



Annual Report Thailand Digital Outlook

2022





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Preface

Thailand Digital Outlook Annual Report 2022

This report was compiled to publish the results of the assessment and establishment of Thailand's digital economy and society development indicators from the 2022 Thailand Digital Outlook Project. The project was conducted in accordance with the OECD's Measuring the Digital Transformation Framework to assess the overview of the country's policies on digital development and innovation for future policy considerations and recommendations.

The statistics and indicator data in this report were results of the project which had collected data from relevant public and private agencies, and surveyed individuals, enterprises, and primary services during April - July 2022. Additionally, the 2022 Thailand Digital Outlook had also studied and collected relevant data from domestic and foreign data sources to reflect the current digital development of Thailand. This included data on the digital development of OECD countries from goingdigital.oecd.org which was used in the study project.

The Office of the National Digital Economy and Society Commission (ONDE)

is the agency responsible for formulating the country's policies and strategies on the development of the digital economy and society, as well as the responsible agency tasked with the Thailand Digital Outlook Project. This report aimed to provide the public sector with relevant assessment of the country's digital development policies and recommendations for such policies in the future to be equipped with international standards that are capable of collaborating with various relevant agencies. It should also provide the business sector and People with information which can be used to enhance the efficiency of operations as well as to increase the competitive capacity and readiness to transition into the Digital Thailand in the future.

**Office of the National Digital
Economy and Society Commission
September 2022**



Table of Content

Preface	1
Table of Content	3
Chapter 1 Introduction	7
Chapter 2 Results of Surveys and Data Collection on the Use of Digital Technology (Demand Side) in 2022	14
Chapter 3 Thailand's Digital Development in the Access Dimension	39
Chapter 4 Thailand's Digital Development in the Use Dimension	57
Chapter 5 Thailand's Digital Development in the Innovation Dimension	73
Chapter 6 Thailand's Digital Development in the Jobs Dimension	83

95

Chapter 7 Thailand's Digital Development in the Society Dimension

111

Chapter 8 Thailand's Digital Development in the Trust Dimension

121

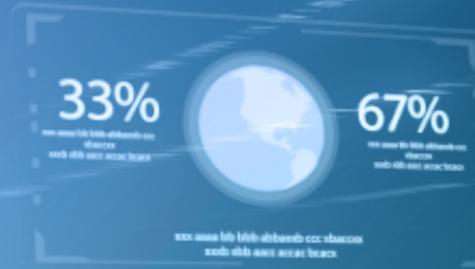
Chapter 9 Thailand's Digital Development in the Market Openness Dimension

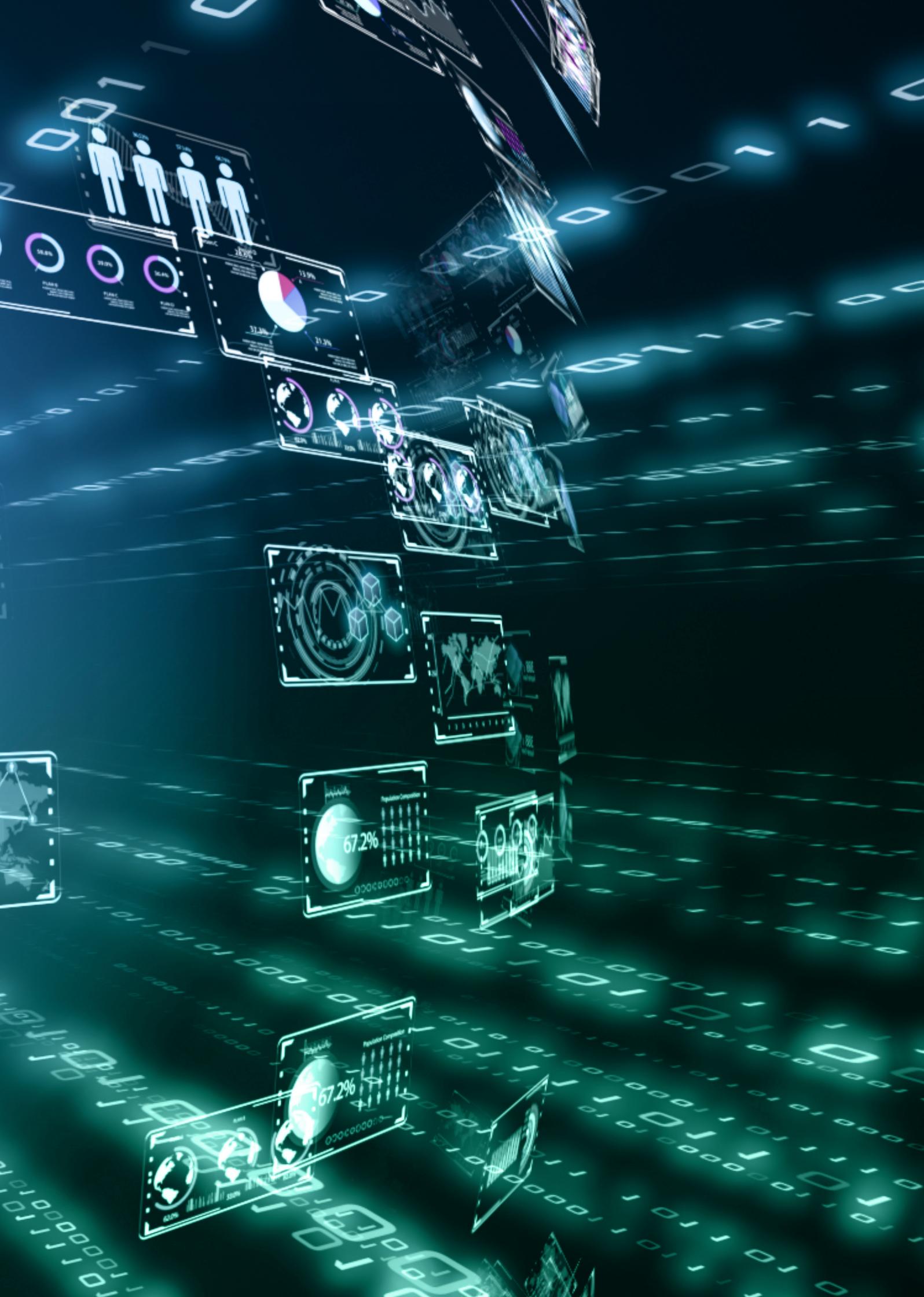
129

Chapter 10 Thailand's Digital Development in the Growth & Well-being Dimension

137

Appendix: Summary of Thailand Digital Development Indicators in 2022





Introduction

The Office of the National Digital Economy and Society Commission (ONDE) had conducted Phase 1 of the Thailand Digital Outlook Project in fiscal year 2018 (2019) by adopting the Measuring the Digital Transformation Framework of the Organisation for Economic Cooperation and Development (OECD) under the Thailand-OECD Country Program Project. This was to assess the overview of digital economy and innovations development in Thailand for further policy recommendations on digital economy and society development of Thailand. The 1st Phase Project had collected data from 3 pilot provinces, namely Ratchaburi, Suphan Buri, and Kanchanaburi.

Subsequently, ONDE had conducted the project for the 2nd and 3rd years (2020-2021) to continue and expand the study by surveying and collecting data nationwide and extending the scope of studied indicators conformity to OECD Frameworks.

For the year of 2022, Thailand Digital Outlook 2022 Project was launched. ONDE had surveyed and collected data on the use of the internet and digital technologies in all regions of Thailand grouped by individuals, enterprises, and primary services. This was to establish 85 digital development indicators which covered 8 policy dimensions in accordance with Thailand Digital Outlook project previous years.

Project Objectives

- ◆ To study worldwide best guidelines and practices for assessing digital development policy and compare such policies of Thailand and those of developed countries
- ◆ To reflect Thailand Digital Outlook, digital development, and use of digital technology
- ◆ To assess problems and obstacles, as well as the country's potentials to become a Digital Thailand in the future
- ◆ To review and reform Thailand's current digital transformation policy in accordance with international standards, as well as to foster integration among relevant authorities to bring about a Digital Thailand



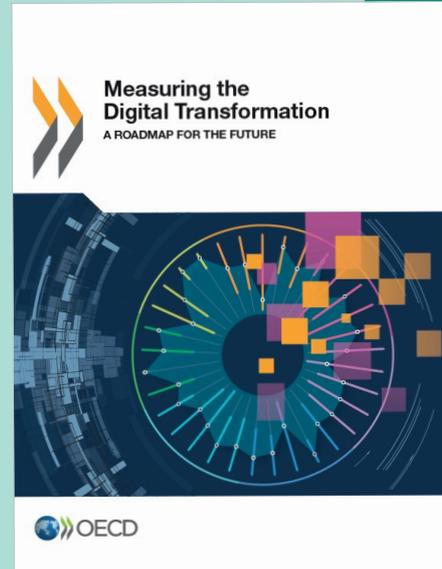
- ◆ Various economic indicators and statistical data which reflect Thailand Digital Outlook
- ◆ Recommendations and guidelines in assessment of national digital policies and reforming such policies at the same level as international practices
- ◆ Concrete policies to enhance Thailand's digital development, serve people demands, solve problems, and create development opportunities for all sectors, including the individuals, the businesses, and the public sector

Project Outcomes



OECD Indicator Framework

OECD had established the “**OECD Measuring the Digital Transformation Framework**” to assess the digital economy development policies of each country which consisted of **8 policy dimension**.



By referencing the Measuring the Digital Transformation Framework, OECD had also established 54 indicators* under the “**Going Digital Toolkit**” for relevant organizations or agencies to assess the country’s digital development policies themselves.



Additionally, other frameworks with similarity to those of OECD have also been used to assess the country’s digital development policies such as the G20 Common Framework for Measuring the Digital Economy Framework which consisted of 36 indicators from their Jobs Dimension, Skills Dimension, and Growth in the Digital Economy Dimension.

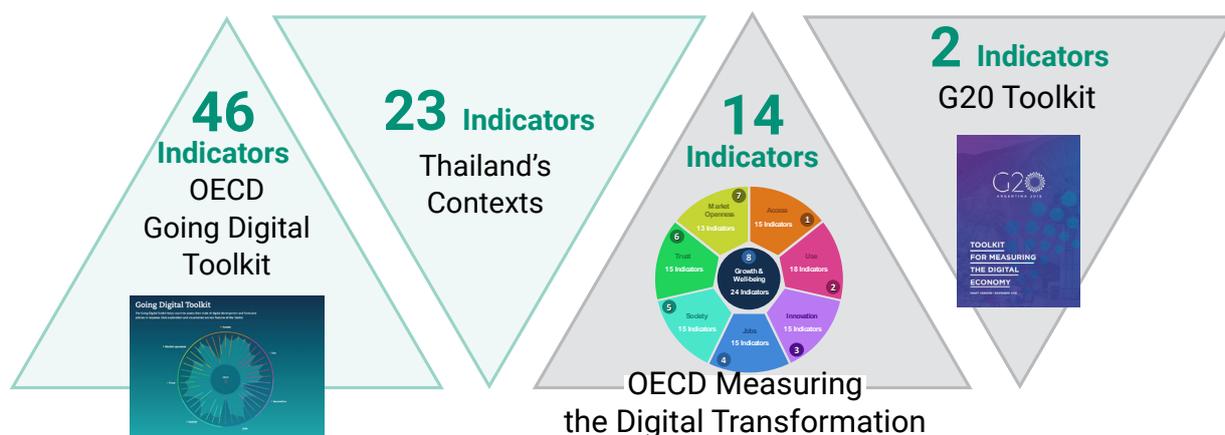
* This number of indicators is counted repeatedly in some indicators of Growth & Well-Being dimension.

Frameworks and Indicators for the Digital Development in 2022

To fully assess Thailand's digital outlook and be key insights for conducting actionable policy and roadmap plan for digital economy and society development, ONDE adopt OECD Framework as well as G20 frameworks for the Thailand Digital Outlook 2022 Project.

Therefore, 85 indicators were selected for the study consisting of (1) 46 OECD Going Digital Toolkit indicators, (2) 14 OECD Measuring the Digital Transformation indicators, (3) 2 G20 Toolkit for Measuring the Digital Economy indicators, and (4) 23 indicators relevant to Thailand's contexts.

85 Total Indicators Studied in the 2022 Project



ONDE had expanded the scope of study that was done in last year with 57 indicators. ONDE has attached importance to consistency and continuity of the Thailand Digital Outlook Project which conducted over the 4-year period. The results of Thailand Digital Outlook also aims to address many issues raised by key stakeholders that had received from workshops and interviews.

Phase 1 Project

2019



Studied best practices to evaluate digital development according to OECD Frameworks



Selected **13 pilot indicators** to study the overview of Thailand



Collected secondary data from **3 pilot provinces** (Ratchaburi, Suphan Buri, and Kanchanaburi)

Phase 2 Project

2020



Studied best practices to evaluate digital development according to OECD Frameworks



Extended the scope of the Project to study **44 indicators**



Surveyed **over 36,145 sampled individual and enterprise from 77 provinces**, and collected secondary data from 19 agencies

Phase 3 Project

2021



Studied best practices to evaluate digital development according to OECD Frameworks



Extended the scope of the Project to study **57 indicators**



Surveyed **over 42,013 sampled from 77 provinces** (Individuals, Enterprises, and Primary Services Agencies) and collected secondary data from 24 agencies

Phase 4 Project

2022



Studied best practices to evaluate digital development according to OECD Frameworks



Extended the scope of the Project to study **85 indicators**



Surveyed **over 46,346 sampled from 77 provinces** (Individuals, Enterprises, and Primary Services) and collected secondary data from 27 agencies



Collaborated with the Electronic Transactions Development Agency (ETDA) and the National Statistical Office (NSO) on survey



Produced actionable policy and roadmap for the development of digital economy and society



Designed Data exchange model



Produced interactive dashboard to display indicator data and analytical data from the survey

The Methodology of the study in Thailand Digital Outlook 2022 Project involved (1) the use of surveys and (2) the collection of secondary data where the main objective is to gather data and various indicators which will later be summarized to establish Thailand's digital outlook indicators.

85^{*}

Indicators

- ◆ Extended the scope of the Phase 3 Project where 57 indicators had been studied/surveyed
- ◆ Covered 8 Dimensions in accordance with the OECD Frameworks
- ◆ Collected data through survey and secondary data sources

Indicators of the Project

Data Collection through Survey

33
Indicators

- ◆ Developed Survey in collaboration with the ETDA and NSO

- ◆ Survey 3 groups or **46,346 respondents**



Sample Individuals
40,936 respondents



Sample Enterprises
3,816 respondents



Sample Primary Services
1,594 respondents

Collection of Secondary Data

52
Indicators

- ◆ Obtained data from 27 domestic and foreign agencies



* The total number of indicators here included a repeated count of indicators in Growth & Well-Being Dimension and excluded other data surveyed and collected from the 2022

2



Results of Surveys and Data Collection on the Use of Digital Technology (Demand Side) in 2022



Summary of the Individuals Survey Results

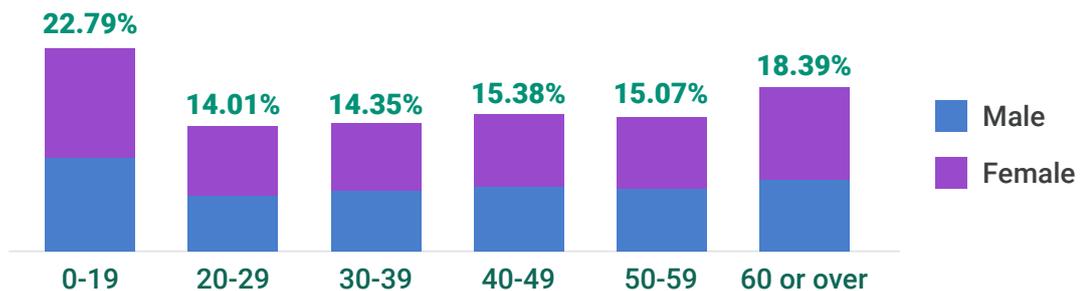
Total Number of Respondents

40,936 individuals

(as of 4 July 2022) from all 77 provinces



Gender and Age Group



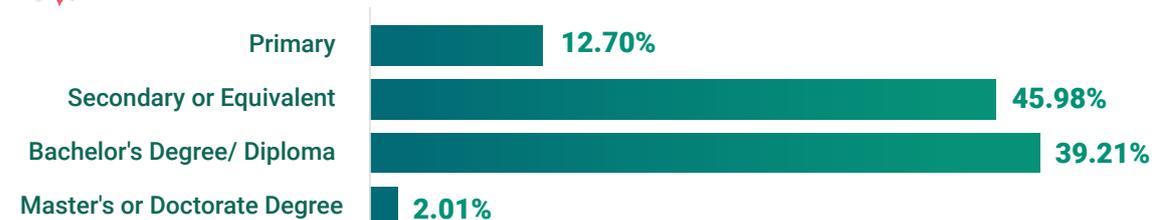
Income Distribution



Occupation



Educational Attainment



Remark : 1 Others include Househusband/Housewife, Unemployed, and others.

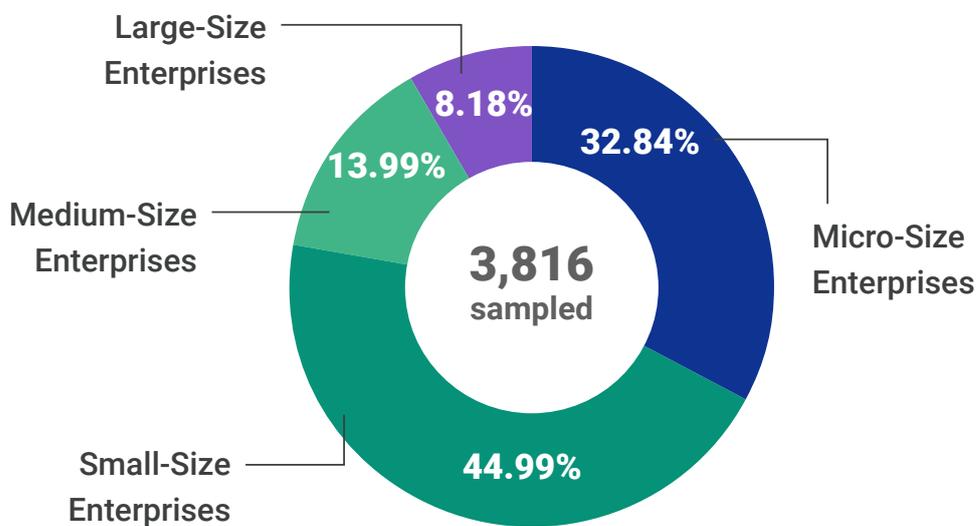
Summary of the Enterprises Survey Results

Total Number of Respondents

3,816 individuals

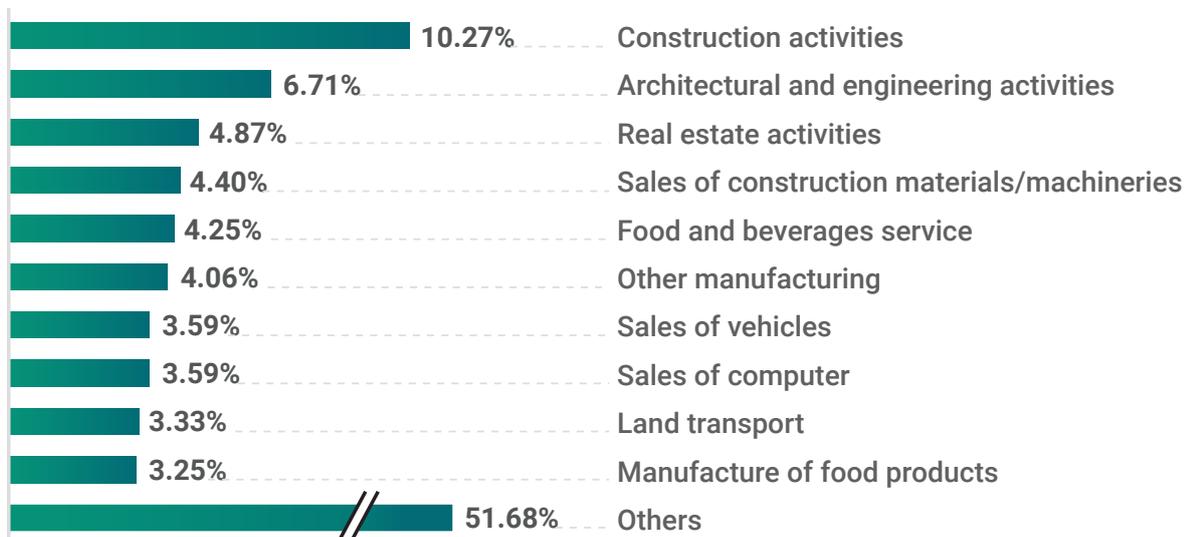
(as of 4 July 2022) from 6 regions

Size of Business



Remark : Business classifications of OSMEP

Type of Business



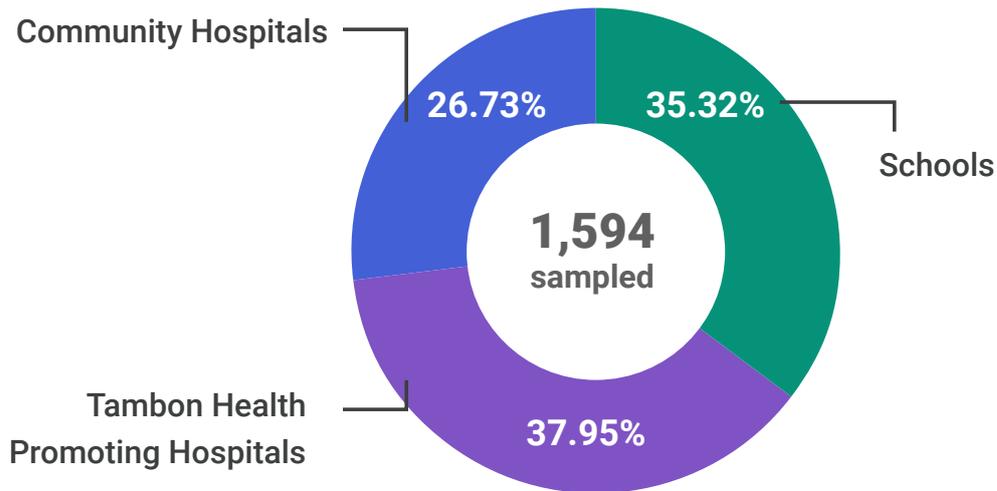
Remarks: Others such as Manufacture of food products, Food and beverages service, Toys and souvenirs, Other personal service activities (e.g. spas, beauty services, etc.) Hotels and resort hotels, Crop and animal production, hunting and related service activities, Employment activities, Sales of cosmetics, supplements, perfumeries, and beauty products, etc.

Summary of the Primary Services Survey Results

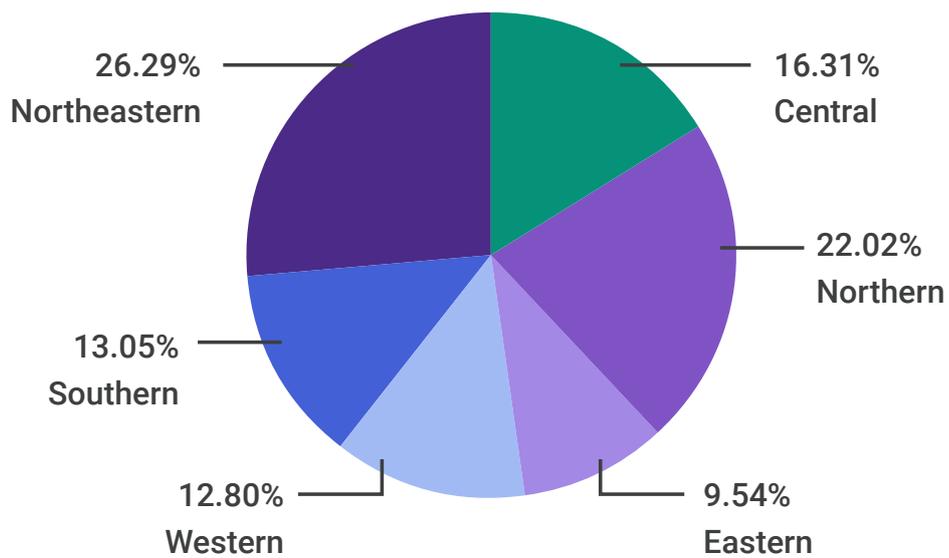
Total Number of Respondents

1,594 places
(as of 4 July 2022) from 6 regions

Type of Agency



Regions



Remark: *Tambon is sub-district area

Agencies Providing Data and Interviews



National Statistical Office
Thailand

National Statistical Office ,Thailand (NSO)



Electronic Transactions
Development Agency (ETDA)



Digital Economy Promotion Agency (DEPA)



National Telecom
Public Company Limited



Digital Government Development
Agency (Public Organization)



Office of the National Broadcasting
and Telecommunications Commission (NBTC)



Bank of Thailand (BOT)



Office of the National Economic
and Social Development Council
(NESDC)



Ministry of Public Health



Ministry of Labor



Office of the Higher Education
Commission (OHEC)



Office of National Higher Education,
Science, Research and Innovation
Policy Council (NXPO)



Institute for the Promotion of
Teaching Science and Technology (IPST)



Customs Department



Revenue Department



กรมพัฒนาธุรกิจการค้า
Department of Business Development



กรมทรัพย์สินทางปัญญา
Department of Intellectual Property



Comptroller General's Department



Fiscal Policy Office



TECHSAUCE
Techsauce Media Company Limited



Advance Info Service
Public Company Limited



True Move H Universal
Communication Company Limited



Total Access Communication
aPublic Company Limited



Organization for Economic Cooperation
and Development (OECD)



United Nations Institute
for Training and Research (Unitar)



International Federation
of Robotics (IFR)



OOKLA

Key Findings from the Individuals Survey

Internet Access



The data from the second quarter of 2022 found that

The household with internet connection

accounted for **88.00%**
or 21.80 million from 24.76 million
households in total.



The Survey found that

84.37% of individuals
had mobile broadband internet connection



45.26% of them
had fixed broadband internet connection.



Disparity of **urban and rural area with internet connection** was at **6.60%** which is an improved rate compared to the rate of 7.20% of the previous year.



Internet Use

Survey found that
the internet use among those
aged over 6 years old

was at **85.00%** where
the average usage was
7 hours and 4 minutes a day.



The average volume of monthly usage
among mobile internet users in 2021 was

24.29 gigabits/month/user

which is an increase from previous year
or only at 18.00 gigabits/month/user.

This reflected an increase in internet
use, especially for communication,
entertainment, commerce, and
online services.



Survey found that



only 63.10%

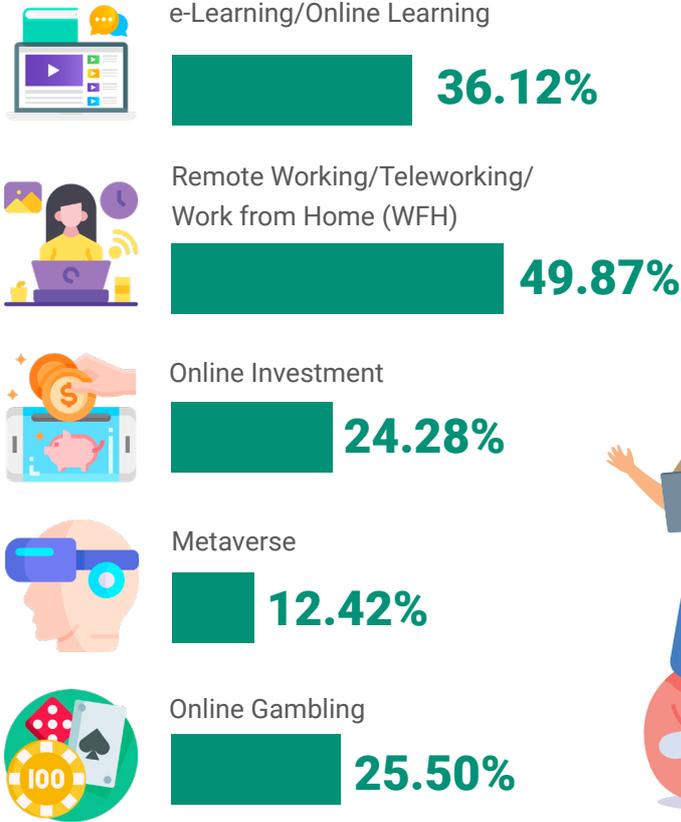
of elderly (aged 55-74) used the internet



while the share of internet use among households
with income in the lowest quartile (lowest 25%) was

only 73.35%

Popular Online Activities in 2022



The survey found that

Government employees, state enterprises employees, and freelancers were mostly used internet for teleworking which covered **95.00%**



For e-Learning/Online Learning Activity, students mostly did the activities which accounted for **95.11%**

Main problems for those used the internet for Teleworking and e-Learning/Online Learning included



The internet price was costly



Inappropriate environment



The lack of device to access the internet (e.g. smartphone, computer, etc.)

The Metaverse is still a relatively new technology compared to other technologies and has not been widespread in Thailand.



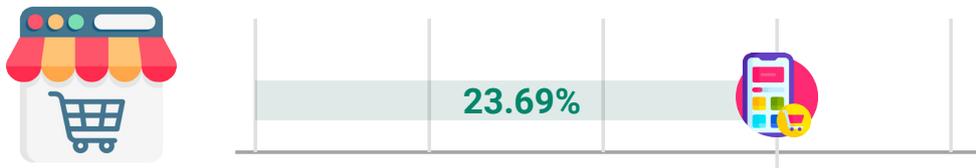
Use of Online Government Services and Online Transaction

Most Popular Online Governmental Services in 2022

Ranking

	1 Registering/receiving/verifying right to governmental services such as Thaichana	77.14%
	2 Keeping up with news from the government such as overview of COVID-19 Pandemic	49.04%
	3 Payment online for usage of electricity, water, telephone services, or other utilities	36.08%
	4 Filing tax forms through an online account	28.52%
	5 Registering/receiving/verifying right to welfare	25.95%

Data from the ETDA Survey in 2022 found that **23.69%** had purchased goods or services via the internet in the last 3 months.



In terms of online payment,

Thailand's average value of digital transactions per capita was 865,373.35 baht via mobile banking (both receiving and making such transaction) which was an increase from previous year when the average was 0.607 million baht.



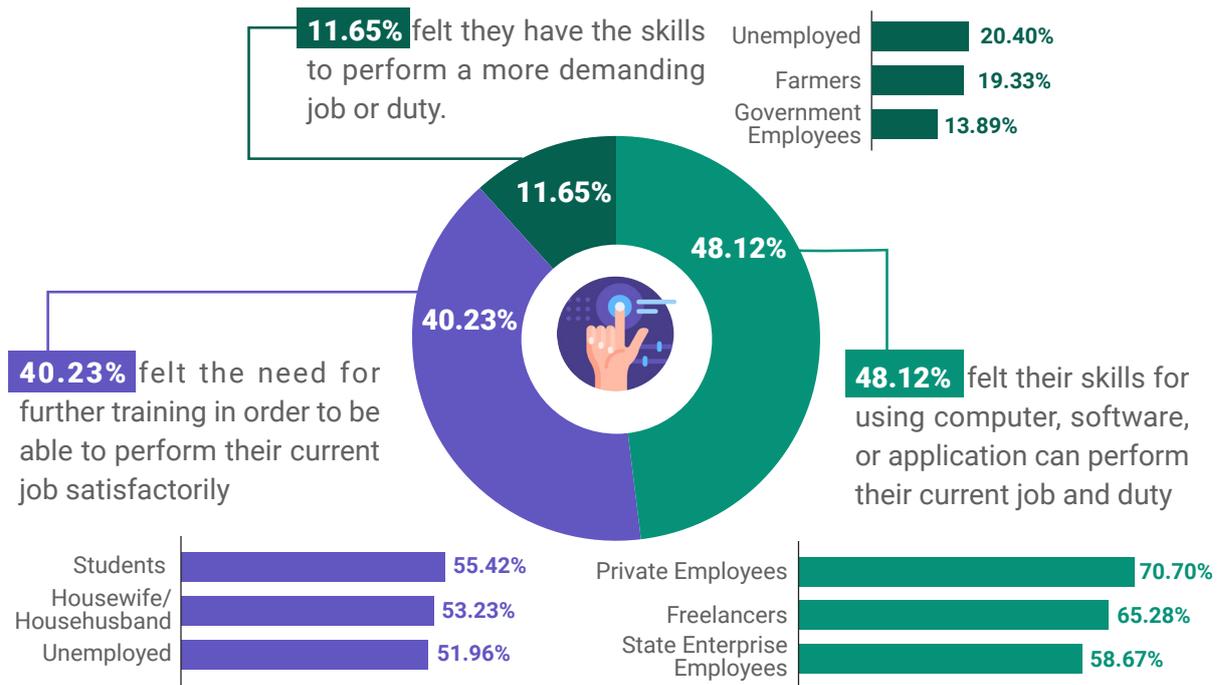
Moreover, **over 44.98%**

had filed tax forms through an online account in 2021 which was an increase from the previous year (42.44 %) while enterprises offering such online service also increased from 10.62% to 12.39% in 2021.

