the running economy, by changing the format and involving the private sector to care for the ageing society. The government sector will be directing this and promote the private sector that is specialized in technology use, mixing with service skills that have Thainess. This is part of development for Thailand to become a center of silver industry.

RECURRING EFFECTS FROM THE CONFLICT BETWEEN GLOBAL POWERS

In this period, the global power divide can be seen much clearly. Numerous international cooperation will see the role of global powers more directly. The development of projects or cooperation will drastically affect the global economic system. Examples include the One Belt One Road, CPTPP, AUKUS and competition for technological leadership especially digital. Aside from this, border conflicts may also be seen, as well as more nominees and weapons collection and other military operations. Thailand must carry out diplomacy in a cautious manner, especially in choosing digital technology partners, and must maintain relations with all friendly countries.

LONG TERM > 5 YEARS

CYBER THREATS AT THE PEOPLE LEVEL AND HIGH LEVEL, FROM TECHNOLOGICAL ADVANCEMENT

Thailand has faced many security and cyber threats from time to time, such as cybercrime and fraud, the setting up of centers by international cyber criminals and effects of cybercrimes that target Thais while operating abroad. All these have made monitoring and follow up more difficult. In this stage, it is possible to see changes in the technical foundation, legal and people preparedness aspects. If Thailand is able to act systematically and in unity, it will be at a manageable level.

EFFECTS FROM CLIMATE CHANGE THAT MAY ALTER THAI AGRICULTURAL SYSTEM

In the long term, Thailand may be affected by natural disasters caused by severe climate change, affecting the agricultural sector and many farmers. The important factor is the ability to manage resources and disasters in Thailand. Thailand may be able to do many things better, and some matters may be not be agreed upon due to social problems or conflicts between groups. The government sector should therefore prepare and gather participation from the sectors in society, while engaging the local level as hosts. There should be a principle, as well as mechanisms for coordination and benefit-sharing. In addition, there are local area risks that may expand to the international level.

OPPORTUNITY OF BECOMING DIGITAL CENTER OF ASEAN

Thailand's policy to develop the country into a center for travel in ASEAN has advanced the transport and logistics system in the country. The modern transportation system relies heavily on the country's digital capacity. It is therefore an opportunity for the government to develop Thailand into a digital center for ASEAN and center for travel. Thailand must consider the capacity of each country to join in a complementary manner. Thailand is able to use its geo-political advantages to move forward important policies, such as in connecting the large market of Indonesia, the financial capability of Singapore, the young labor force in Vietnam and abundant natural resources of Myanmar. Finally, Thailand can leverage negotiation skills and connection with friendly countries for its benefit.

SUMMARY OF FACTORS AND CHALLENGES IN DEVELOPING DIGITAL FOR NATIONAL ECONOMY AND SOCIETY

4.3

	CHALLENGES AND OPPORTUNITIES	POLICIES THAT SHOULD BE PUSHED FORWARD
SHORT TERM < 2 YEARS	<ul style="list-style-type: none"> Thailand's sudden transition to digital Rehabilitation of country in New Normal and dependency on digital World lacks leadership and conflict between world powers Beginning of effects on ageing society Fragility of Thai society and need for change Managing natural disasters through digital 	<ul style="list-style-type: none"> Balance between competitiveness and digital disparity Building digital capacity in New Normal and economic restructuring, especially upstream capacity and development to reduce dependency Mitigating impacts and preparing readiness for ageing society Monitoring and building a digital society that supports co-existence with respect and peace Expanding digital technology to manage natural disasters and promote continuous industry
MEDIUM TERM 2 - 5 YEARS	<ul style="list-style-type: none"> Adjusting Thailand's economic structure and revitalization of Thai economy through digital Adapting way of thinking, beliefs and values in Thai society Moving into a fully ageing society Recurring effects from the conflict between global powers 	<ul style="list-style-type: none"> Continuous development of digital capacity for economic restructuring, especially upstream capacity and development to reduce dependency Supporting creative transition in Thai society Promoting Silver Industry and push forward digital transition in private sector Monitoring effects of global politics and international measures to develop digital for Thai society
LONG TERM > 5 YEARS	<ul style="list-style-type: none"> Cyber threats at the people level and high level, from technological advancement Effects from climate change that may alter Thai agricultural system Opportunity of becoming digital center of ASEAN 	<ul style="list-style-type: none"> Building cyber security, in the aspects of technic, legal and people. Expanding the success of environmental and disasters management for the ASEAN region level Making Thailand a digital center in ASEAN, utilizing cooperation built and Thailand's geo-political advantages