Use of Digital Technologies and Digital Skills

The survey in 2022 found that

48.12% reported that their skills level for using computer, software, or application can perform their current job and duty while **40.23% felt the need for further training** in order to be able to perform their current job satisfactorily and **11.65% felt they have the skills to perform** a more demanding job or duty.



More than half of Thais had basic required skills to work in the digital age but many do not have especially digital skills for working in the future workplace, including government officers and students.

	Basic Digital Skills				Digital Skills for the Future		
	Editing Document	Basic Spreadsheet	Advanced Spreadsheet	Presentation	AI-Related Programs	Programming and Coding	Website Building
Government Employees	56.22%	64.92%	57.56%	49.26%	48.71%	29.91%	32.86%
State-Enterprise Employees	59.75%	67.07%	60.96%	51.81%	61.57%	35.18%	47.17%
Private-Company Employees	69.29%	71.65%	66.72%	67.68%	69.74%	68.88%	72.41%
Students	41.08%	38.00%	43.67%	44.66%	48.32%	18.21%	10.07%
Business Owners	53.71%	61.50%	62.08%	49.55%	59.35%	40.81%	39.58%
Freelancers	61.71%	67.64%	51.91%	66.59%	58.36%	53.47%	57.32%

Problems of Using the Internet



In 2022, **3.40% of users encountered privacy and security breaches** which was the most common issue followed by damages to devices caused by virus.

Moreover, 64.10% of Thais have provided personal data through the internet which mostly included **70.70% of Gen Y (aged 22-41)**



In terms of trust in the information or news on social media,

It was found that **over 82.22% have encountered fake news in online social platforms** wheremost of them were on social media and chat applications.



Concerns in Purchasing of Goods/Services via Online



Concerns over online payment security accounted for 17.33%



Concerns over returning products policy accounted for 19.77%

Attitudes towards the Government's Digital Policies

Average Satisfaction Score (out of 5)



Net Pracharat Project **3.15**



Digital Community Center **3.15**



Anti-Fake News Center **3.17**



Thaichana Application **3.53**



Paotang Application **3.86**



MohPromt Program **3.79**



Requests for Digital Policies

Top 3 requests for digital policies from individuals respondents included

- 1 Providing free-of-charge internet services **56.11%**
- 2 Developing digital infrastructure to enhance the internet access **54.80%**
- 3 Supporting devices used for connecting to the internet **53.71%**

Key Findings from the Enterprises Survey

Internet Access

The survey in 2022 found that **80.45% of enterprises** had accessed to the internet while 19.55% of them had not.



Enterprises

had used fixed broadband (internet in the workplace) accounted for

91.53%



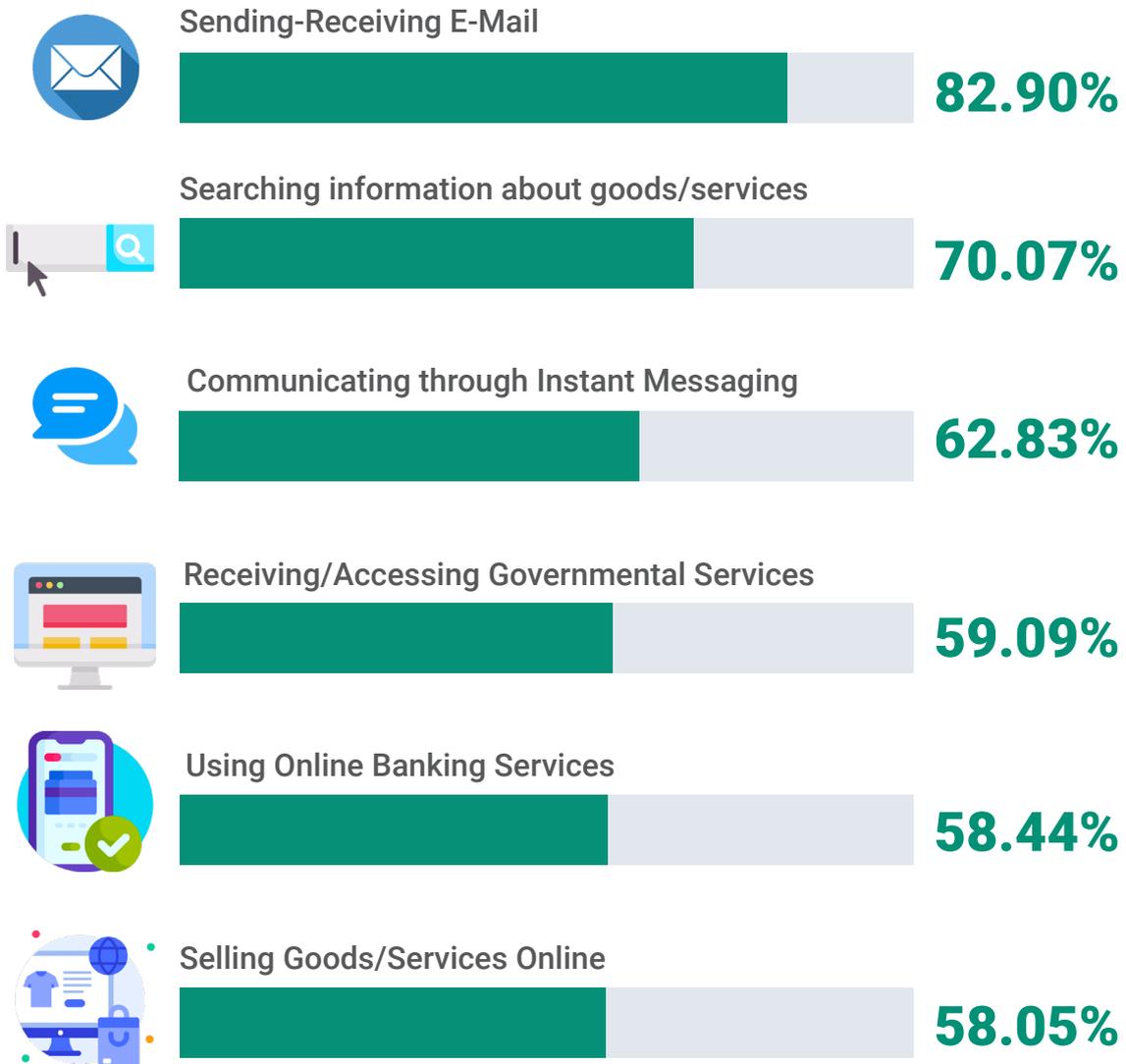
while **32.51%** used mobile

92.41% connected to the internet with **the speed of greater than 30 Mbps**



Internet Use

Businesses had used the internet for a variety of purposes.



Use of Online Government Services

01
Filing tax forms
or information
via online
92.86%

02
Paying Utility Bills
65.54%

03
Submitting
employee information
63.50%

04
Paying fines
or fees
59.18%

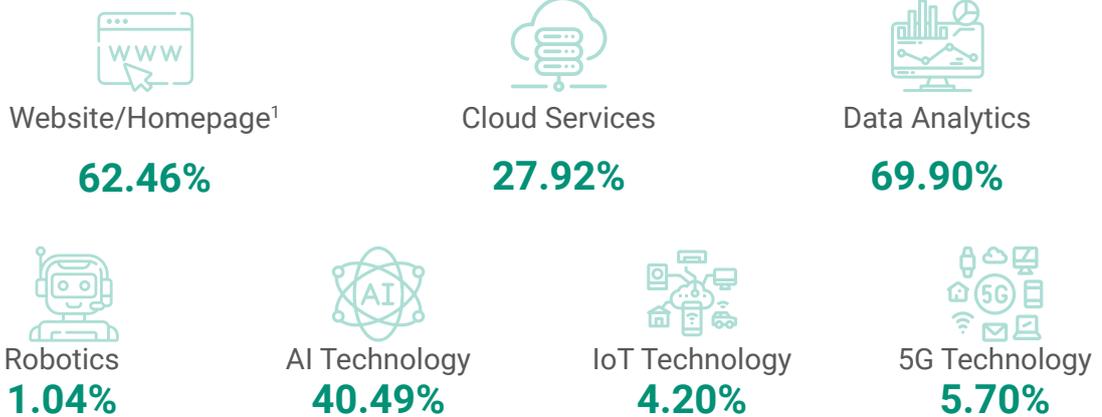
05
Filing for tax benefits
and refunds
43.95%



Use of Digital Technologies

In 2022, 40.39% of Thai enterprises had sold goods/services via online.

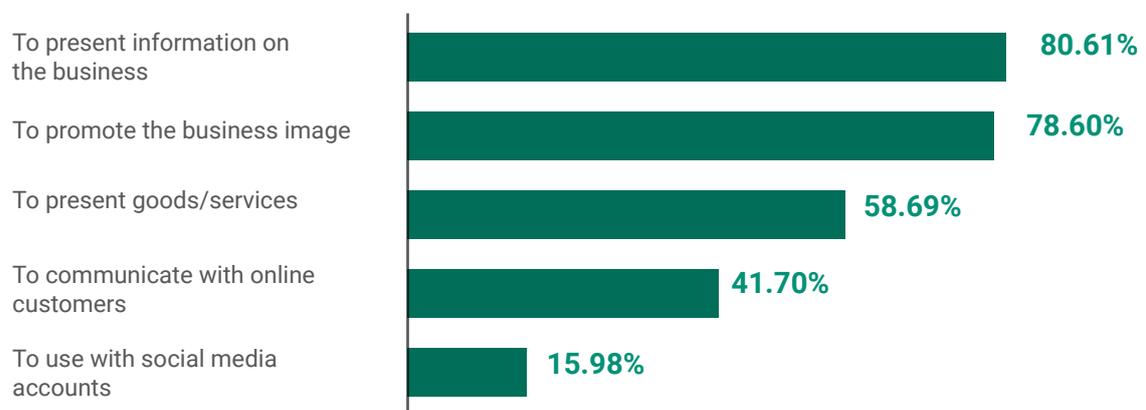
Share of enterprises who used digital technologies, by type of technologies



Use of Website and Homepage in Businesses



5 Purposes of using website/homepage in businesses



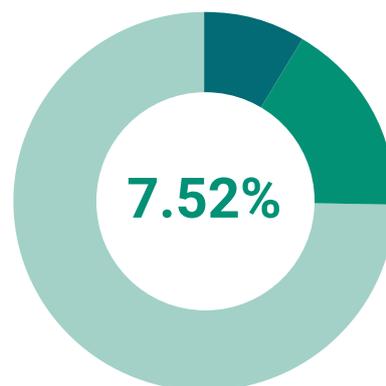
Remark: ¹ for enterprises with at 10 employees or more

Digital Workforces

ICT Specialists positions in Enterprise

 **21.75%** of enterprises hired ICT personnel

 **17.96%** of enterprises who had vacancy in the IT department



Share of Enterprises Providing Training to Employees

96.58% provided training to all employees



9.73% provided training to ICT Specialists



Top 5 skills

that enterprises had provided training on employees and IT specialists included



1) Software development which accounted for **46.22%**



2) IT security which accounted for **43.42 %**



3) ICT knowledge for manager and executive level which accounted for **42.30%**



4) IT system administration which accounted for **41.46%,**

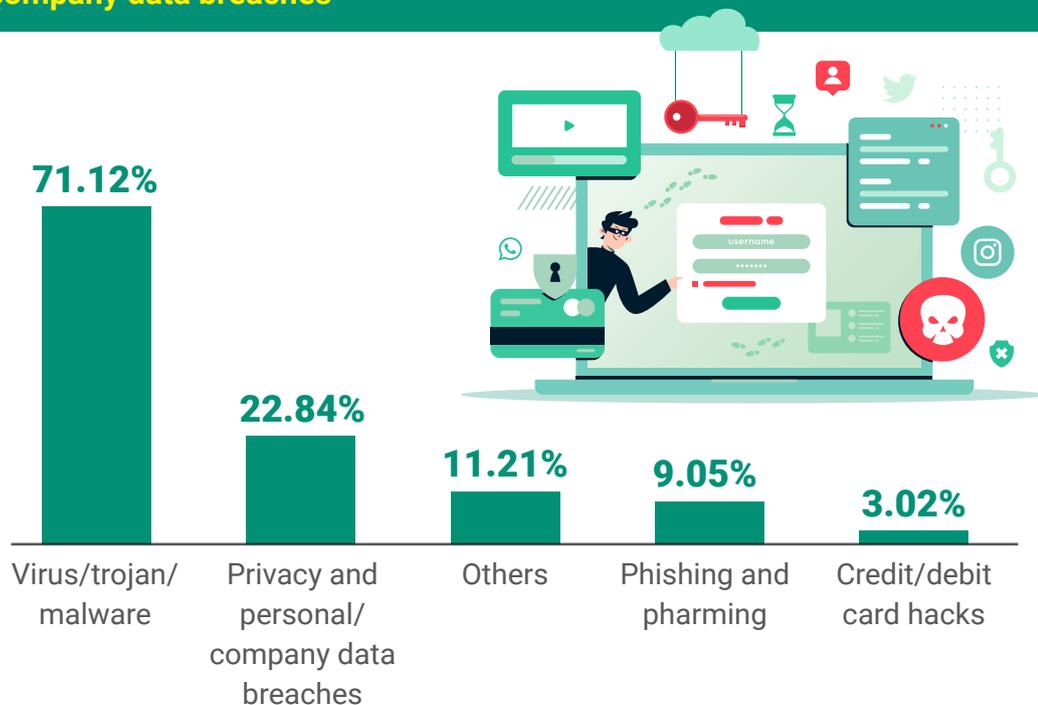


5) Database administration which accounted for **39.50%**

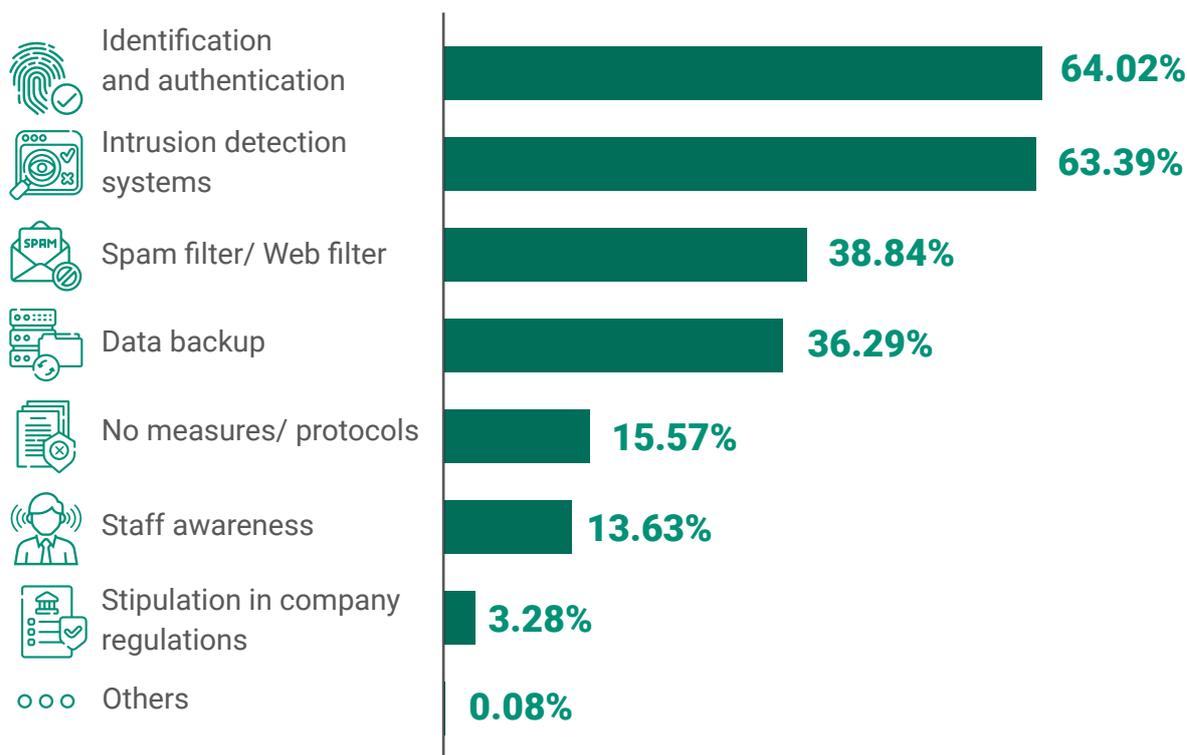
Problems from Using the Internet

6.08 percent of enterprise

had experienced IT incidents where **the most common problems** were that **devices damaged** by virus/trojan/malware, and **privacy and personal/company data breaches**



ICT Security measures Mostly Used or Implemented by Enterprises



Attitudes towards the Digital Policies

Average Satisfaction Score (out of 5)



3.98

Paotang Application



3.31

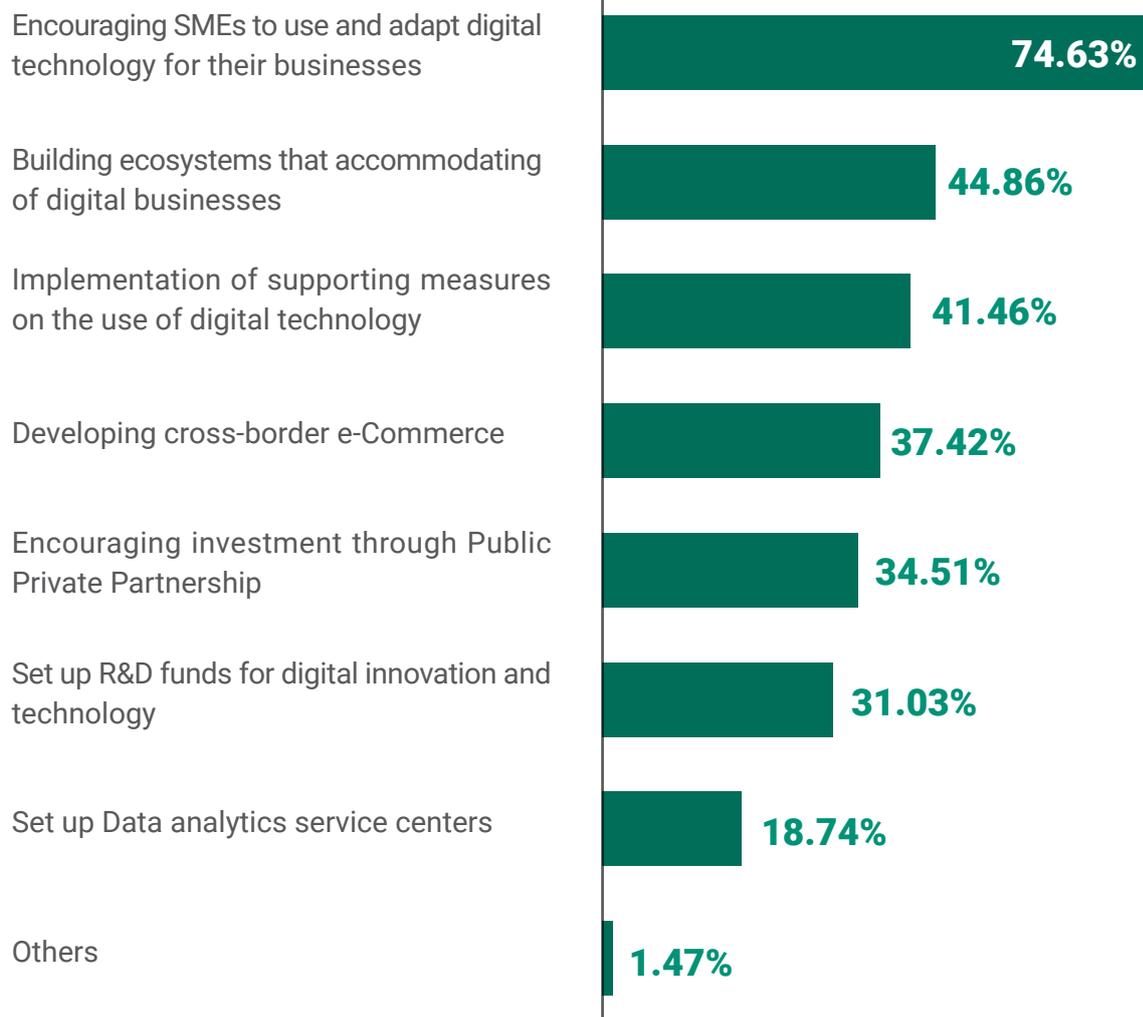
Digital Start-up Initiative



3.14

Net Pracharat Project

Requests for Digital Policies



Key Findings from the Primary Services Survey



As for primary services such as schools as well as community and subdistrict health promoting hospitals, **the rate of access to the internet was at 95.17%**

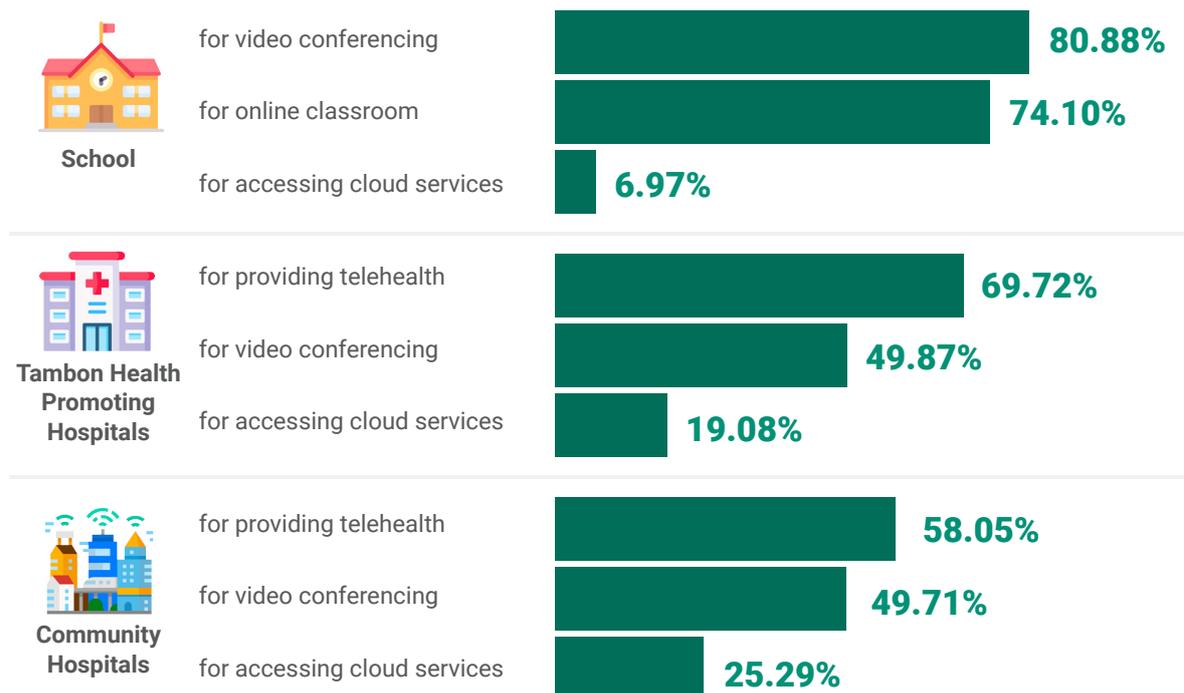
It was also found that **72.45% of primary services** with internet access used fiber optic

18.59% of them used cable modem

Moreover, some primary services used satellite and terrestrial fixed wireless and other types of broadband.

71.39% of primary services use the internet with the speed greater than 30 Mbps. Some primary services reported demand for 5G mobile broadband in order to provide online services, online conference, and so on.

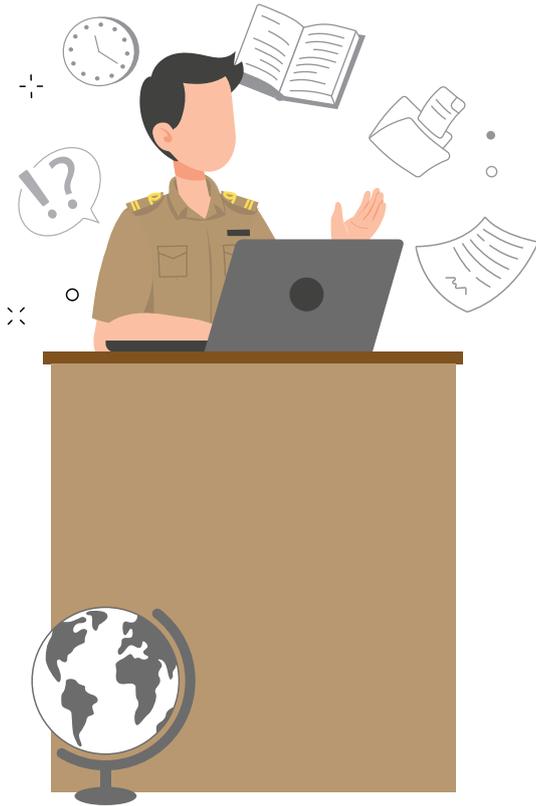
Demands for 5G Broadband of Primary Services



Providing Online Government Services

62.69%

of primary services provided online government services



It was also found that **74.50% of schools** used the internet for providing online classrooms

while **58.76% of them** used the internet for providing e-Learning/online learning.

Moreover, **95.24%** of the Community Hospitals and **90.63%** of the Tambon Health used the internet for providing telehealth services



TOP 3

Most Popular Online Communication channels of Primary Service



Website

83.06%



Facebook

79.87%



LINE

27.50%

Access and Use of Digital Technologies

Share of primary services accessed to digital technologies



Data Analytics
13.32%



AI Technology
14.11%



5G Technology
47.00%



Cloud Technology
86.35%

Share of primary services adopted digital technologies in their services



Data Analytics
10.74%



AI Technology
4.61%



5G Technology
8.90%

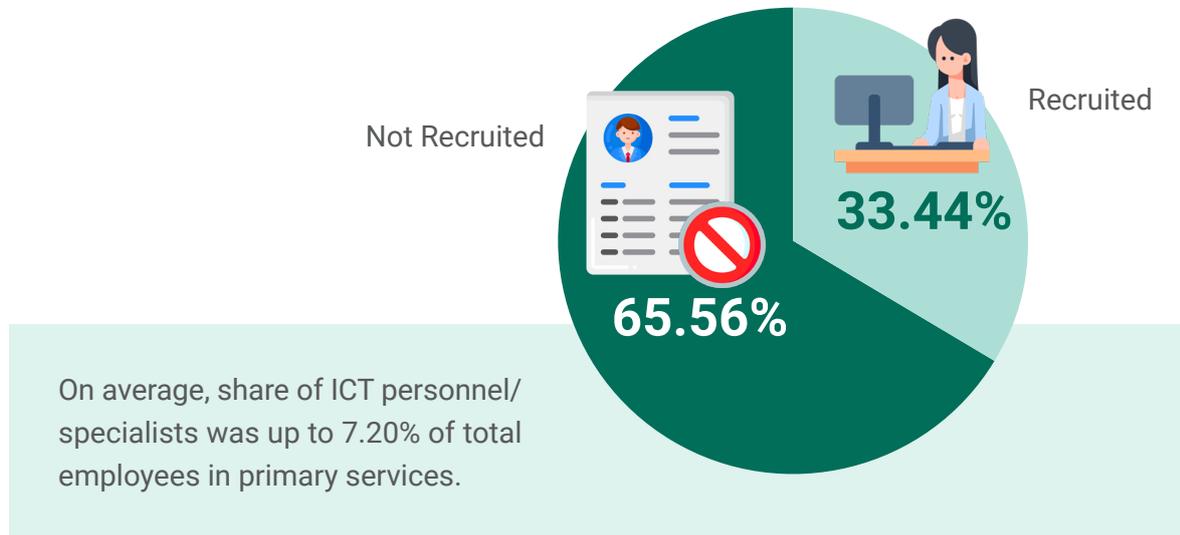


Cloud Technology
75.41%



Digital Workforces

Recruitment of ICT Personnel/Specialists in Primary Services



ICT Training among Primary Services

% of Employees provided ICT Training



% of ICT personnel/specialists provided ICT Training



IT Security Protocols and Measurements

8.85% of primary services had encountered breaches/incidents in IT security.

Most IT security incidents encountered by primary services



1 **80.14%**
virus, trojan, or malware



2 **18.44%**
the privacy and security breaches



3 **6.38%**
phishing and pharming



4 **3.55%**
credit/debit card hacks

IT Security Protocols and Measurements



Identification and authentication
(e.g. strong password, Biometric methods, etc.)



74.03%



Intrusion detection systems
(e.g. antivirus, firewall, etc.)



73.02%



Staff awareness initiative on their obligations on ICT security



41.91%



Spam filter/ Web filter



40.40%



Data backup



37.26%



60%



Cloud Network

NEXT



Thailand's Digital Development in the Access Dimension

3

Internet access is crucial to the development of the digital economy and society. Whether individuals, businesses or government agencies can effectively utilize the internet depends on the development of digital and information technology and communication infrastructure as well as country's backbone network, both fixed and mobile broadband.

For the **Access Dimension**, ONDE had referenced the OECD Frameworks to study and collect indicators representing the access to the internet and digital technologies in Thailand. The indicators help ONDE to assess readiness of Thailand digital infrastructure and be useful as important data to the public sector, relevant government agencies, and the private sector including internet providers who had invested in such infrastructure in order to improve quality of network and service coverage nationwide.

There are 16 indicators that were studied and 7 of them were comparable to OECD countries.

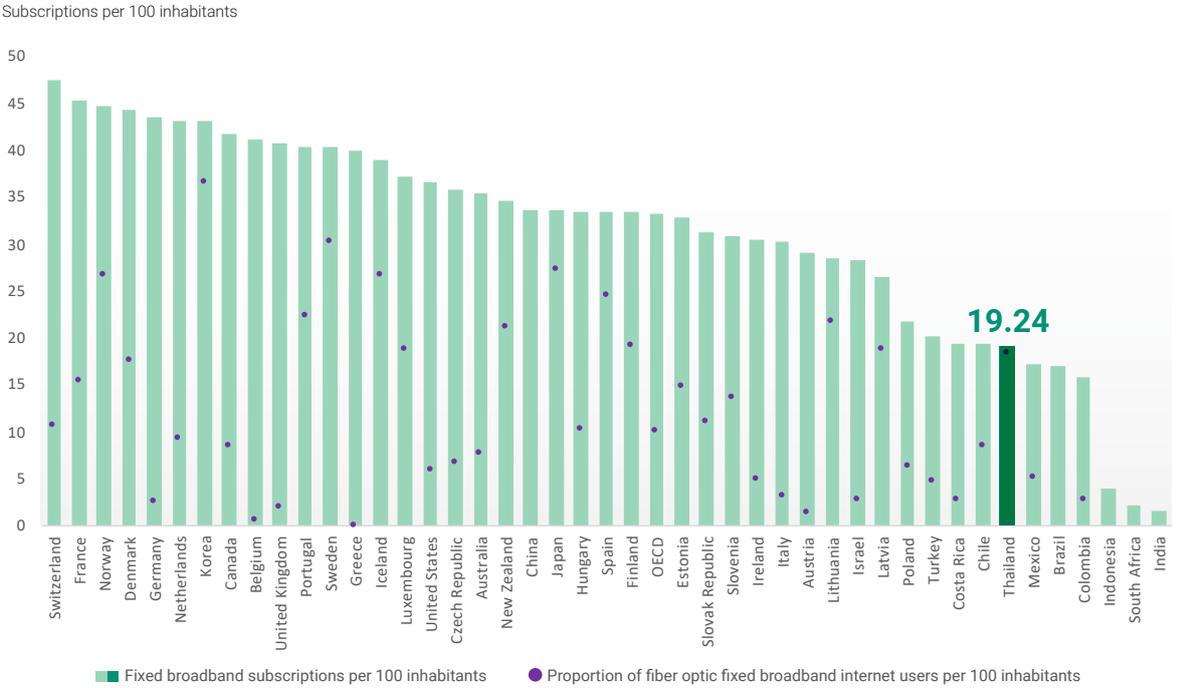
A1 : Fixed broadband subscriptions per 100 inhabitants

The indicator reflects the accessibility of fixed broadband internet in Thailand where OECD considered fixed broadband connection with internet speed of 256 Kbps or more. In additional, according to OECD, fixed broadband consists of various technologies including Hybrid Fiber Coaxial or coaxial cable, fiber optic cable or FTTx, as well as other types of broadband, such as satellite internet, and fixed wireless broadband. The indicator help illustrate the share of Thais with access to fixed broadband and whether relevant agencies should promote the level of internet access.

Data from the 2021 NBTC Telecommunication Market Reports found that 19.24 out of 100 had subscribed fixed broadband in which was an increase from 2020 when only 16.85 out of 100 were fixed broadband subscribers.

Thailand has a relatively low share of fixed broadband subscriptions compared to the average share among OECD countries that was at 31.38 subscribers out of 100 inhabitants. For this indicator, Switzerland ranked the highest among OECD countries with 47.39 subscribers out of 100 inhabitants.

Fixed broadband subscriptions per 100 inhabitants



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the NBTC Telecommunication Market Reports

A2 : M2M (machine-to-machine) SIM cards per 100 inhabitants

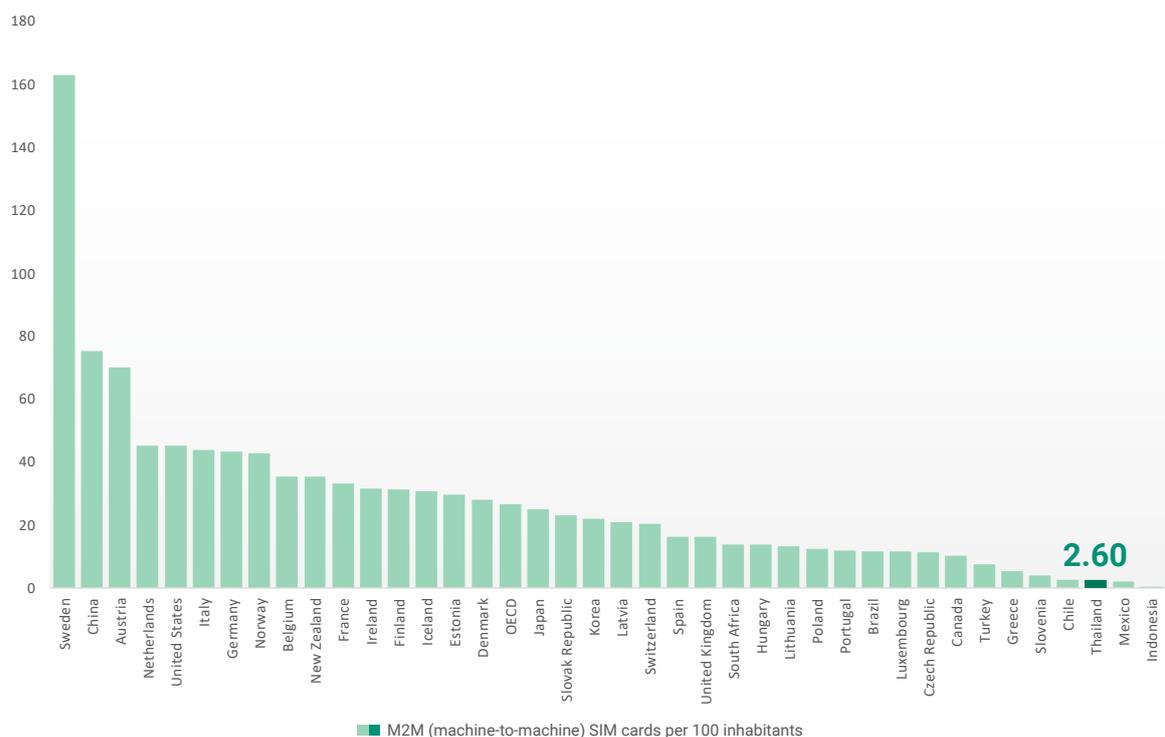
This indicator reflects the increase in the use of electronic and digital devices in Thailand where many of them had connected with internet and called Internet of Things (IoT) devices e.g. household electronics, smart wearable, office equipment, vehicles, smart meters/sensors, industrial machineries, and agricultural drones. The indicator allows public sector to implement policies that develop IoT industry in Thailand and help businesses for seeking investment opportunities in IoT or other relevant industries.

According to annual reports published by telecommunication service providers found that there were 1.70 million registered M2M SIM cards in 2021 which meant 2.60 SIM cards were used per 100 inhabitants. Such was an increase from 2020 when only 2.27 SIM cards were used per 100 inhabitants which reflected the growth of IoT industry as well as in the use of various IoT devices.

Thailand had a significant low share of registered M2M SIM cards compared to the average share among OECD countries was at 27.89 SIM cards per 100 inhabitants. For this indicator, Sweden ranked the highest among OECD countries with 162.98 registered M2M SIM cards per 100 inhabitants.

M2M (machine-to-machine) SIM cards per 100 inhabitants

M2M SIM cards per 100 inhabitants



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Annual reports published by each telecommunication service provider

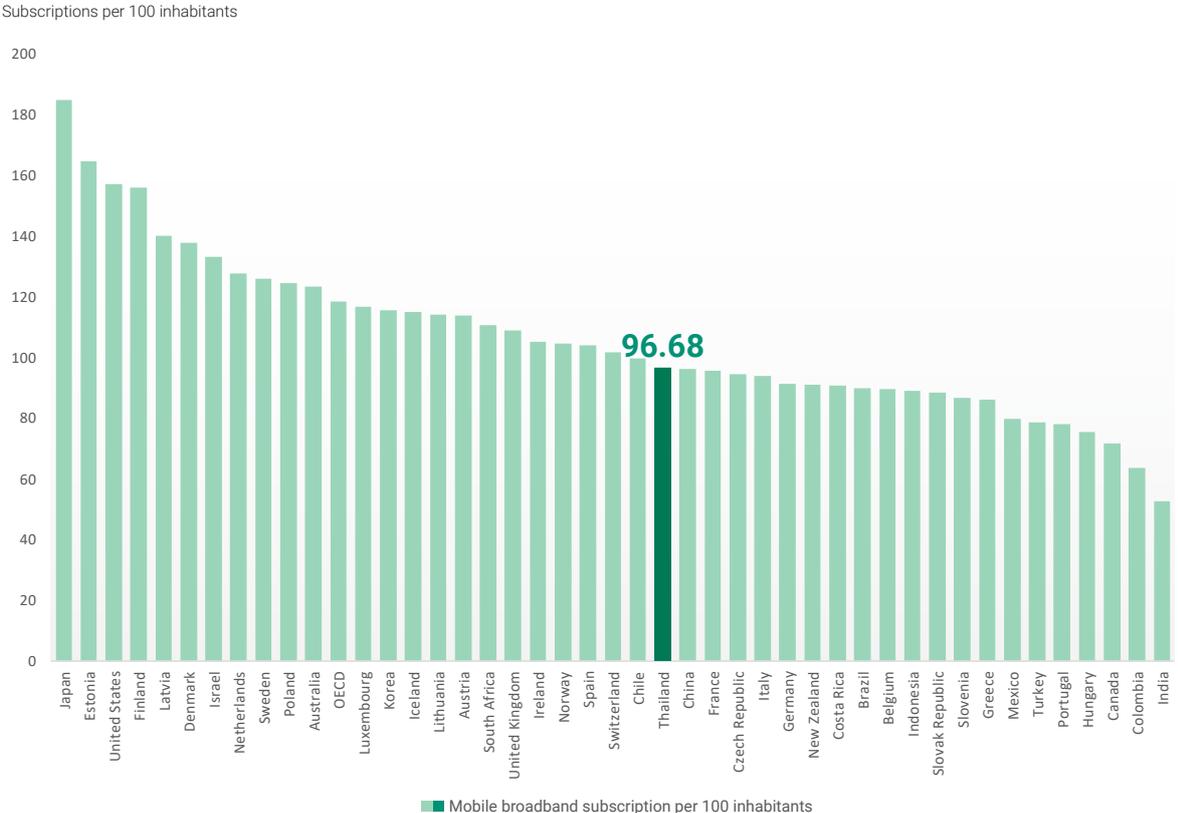
A3 : Mobile broadband subscription per 100 inhabitants

Similar to A1, this indicator reflects the accessibility of mobile broadband internet in Thailand where OECD considered mobile broadband connection with internet speed of 256 Kbps or more. Such internet subscriptions can include various technologies including HSPA and LTE network, but excluding network service subscription of GPRS, EDGE or CDMA, as well as 1XRTT network. Therefore the public sector could assess the access to and use of mobile broadband within the population for further policies or measures to enhance the access to mobile broadband services.

The 2021 NBTC Telecommunication Market Report found that 97 out of 100 had mobile broadband subscriptions, which was an increase from 2020 when only 93 out of 100 were mobile broadband subscribers. This reflected the increase in the demands for the use of both fixed and mobile broadband internet.

Thailand had a moderate share of mobile broadband subscribers compared to the average share among OECD countries was at 106.51 mobile broadband subscribers per 100 inhabitants. For this indicator, Japan ranked the highest among OECD countries with 184.70 mobile broadband subscribers per 100 inhabitants.

Mobile broadband subscription per 100 inhabitants



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the NBTC Telecommunication Market Reports

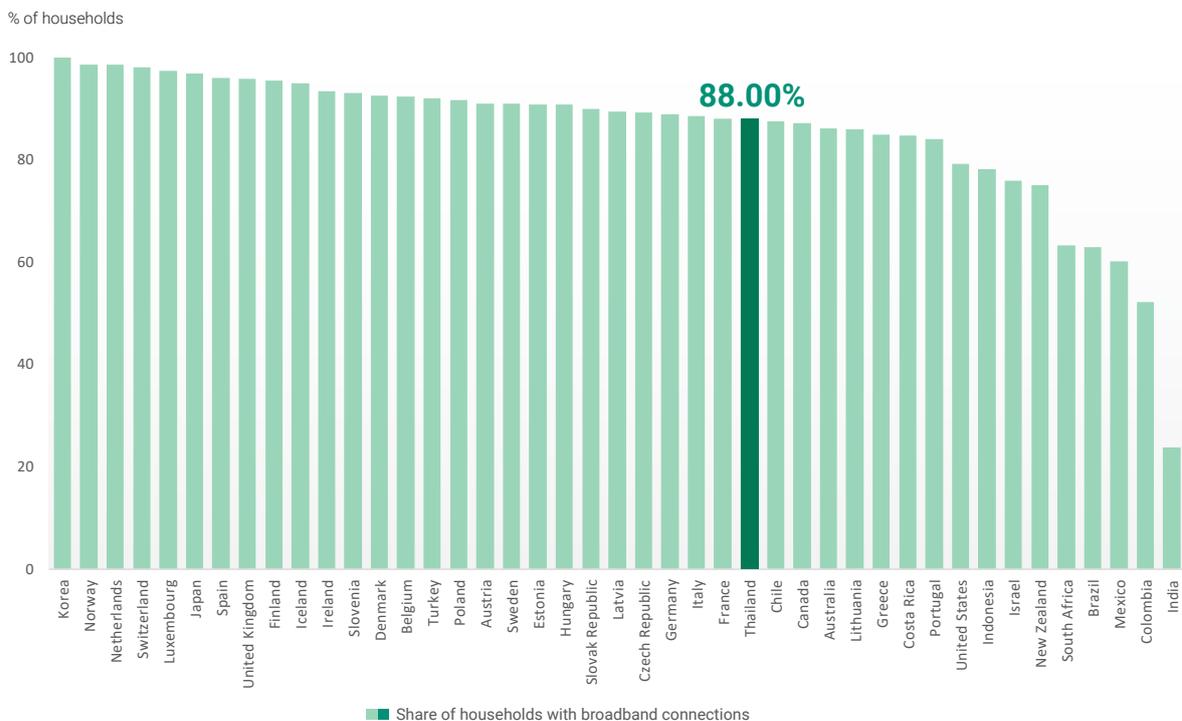
A4 : Share of households with broadband connections

This indicator reflects the households with access to internet broadband which implies to the level of the country's digital infrastructure development. To measure the accessibility of fixed broadband internet of households, OECD considered internet access in various technologies including network with digital subscriber line, cable modem, fiber optical line, other wired broadband such as leased lines, and wireless connection such as fixed wireless access, satellite and terrestrial fixed wireless, mobile broadband (e.g. 3G, 4G, and 5G), and narrowband connections where OECD only considered internet connection with the speed of greater than 256 kbps.

The Household Survey on the Use of Information and Communication Technology (Annually) conducted by the National Statistical Office (NSO) found that 88.00 out of 100 households had broadband connections in 2022 which was an increase from 2021 when only 85.10 households could access broadband internet.

Thailand had a moderate share of households with internet access which was higher than the average share among OECD countries or 85.61 percent of all households. For this indicator, South Korea ranked the highest among OECD countries with 99.93 out of 100 households with internet access.

Share of households with broadband connections



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Household Survey on the Use of Information and Communication Technology (Annually) by NSO.

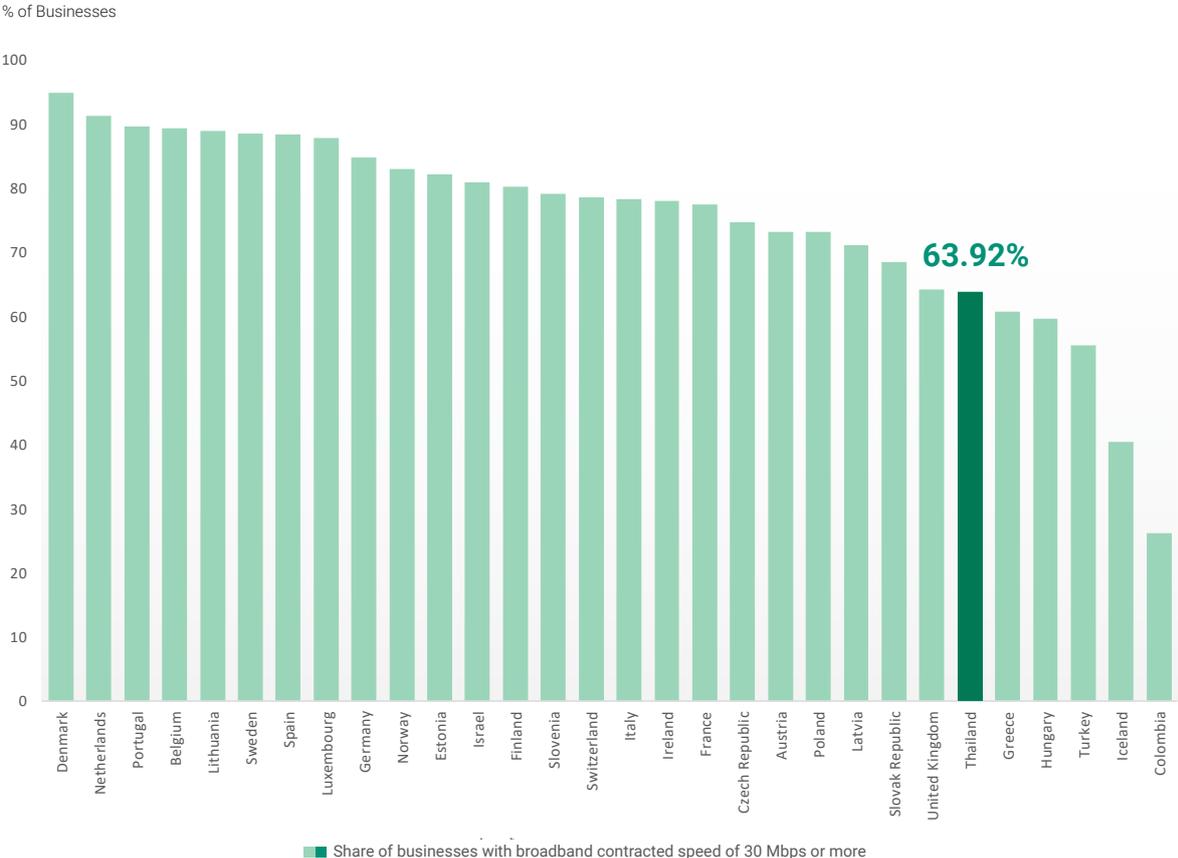
A5 : Share of businesses with broadband contracted speed of 30 Mbps or more

This indicator reflects the country’s digital infrastructure as well as the access to broadband internet among the business sectors. OECD considered the internet access in the enterprises with 10 and over employees (i.e. small businesses and those that greater business size) and measure the share of businesses with fixed broadband speed of at least 30 Mbps.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 63.92 percent had connected to internet with the speed of 30 Mbps or faster which was a decrease from 2021 when such share stood at 89.80 percent. It was expected that the decline was a result of the shift towards mobile broadband as well as the COVID-19 pandemic which had cause businesses to adopt Work From Home (WFH) policies and reduce internet use in the workplace.

Thailand had a relatively low share of businesses with the internet speed of 30 Mbps or more compared to the average share among OECD countries was at 75.51 percent of all businesses. For this indicator, Denmark ranked the highest among OECD countries with over 94.96 percent of businesses having the internet with the speed of at least 30 Mbps.

Share of businesses with broadband contracted speed of 30 Mbps or more



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Enterprises Survey of Thailand Digital Outlook 2022 Project

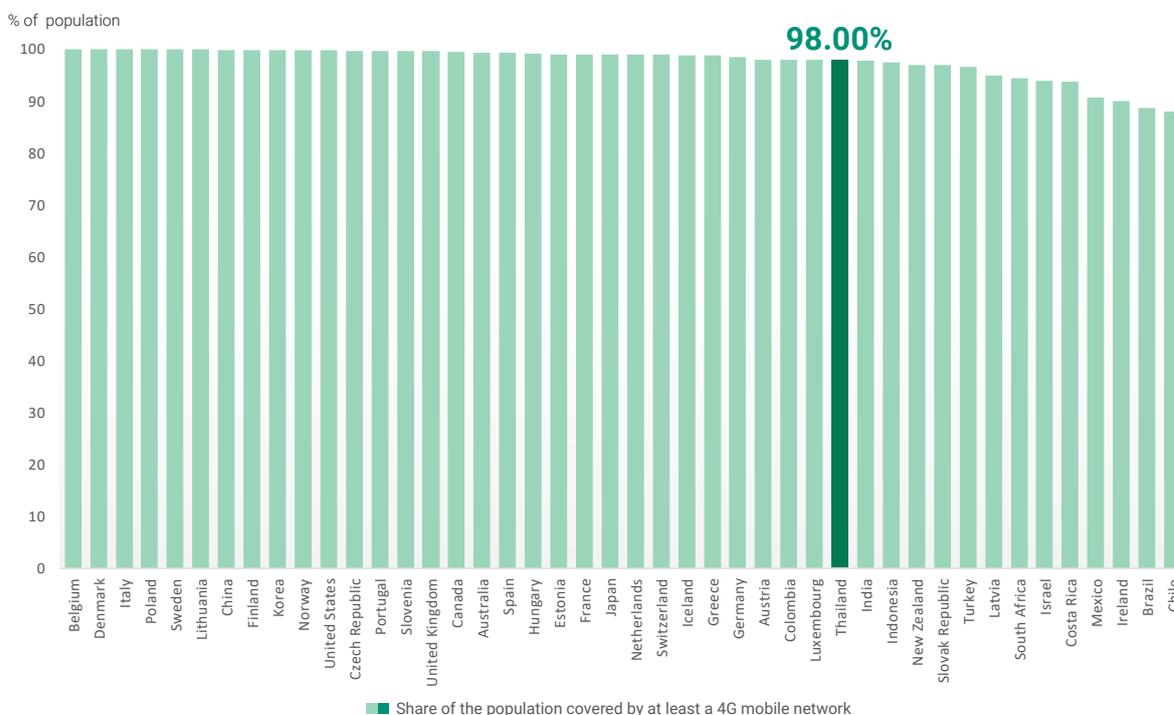
A6 : Share of the population covered by at least a 4G mobile network

This indicator is studied in areas where 4G or faster mobile networks were offered to reflect the coverage of 4G or faster network in terms of telecommunication infrastructure as well as to enhance access to high-speed internet which would allow individuals and businesses to more effectively utilize digital technologies. Such technologies include cloud computing as well as video streaming services. Additionally, this indicator could also complement the study of other indicators related to internet price for further assessment of the volume of internet use among internet users in the country.

According to the United Nations' Report on Global Sustainable Development Goals Indicators annually compiled by NBTC, the share of population covered by at least a 4G mobile network was at 98.00 percent in 2021 which was a steady rate since the previous year.

Comparatively, Thailand had a moderate share of population covered by at least a 4G mobile network while the average share among OECD countries was at 97.73 percent of the whole population. For this indicator, Belgium, Denmark, Italy and many other OECD countries ranked the highest as 100 percent of their population had been covered by at least a 4G mobile network.

Share of the population covered by at least a 4G mobile network



Source: OECD Going Digital Toolkits (as of 2 August 2022) and Indicator 9.c.1 Proportion of population covered by at least 4G mobile network (%) from the Global SDG Indicators Database by United Nations (UN) which compiled by NBTC.

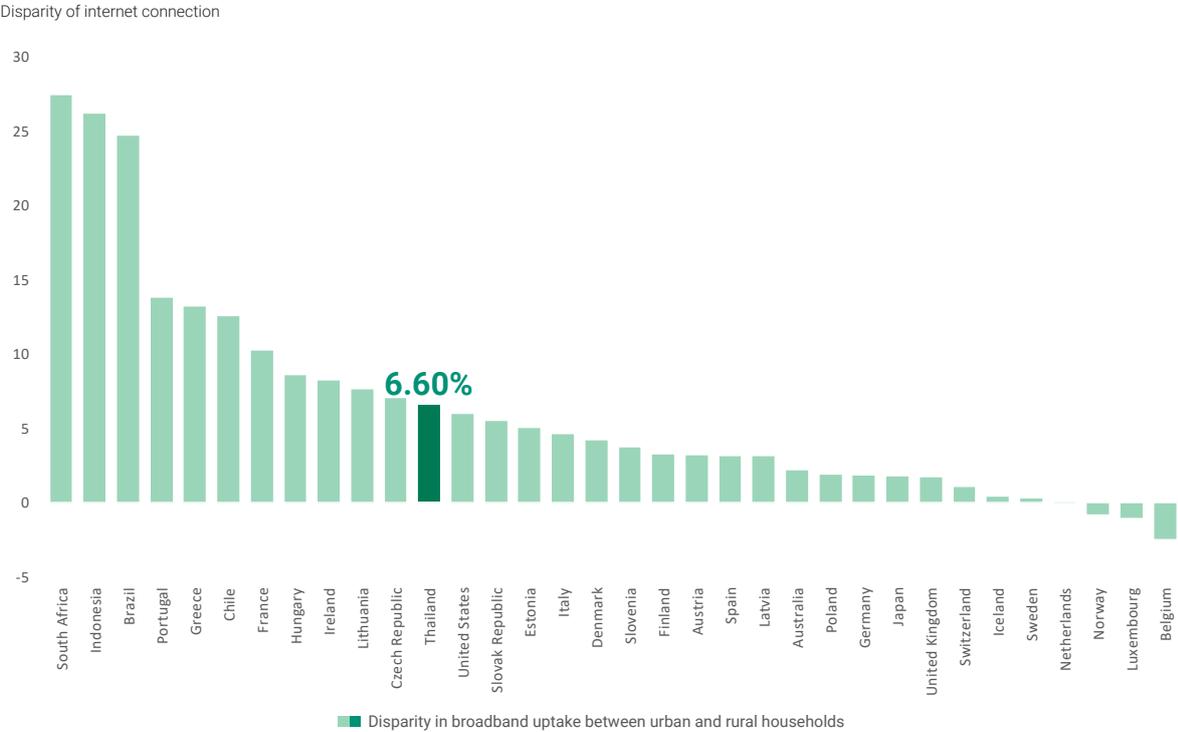
A7 : Disparity in broadband uptake between urban and rural households

This indicator compares the access to both fixed and mobile broadband internet with at least 256 kbps of urban and rural households to study the issues of disparate access and pricing (with those in urban areas having greater internet access at cheaper prices than those in rural areas) as well as further measures to effectively tackle such disparity.

According to the Household Survey on the Use of Information and Communication Technology (Annually) conducted by the National Statistical Office (NSO) in the 2nd Quarter of 2022, it was found that the disparity in internet access among urban and rural households was at 6.60 percent which was a decrease from 2021 when such rate was 7.20 percent.

Thailand had a relatively moderate ranking for this indicator compared to the average rate of urban-rural disparity in internet access of OECD countries was at 6.32 percent. For this indicator, Belgium scored the lowest with the disparity rate of -2.40 percent which reflected how their population in rural areas had higher level of internet use than those in urban areas.

Disparity in broadband uptake between urban and rural households



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Household Survey on the Use of Information and Communication Technology (Annually) by NSO.

A8 : Trends in fixed broadband monthly subscription prices

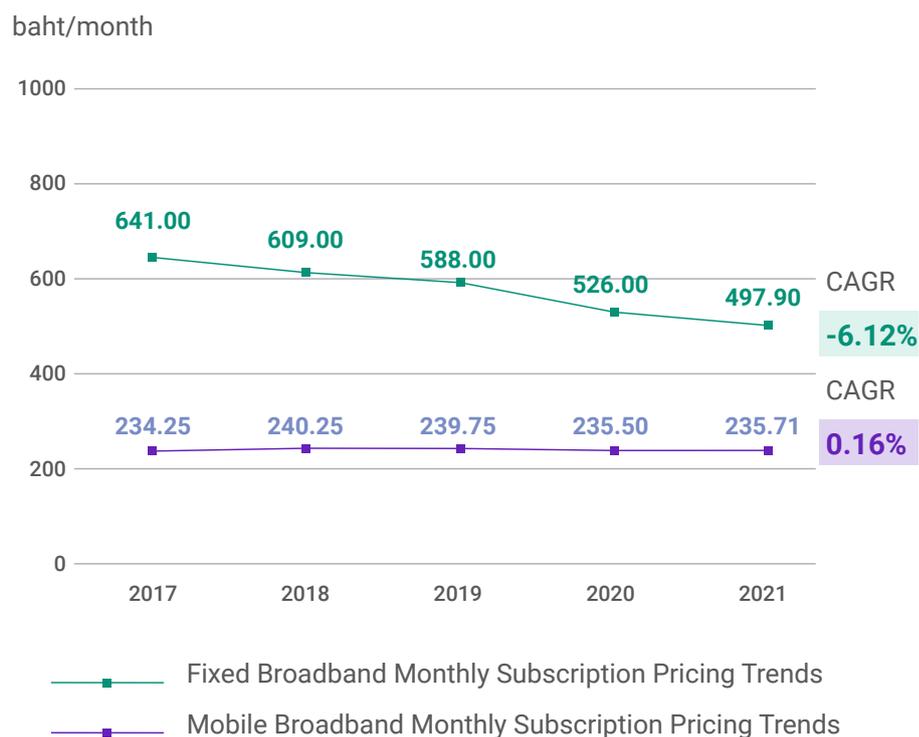
This indicator assesses the trends and level of fixed broadband prices in Thailand that had been determined by internet service providers to reflect the various changes as well as the factors affecting domestic internet users and policy recommendations to enhance internet access and connection.

According to data on monthly broadband prices from broadband internet providers in Thailand, it was found that fixed broadband monthly subscription prices had been declining since 2017 where the average price of fixed broadband subscription in 2021 was at 497.90 baht per month which was a decrease from 2019 when the monthly average was 641 baht. By calculating the compound annual growth rate (CAGR), there has been a 6.12 percent decrease in internet price for every year from 2017-2021.

A9 : Mobile Broadband monthly subscription pricing trends

Similar to A8, this indicator assesses the trends and level of mobile broadband prices in Thailand. According to data on monthly broadband prices from telecommunication service providers in Thailand, it was found that mobile broadband monthly subscription price over the years had not changed much since 2017 as the average monthly prices in 2017 and 2021 were 234.25 baht and 235.71 baht respectively.

Broadband Monthly Subscription Pricing Trends



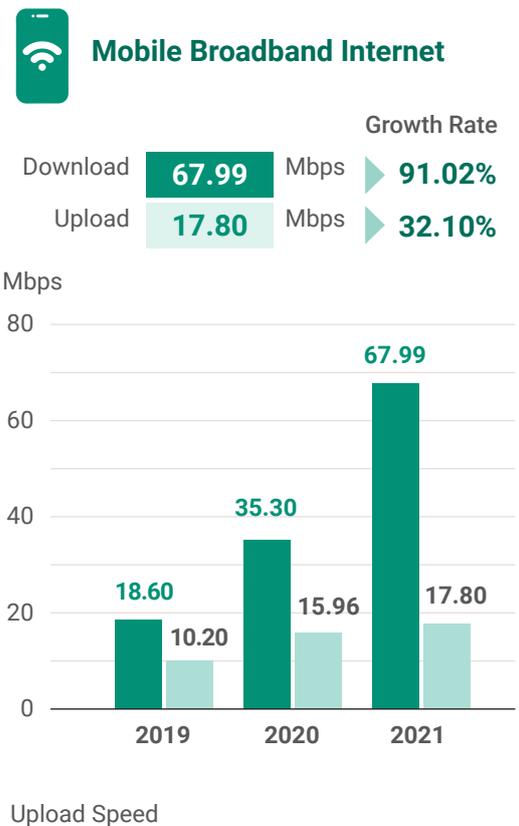
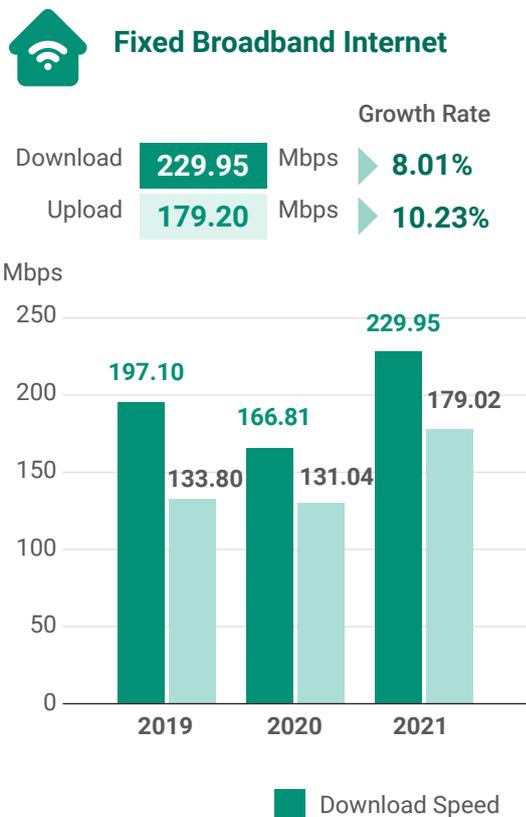
Source: NBTC

Indicator A10 : Global Connection Speed

This indicator assessed the country's fixed and mobile broadband speed to reflect the quality, coverage, and development of Thailand's overall telecommunication infrastructures. For this indicator, OECD had used data on the average speed of monthly fixed and mobile broadband internet for calculation.

According to Ookla's 2021 reports on mobile and broadband internet speed, the average fixed broadband download and upload speeds were 229.95 and 179.20 Mbps respectively which represented a considerable increase from 2019.

With regards to mobile broadband internet, the average download and upload speeds were 67.99 and 17.80 Mbps respectively which represented a considerable increase from 2019 as the country's 5G infrastructure had been greatly enhanced over the years, resulting in even faster internet speeds.



Source: OOKLA

AX1 : Fixed Broadband Price to GNI per Capita

This indicator measures the proportion of fixed broadband internet price to national income per capita to evaluate the affordability of the citizens in each country to obtain such internet service.

The average fixed broadband price in 2021 was 2.53 percent of income per capita which was a decrease from 2.73 percent in 2020 and 2.89 percent in 2019. The enhanced ability to afford broadband internet services was due to increased competition among many telecommunication service providers in the market.



AX2 : Share of high-speed internet connection by type of connection

This indicator assesses the share of high-speed connection via fiber optic technology by considering it in relation to the total number of fixed broadband subscribers to reflect the efficiency of the current fiber optical infrastructure and the quality of highest speed internet services. More specifically, fiber optical network is considered.

According to data obtained from NBTC Telecommunications Market Report, 95.35 percent of internet subscribers connected to fiber optical network for their internet services in 2021 which was a considerable increase from 2020 when only 58.22 percent of

internet subscribers employed such service. Fiber optic had, thus, replaced the internet service via digital subscriber line and cable modem.



AX3 : Share of primary services with access to the internet

This indicator measures the access to the internet of primary services such as Schools under the Ministry of Education, Tambon Health Promoting Hospitals, and Community Hospitals under the Ministry of Health. Currently, such agencies need such internet service to be able to service the increasing number of online customers. Consequently, access to quality internet would allow agencies to effectively provide services at a fair and affordable price.

The results found that 95.17 percent of primary services had internet connection which was an increase from 2021 when such share was only 76.40 percent of all respondents.



AX4 : Share of individuals with access to and usage of the internet, by type of residence

To reflect the access to and use of the broadband internet services by various types of residences, this indicator considers the share of individuals with fixed broadband internet connection by each type of residences such as detached house, semi-detached house, townhouse, townhome, condominium, mansion, flat, apartment, dormitory, shop house, row house, or others. Such data would help to enhance effective access to and use of high-speed internet to serve the needs of individuals as well as to provide internet providers with information related to their business and its marketing.