**IMPLEMENTATION
TO ELEVATE
NATIONAL DIGITAL
COMPETITIVENESS**

DIRECTION OF NATIONAL DIGITAL DEVELOPMENT

5.1

The current of change has been fast paced, both in the domestic and international contexts, which has resulted in a changing environment of national development. Thailand would have to face the following opportunities and challenges :

OPPORTUNITIES

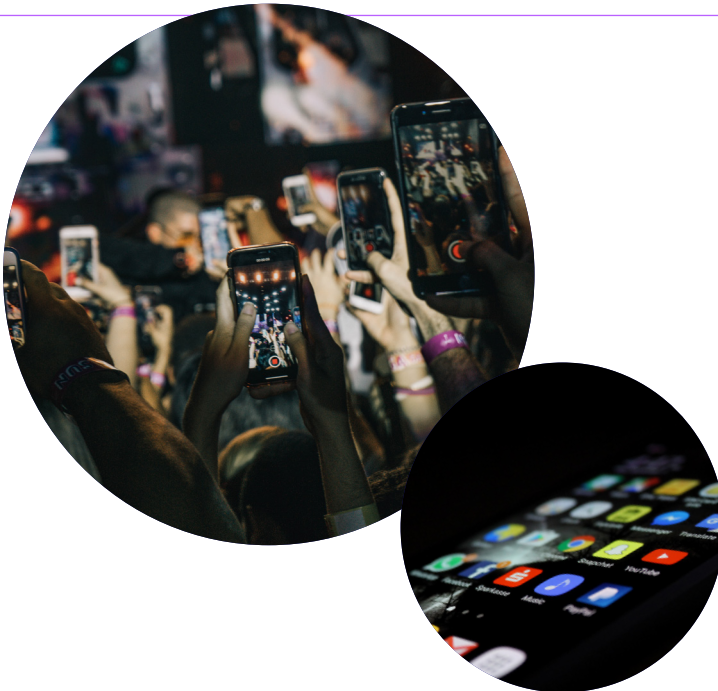
1. Surpassing the middle-income trap
2. Developing capacity of agriculture, industry and services sectors
3. Adapting and using the opportunity from economic integration
4. Solving social disparity
5. Managing an ageing society
6. Developing human potential in the country through digital technology as a tool for capacity-building
7. Solving corruption
8. Cyber threats

CHALLENGES

1. Disruptive technological changes
2. Integration of global economic and social activities, online and offline
3. Trend in using digital technology for increased productivity
4. Competition on the basis of innovative products and services
5. Increasing use of intelligent systems (Smart Everything)
6. Creation of vast amounts of data from users and sensor devices, thus the world is one of information competition
7. Creation of cyber-security risk in many forms
8. Change in structure of manpower, both negatively (replaced) and positively (higher skill sets)

FUTURE TRENDS OF DIGITAL DEVELOPMENT IN THAILAND

1. Use of digital technology as a tool in connecting economic and social activities of communities within the country and international community, with the people having a role through wide and equal participation.
2. Entrance into an economic and social system that is powered by innovation, especially digital innovation to build value and capacity in global competitiveness, and elevate the quality of life of the people.
3. Creating and benefitting from the vast amount of data, to improve the efficiency of productivity, services, providing public services and building competitiveness.
4. Using digital technology that is widespread in every sector to build opportunity for people in every group to participate in bringing Thailand towards a society that all are able to be producers and value optimizers.