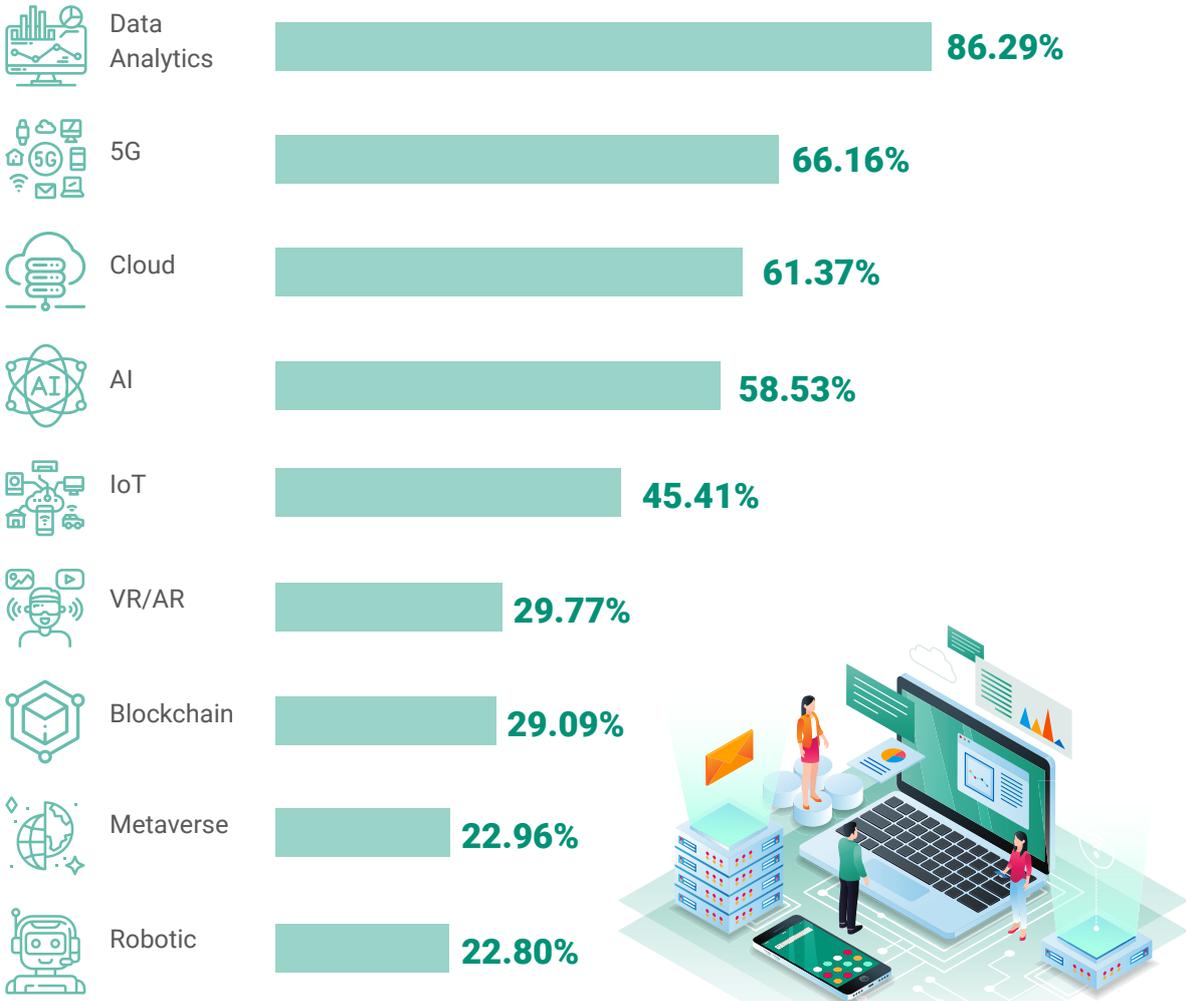
The results found that the shares of access to the internet among individuals of horizontal and vertical residences were 84.00 and 74.75 percent respectively which showed how differences in residence impacted behaviors and demands for the internet use as vertical residences had less internet use than horizontal residences.



AX5 : Share of businesses with access to digital technologies, by technology type

This indicator reflects the access to digital technologies among businesses in Thailand as well as other various aspects including the disparity in such access among businesses when considered simultaneously with other information such as the sizes or types of businesses. Such information would provide relevant data to the public sector who could issue supporting measures to encourage a more intensified utilization of digital technologies by the businesses.

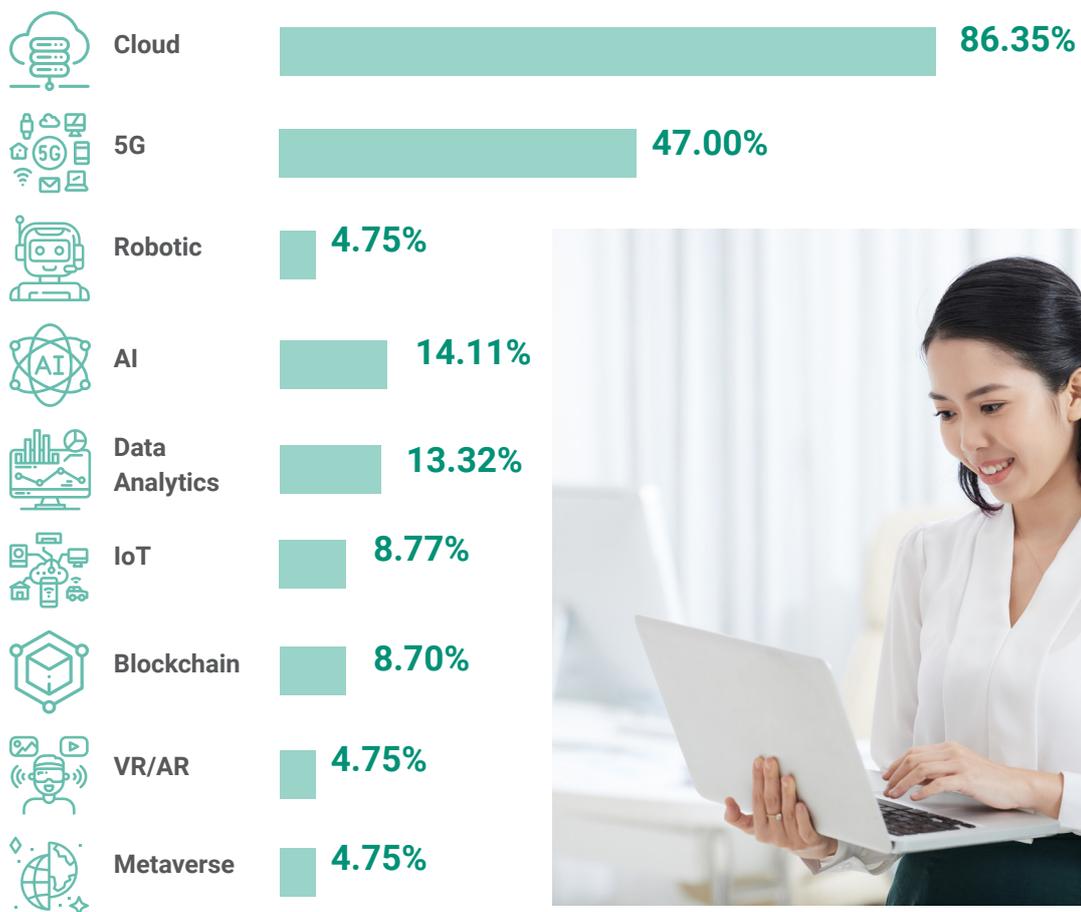
The results found that among various digital technologies, the share of businesses with access to Data Analytics, 5G Technology, and Cloud Technology were 86.29, 66.16, and 61.37 percent respectively.



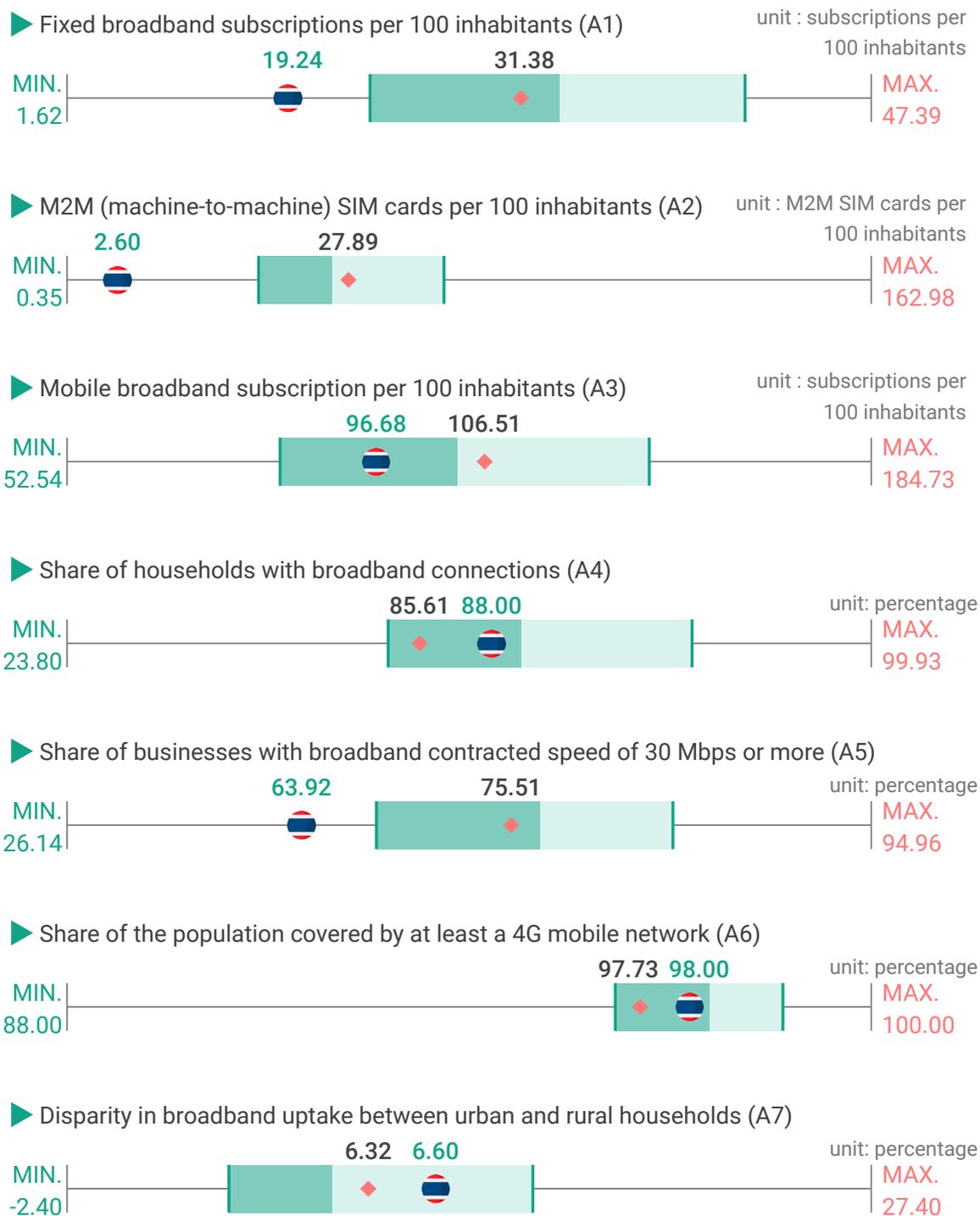
AX6 : Share of primary services with access to digital technologies, by technology type

Similar to AX5, this indicator reflects the access to digital technology among primary services in Thailand as well as other various aspects including the disparity in such access among primary services when considered simultaneously with other information such as the location of the agencies placed. Such information would provide to the public sector who could recognize the various issues or limitations and consequently issue further supporting measures such as allocating additional funding or resources to primary services. This would help the primary services to effectively utilize digital technology in their operations and services.

The results found that the share of primary services with access to Cloud Technology and 5G Technology were 86.35 percent and 47.00 percent and AI Technology 14.11 percent respectively. However, primary services had limited access to other types of digital technologies.



Summary of Thailand's Digital Development in the Access Dimension

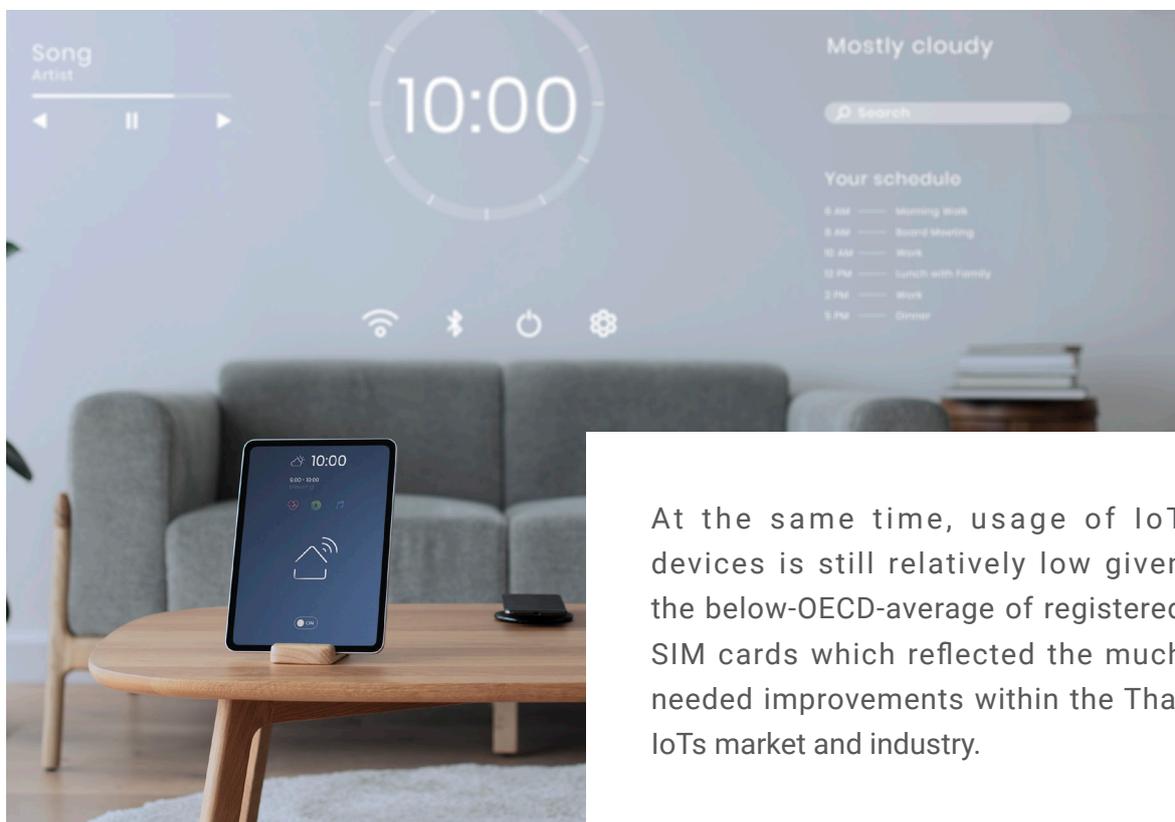


Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Based on comparative assessments of the digital development of Thailand and OECD members

within the Access Dimension, it was found that access to high speed internet connection and fixed broadband usage have not been that high among individuals and enterprises in Thailand when compared to other OECD countries.

On the other hand, usage of mobile broadband among individuals and households has been moderate as well as the disparity in broadband uptake which reflected the much needed improvements of internet coverage to enhance access in rural areas despite the already high share of population covered by 4G mobile network



At the same time, usage of IoT devices is still relatively low given the below-OECD-average of registered SIM cards which reflected the much needed improvements within the Thai IoTs market and industry.





Thailand's Digital Development in the Use Dimension



Whether by individuals, businesses or government sectors, internet use leads to various digital economic and social activities given how more and more of those activities have transitioned to the online or digital ways.

Thus, further utilization of internet and digital technology would be vital for the public sector and government to develop digital nation. Considered internet usage both in terms of quantity which includes the number of hours spent on the internet, frequency of internet use, and internet traffic as well as in terms of quality which includes the purpose of internet use and type of activities/services.

For the **Use Dimension**, ONDE had referenced the OECD Frameworks to study and collect indicators for assessing the use of the internet and use of digital technologies in each sector as well as identifying the problems that occurred which would be information that useful for further policy recommendations. This would also aid the fostering of an environment that would facilitate further use of the internet and digital technologies of the various sectors in the country.

There are 14 indicators that were studied and 7 of them were comparable to OECD countries.

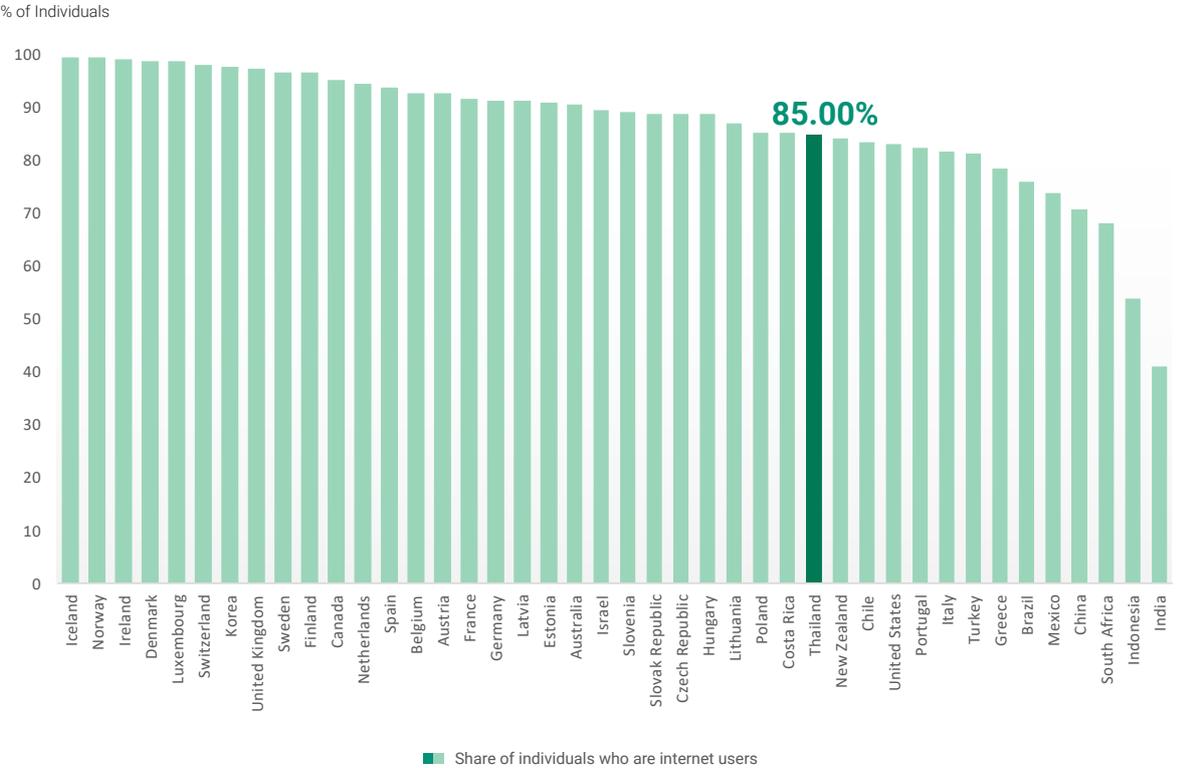
U1 : Share of individuals who are Internet users

This indicator reflects the daily use of the internet by people whether it was for accessing news media, studying, working, or receiving government services. It considered the gender, age, education level, and income of internet users which would provide useful information for formulating further policies or measures to support internet usage as well as additional utilization of the internet.

According to the Household Survey on the Use of Information and Communication Technology (Annually) conducted by the National Statistical Office (NSO) in the 2nd Quarter of 2022, it was found that 85.00 percent of individuals aged 16-74 had access to the internet which was an increase from 2021 when such rate was 84.30 percent.

Thailand had a similar share of internet users with other OECD countries whose average share was 86.99 percent. However, such share was still lower than that of some OECD countries such as Iceland who had the highest share where 99.44 percent of the population were internet users.

Share of individuals who are Internet users



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Household Survey on the Use of Information and Communication Technology (Annually) by NSO.

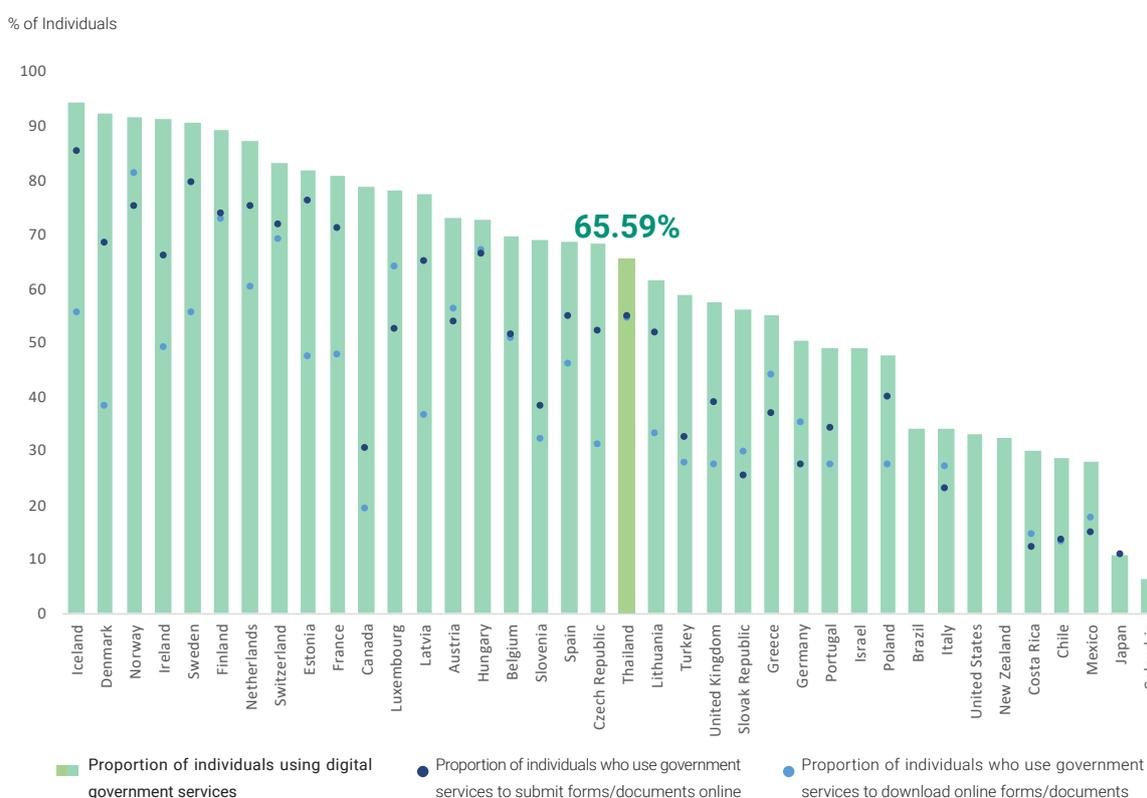
U2 : Share of individuals using the internet to interact with public authorities

This indicator assesses the digital activities of internet users that are related to the services provided by the public sector such as searching information from government sites and other online services including the downloading or submission of forms through online channel. It considered the share of users engaged in such activities in relation to all internet users in the country.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 65.59 percent of internet users used the internet to interact with public authorities which was an increase from 2021 when such share was 64.20 percent.

Thailand had a moderate share of users engaged in digital services of the government compared to the average share of OECD countries was at 61.06 percent. For this indicator, Iceland ranked the highest among OECD countries with over 94.15 percent of users engaging in such services.

Share of individuals using the internet to interact with public authorities



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project.

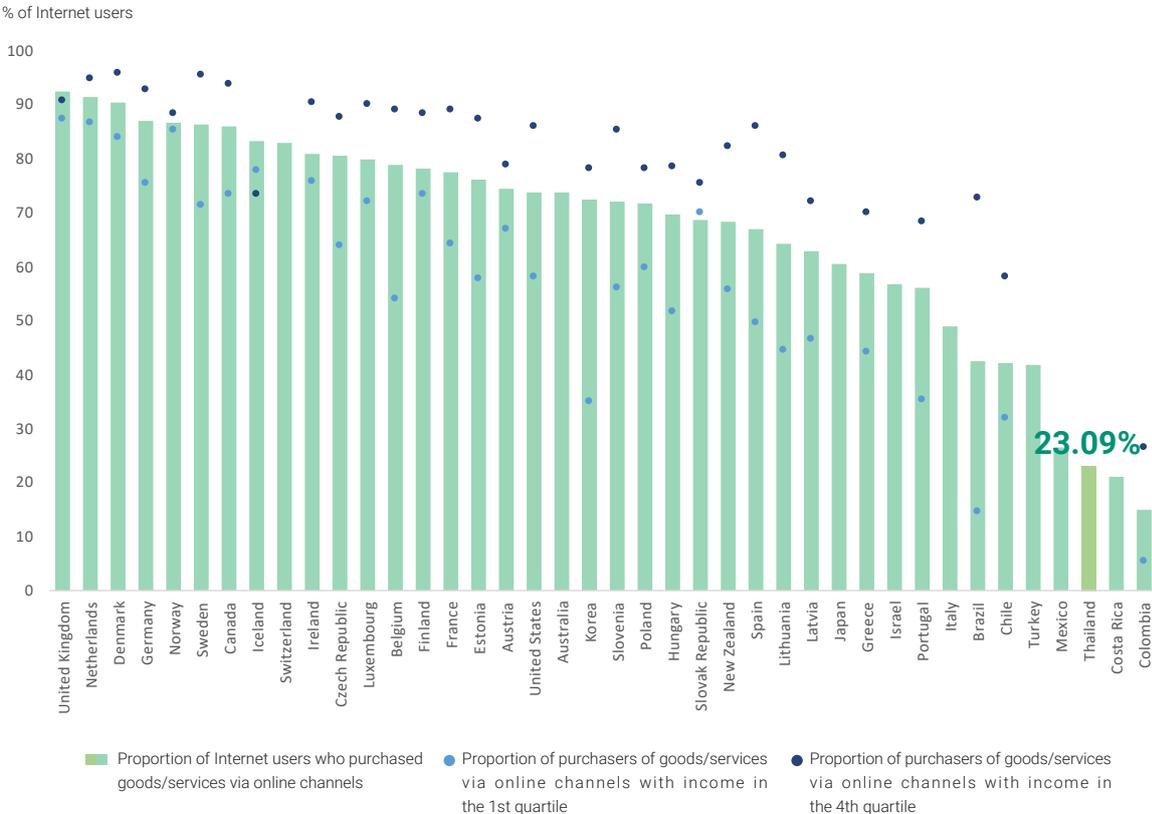
U3 : Share of internet users who have purchased online in the last 12 months

This indicator reflected the digital activity of the internet users in relation to purchasing goods / services via online channels where such services had increased in popularity among users in the present days. In addition to the user behaviors which would be reflected from this indicator, the data would also illustrate the development of the country’s payment infrastructure and public confidence in online services.

According to the Internet User Behavior (IUB) Survey 2022 by ETDA, it was found that 23.09 percent of internet users have purchased goods/services online.

Comparatively, Thailand had a considerably low share of internet users buying online where the average share of OECD countries was at 67.83 percent of all users. For this indicator, the United Kingdom ranked the highest among OECD countries with over 92.29 percent of users buying online.

Proportion of Internet users who purchased goods/services via online channels during the past 12 months



Source: OECD Going Digital Toolkit and Survey on Internet Usage Behavior in Thailand, Year 2022, Electronic Transactions Development Agency (ETDA)

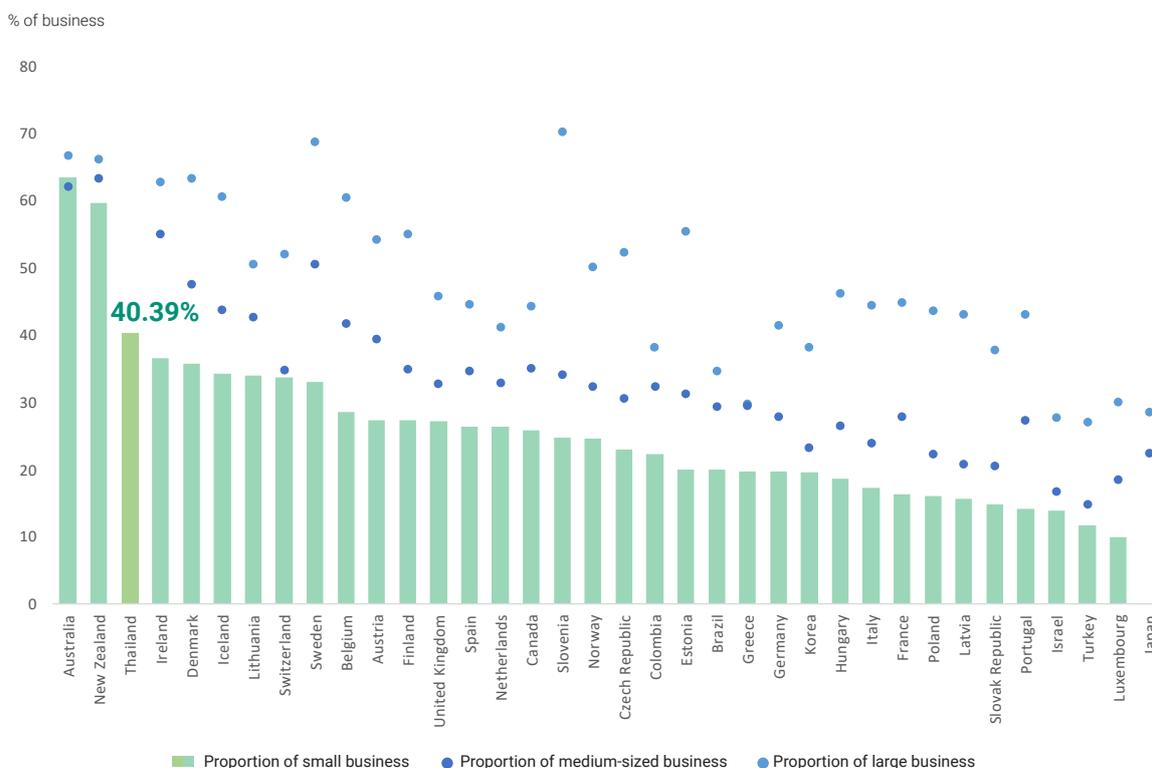
U4 : Share of small businesses making e-Commerce sales in the last 12 months

This indicator reflects the digital activity of the business sector in the area of e-Commerce which had become a vital feature of many businesses that are developing online channels to adapt to the changing consumer behaviors following the COVID-19 pandemic outbreak.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 40.39 percent of small businesses had made e-Commerce sales which was an increase from 2021 and 2020 when such shares were 36.50 percent and 29.20 percent respectively.

Thailand had a considerably high share of small businesses with e-Commerce sales compared to the average share of OECD countries was 25.34 percent. For this indicator, Australia ranked the highest among OECD countries with over 63.37 percent of businesses with e-Commerce sales.

Share of small businesses making e-Commerce sales in the last 12 months



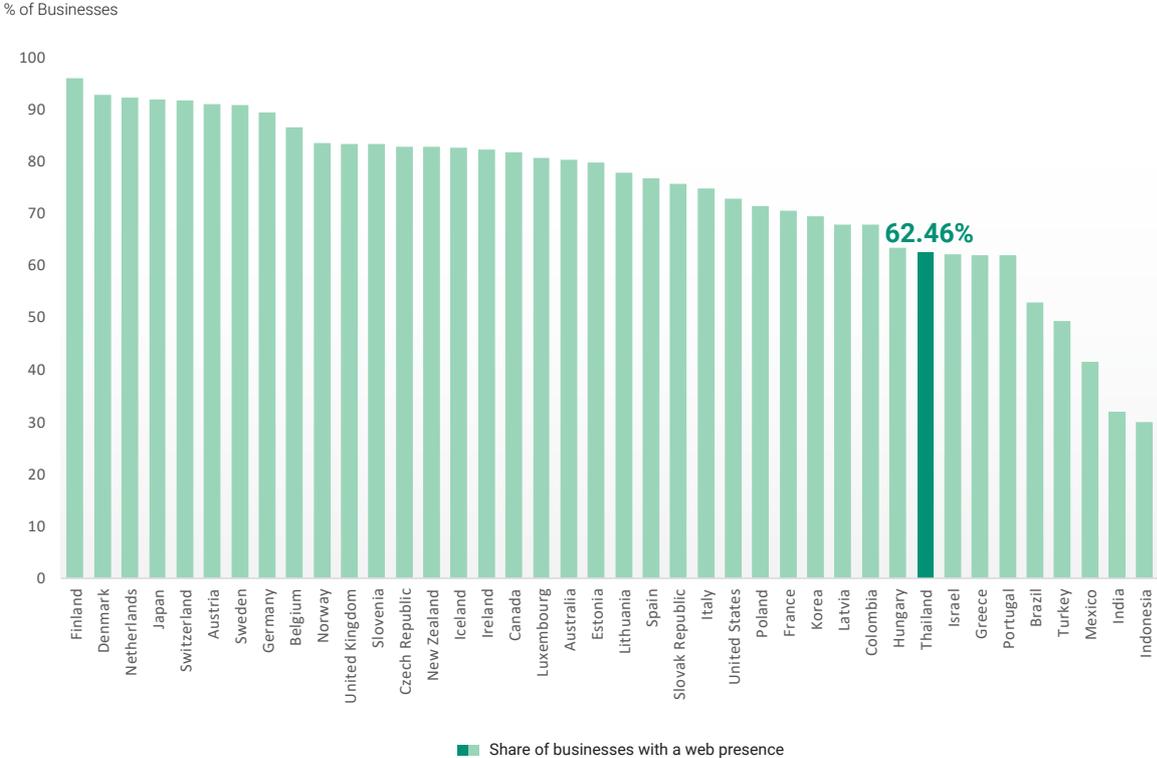
U5 : Share of businesses with a web presence

This indicator assesses businesses with their own web presence or used a website for sharing business' information as well as promoting their goods/services in comparison with the total number of the sampled enterprises. It reflected the readiness in online operations and transaction of businesses which are crucial to the current business environment of various industries. Especially, small businesses may need additional support and reliefs from the public sector in terms of adapting to this new form of business feature.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 62.46 percent had a business website which was a decrease from 2021 (73.90 percent). It was most likely due to the increased popularity of other channels such as the e-Marketplace platform and social media which could offer more convenient services at lower cost compared to a webpage.

Comparatively, Thailand had a considerably low share of businesses with a web presence where the average share of OECD countries is 74.52 percent. For this indicator, Finland ranked the highest among OECD countries with over 96.06 percent of businesses with a web presence.

Share of businesses with a web presence



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Enterprises Survey of Thailand Digital Outlook 2022 Project.

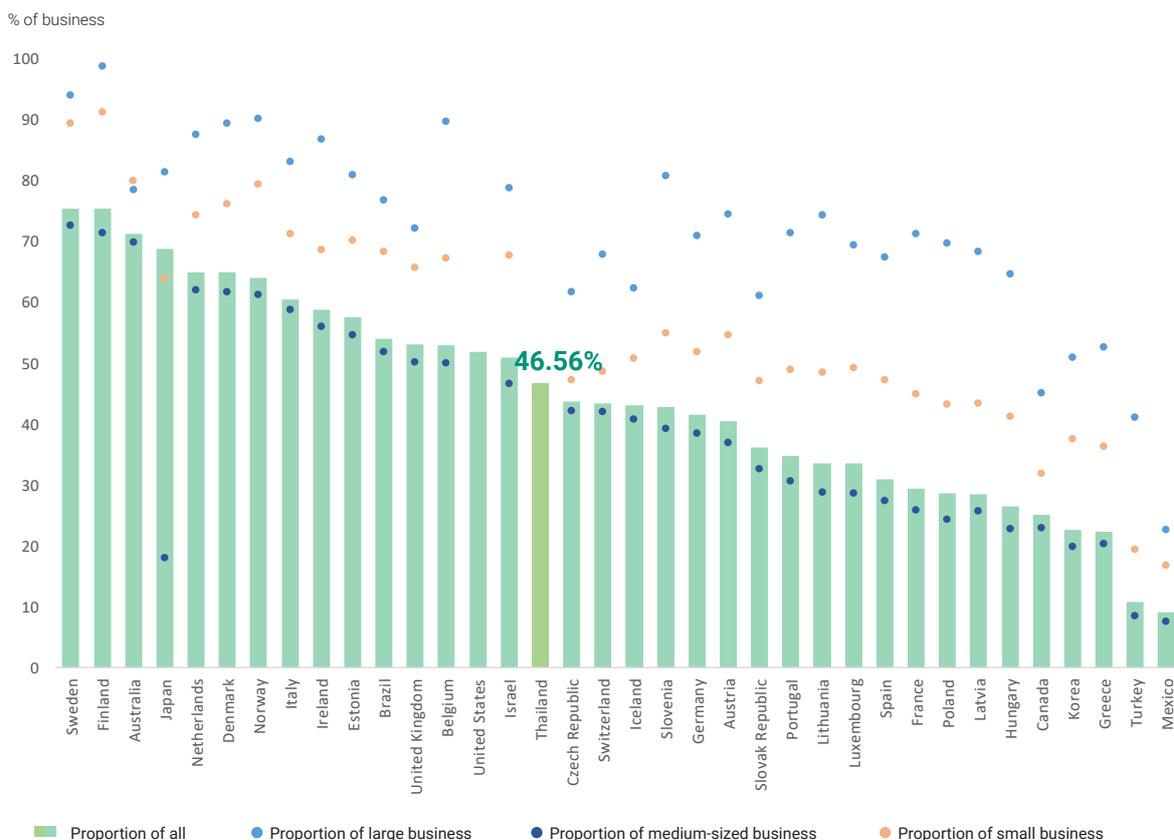
U6 : Share of businesses purchasing cloud services

This indicator reviews the digital transition of businesses who had utilized technologies in their operations. It considered the use of cloud services by businesses and the purpose of using such services, such as storing data, sending email or using with company software as well as using with processing programs or applications, etc. Additionally, simultaneously considering the size and type of such businesses also illustrated business behaviors and the disparity in the use of cloud technology among businesses in Thailand.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 46.56 percent of businesses purchased cloud services which was a decrease from 2021 when only 51.30 percent of them did so.

Thailand had a moderate share of businesses purchasing cloud services compared to the average share of OECD countries was at 44.31 percent. For this indicator, Sweden ranked the highest among OECD countries with over 75.39 percent of businesses having purchased cloud services.

Share of businesses purchasing cloud services



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Enterprises Survey of Thailand Digital Outlook 2022 Project.

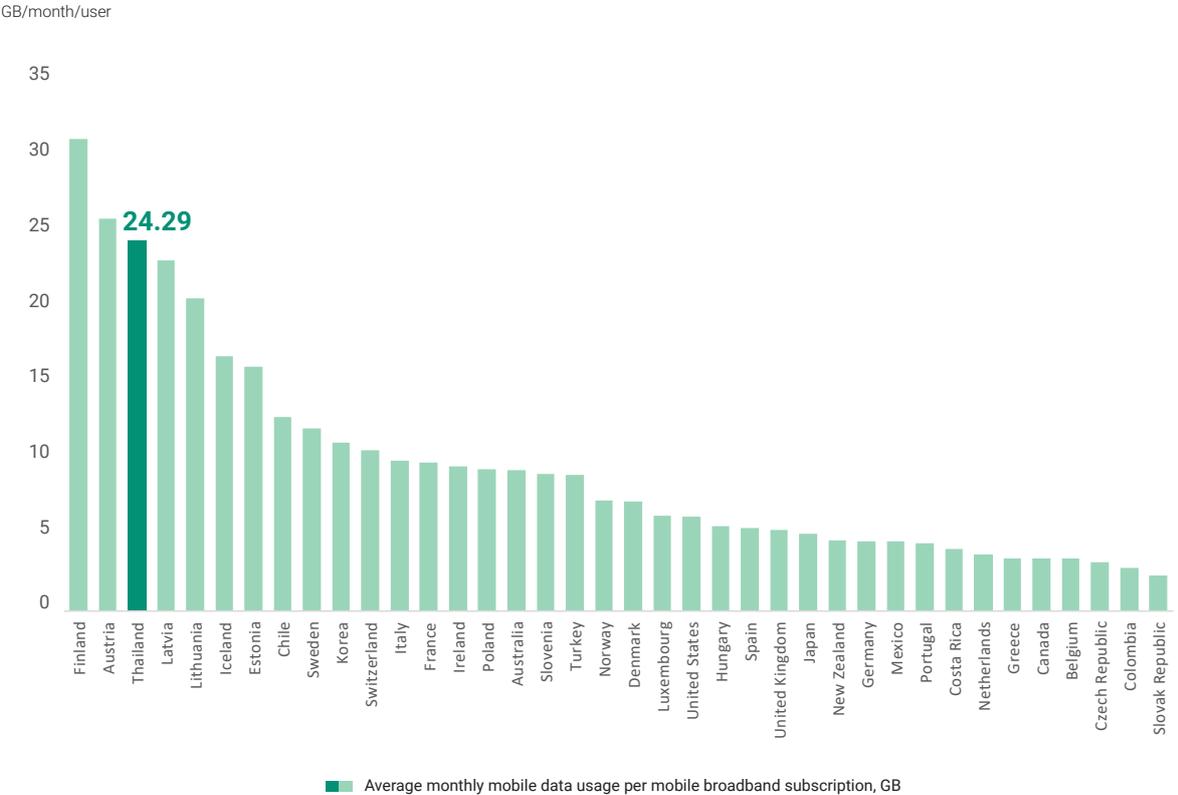
U7 : Average monthly mobile data usage per mobile broadband subscription (GB)

The indicator reflects the ability of mobile broadband internet users in using online activities and services and accessing data through the online platform. Thus, broadband effectiveness is crucial to tailoring the customer’s needs and usage of internet services. This indicator also provides information on user behaviors as well as the changes in digital technologies.

According to the 2021 NBTC Telecommunication Market Report, Thais had a monthly average of 24.29 gigabyte of data usage per mobile broadband subscriber which was a considerable increase from 2020 when the such monthly volume of data usage was only 18.00 gigabyte.

Comparatively, Thailand had a considerably high average volume of data usage where the average of OECD countries was only 9.12 gigabyte/month/user. For this indicator, Finland and Australia ranked higher than Thailand with the averages of 31.00 gigabits and 25.70 gigabyte respectively.

Average monthly mobile data usage per mobile broadband subscription, GB



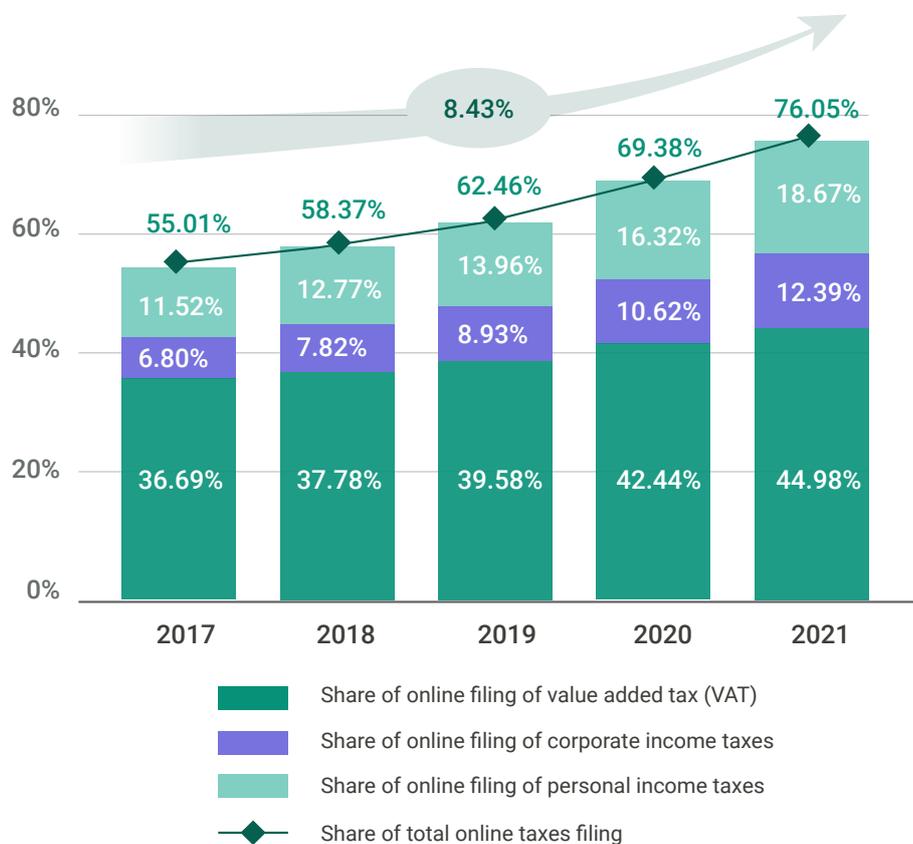
Source: OECD Going Digital Toolkits (as of 2 August 2022) and the NBTC Telecommunication Market Reports

U8 : Share of persons and corporations filed income tax via online

This indicator assesses the digital activities of internet users that are related to the filing and payment of taxes via online which is considered a vital service of the public sector offered to individuals and businesses with great conveniences provided.

According to statistics on the online filing of income tax from the Revenue Department, 76.05 percent of filing of income tax in Thailand were filed online in 2021 which was part of a continual increase where such rates in 2020 and 2019 were 69.38 percent and 62.46 percent respectively. This clearly showed how have been adapting and changing their means for income tax filing. Additionally, the Revenue Department had also developed a website and an application for individuals and businesses to conveniently file for income tax.

Share of persons and corporations filed income tax via online from 2017-2021

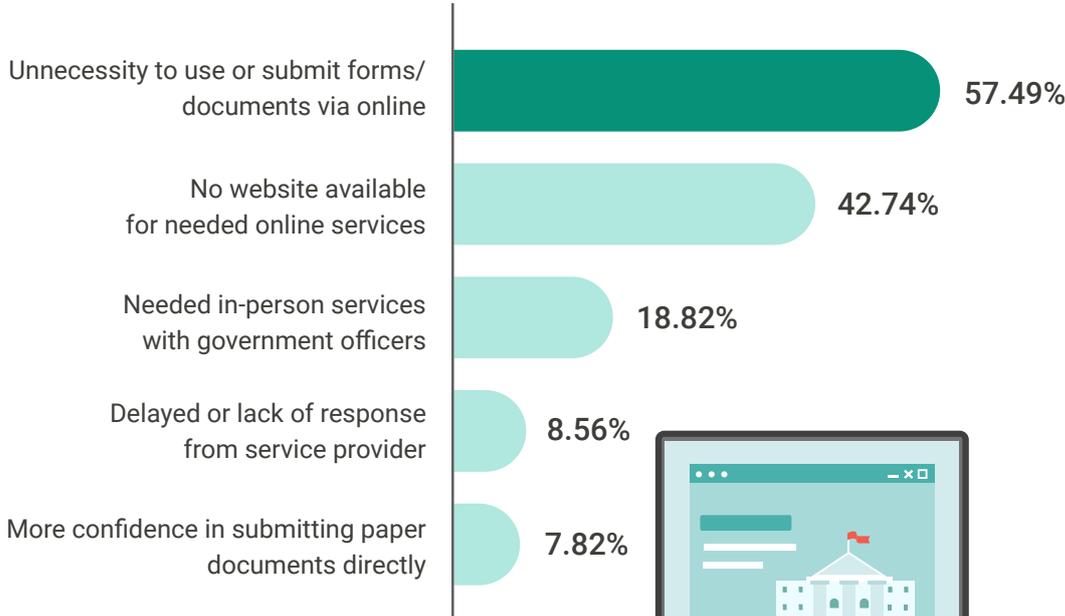


U9 : Share of individuals who did not submit forms to public authorities online due to service availability

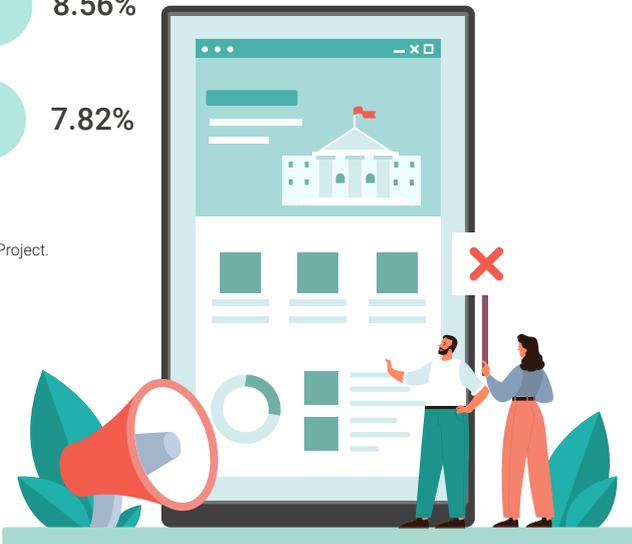
This indicator measures the opposite data of U2 by considering the share of individuals not submitting forms to public authorities online due to service availability which reflects the readiness of the public sector in providing such online services.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 42.74 percent of individuals did not submit forms to public authorities online due to service availability which showed how additional improvements in the online services are needed to better facilitate transactions in the future.

Top 5 Reasons for not Using Online Government Services



Source: The Individuals Survey of Thailand Digital Outlook 2022 Project.

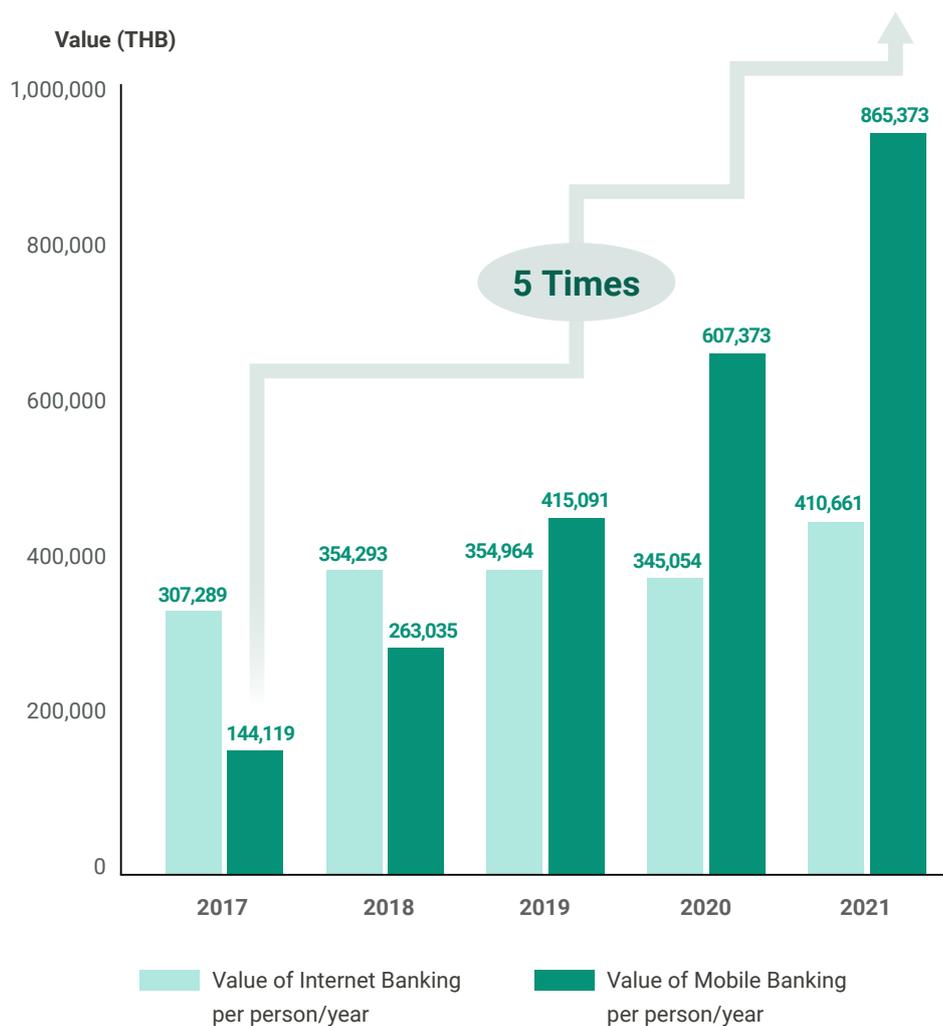


UX1 : Value of digital transactions per person

This indicator reflects the volume of digital transactions through internet or mobile banking as well as other digital means

According to the Bank of Thailand's statistics on value and volume of mobile and internet banking transactions in 2021, the value of digital transactions to 1 individual was 865,373.35 baht for mobile banking and 410,660.56 baht for internet banking. Additionally, it was found that such value would continually increase because of transitioning into a more cashless society.

Value of digital transactions through internet and mobile banking per capita



Source: Bank of Thailand (BOT)

UX2 : Share of agencies using public cloud services

This indicator reflects the development of the government’s digital technology infrastructure as well as the utilization of cloud technology by various agencies in the efforts to transition into a fully digital public sector. The indicator considers the data from the Government Data Center and Cloud Service (GDCC) to represent the current situation.

According to the data compiled by ONDE and the National Telecom Public Company Limited from the 902 agencies that had requested access to government cloud services between 20 April – 19 May 2022, 36,387 units of virtual machines had been allocated and 48,649 units of cloud virtual machines had been requested which accounted for 74.79 percent.



UX3 : Daily time spent on the internet

This indicator shows the use of internet among individuals as studied in U1 to illustrate behaviors of internet users from their daily use of the internet in terms of the volume of internet use. This would provide relevant agencies with a better understanding of individuals’s internet use and businesses with data that are useful for their marketing and operations.

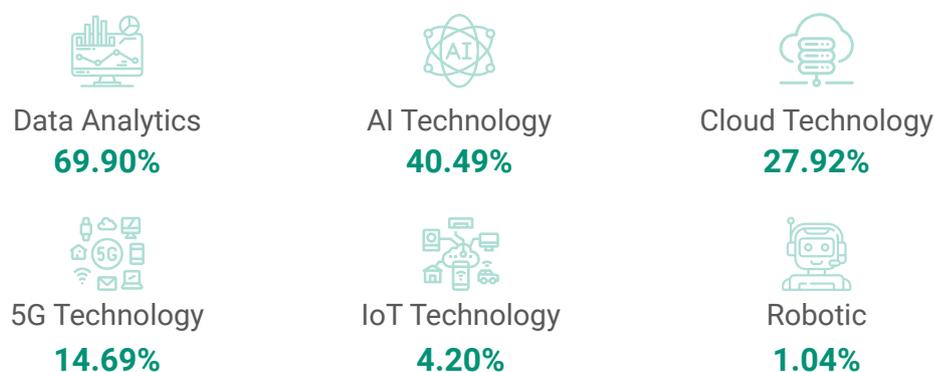
According to the Internet User Behavior (IUB) 2022 Survey annually compiled by the ETDA, Thais spent an average of 7 hours and 4 minutes per day on the internet.



UX4 : Share of enterprises adopting digital technology, by technology type

This indicator reflects the use of digital technology among businesses in Thailand in similar manners to AX5 which shows the access to various technologies. Digital technologies reduced business costs, increased the competitiveness to entrepreneurs, and enhanced the efficiency of business operations in terms of manufacturing and services. The data for this indicator will provide the public sector with relevant information for further measures and policies to enhance businesses' use and utilization of digital technologies.

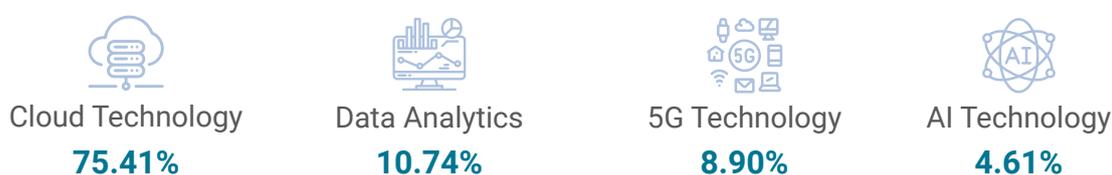
The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 69.90 percent of businesses had access to Data Analytics while the shares of businesses with access to Artificial Intelligence (AI) and Cloud Technology were 40.49 percent and 27.92 percent respectively.



UX5 : Share of primary services adopting digital technology, by technology type

This indicator reflects the use of digital technology among primary services in Thailand in similar manners to AX6 which shows the access to various technologies. Digital technologies enhanced the efficiency of operations and services offered by primary services which would increase the level of satisfaction of their customers and people who received services.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 75.41 percent of primary services had access to Cloud Technology while the shares of them with access to Data Analytics and 5G Technology were 10.74 percent and 8.90 percent respectively.

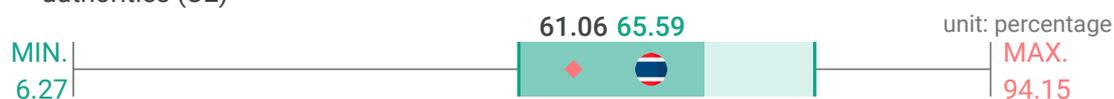


Summary of Thailand's Digital Development in the Use Dimension

▶ Internet users, aged 16-74 years, as a share of individuals (U1)



▶ Share of individuals aged 16-74 years using the internet to interact with public authorities (U2)



▶ Share of internet users who have purchased online in the last 12 months (U3)



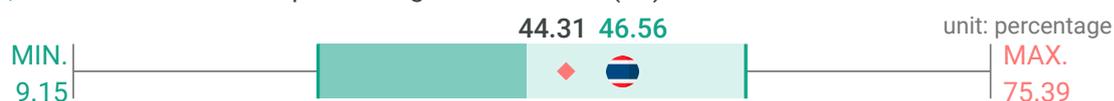
▶ Share of small businesses making e-commerce sales in the last 12 months (U4)



▶ Share of businesses with a web presence (U5)



▶ Share of businesses purchasing cloud services (U6)



▶ Average monthly mobile data usage per mobile broadband subscription (GB) (U7)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Based on comparative assessments of the digital development of Thailand and OECD members,

within the Use Dimension, it was found that the share of internet users in Thailand is relatively close to that of OECD countries but the volume of monthly data usage per individual much exceeded that of many OECD countries.



The usage of governmental digital services in Thailand has been moderate while the purchase of goods/services online among Thais has been relatively lower than that of OECD countries.

Only a low percentage of Thai enterprises have a website as other channels such as social media and e- Marketplace could be used for promotional purposes. At the same time, more businesses are starting to value the significance of data collection via the cloud system as well as the use of free-of-charge cloud services which have become more prevalent.







Thailand's Digital Development in the Innovation Dimension



Investments in research and development (R&D) as well as digital innovations are key engines to drive the country's digital development. Such investments would lead to the integration of both the old and new technology and innovation which could create even newer products, services, or businesses with even more added value.

Digital innovations not only enhance services, operations, and manufacturing efficiency and productivity of the public and private sector, but also improve the general living and quality of life of the population.

For the **Innovation Dimension**, ONDE had referenced the OECD Frameworks to study relevant indicators for assessing the efficiency of machines, tools, equipment, software/applications, and various innovations for the purpose of adding values to products as well as intellectual property.

There are 7 indicators that were studied and 4 of them were comparable to OECD countries.

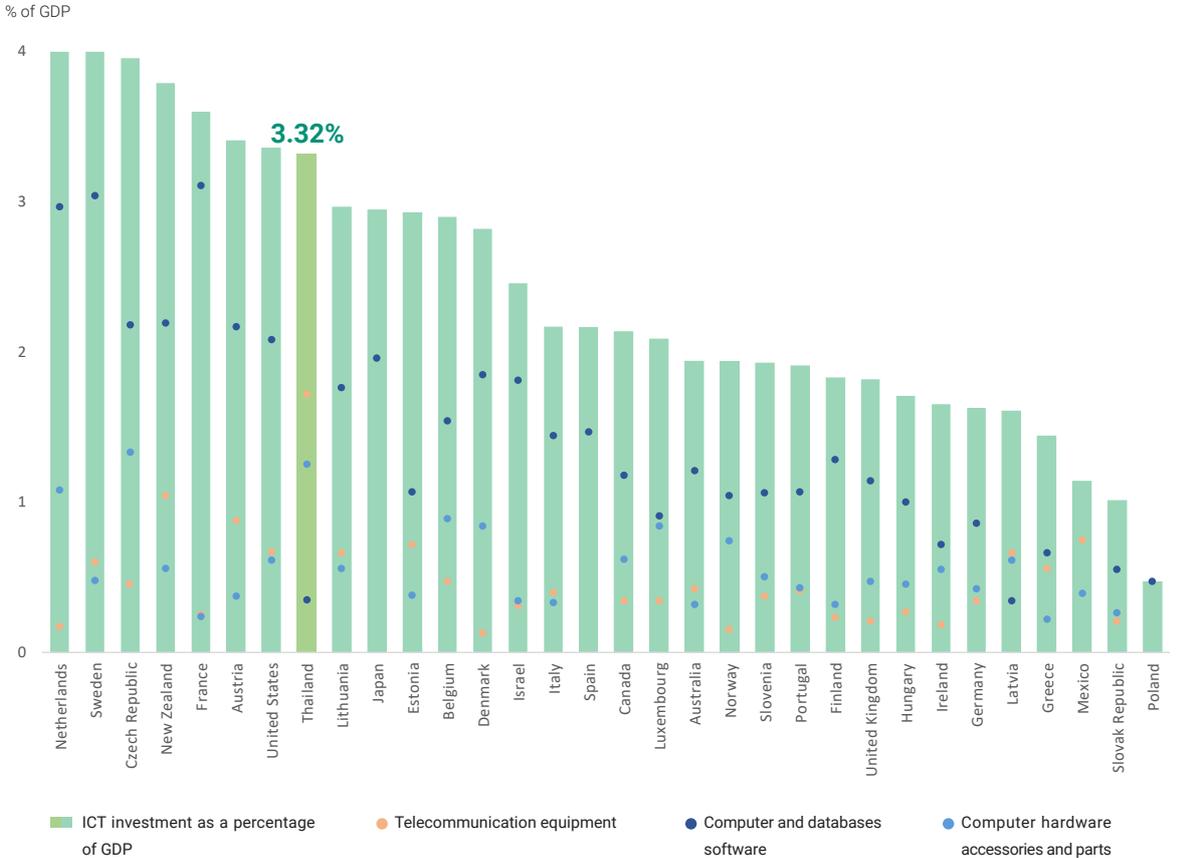
I1 : ICT investment as a percentage of GDP

This indicator reflects ICT Diffusion in the economy by considering investments in the area of information technology equipment, software, computers and databases in the Gross Fixed Capital Formation.

According to the data obtained from the survey of the value of Thailand’s digital industry by DEPA, NBTC, and NESDC, the total value of ICT investment in 2021 accounted for 3.32 percent of the GDP which was a steady increase from 2019 when the value was only 3.11 percent of the GDP.

Comparatively, Thailand had a considerably high volume of ICT investment to the GDP where the average of OECD countries was only 2.37 percent. For this indicator, the Netherlands ranked the highest with ICT investment accounting for 4.21 percent of their GDP.

ICT investment as a percentage of GDP



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the survey of the value of Thailand’s digital industry by the DEPA, NBTC, NESDC.

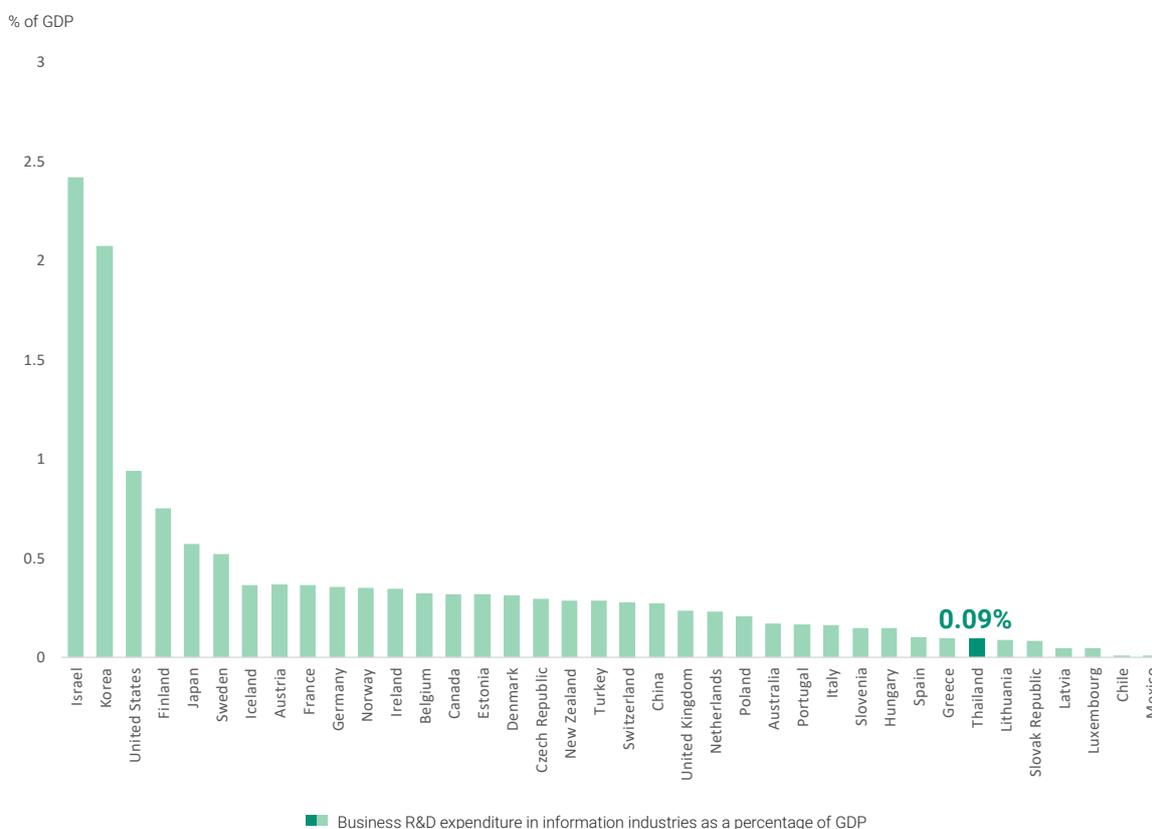
I2 : Business R&D expenditure in information industries as a percentage of GDP

The indicator considers all types of fundings by the ICT industries related to research and development as well as innovative activities which increases the overall knowledge and enhanced technological innovations such as the development of prototype products, new softwares, and software updates.