RESULTS OF IMPLEMENTATION AND GENERAL OVERVIEW OF DIGITAL DEVELOPMENT **5.2**

At present, Thailand is moving forward the digital development in full force to be in sync with the global situation and in line with the borderless interconnectivity of all economic and social activities. The aim is to reform Thailand towards the digital era in full capacity, from the laying of the national digital foundation, investment in digital infrastructure, building a digital economic and social system that all sectors participate in using the Public-Private-People (Pracharat) Model, mobilizing the economic and social systems, fully using digital innovation, to the elevation of Thailand's competitiveness and future status as a developed country. These will be mobilized through policies and national plans on digital development for economy and society. Summary of details as follows :

STRATEGY 1

DEVELOPMENT OF HIGH-QUALITY BASIC DIGITAL INFRASTRUCTURE TO COVER NATIONWIDE

The basic digital infrastructure is not only about setting high-speed internet, but it covers technology infrastructure, communication networks, voice and visual dissemination on ground, sea and air or space. For example, this includes satellite communications, platform service development (application or other related). These digital infrastructure will be an important foundation in moving the economy and society forward with technology and digital innovation, creating connectivity of all sectors together. It will be an important part in enabling technology and innovation to be customized and used for benefits.

In the past period, Thailand has seriously developed its digital infrastructure and there had been outputs that have clearly benefitted the nation through many projects, for example as follows :

- 1. Net Pracharat, or setting of a high-speed internet network** to reach national coverage with 100/50 Mbps speed without any fees. This marks a change for Thailand from the traditional to new lifestyle, in connection with other sectors of society and the opening up of opportunities for Thais across the country. Particularly for people in rural and remote areas, they will have equality and there will be less disparity in a sustainable manner.
- 2. Government Data Center and Cloud Service : GDCC** which is the Data Center and Cloud that has standard and safety for government agencies. The objective is to create connectivity and information exchange, leading to integration into a digital government. Aside from this, it will help the government sector in saving budget up to 30-70 %.
- 3. Moving ahead Thailand's 5G** The status of 5G in Thailand is highly developed, with the first 5G frequency in ASEAN. Importantly, it has the readiness in terms of consumers and service providers. In the past, it has been a pride to mention that Thailand is a country with 5G network development and it has mobilized the use of 5G quickly, making Bangkok the top ten cities with the best 5G network in the world. This can be attested by the Open Signal 5G Global Awards 2021 : The Global Winners and Leaders. Thailand was placed top in the list, and one of the 5G global leaders in many fields. At present, Thailand has mobilized 5G through the national committee, which the Prime Minister is chair. Currently, it is in the pilot process for the use of the 5G dimension, the clear output of this process will be seen by 2022.
- 4. Management of Communication Satellite** The management guidelines for Thaicom 4, 5, 6 after the expiration of the concession has been formulated, and the contracts for satellite operation in Thailand have been properly managed. The policy on landing rights of foreign satellite at the state level which related to security, economic, social, and international relations issues has also been rolled out, and the coordination on international space operations has also been conducted.

STRATEGY 2

DEVELOPING ECONOMY THROUGH DIGITAL TECHNOLOGY

To mobilize the economy through digital technology. Thailand prioritizes economic development using digital technology, which expands the capacity in doing business, as well as the foundation to build an ecosystem for digital business especially elevating and developing business competitiveness in the digital business ecosystem. This is done in parallel with the development of digital infrastructure and the use of digital technology in business. In the past these have been done, for example :

1. **Measurement of Gross Domestic Product from digital technology** according to the framework of OECD, and customized to be suitable for economic and social conditions of the country. Thailand is one of the few countries in the world that have done such measurement of value. The measurement of GDP from digital technology will help the government sector understand the structure and source of digital economy for use in formulating policy, measures and related work plans, as well as in budget and personnel planning for the country. Aside from this, the results of the study clearly shows that digital economy is very important to the general economic system. At present for this measurement, the Office of National Digital for Economy and Society Commission has set the value of GDP from digital technology as the indicator and to follow up on the situation of digital economy in the country as well.
2. **Developing Digital Startups** In the past, this has been promoted through many activities such as the push for creation of a Sandbox Company, and for the opening up of government sector markets for product and services that are ready through government procurement procedures, instead of budgeting and self-contracting. Moreover, there has been the creation of a Digital Startup assistance fund, as well as connection with International Venture Capital an expediting of Thailand Digital Valley to become a center of design, digital technology/innovation of the new generation and multi-national technology companies, as examples.