According to data published by the Office of National Higher Education Science Research and Innovation Policy Council (NXPO), the R&D expenditures in 2019 of businesses in the information industries accounted for 0.092 percent of the GDP which was an increase from the 0.078 percent of the previous year.

Comparatively, Thailand had a considerably low volume of R&D expenditures by ICT-related businesses where the average value of OECD countries was at 0.38 percent of the overall GDP. For this indicator, Israel ranked the highest with business R&D expenditures accounting for 2.42 percent of their GDP.

Business R&D expenditure in information industries as a percentage of GDP



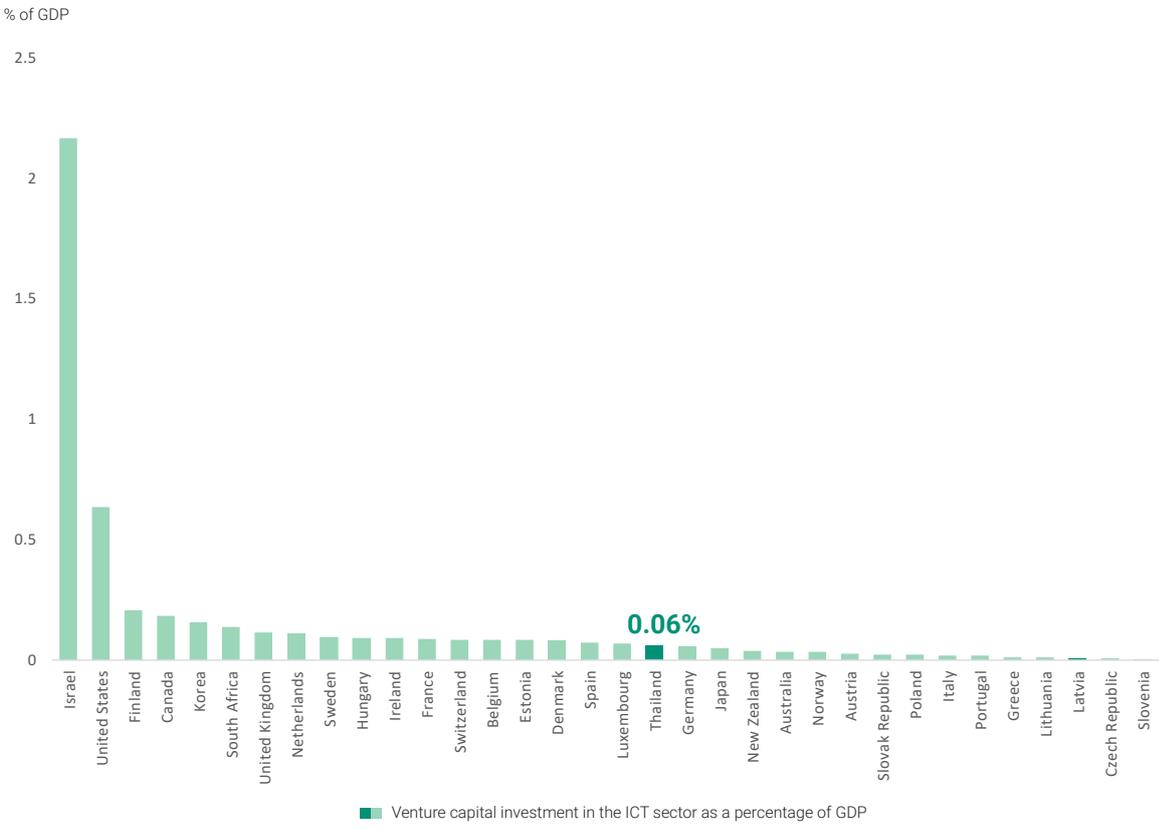
I3 : Venture Capital investment in the ICT sector as a percentage of GDP

This indicator measures the value of venture capital investment in the ICT sector as a percentage of the GDP to reflect the investment in innovative companies with high growth potential and to produce guidelines for the development and enhancement of entrepreneurs' investment in businesses that are expected to have high potential in each country.

According to the 2021 Thailand Tech Startup Ecosystem Year in Review Report compiled by Techsauce, the value of venture capital investment in the ICT sector in Thailand accounted for 0.06% of the GDP. Such was an increase from the value of 2019 but also a slight decrease from 2020 when the value of such investment was worth 0.07% of the GDP.

Thailand had a considerably low volume of venture capital investment in ICT compared to the average value of OECD countries was at 0.15 percent of the overall GDP. For this indicator, Israel ranked the highest with venture capital investment in ICT accounting for 2.17 percent of their GDP.

Venture capital investment in the ICT sector as a percentage of GDP



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Thailand Tech Startup Ecosystem Year in Review report (Techsauce).

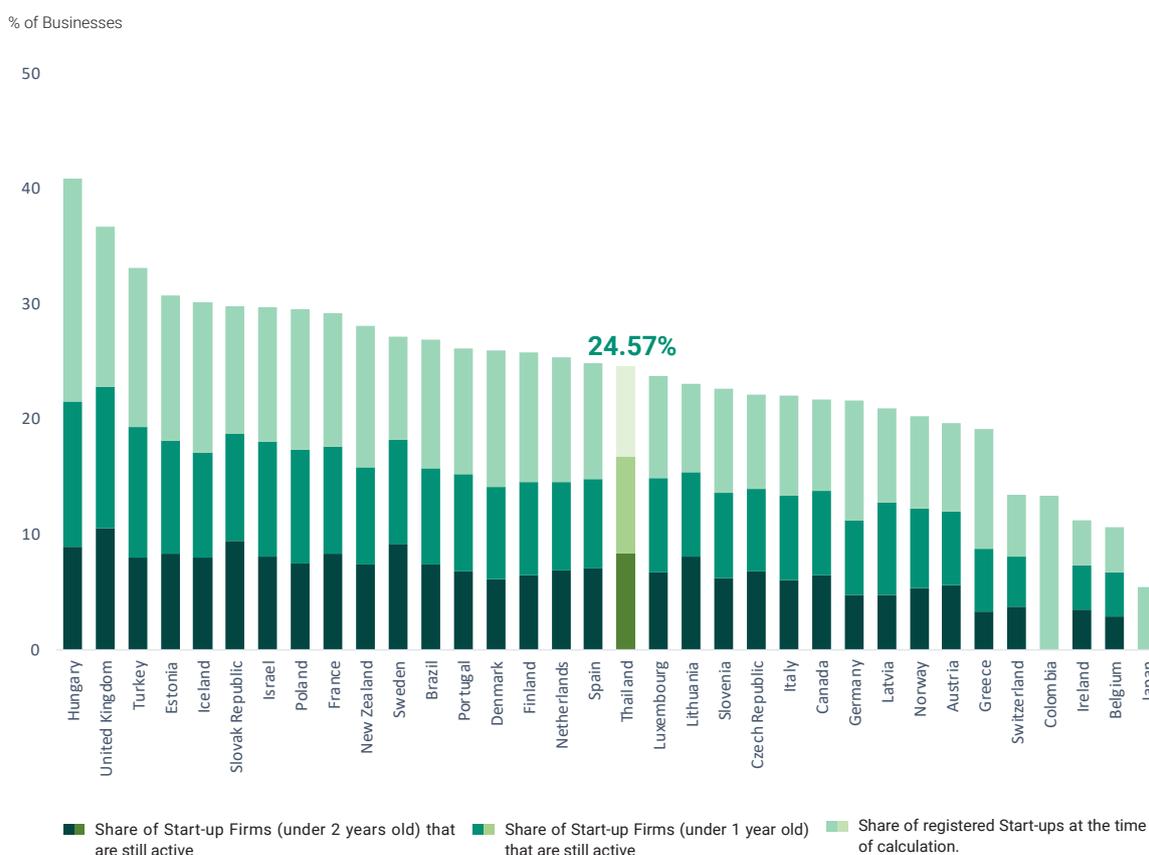
14 : Share of start-up firms (up to 2 years old) in the business population

This indicator reflects the current business dynamics within the business population in order to enhance the efficiency of resource allocation through resource movement from lower performing businesses to higher performing businesses.

Data from the Department of Business Development in 2022 found that 24.57 percent of all businesses were start-ups which was a decrease from that of 2020 and 2021 when such shares were 25.83 percent and 25.48 percent respectively.

Comparatively, Thailand had a similar share of start-up firms having been active up to 2 years old to the average value of OECD countries which stood at 23.92 percent. For this indicator, Hungary ranked the highest with start-ups representing 40.70 percent of all businesses.

Share of start-up firms (up to 2 years old) in the business population



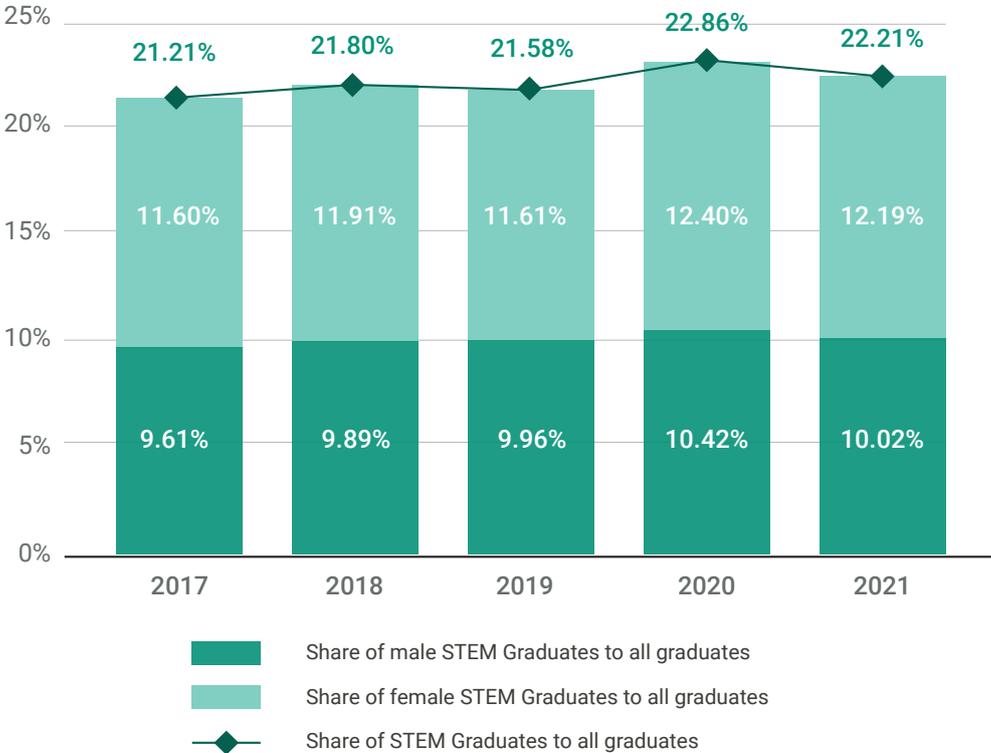
Source: OECD Going Digital Toolkits (as of 2 August 2022) and DBD Warehouse+ Database (DBD).

I5 : Tertiary graduates in natural sciences, engineering, and ICTs (NSE & ICT), by gender

This indicator considers graduates in natural sciences, engineering, and ICTs by gender in relation to all graduates to reflect the new labor force in areas related to the country’s innovative industries. It also reflects the issue of gender disparity among graduates of such fields as well.

Data compiled by the Office of the Higher Education Commission in accordance with UNESCO and OECD standards in 2021 found that 12.19 percent of graduates in the field of natural sciences, engineering and ICTs (NST&ICT) were male and 10.02 percent were female.

Share of Tertiary graduates in STEM by Gender from 2017-2021



Source: the Office of the Higher Education Commission (OHEC).

IX1 : Number of ICT-related patents filed in Thailand

This indicator reflects innovations and inventions related to the field of ICT in each year which also showed the level of the country's innovative development with particular emphasis on the audio-visual technology, information technology, and telecommunications products that became patented.

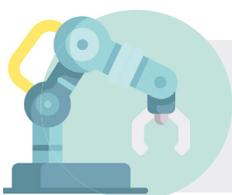
The data from the Department of Intellectual Property under the Ministry of Commerce found that there were 64 ICT-related patents filed in 2021 which accounted for 7.38 percent of all patents filed in the same year. With only 56 patent requests in the previous, such value marked a continual increasing trend in the filing of ICT-related patents due to the growth of the country's ICT industry in innovative manners.



IX2 : Ratio of robots used in Thailand's manufacturing industry to 10,000 laborers

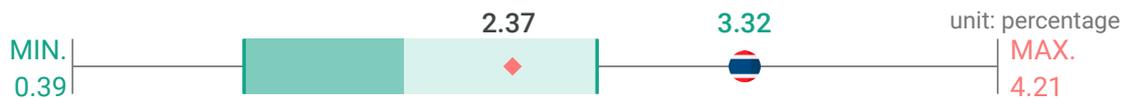
This indicator reflects the use of robots in enhancing manufacturing operations and increasing competitive efficiency as well as the importance of investment in such robotic technologies and innovations.

According to annual reports of International Federation of Robotics, it was observed that there were 69.39 robots used in Thailand in 2021 to 10,000 laborers which represented an increase from 2019 when only 58.81 percent of robots were used. This also showed the changes within the Thai manufacturing industries where more and more robots have replaced the traditional labor force.



Summary of Thailand's Digital Development in the Innovation Dimension

▶ ICT investment as a share of GDP (I1)



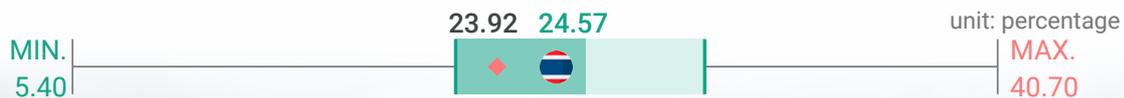
▶ Business R&D expenditure in information industries as a share of GDP (I2)



▶ Venture Capital investment in the ICT sector as a share of GDP (I3)



▶ Start-up firms (up to 2 years old) as a share of all businesses (I4)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Based on comparative assessments of the digital development of Thailand and OECD members,

within the Innovation Dimension, it was found that Thailand has moderate to high ranking for ICT investment as a percentage of the GDP but the level of investment in R&D of the ICT industries has been low which reflected the discrepancy in such investments of the ICT industries in Thailand and other OECD countries



Venture capital investment in the Thai ICT sectors has also been moderate.

The share of start-up firms in the past 1-2 years has also been at similar rate to that of OECD countries.





“ Thailand’s Digital Development in the Jobs Dimension

6

Human resources in the field of information and communication technology are key to advancing transformation and enhancing growth of the digital economy and society of the country. Thus, this Dimension reflected the current stage of the country’s digital workforces in various aspects including the share of ICT personnel in the labor force, the development of digital skills and potentials, as well as the creation of a new generation of ICT personnel and their path into the labor market.

For the **Jobs Dimension**, ONDE had referenced the OECD Frameworks to study relevant indicators for the Thai digital labor market in terms of their personnel who are key to driving the country’s digital development. Additionally, the Jobs Dimension also assessed the potentials of the current digital labor force, opportunities to enhance their skills, and the development of relevant skills for workers to be able to work effectively while generating the most productivity to the country’s digital economy.

There are 10 indicators that were studied and 5 of them were comparable to OECD countries.

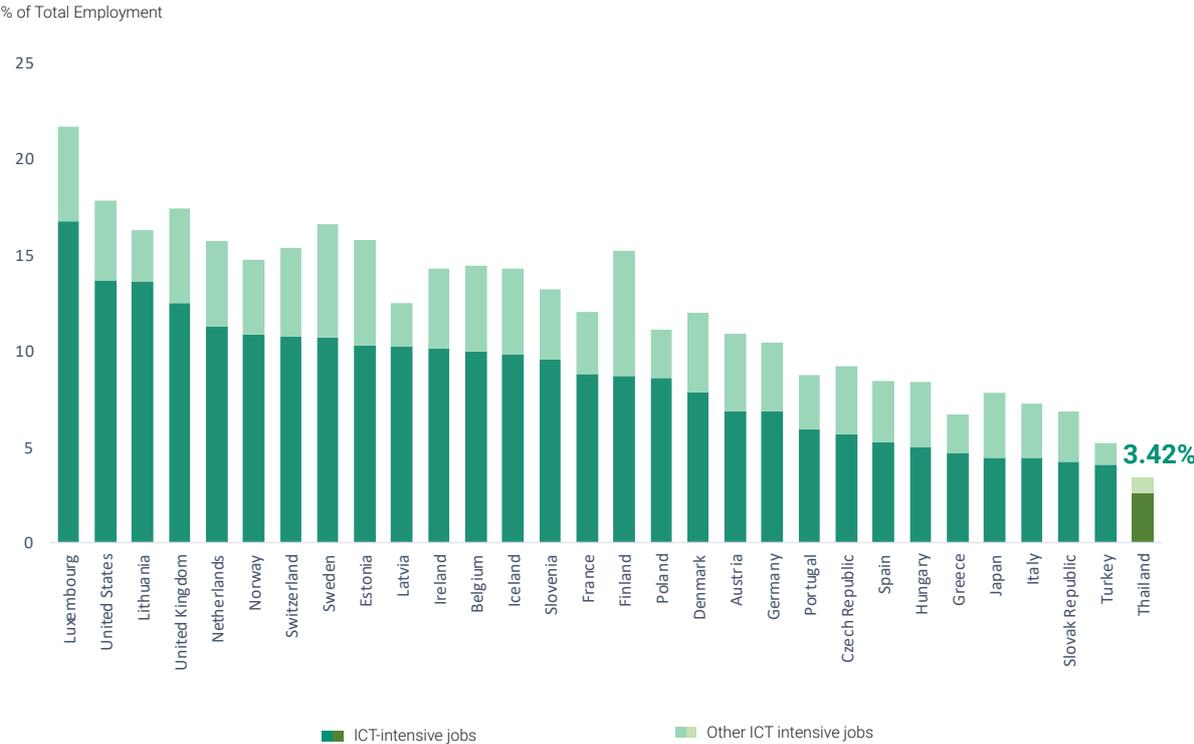
J1 : ICT task-intensive jobs as a percentage of total employment

This indicator assesses the share of ICT task-intensive jobs as a percentage of total employment by considering 21 ICT specialist jobs and 36 other ICT-intensive jobs in order to reflect the level of digital work in Thailand.

The data annually compiled by the National Statistical Office (NSO) found that there were a total of 1.29 million ICT employees where 0.32 million of them were ICT specialists and 0.97 million of them were employed in other ICT-intensive jobs. **This accounted for 3.42 percent of total employment in Thailand or 37.75 million employees in 2021** which was a decrease from 2020 when ICT employees made up 3.81 percent of all employment.

Comparatively, Thailand had a considerably low share of ICT task-intensive jobs where the average value of OECD countries was at 12.42 percent of the total employment. For this indicator, Luxembourg ranked the highest with ICT task-intensive jobs accounting for 21.69 percent of total employment.

ICT task-intensive jobs as a percentage of total employment



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Labour Force survey by NSO.

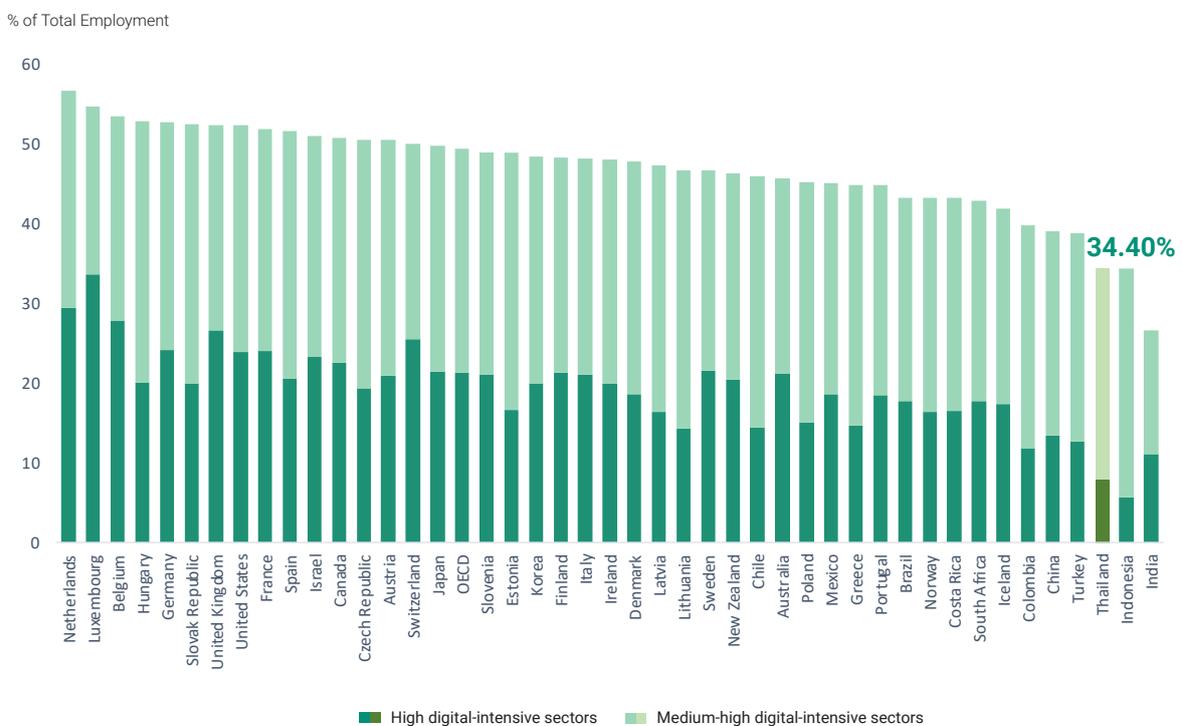
J2 : Digital-intensive sectors' share in total employment

This indicator reflects the amount of the digital labor force in relations to the entire labor force of the country by studying employment in High Digital-intensive Sectors and Medium-high Digital-intensive Sectors

Data compiled in 2021 by the National Statistical Office found a total of 12.99 million employees in the digital-intensive sectors which accounted for 34.40 percent of total employment, a similar rate to those of previous years.

Thailand had a considerably low share of employees in the digital-intensive sectors compared to the average value of OECD countries was at 47.15 percent of the total employment. For this indicator, the Netherlands ranked the highest with employees in the digital-intensive sectors accounting for 56.72 percent of total employment.

Digital-intensive sectors' share in total employment



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Labour Force survey by NSO.

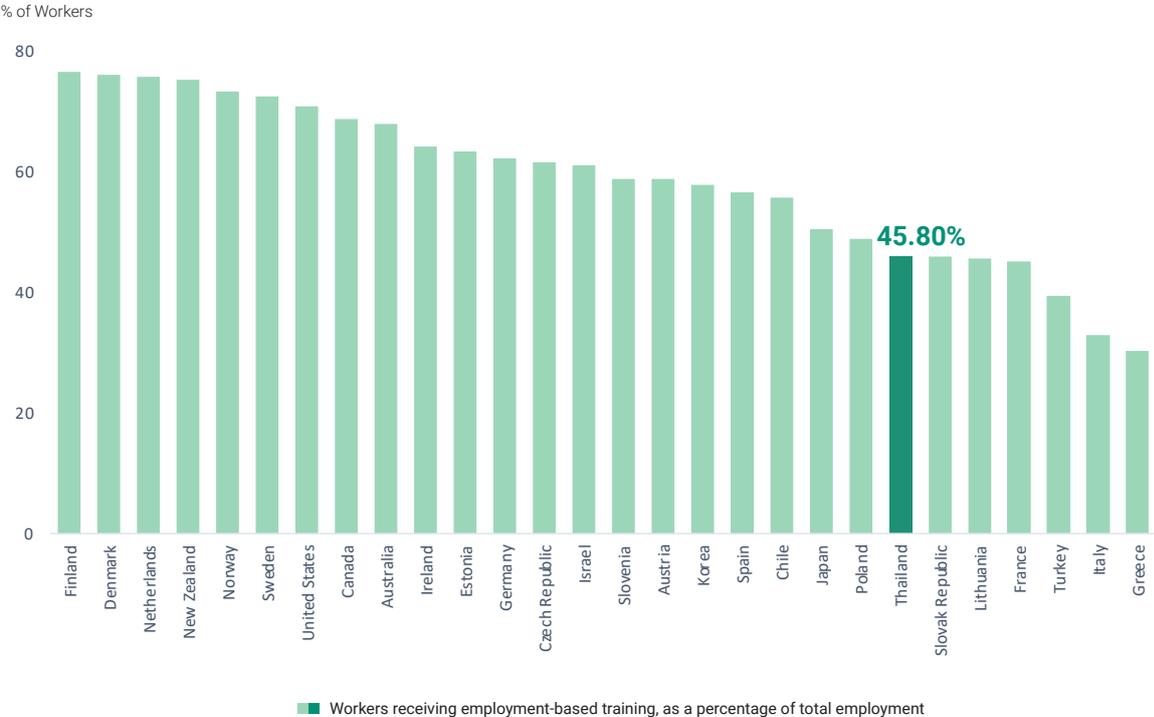
J3 : Workers receiving employment-based training, as a percentage of total employment

This indicator assesses the perspectives of entrepreneurs/employers in their emphasis on their employees’ skill development by considering formal and on the job training offered internally.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 45.80 percent of workers received employment-based training which was a slight increase from 2021 when such share was only 44.20 percent.

Thailand had a considerably low share of workers receiving employment-based training compared to the average share among OECD countries was at 58.98 percent of all employees. For this indicator, Finland ranked the highest with over 76.38 percent of employees having received employment-based training.

Workers receiving employment-based training, as a percentage of total employment



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project.

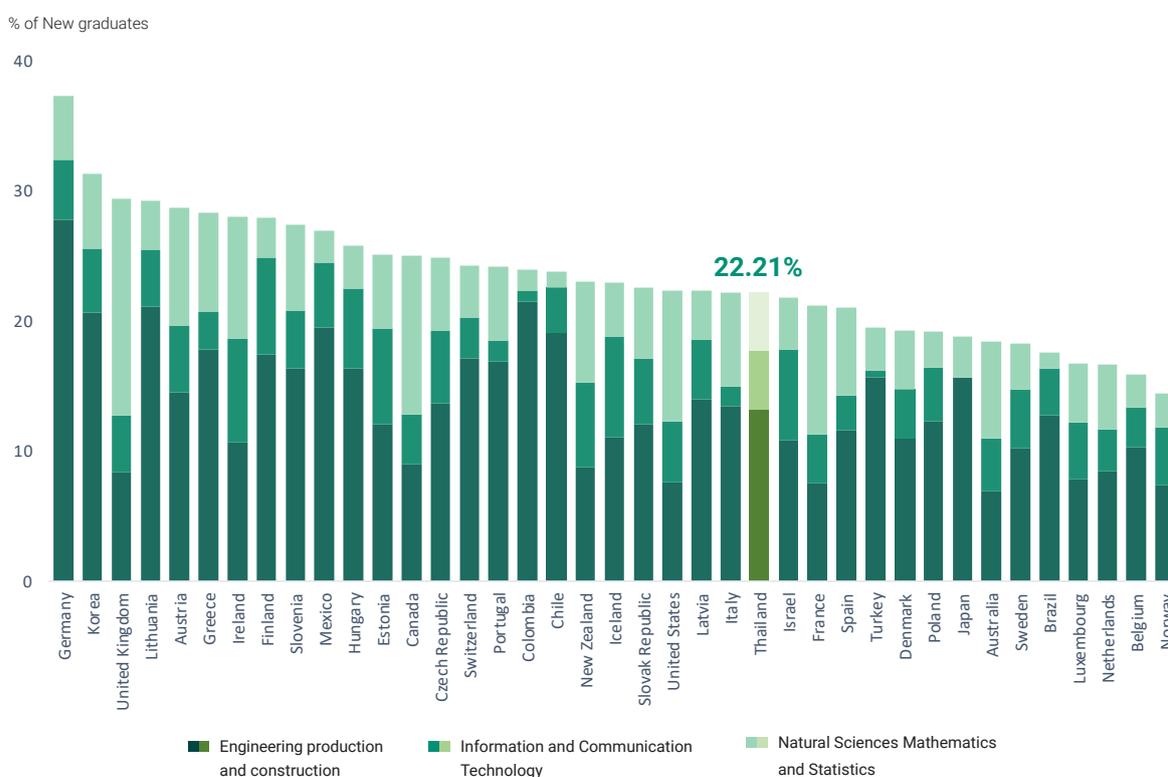
J4 : New tertiary graduates in science, technology, engineering and mathematics, as a percentage of new graduates

This indicator assesses graduates in science, technology, engineering and mathematics as well as ICTs in relation to all the new graduates to reflect the country's potential in developing the digital labor force.

Data from the Office of the Higher Education Commission found that graduates in the fields of science, technology, engineering and mathematics accounted for 22.21 percent of all graduates in 2021 which was a slight decrease from 2020 (22.86 percent) and slight increase from 2019 (21.58 percent).

Comparatively, Thailand had a similar share of STEM graduates where the average share among OECD countries was at 23.31 percent of all graduates. For this indicator, Germany ranked the highest with STEM graduates accounting for 37.30 percent of all graduates.

New tertiary graduates in science, technology, engineering and mathematics, as a percentage of new graduates



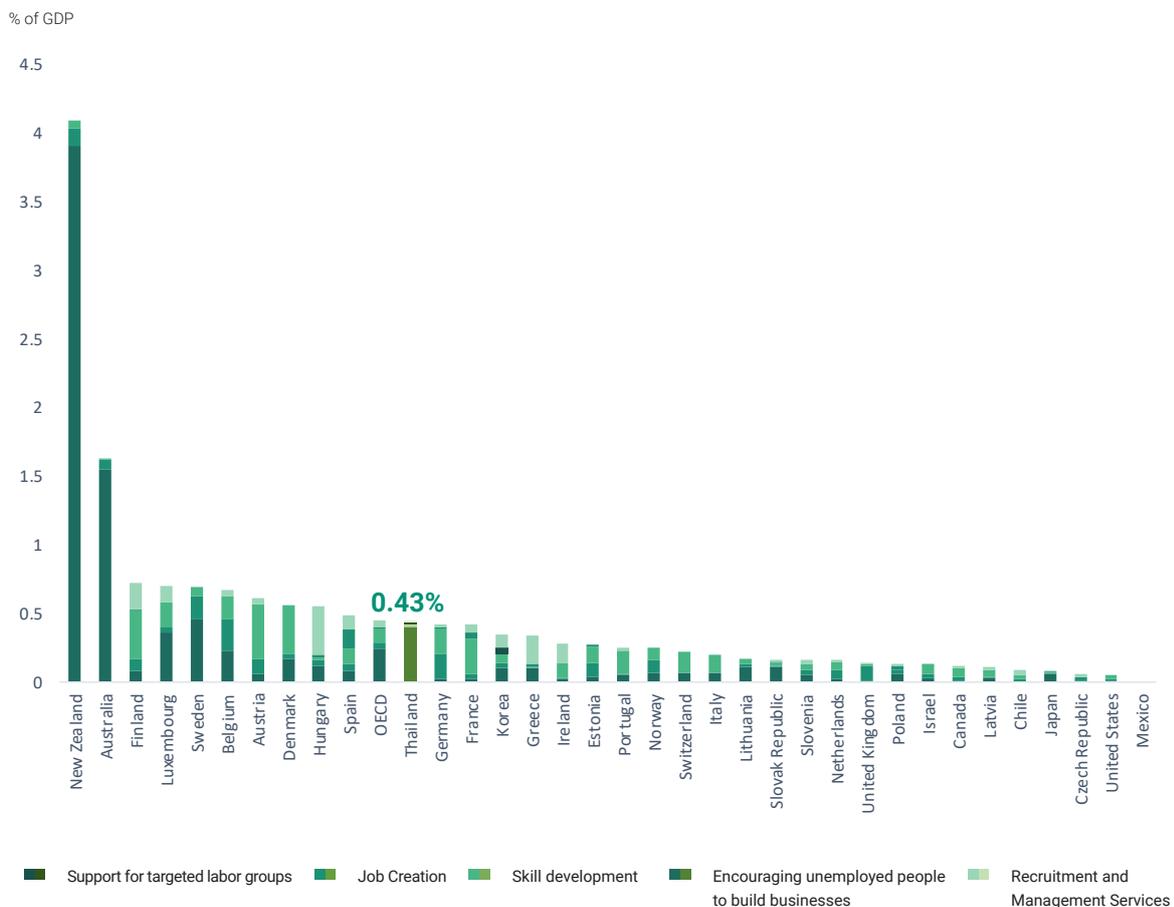
J5 : Public spending on active labor market policies, as a percentage of GDP

This indicator assesses public spendings on the development of workers' skills, measures related to business potentials of workers, support provided to the unemployed, as well as the creation and protection of welfare of the country.