STRATEGY 3

BUILDING A QUALITY SOCIETY THAT IS INCLUSIVE AND HAS EQUALITY THROUGH DIGITAL TECHNOLOGY

This strategy involved the speeding up of development in Thailand in all groups of the population, especially those in remote areas, the elderly, disadvantaged and disabled. It is for these groups to have access to and gain benefit from government services through digital technology and be able to access digital technology, have the necessary skills to use and bring to good use with responsibility to Thai society. Examples of activities that have been done :

1. **Community Digital Centers** These are centers for use of and to benefit from community digital technology. At present, the Community Digital Centers are scattered in locations across the country, as centers of education and learning for leisure, servicing people of all professions, gender and age. They are also centers to support jobs, to open doors to advertise products and community tourism attractions to increase income and expand government services to local areas in the widest scope, and equally with digital technology.
2. **Smart City Promotion** This will be an opportunity for the private sector, public and investors to develop local areas, in the form of both the livable traditional city and modern city. In the past, there had been an announcement of tax privileges of the Board of Investment (BOI) which are incentives to invest in a Smart City. These are incentives to invest in areas, systems or industrial zones for Smart City. At present Thailand has developed 15 Smart Cities such as Khon Kaen Smart City, Chachoengsao Livable City for Tourism and Investment, Phuket Smart City, Sri-Trang City, Samyan Smart City as examples. These are the first 15 smart cities and model cities that have concrete results, along with development plans for infrastructure, and data system for management of smart city that is clear and concrete. The development of these 15 cities is a deliverable and determination in moving forward the creation of smart cities in other parts of Thailand and in all sectors, government, private and public.



STRATEGY 4

TRANSFORMING GOVERNMENT SECTOR INTO DIGITAL GOVERNMENT

This transformation is through using digital technology to improve efficiency in management of government agencies, both central and regional levels in a planned and systematic development towards a fully digital government. Here are some examples :

1. **Drafting of a National Data Strategy** which is a framework for data implementation at the national level, to be in sync and streamlined throughout the system, able to work together seamlessly from the upstream to downstream processes. This includes the role of agency producing the data that has to be guided by the data governance and transparency framework as well as in the aspects of legal and digital technology for collecting and usage. The focus is on saving such data on cloud infrastructure to lead to services provided that are efficient and matching with needs. Apart from data that is of quality and able to support government work, it also supports open government data requirements (according to confidentiality levels) for the private sector to avail and for the general public to use and benefit from such information in due course.
2. **Pushing for the government sector to adjust service process to become electronic (e-Document)** such as issuing electronic permits that are of standard, as well as promote and support government agencies that pilot this to be able to truly transition to electronic government services, both in e-Document or e-Signature formats.

STRATEGY 5

DEVELOPING MANPOWER SKILLS TO BE READY FOR THE DIGITAL ECONOMY AND SOCIETY

This strategy is about building and developing personnel to have the creative ability and use technology intelligently as tools for use in their jobs. This includes the development of digital technology skills of personnel in government, private sector, in the digital technology field and other line of work, so that they may have international standard abilities, skills and specializations. This strategy focuses on developing the digital workforce to address the needs of working in a digital economy, as an important part contributing to productivity in the economic system. Examples are as follows :

1. **Expediting the development of manpower skills and new jobs in the digital field** such as Content Creator, Gamer and Drone Controller by strengthening skills and creating jobs for graduates who are yet to find jobs, and the unemployed. Also, this includes the development of specialists in the digital field, focusing on skills for AI, Big Data (Data Science, Data Engineer), including developing digital opportunities for the vulnerable, elderly, and disabled. An example is such as the call for proposals from agencies to jointly screen qualifications for legal entities that apply for assistance or scholarships in digital technology and innovation (DEPA Digital Scholarships). This scholarship program is under the government-private sector project to build new digital skills among newly graduated students and graduates of other fields to prepare to work in the digital field.
2. **Approach in developing digital skills of civil servants and government personnel for the transformation to a digital government**, aimed at creating digital skills for government officials to have necessary qualifications to become important catalysts to transform government sector into a digital government. It also aims to allow civil servants and government personnel to be able to adapt to technological changes of the times and have readiness to perform tasks according to their respective roles, expected behavior in context of digital government transformation, and to be able to use digital technology to the utmost benefit. Approach covers period 2018-2022 for civil servants, personnel in ministries, state officials and all other types of officials and staff in the government system.

STRATEGY 6

BUILDING CONFIDENCE IN USING DIGITAL TECHNOLOGY

Building confidence focuses on creating safety and confidence in using digital technology, especially for entrepreneurs, employees and service customers. This is a basic factor for security and confidence-building in digital technology transactions that will move the country towards a digital economy. Examples of related activities :

1. **Anti-Fake News Center** This center solves the issue of fake news that adversely affect the general public in 4 areas, namely, health products, government policy, economic area and disasters. The center coordinates with agencies leading in each issue to monitor and verify the fake news within 2 hours.
2. **Work on prevention and suppression of technology crimes** such as closure of illegal websites (according to the Computer Crimes Act) and online gambling websites, law enforcement action in the case that service providers or platforms refuse to close sites as per court order (article 27), as examples.
3. **Promotion of identity verification (Digital ID)** that is trustworthy and ready to address online transactions taken by the public. This is done through setting a framework and standard for Digital ID curators, along with a Sandbox for testing the use of Digital ID. Such include D.DOPA Application of the Department of Local Government, as well as support for Ministry of Interior in pushing ahead the creation of a verification system and digital facial recognition as identity.



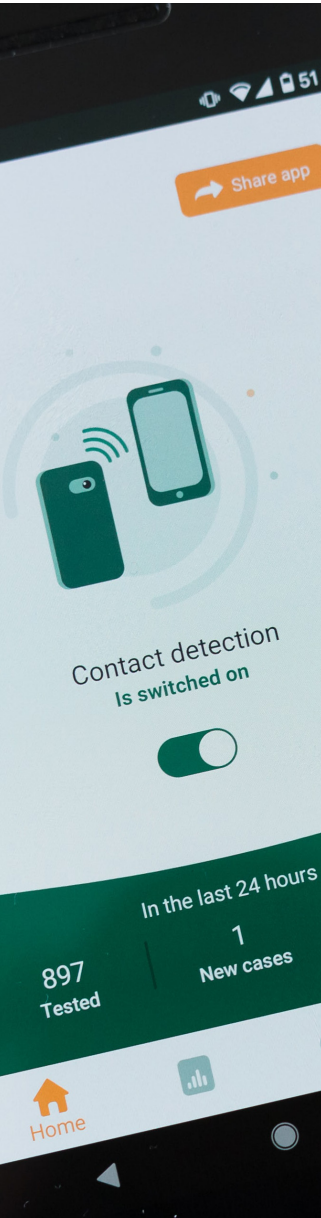
WORK PLAN OR FLAGSHIP PROJECTS

5.3

GOVERNMENT DATA CENTER AND CLOUD SERVICE: GDCC

The development of a central government cloud system is aimed at providing standard service that is safe, for the integration and inter-agency data service that is systematic, fast, and safe and under control. This will lead to analyses and making full use of shared data in the most effective way. It will help save government budget up to 30-70%, towards building a digital government. GDCC is an important infrastructure set to hold data integrated from every agency, and when the data is all connected, it will serve as a central database of government information. All sectors will be able to avail of the data and utilize the data as appropriate with the confidentiality level. It can develop into a Data Center and Big Data for the government sector. Most importantly, it will allow all sectors to use government data in a fast and widespread manner. At present, the process is in the stage of transferring information from government agencies to the GDCC. Some examples of agencies that already use GDCC at present, are as follows:





1. Ministry of Public Health

- **National Digital Health Platform System**
is built to provide services in managing pandemics and medical resources during the Covid-19 pandemic situation.
- **Mor Chana Application**
is used to monitor and follow up on the Covid-19 pandemic situation, record travel data of users, which will be tools to help the Department of Communicable Disease Control and medical personnel diagnose diseases at a quick timespan.

2. Ministry of Agriculture and Cooperatives

- **Agriculture Database**
Verify status of being an agriculturalist and member of household.
- **Livestock 4.0 System**
Request assistance on livestock, report pandemics, floods and droughts.

3. Ministry of Transportation

- **Smart Bus Terminal**
System to track public buses, show bus timetables for outbound and inbound, in a real-time mode within 81 stations nationwide.
- **Central Transportation and Traffic Information and Communication Center**

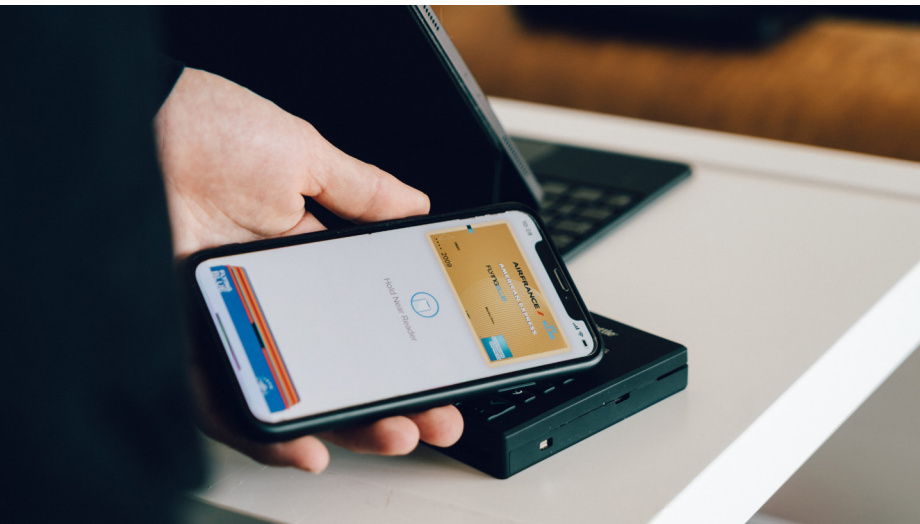
4. National Police

- **POLICE 4.0**
System for management of superior officers and operations of patrol officers, connect mission data of patrol officers.
- **Traffic Ticket Management System**
System to issue traffic violation tickets, record data, control and oversee traffic ticket system of National Police.

Apart from this, currently efforts to promote government sector to prepare open data in accordance with Thailand's data strategy is composed of:

1. The setting up of Data Strategy Committees
2. Legal improvement, including rules and regulations related to use of government data
3. Procurement of Cloud System
4. Support for budget in moving forward the national data strategy

Currently the development of the data system is ongoing as a pilot project in integrating sharing data. An example is the pilot project for land and building tax data to address the needs of the government and people who need such information, for agencies that collect land taxes to have data to calculate taxes for land and buildings, as well as ease in paying such taxes.



COMMUNITY DIGITAL CENTER

The Community Digital Center of center for learning and benefit from community digital technology is an important project mobilized to build equality, reduce disparity and build economic and social values with digital technology. The main target groups are people in all groups, including the elderly, disabled, children and youth, women and the disadvantaged or those living in remote areas. The Center is not only a local-based digital learning center, but also a community service center that integrates work with the central and local level government in providing complete services to the people. It is also a service center for equipment (in case there is need) internet router connection and a service center advising on doing business and online jobs in the community, as well as an area to economic and social activities such as education, agriculture, healthcare, trade, tourism service and social welfare. At present, there are 2,365 centers across all regions of the country located in community areas like religious centers, education institutions, local administration, communities, and other locations like District Offices and Community Product Centers, as examples.