According to data on the expenditures from the Department of Skill Development, Department of Labor Protection and Welfare, and the Fiscal Policy Office, public spending on active labor market policies in 2021 accounted for 0.43 percent of the GDP which marked a continual increase where it was 0.34 percent and 0.47 percent in 2020 and 2019 respectively.

Thailand had a moderate level of public spending on active labor market policies compared to the average spending among OECD countries was at 0.45 percent of the overall GDP. For this indicator, New Zealand ranked the highest with such spendings accountin for over 4.09 percent of their GDP.

Public spending on active labor market policies, as a percentage of GDP



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the government expenditures data was compiled from 4 departments under Ministry of Labor, the Fiscal Policy Office (FPO) and the Office of SMEs Promotion (OSMEP).

J6 : Share of enterprises that reported hard-to-fill vacancies for ICT specialists

This indicator assesses the capacity of the Thai digital labor force by considering the sufficiency of such workers in relation to the existing needs of the business sectors. It reflects the state of the operations of businesses employing digital labor as well as issues that may arise from such activities which would impact the general development of the country's digital economy.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 5-6 businesses or about 5.74 percent reported hard-to-fill ICT vacancies.



J7 : Digital skills (mis) match at work (as a percentage of individuals who use computers or computerized equipment at work)

This indicator assessed the level of digital skills mismatch at work which is related to the level of digital skills utilization in the workplace.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the shares of workers with matching and mismatching digital skills in relation to all who use computer or computerized equipment at work were 64.98 percent and 35.02 percent respectively.

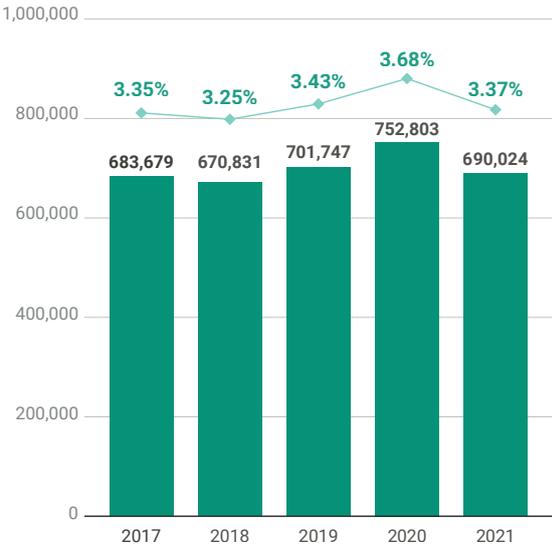


J8 : ICT professionals and technicians by gender

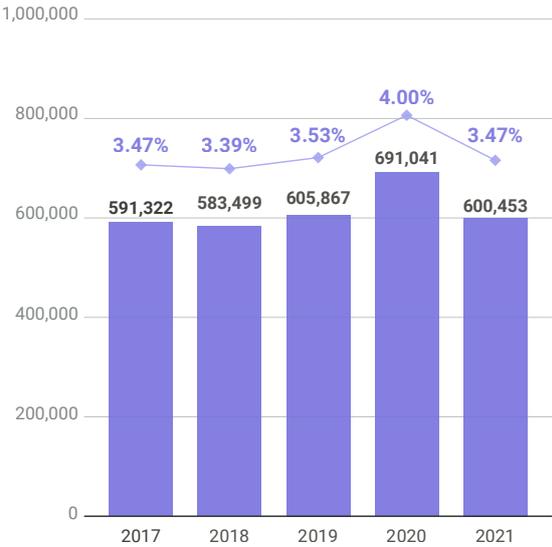
This indicator assesses the share of ICT professionals and technicians in the workplace by gender to reflect the various differences in the workplace contributed by the men and women of the ICT labor force.

According to the Labour Force Survey conducted by the National Statistical Office (NSO) in 2021, there were 690,024 male ICT professionals and technicians which accounted for 3.37 percent of all the 20,459,378 men in the labor force, and 600,453 female ICT professionals and technicians which accounted for 3.47 percent of all the 17,291,919 women in the labor force.

Share of Male ICT Specialists

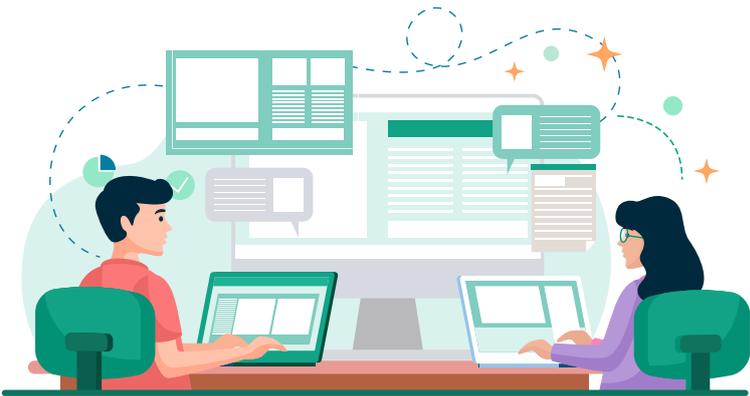


Share of Female ICT Specialists



■ Number of Male ICT Specialists ■ Number of Female ICT Specialists
◆ Share of Male ICT Specialists ◆ Share of Female ICT Specialists

Source: National Statistical Office (NSO)



JX1 : Average wage of ICT specialists

This indicator assesses the average wage of ICT specialists to reflect the level of personal income in the digital sector and the shortage in such sectors as reflected from the rate of compensation available in the current market.

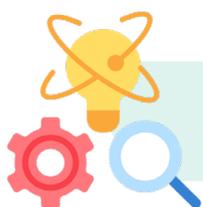
According to the National Statistical Office (NSO), the average wage of ICT specialists in 2020 was at 27,476.80 baht per month which was an increase from 2019 when the average wage was only 26,808.24 baht per month. This was due to the various technological advances that had enhanced business operations and encouraged businesses as well as agencies to offer higher compensation and benefits to ICT professionals for the purpose of retaining them and attracting more ICT-related employees.



JX2 : Labor Productivity in Digital-intensive industries

This indicator assesses the abilities of businesses in utilizing new technologies and hiring quality-personnel that are capable of innovatively adapting such technologies for increased efficiency in operations and added value to the goods and services. Such adaptation would help increase the productivity of the business as well as encourage further investments on newer technologies and innovations.

According to the labor productivity index calculated by the National Economic and Social Development Board (NESDB), and the National Statistical Office (NSO), it was observed that the labor productivity in digital-intensive industries was at 334,703.40 baht per worker which was an increase from that of 2020 when it was only at 317,691.16 baht per worker. This clearly reflected the transformation of the digital sector both in terms of manufacturing and servicing as more robots have been used as part of businesses' digital transformation to reduce the hiring of laborers and increase operational efficiency.

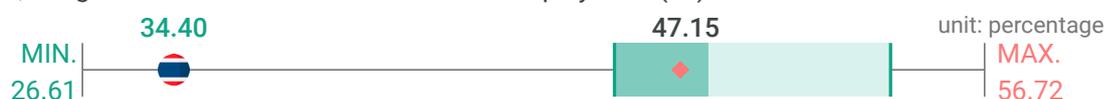


Summary of Thailand's Digital Development in the Jobs Dimension

ICT task-intensive jobs as a share of total employment (J1)



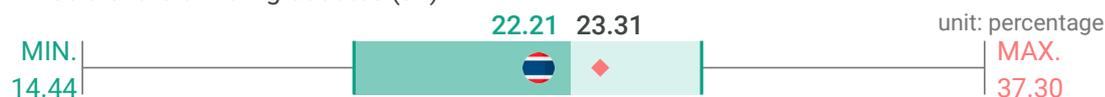
Digital-intensive sectors' share in total employment (J2)



Workers receiving employment-based training, as a share of total employment (J3)



New tertiary graduates in science, technology, engineering and mathematics, as a share of new graduates (J4)



Public spending on active labor market policies, as a share of GDP (J5)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Based on comparative assessments of the digital development of Thailand and OECD members,

within the Jobs Dimension, it was found that Thailand's labor market has a relatively low proportion of ICT personnel and digital-intensive employees when compared to those of OECD countries.

Compared to that of other OECD countries, the share of STEM graduates in Thailand has also been moderate.



The support from governmental agencies on the Thai labor market has been moderate when compared to other OECD countries. However, businesses have placed inadequate emphasis on the need to develop digital skills of their employees





Thailand's Digital Development in the Society Dimension

Digital inclusion or the inclusive access to and coverage of the internet for all regions and gender remained the ultimate goal of the digital society development by the public sector and various other agencies that are involved. Additionally, digital inclusion would also lead to equal opportunities within the digital society and elevation of people's quality of life.

For the **Society Dimension**, ONDE had referenced the OECD Frameworks to study relevant indicators for assessing the various digital development policies of the country related to the internet use by the population of various gender/age as well as the digital skills awareness among the various sectors. The assessment of internet access and usage considered several aspects including individuals' digital skills or competencies by each age group, as well as the dimensions of gender equality, and societal inequality.

There are 16 indicators that were studied and 7 of them were comparable to OECD countries.

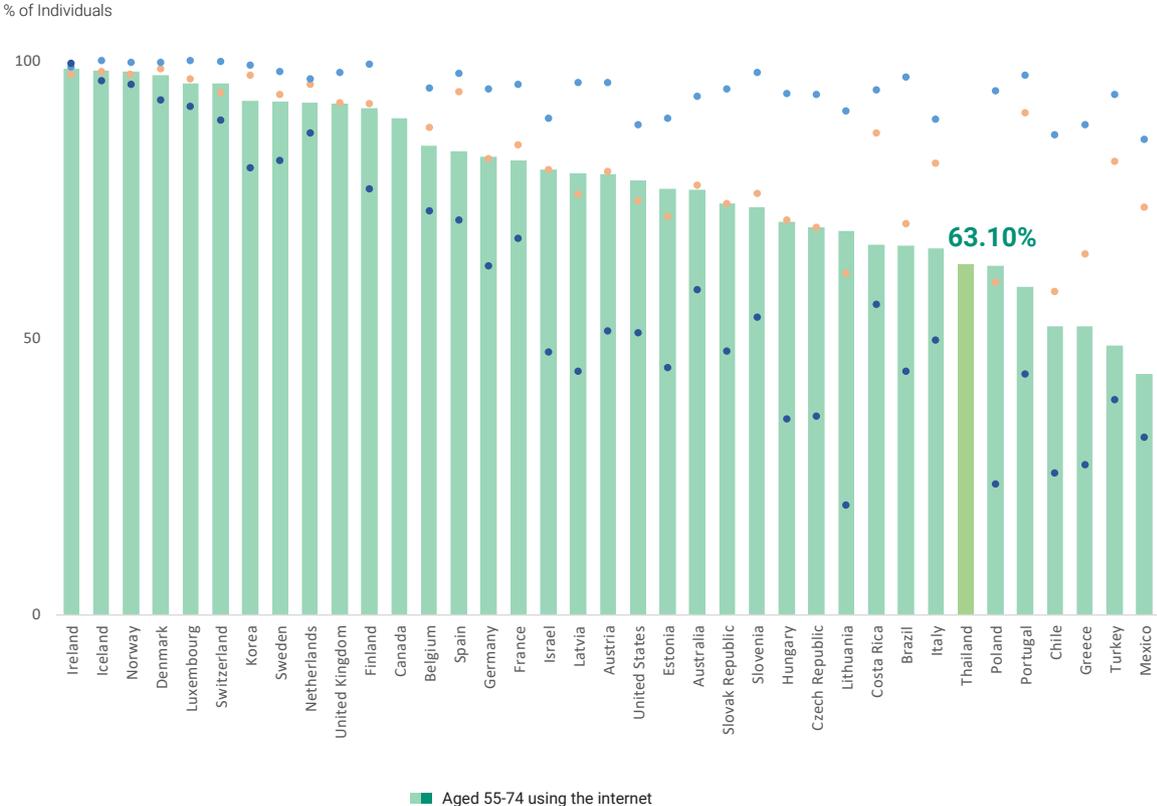
S1 : Percentage of individuals aged 55-74 using the internet

This indicator assesses the share of the elderly using the internet to reflect the digital gap in terms of access and opportunities as results of the rapid development of the country’s digital infrastructure which had made certain people unable to adapt to the changes. Additional outcomes of such transformation include inequality in the access to such technologies and the disparate influences that such technologies had impacted on people’s living.

According to the Household Survey on the Use of Information and Communication Technology (Annually) conducted by the National Statistical Office (NSO) in the 2nd Quarter of 2022, it was found that 63.10 percent of individuals aged 55-74 used the internet which was an increase from 2021 when such rate was 44.80 percent.

Thailand had a considerably low share of individuals aged 55-74 using the internet compared to the average share of OECD countries was 78.18 percent. For this indicator, Ireland ranked the highest with 98.48 percent of individuals aged 55-74 using the internet.

Percentage of individuals aged 55-74 using the internet



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Household Survey on the Use of Information and Communication Technology (Annually) by NSO.

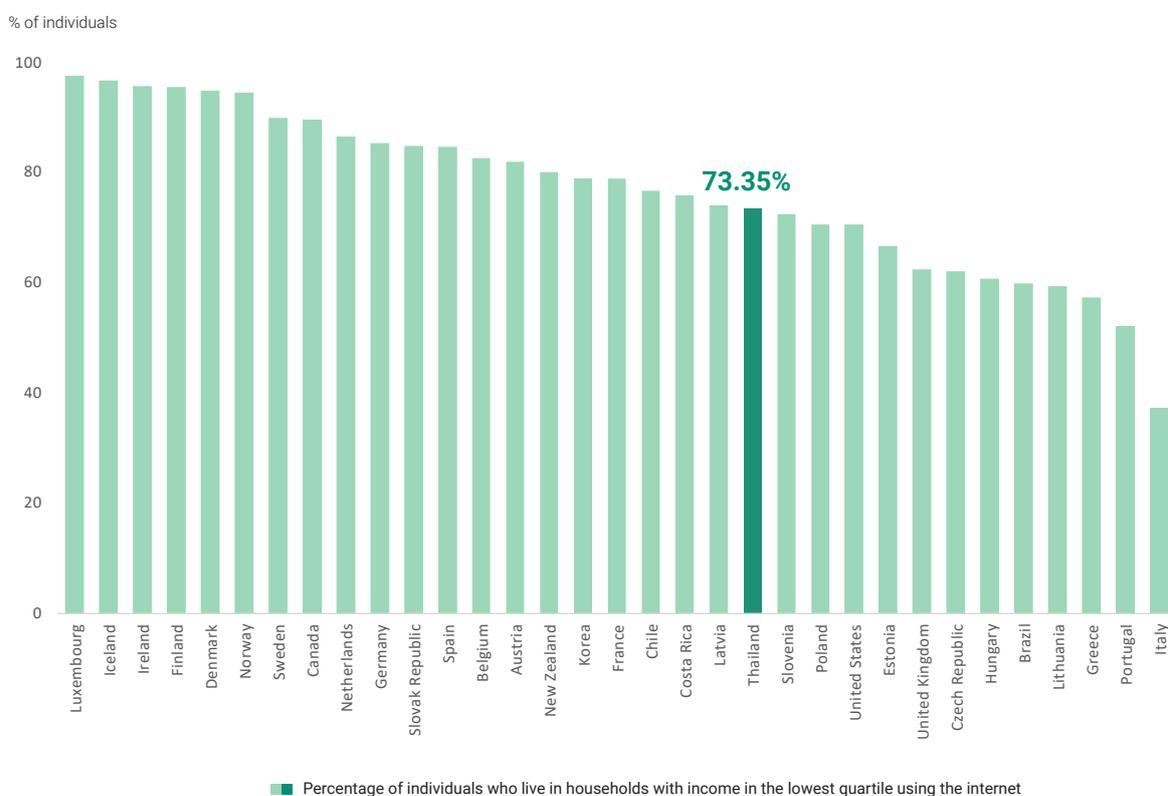
S2 : Percentage of individuals who live in households with income in the lowest quartile using the internet

This indicator reflects another aspect of digital development by looking into those with low income and their access to the internet in order to study the level of disparity in internet access.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 73.35 percent of individuals in households with income in the lowest quartile used the internet which was a decrease from 2021 when such share was 83.20 percent.

Comparatively, Thailand had a similar share of individuals in households with income in the lowest quartile with other OECD countries whose average share was 76.66 percent. For this indicator, Luxembourg ranked the highest with 97.48 percent of individuals in households with income in the lowest quartile using the internet.

Percentage of individuals who live in households with income in the lowest quartile using the internet



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project.

Note: This indicator is the same with G4 under Growth and Well-being Dimension.

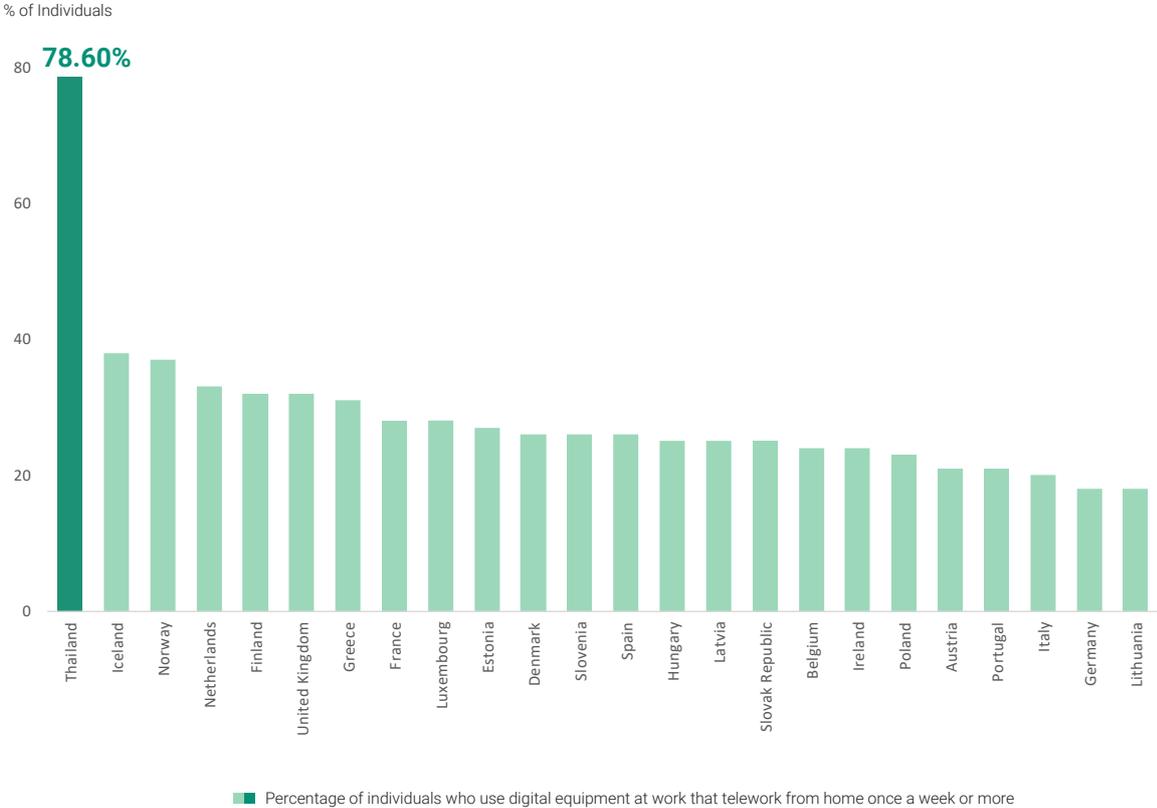
S3 : Percentage of individuals who use digital equipment at work that telework from home once a week or more

This indicator reflects the use of digital equipment by the current digital labor force for working from home which has increased with the advent of the New Normal following the COVID-19 outbreak.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 78.60 percent of individuals used digital equipment for teleworking from home at least once a week which was an increase from 2020 and 2021 when such shares were 35.70 percent and 36.70 percent respectively.

Comparatively, Thailand had a rather high share of such individuals when compared to other OECD countries whose average value for this indicator was only 26.43 percent*. However, Iceland had the best ranking for this indicator with only 38.00 percent of individuals using digital equipment for teleworking from home at least once a week.

Percentage of individuals who use digital equipment at work that telework from home once a week or more



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project

Note: This indicator is the same with G2 under Growth and Well-being Dimension.

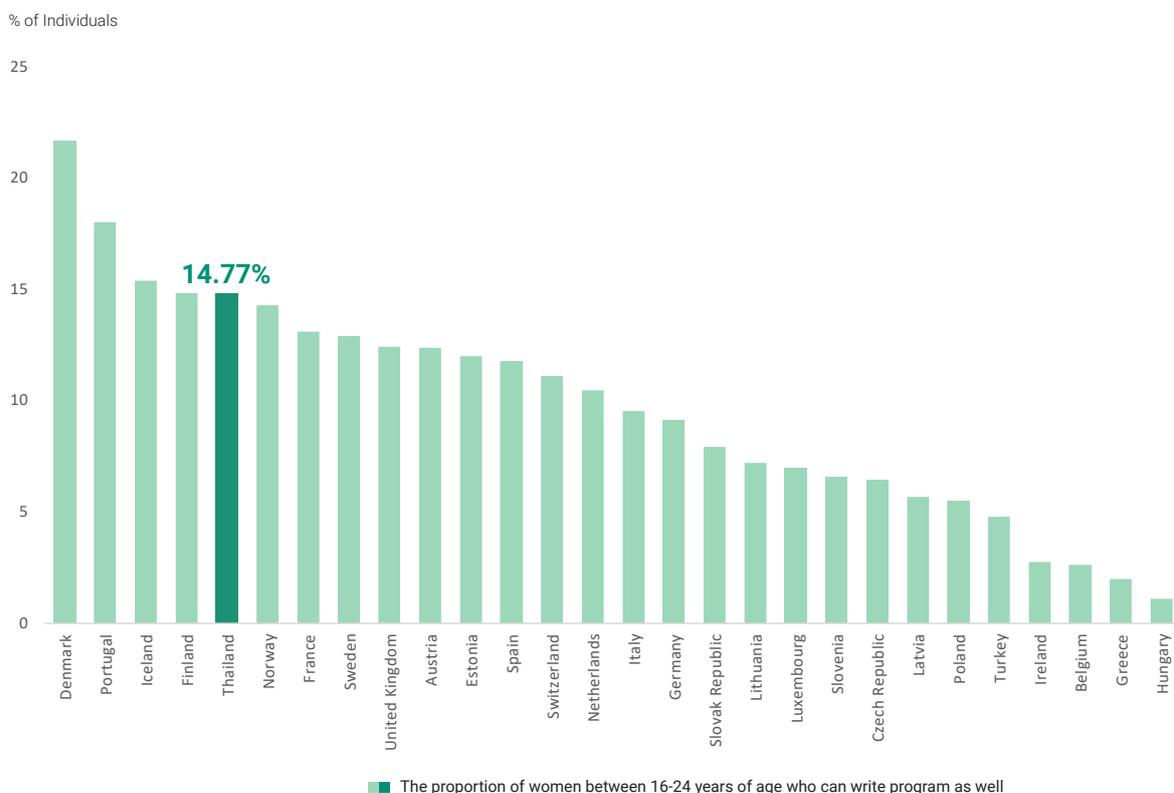
S4 : Women as a share of all 16-24 year-olds who can program

This indicator assesses the level of gender disparity in the digital dimension by considering programming skills among men and women which would produce data on the level of gender disparity as well as differences in the digital skills between the genders.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 14.77 percent of women aged 16-24 could program which was a lower share than that of men of the same age (17.54 percent) but an increase from 2021 when only 12.10 percent of women aged 16-24 could program.

Comparatively, Thailand had a rather high share of women aged 16-24 who could program when compared to other OECD countries whose average value for this indicator was only 9.56 percent. For this indicator, Denmark had the best ranking where 21.67 percent of women aged 16-24 could program.

Women as a share of all 16–24 years-olds who can program



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project.

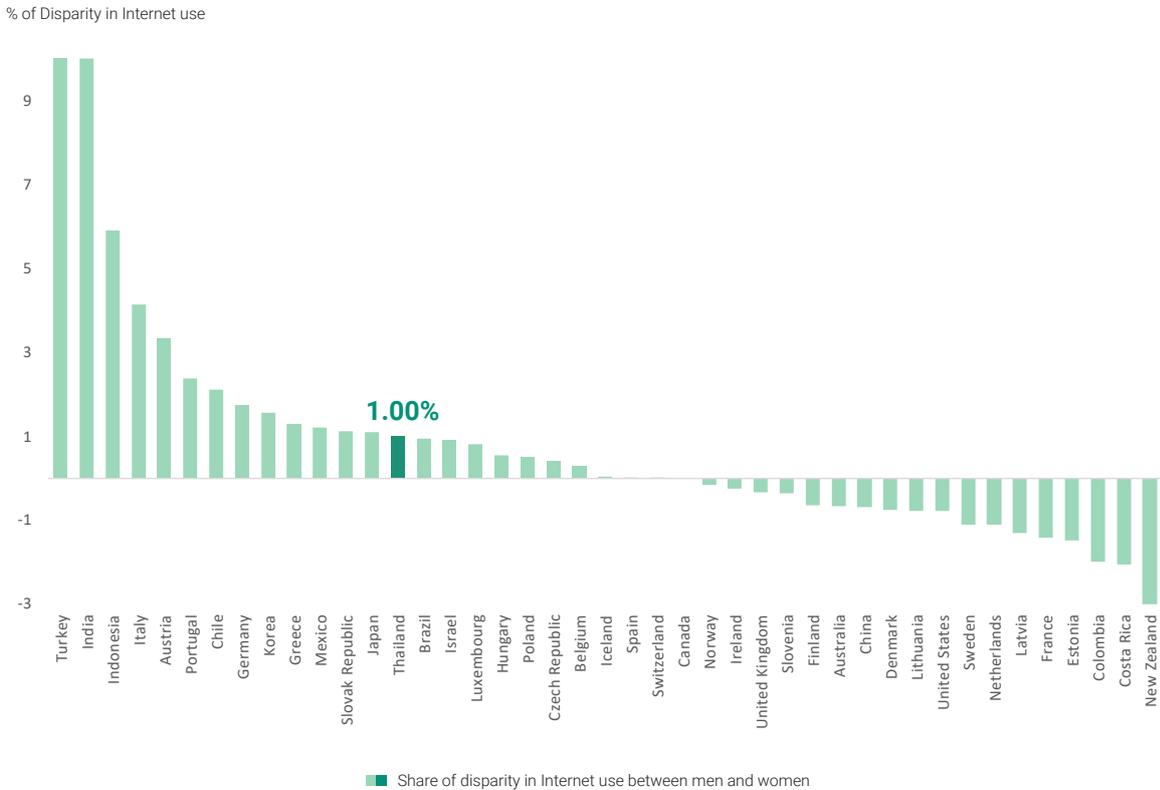
S5 : Disparity in Internet use between men and women

This indicator assesses the level of gender disparity in the digital dimension by considering the difference in the shares of internet use among men and women.

According to the Household Survey on the Use of Information and Communication Technology (Annually) conducted by the National Statistical Office (NSO) in the 2nd Quarter of 2022, it was found that 85.90 percent of women were internet users while such share for men was 86.90 percent. This meant that the disparity in the internet use of men and women was only 1.00 percent.

Thailand had a relatively low rate of disparity in the internet use among men and women compared to the average value of OECD countries was 0.75 percent. For this indicator, Canada had the best ranking where the rate of disparity was 0.00 percent or non-existent.

Disparity in Internet use between men and women



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Household Survey on the Use of Information and Communication Technology (Annually) by NSO.

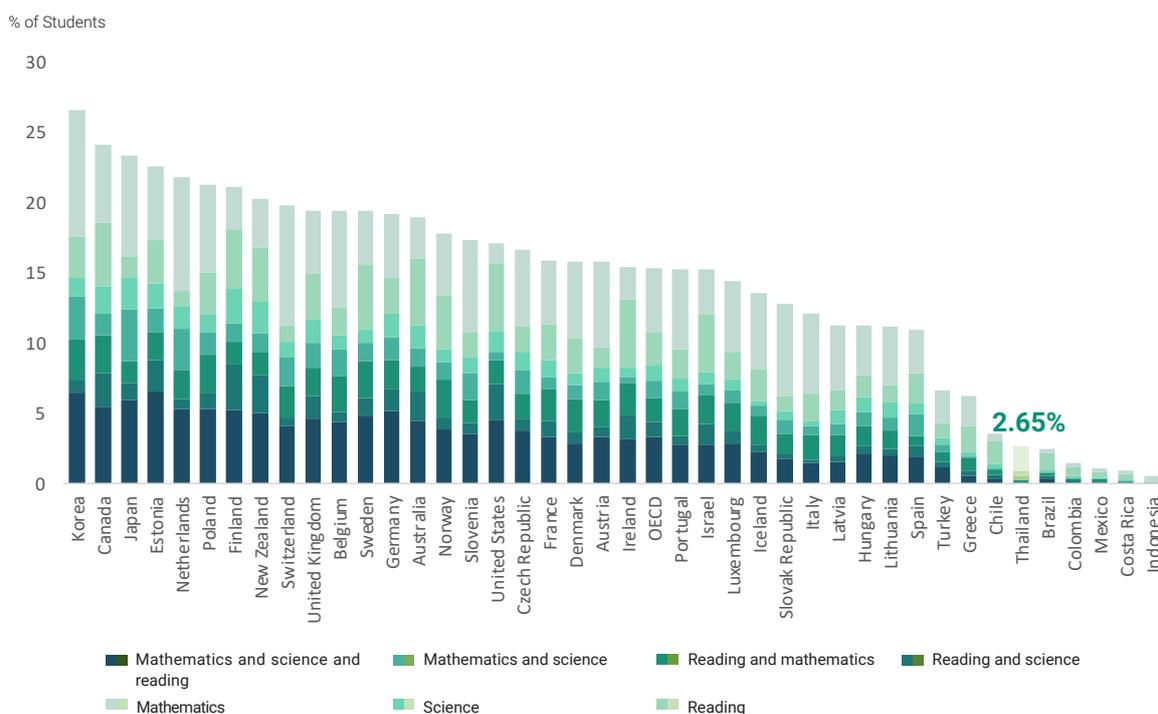
S6 : Share of top-performing 15-16 year old students in science, mathematics and reading according to PISA

This indicator assesses the level of basic competence in reading, mathematics, and science that are required of each individual in order to adapt to the digital age by considering students aged 15-16. It does not only reflect the potential of youth who would soon play a crucial role in the country's digital society, but also policy recommendations related to the education sector and the development of Thai education.

The Institute for the Promotion of Teaching Science and Technology (IPST) and the OECD had developed an assessment program (PISA) where it found that 2.65 percent of all the 15–16-year-old PISA-assessed students scored at level 5 or above for at least one subject in 2018.

Comparatively, Thailand had a relatively low share of students with high PISA scores where the average share of 15–16-year-old PISA-assessed students who scored at level 5 or above among OECD countries was 14.50 percent. For this indicator, South Korea had the best ranking where 26.56 percent of 15–16-year-old PISA-assessed students scoring at level 5 or above

Top-performing 15-16 years old students in science, mathematics and reading according to PISA



S7 : E-waste generated, kilograms per inhabitant

This indicator assesses the environmental impact from the electronic waste generated by the ICT manufacturing and consumption sectors as well as consumption of individuals in the country.

According to the 2019 Global E-waste Monitor Report compiled by the Global E-waste Statistics Partnership, the volume of electronic waste generated was equivalent to 9.20 kilograms per person.

Comparatively, Thailand had a relatively low level of e-waste generation per person where the average volume among OECD countries was 15.91 kilograms per person. For this indicator, Norway had the highest ranking with over 26.00 kilograms of e-waste generated per person.