The work of the Community Digital Centers is to service the people in the community so that they will be able to access and use digital tools for their jobs and livelihood, to be knowledgeable and responsible. Its purpose is also to directly benefit from the digital policy to build value and develop quality of lives. From the past outputs, community entrepreneurs, farmers and local businesses have had more opportunity and increased markets through internet access and online markets. There were actual sales through comprehensive e-commerce, forming an identity in the global market. Aside from this, the Center has helped communities to have a learning center for leisure at any place and time through digital devices that can be utilized for life-long learning. Communities are able to access information and services as well as incentives and benefits from government agencies and local wisdom throughout the country. Such information is systematic and provides a platform for product exchange, value-addition and exchange of information. It also helps reduce costs such as internet costs, training, travel costs, and generates income for the people. These factors are derived from the opening up of the vision and perspectives through the use of digital technology.

From the output of the tasks carried out by the Community Digital Centers, it is considered that the Center is an important tool of the Ministry of Digital Economy and Society in moving forward the activities in local areas in the field of digital economy and society. It has been proven from past projects of the Community Digital Centers that at least 6,000 new community entrepreneurs have been born in the past year, generating online trade value for the community of over 200 million baht and additional income of at least 47,000 baht per business that joined the projects. This is a very good start in the development of community entrepreneurs, reflecting on the overall strong economic development of the country.

Presently, the Office of National Digital Economy and Society Commission is in the process of a physical and systematic internal adjustment for the Community Digital Centers to be modern and in tune with the needs of the contemporary times, as well as the needs of local areas. There have been these project clusters:



1. Start/Stop/Stronger

Opening up new Centers, closing ones with no potential, and developing/improving existing Centers as necessary

2. Programming & System

Developing a management system for the Community Digital Centers

3. Standardization & Evaluation

Building standards, evaluating and studying the opening and closing of Centers

4. Center Mapping

Developing mapping for Community Digital Centers

5. Big Data for Digital Village Pilot Area

Study and analyses of data from each province/village

6. One Man Show Program

Managing personnel at Centers for efficient administration

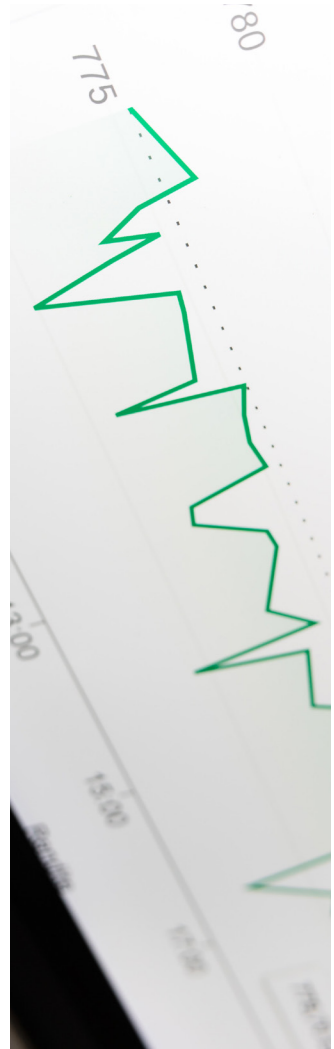


The Ministry of Digital Economy and Society highly prioritizes these activities, hoping that after implementation, people from all areas will fully benefit from the Community Digital Centers, thus contributing to the local economy and society and the overall economy and society of the county as well.

DIGITAL ECONOMY AND SOCIETY DEVELOPMENT FUND

The Digital Economy and Society Development Fund has the objective under the national policy and plan on digital development for economy and society, and the Strategy on promoting digital economy. The Fund will be used to promote and support the following main activities :

1. **Promote, support, or assist government and private agencies**, and public in promoting, supporting and assisting in development of digital for economy and society, which must have the objective of providing public service, not gain profit, and not hinder competition that is a normal part of the private sector business.
2. **Support research for government and private agencies and public** in the development of digital for economy and society.
3. **Subsidy for Office of National Digital for Economy and Society Commission in operations** according to authority, apart from that received from state budget.
4. **Support costs for operations of Office of National Digital** for Economy and Society Commission as deemed appropriate by the Fund Management Committee.
5. **Support costs for Fund Management.**
6. **Other costs** as set by the National Digital for Economy and Society Commission



The Digital Economy and Society Development Fund announced applications for the first time on 3rd May 2019 after the National Policy and Plan on Development of Digital for Economy and Society was published in the Royal Gazette on 11th April 2019. Support from the Fund was provided for digital development and research in important areas such as :

- 1. Health :** This area is to focus on promoting and developing digital innovation on health, covering network-building, connecting medical-related information, health services and consultation through digital technology, for example, development of treatment system for strokes using the Mobile Stroke Unit with 5G technology with telemedicine consultation. It also encompasses the development of a central platform to connect health data among hospitals nationwide, both government and private, through pilot projects with 100 hospitals, and the development of artificial intelligence and intelligent applications for diagnosis of children's skin diseases, for example.
- 2. Agriculture :** This area is to focus on use of digital technology to support proactive agricultural management from the upstream, mid-stream and downstream stages. This is done through the elevation of personnel capacity and agricultural activities to be stronger. Digital innovation has also added value and topped up agriculture towards other dimensions of development, such as development of intelligent buildings in planting biomaterial medicines and producing vaccines that have plant-controlled aspects through IoT, so that there will be a standard in planting and develop the refinement to ensure the purity of proteins. This area includes development of robots and AI platform to manage and harvest garden plants, and the development of model precision pig farming.
- 3. Manpower Development :** This area focuses on bringing technology to be used for education management planning throughout the lifespan to promote life-long learning, and using data to benefit policymaking on national manpower to be in line with need of labor market to increase competitiveness. For example, development of platform for management of teaching and learning for schools in border areas, development and awareness-building on e-commerce in the community

level through Community Digital Centers and agencies providing support on digital education that is found across the country. Another example is the development of 1,000 personnel on cyber-security in the immediate stage, covering operation and management levels.

4. **Developing Digital Government :** This area supports the use of digital technology in designing government services to cater the needs of service customers in all sectors. Another example is the integration and working together to make use of Big Data in government work in the most efficient way. Another is the pilot digital prisoner visiting model to expand the capacity of real-time family visits (video conference) for Samut Prakan Central Prison, the development of a digital analyses process for witness and evidences in internet child sex violations. The development of a central ICT system on legal matters is another example.
5. **Activities during the Covid-19 Pandemic Situation :** These activities promote, support and assist the sectors of government, state enterprises, government hospitals and health centers, university hospitals and medical schools and Thai Red Cross in providing technology or digital equipment that assists public health work and healthcare of the public affected by Covid-19 pandemic situation. Example are the automatic robot system to assist medical personnel, patient appointment system, patient screening system, medical information system for general patient ward and cohort patient ward. In addition, finding network and computer system to support medical services, such as the CCTV system, is another.

Not long ago, the Digital Economy and Society Development Fund Management Committee announced its funding policy for budget year 2022, prioritizing support for Proactive Agriculture with Innovation (Digital Agriculture), Education and New Generation in digital age (Digital Manpower), Digital Government, and Future Digital Technology. The Fund is an important channel in supporting development that utilizes different dimensions of digital technology, and there is funding for every year. For those interested, queries on further information on funding framework and policy and timeline as well as funding cycle can be found at www.onde.go.th

From the mentioned actions, it can be seen that the Digital Economy and Society Development Fund is an important part in the mobilization of national digital development. The Fund gives utmost priority to the opportunity for government, private sector and general public to access the fund for use in development and research, which will reap benefits for public service and strengthen research and new innovation that will benefit the country in the future.