E-waste generated, kilograms per inhabitant



Source: OECD Going Digital Toolkits (as of 2 August 2022) and The Global E-waste Management 2019 report

Note: This indicator is the same with G7 under Growth and Well-being Dimension.

S8 : Gap in Internet use, by educational attainment

This indicator assesses the gap in internet use by considering internet users with lower than secondary education and those with higher than secondary education. It reflects the level of disparity in internet use in society from the perspective of the population's educational attainment.

According to the Household Survey on the Use of Information and Communication Technology (Annually) conducted by the National Statistical Office (NSO) in the 2nd Quarter of 2022, it was found that 70.60 percent of individuals with lower than secondary education and 91.88 percent of those with higher than secondary education used the internet which mean the gap in internet use was 21.28 percent.



S9 : Share of individuals who used the Internet to access social networking sites, by age

This indicator considers the share of internet users using the internet for “social networking” in relation to all users in each age group to study the differences in user’s behavior.

According to the Internet User Behavior (IUB) 2022 Survey annually compiled by the ETDA, 92.02 percent of internet users used the internet for social networking. More specifically, it was found that Gen Y (aged 21-40) accessed social networking sites the most while those in the Babyboomer+ (aged 57-75) accessed such sites the least.



S10 : Share of individuals who used the Internet to access news online

This indicator considers the share of internet users using the internet “to access news online” through reading or downloading newspapers or magazines as well as through other means. It reflected upon the behaviors of internet users engaging in the quickest meanest to access the news today.

According to the Internet User Behavior (IUB) 2022 Survey annually compiled by the ETDA, 79.60 percent of internet users accessed news online where the most popular activities include general communication (up to 97.00 percent), entertaining activities such as viewing movies/listening to music/ gaming online (92.60 percent), receiving government services (83.20 percent), accessing news, articles or books online (79.60 percent), conducting online financial transactions (78.60 percent), and purchasing online goods or services (71.80 percent).



SX1 : Awareness of digital technology among individuals



This indicator assesses individuals' awareness of new digital technologies such as 5G Technology, Artificial Intelligence (AI), Internet of Things (IoT), and VR/AR Technology whose impacts on daily living as well as the expansion of the country's digital economy and society have been increasing in intensity.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the level of awareness among individuals were 43.84 percent for 5G Technology, 33.78 percent for Artificial Intelligence (AI), 32.47 percent for Cloud Technology, 31.83 percent for Robotics, 30.46 percent for the Internet of Things (IoT), 29.35 percent for Data Analytics, 27.10 percent for Blockchain Technology, 26.76 percent for VR/AR Technology, and 25.38 percent for Metaverse.



5G Technology
43.84%



Artificial
Intelligence (AI)
33.78%



Cloud Technology
32.47%

SX2 : Awareness of digital laws among individuals



This indicator assesses individuals' awareness of various digital laws whose impacts on the expansion of the country's digital economy and society have been increasing in intensity.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the level of awareness among individuals were 38.96 percent for the Computer-Related Crime Act, 33.74 percent for the Cybersecurity Act, 30.41 percent for Personal Data Protection Act (PDPA), 28.71 percent for the Digital Economy and Society Development Act, and 28.63 percent for the Digitalization of Public Administration and Services Delivery Act.

- 1 Computer-Related Crime Act at **38.96%**
- 2 Cybersecurity Act at **33.74%**
- 3 Personal Data Protection Act (PDPA) at **30.41%**

SX3 : Awareness of digital technology among enterprises



This indicator assesses businesses' awareness of new digital technologies such as 5G Technology, Artificial Intelligence (AI), Robotics, and Data Analytics whose impacts on business operations as well as the expansion of the country's digital economy and society have been increasing in intensity.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the level of awareness among businesses were 52.73 percent for 5G Technology, 50.54 percent for Cloud Technology, 44.15 percent for Data Analytics, 36.41 percent for Blockchain Technology, 33.15 percent for VR/AR Technology, 30.70 percent for the Internet of Things (IoT), 30.01 percent for Artificial Intelligence (AI), 28.07 percent for Metaverse, and 27.69 percent for Robotics.



SX4 : Awareness of digital laws among enterprises



This indicator assesses businesses' awareness of various digital laws whose impacts on the expansion of the country's digital economy and society have been increasing in intensity.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the level of awareness among businesses were 44.02 percent for the Digital Economy and Society Development Act, 39.33 percent for the Personal Data Protection Act (PDPA), 39.27 percent for the Cybersecurity Act, 38.63 percent for the Computer-Related Crime Act, and 38.59 percent for the Digitalization of Public Administration and Services Delivery Act.

- 1 Digital Economy and Society Development Act at **44.02%**
- 2 Personal Data Protection Act (PDPA) at **39.33%**
- 3 Cybersecurity Act at **39.27%**

SX5 : Awareness of digital technology among primary services



This indicator assesses primary services' awareness of new digital technologies such as 5G Technology, Artificial Intelligence (AI), Robotics, and Data Analytics whose impacts on services as well as the expansion of the country's digital economy and society have been increasing in intensity.

The results from the Primary Services Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the level of awareness among primary services were 91.91 percent for Cloud Technology, 80.00 percent for 5G Technology, 31.58 percent for the Internet of Things (IoT), 30.85 percent for Data Analytics, 25.22 percent for VR/AR Technology, 23.57 percent for Robotics, 23.45 percent for Artificial Intelligence (AI), 20.81 percent for Blockchain Technology, and 18.82 percent for Metaverse.



SX6 : Awareness of digital laws among primary services



This indicator assesses primary services' awareness of various digital laws whose impacts on agency operations as well as the expansion of the country's digital economy and society have been increasing in intensity.

The results from the Primary Services Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that the level of awareness among primary services were 69.83 percent for the Digitalization of Public Administration and Services Delivery Act, 68.38 percent for the Digital Economy and Society Development Act, 66.42 percent for the Computer-Related Crime Act, 64.63 percent for Personal Data Protection Act (PDPA), and 64.00 percent for the Cybersecurity Act.

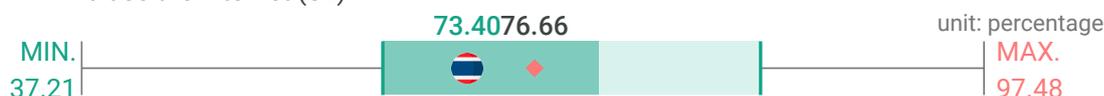
- 1 Digitalization of Public Administration and Services Delivery Act at **69.83%**
- 2 Digital Economy and Society Development Act at **68.38%**
- 3 Computer-Related Crime Act, 64.63 percent for Personal Data Protection Act (PDPA) at **66.42%**

Summary of Thailand's Digital Development in the Society Dimension

► Share of individuals aged 55-74 years using the internet (S1)



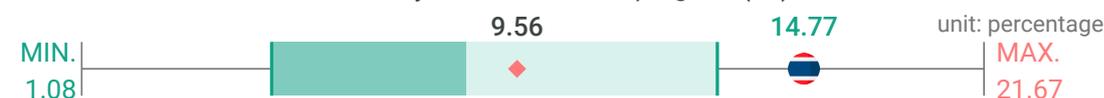
► Share of individuals who live in households with income in the lowest quartile who use the internet (S2)



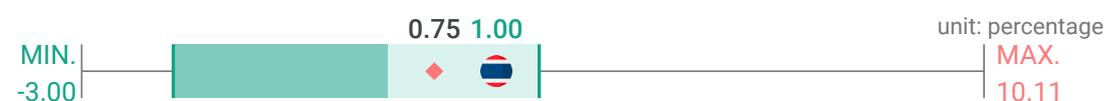
► Share of individuals who use digital equipment at work that telework from home once a week or more (S3)



► Women as a share of all 16-24 year-olds who can program (S4)



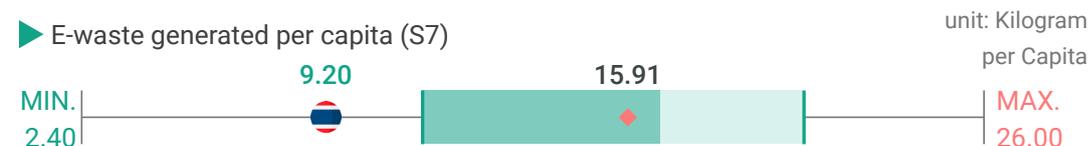
► Disparity in Internet use between men and women (S5)



► Share of top-performing 15-16 year old students in science, mathematics and reading according to PISA (S6)



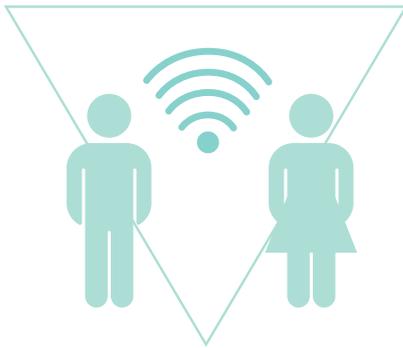
► E-waste generated per capita (S7)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Based on comparative assessments of the digital development of Thailand and OECD members

within the **Society Dimension**, it was found that the elderly and those with low income have low rate of internet use which meant more measures are needed to enhance internet access, usage, and affordability of these particular groups.



In terms of internet use among men and women in Thailand, **it was found that access to broadband internet of women was lower than that of men which correspond with the data of many OECD countries** where disparity in internet access between the sexes has been relatively low.

As for programming skills, it was found that **Thailand has a relatively high share of women aged 16 - 24 who can program** when compared to other OECD countries which reflected the trend of newer generations acquiring programming skills.



Due to the COVID-19 Outbreak, Thailand has a high share of workers working from home or teleworking.



As for e-waste, it was found that Thailand low amount of e-waste generated when compared to other OECD countries which reflected the lower volume of electronic device usage.





Thailand's Digital Development in the Trust Dimension



Information security and cyber threats have been key issues following the development of digital technologies and growth of the digital economy and society. Therefore, building internet trust for individuals, businesses, and public sectors is a measure that could enhance various electronic and online activities or transactions in terms of their operations and reduce the level of anxiety users may have regarding such activities.

In addition to the aforementioned issues, issues such as the protection of personal data and privacy of users remain a central concern of many agencies in Thailand and other countries today as several laws have been enacted to provide data protection for internet users and security facilities for online transactions. The ultimate goal has been to build credibility and trust for society in order to transition into a Digital Thailand with stability and confidence of all sectors.

For the **Trust Dimension**, ONDE had referenced the OECD Frameworks to study relevant indicators for assessing the confidence and trust of internet users in Thailand with emphasis on issues such as the protection of personal information as well as issues related to online activities.

There are 7 indicators that were studied and 5 of them were comparable to OECD countries.

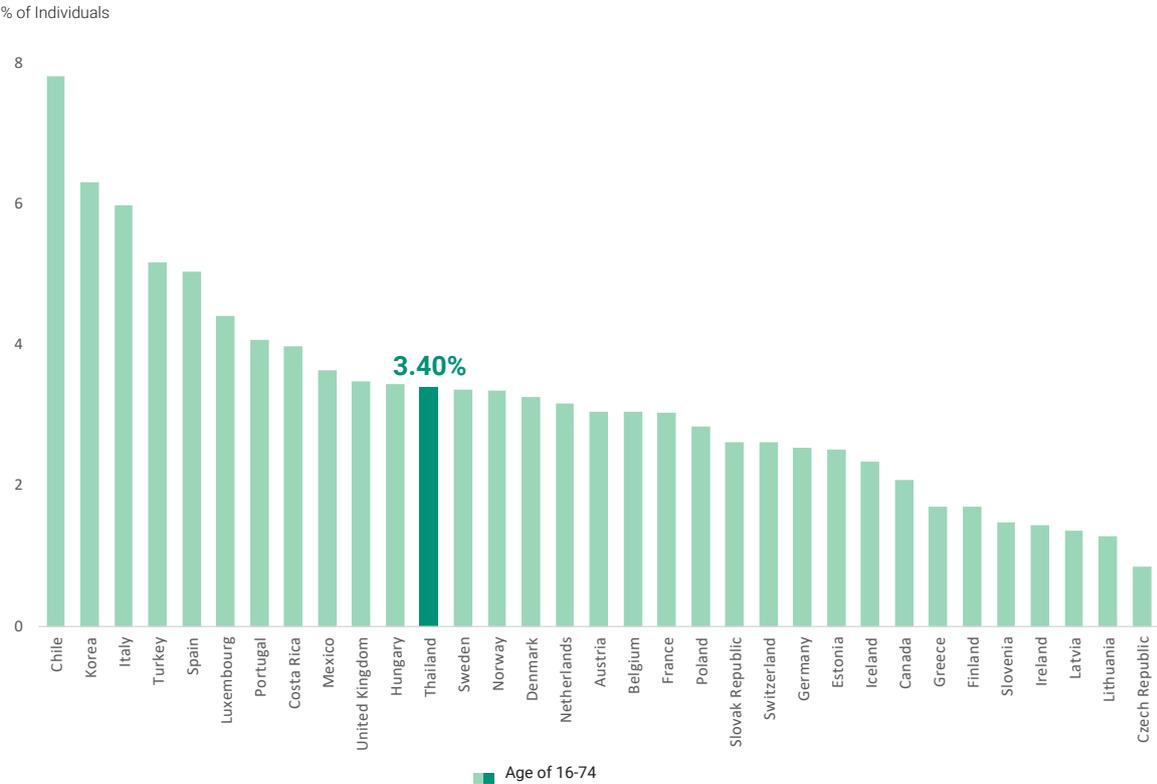
T1 : Percentage of internet users experiencing abuse of personal information or privacy violations

This indicator reflects the insecurity of the Internet which is an important factor affecting the confidence of users in the country.

Data from the Internet Trust & Security (ITS) 2022 Surveys by ETDA found that 3.40 percent of internet users experienced abuse of personal information or privacy violations which was a decrease from 2021 when such rate was at 6.30 percent.

Comparatively, Thailand had a moderate share of users experiencing abuse of personal information or privacy violations where the average share of OECD countries was 3.21 percent. For this indicator, the Czech Republic had the best ranking where only 0.84 percent of internet users had experienced abuse of personal information or privacy violations.

Percentage of internet users experiencing abuse of personal information or privacy violations



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Internet Trust & Security (ITS) 2022 Surveys by ETDA

Note: This indicator is the same with G6 under Growth and Well-being Dimension.

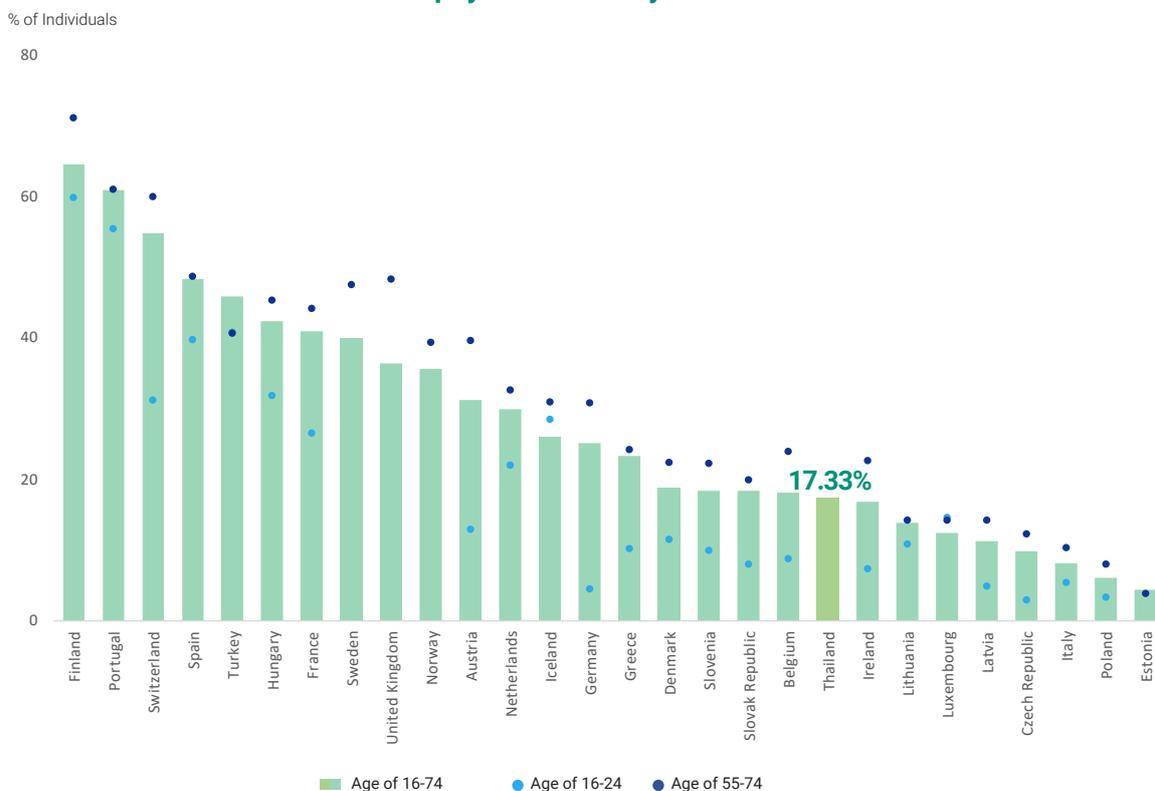
T2 : Percentage of individuals not buying online due to payment security concerns

This indicator assesses factors affecting the trust of consumers in buying goods/ services online where the focus had been placed on the security of the system for electronic transaction and e-Commerce as well as the concerns over such platforms.

The Internet User Behavior (IUB) 2022 Survey, annually compiled by the ETDA, found that 17.33 percent of individuals did not buy online due to payment security concerns which was an increase from 2021 when ONDE had observed that such users only accounted for 5.40 percent.

Thailand had a low share of users not buying online due to payment security concerns compared to the average share of OECD countries was 28.17 percent. For this indicator, Estonia had the best ranking with only 4.36 percent of individuals not buying online due to payment security concerns.

Percentage of individuals not buying online due to payment security concerns



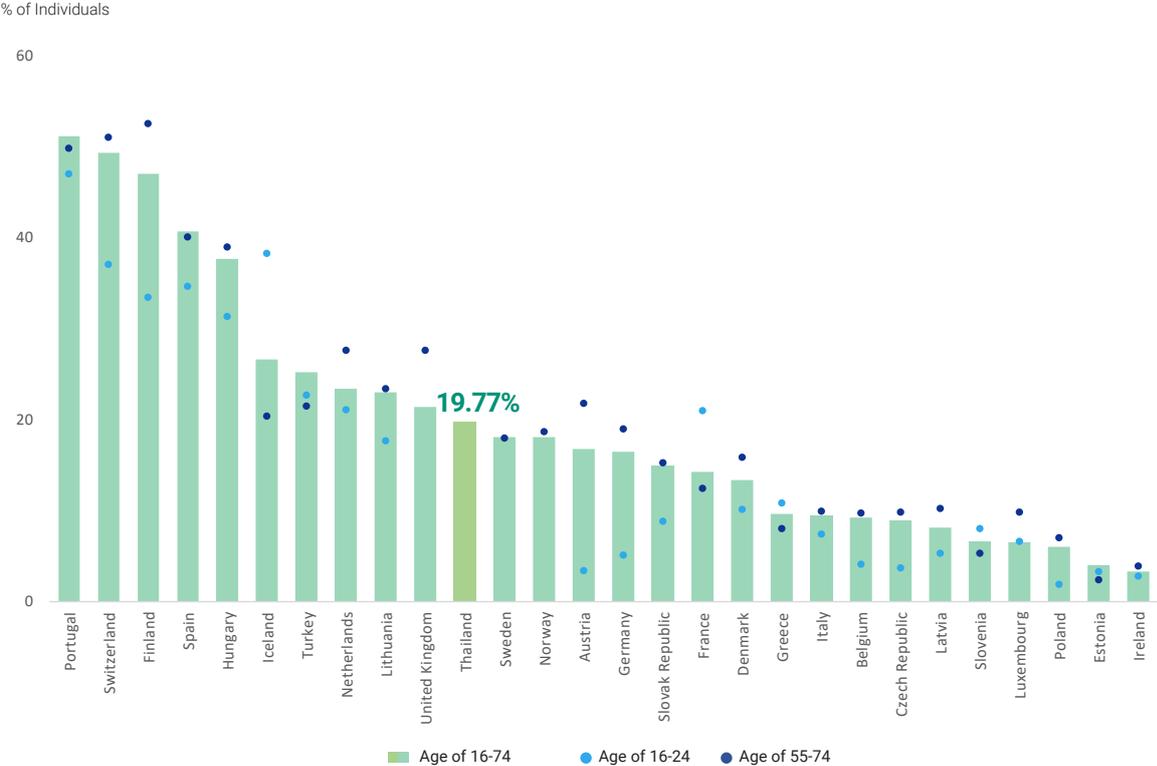
T3 : Percentage of individuals not buying online due to concerns about returning products

Similar to T2, this indicator assesses factors affecting the trust of consumers in buying goods/services online where the focus had been placed on the security of the system for electronic transaction and e-Commerce, as well as the concerns about returning products of the e-Marketplace platforms and related procedures.

The Internet User Behavior (IUB) 2022 Survey, annually compiled by the ETDA, found that 19.77 percent of individuals did not buy online due to concerns about returning products, which was an increase from 2021 when ONDE had observed that such users only accounted for 13.60 percent.

Comparatively, Thailand had a low share of users not buying online due to concerns about returning products where the average share of OECD countries was 19.55 percent. For this indicator, Ireland had the best ranking with only 3.23 percent of individuals not buying online due to concerns about returning products.

Percentage of individuals not buying online due to concerns about returning products



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Internet User Behavior (IUB) 2022 Survey by ETDA.

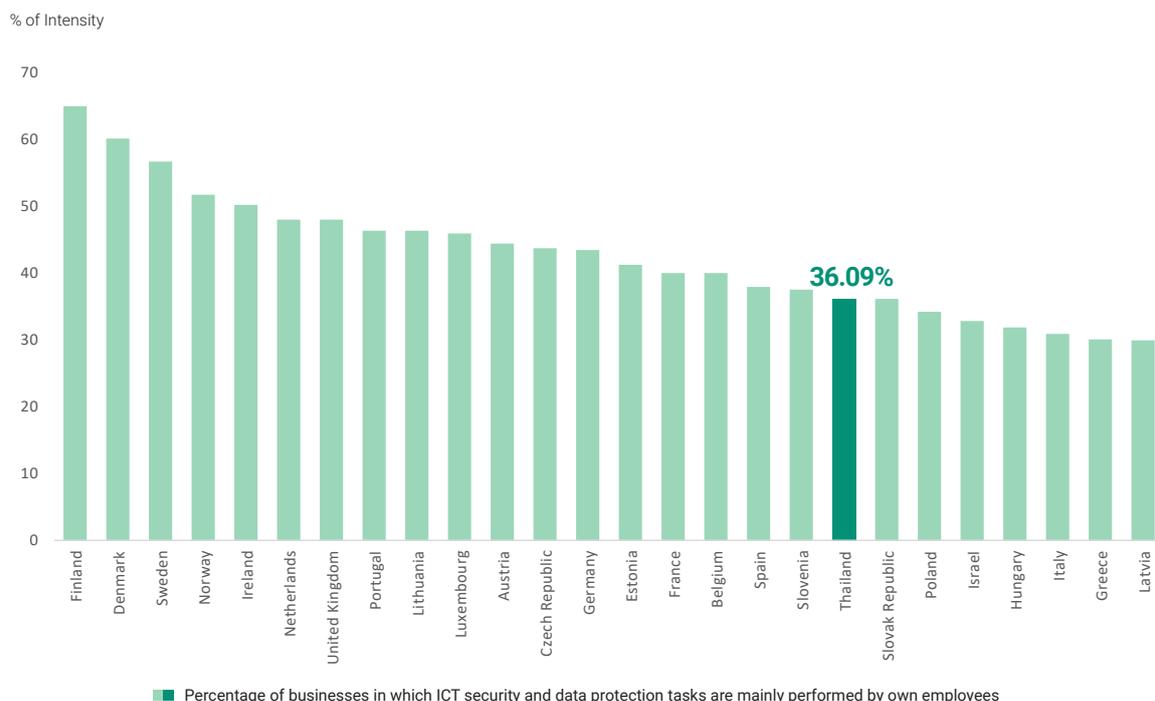
T4 : Percentage of businesses in which ICT security and data protection tasks are mainly performed by own employees

This indicator reflects the emphasis businesses had placed on ICT security protocols and facilities on data protection where such measures could be purchased or performed by the company's employees themselves.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found 36.09 percent tasked their own employees with ICT security and data protection tasks which was an increase from 2021 when only 28.60 percent of businesses did so.

Comparatively, Thailand had a low share of businesses tasking their own employees with ICT security and data protection tasks where the average share of OECD countries was 42.83 percent. For this indicator, Finland had the best ranking with over 64.83 percent of their businesses tasking their own employees with ICT security and data protection tasks.

Percentage of businesses in which ICT security and data protection tasks are mainly performed by own employees



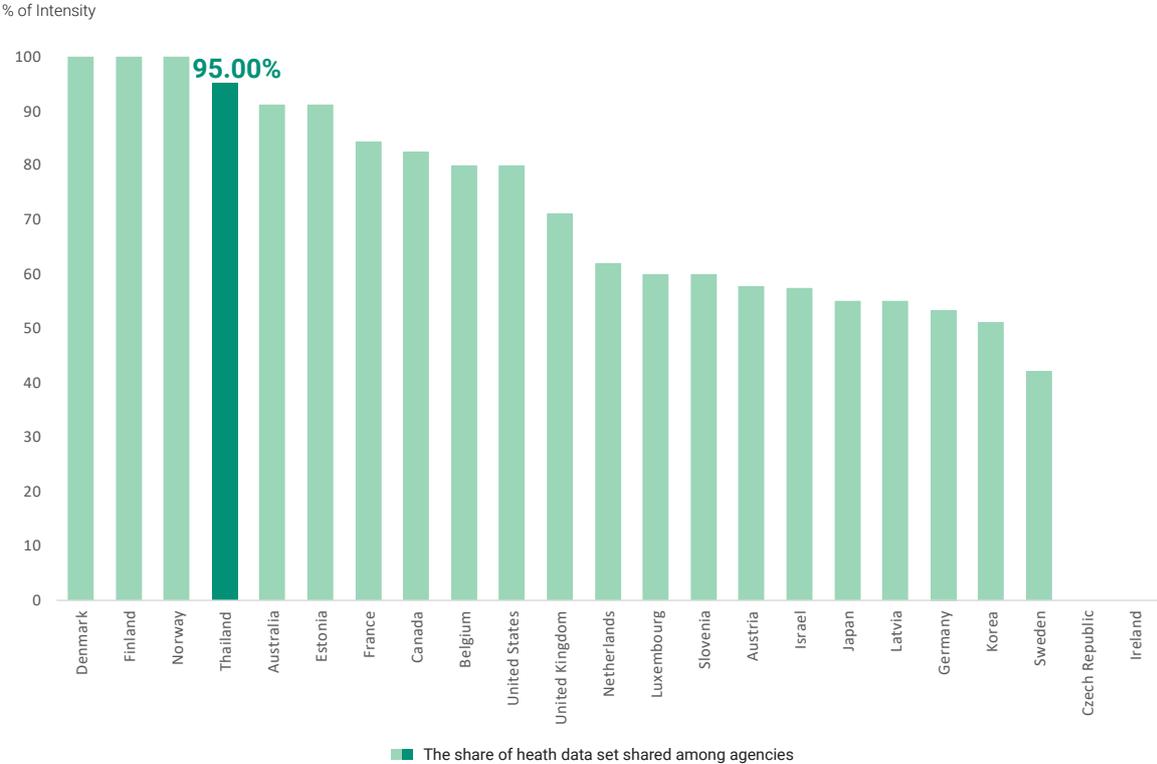
T5 : Health data sharing intensity

This indicator reflects the capacity and readiness of the country’s domestic databases which could foster confidence in various sectors. The integration and exchange of health data between domestic and foreign agencies were of concern to this indicator’s calculation.

Data from the Office of the Permanent Secretary of the Ministry of Public Health found that 95.00 percent of all health data sets were exchangeable among agencies (excluding personal information) which was a result of the policy agreements between the Ministry of Public Health and relevant agencies to ensure effective and secure exchange of such data.

Consequently, the intensity of health data sharing in Thailand was rather high where the average share of OECD countries was 65.19 percent. For this indicator, Denmark, Norway, and Finland had the best ranking with 100.00 percent of coverage when it comes to the sharing of such data.

Health data sharing intensity

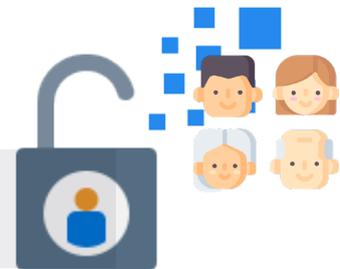


Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Office of the Permanent Secretary of the Ministry of Public Health

T6 : Individuals who provided personal information over the Internet

This indicator assesses the confidence of internet users in terms of the provision of personal information to websites or other online media.

The Internet User Behavior (IUB) 2022 Survey, annually compiled by the ETDA, found that 64.10 percent of individuals had provided personal information over the internet which was mostly made up of individuals aged 22-41. This was followed by individuals aged 15-21 or those in the Gen Y and Gen Z who had considerably more trust in the online platforms than individuals of most other age groups.



T7 : Trust in information accessed on social networks and messaging applications

This indicator reflects the trust in information on websites or applications providing digital services which remains vital to users' general online activities since information available online can be equally deceptive and beneficial to users depending on its accuracy and users' interpretation.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 51.59 percent trusted information accessed on social networks and messaging applications.

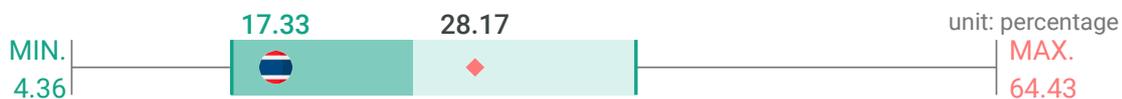


Summary of Thailand's Digital Development in the Trust Dimension

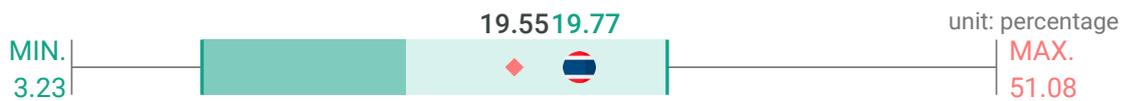
► Share of internet users experiencing abuse of personal information or privacy violations (T1)



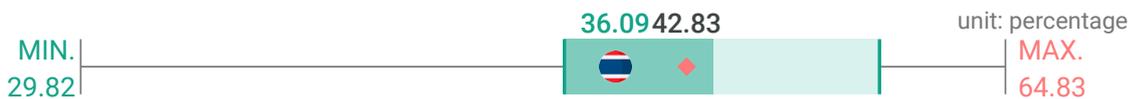
► Share of individuals not buying online due to payment security concerns (T2)



► Share of individuals not buying online due to concerns about returning products (T3)



► Share of enterprises in which own employees carry at ICT security related activities (T4)



► Health data sharing intensity (T5)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.



Based on comparative assessments of the digital development of Thailand and OECD members,

In the Trust Dimension, it was found that Thailand has a moderate share of users having experienced data breaches which was partly due to low awareness among individuals related Thai businesses have been keeping with with their IT and to privacy and personal protection.

Thai businesses have been keeping with with their IT and data security facilities where the share of Thai businesses tasking their internal employees for such assignment match that of other OECD countries



As for the trust in the e-Commerce, Thais placed considerable trust in e-Commerce services and market where many bought goods/services while the shares of users not buying online due to concerns about returning products and payment security were in the moderate and in the low level respectively.



In terms of health data sharing intensity, Thailand ranked relatively high when compared to other OECD countries which meant medical services have been extremely effectively and that every sector trusted the health data exchange system of the country.





Thailand's Digital Development in the Market Openness Dimension

Technologies and digital innovations not only strengthen the competitiveness of businesses but also create opportunities to access the online market for both consumers and suppliers. Hence, e-Commerce has become one of the most rapidly growing businesses in recent years since it could allow consumers to buy products easily and quickly. Additionally, it increases the opportunities for sellers to sell products/services domestically as well as internationally (or “cross-border e-Commerce”) via online channels without interfacing given how such activities and transactions have transitioned into the online platforms.

Consequently, it remains vital to evaluate digital policies affecting and enhancing the sales of goods/services which would reflect the extent to which businesses had utilized digital technologies in their operations. For the Market Openness Dimension, ONDE had referenced the OECD Frameworks to study relevant indicators on e-Commerce and the added value from such activities.

There are 4 indicators that were studied and all of them were comparable to OECD countries.

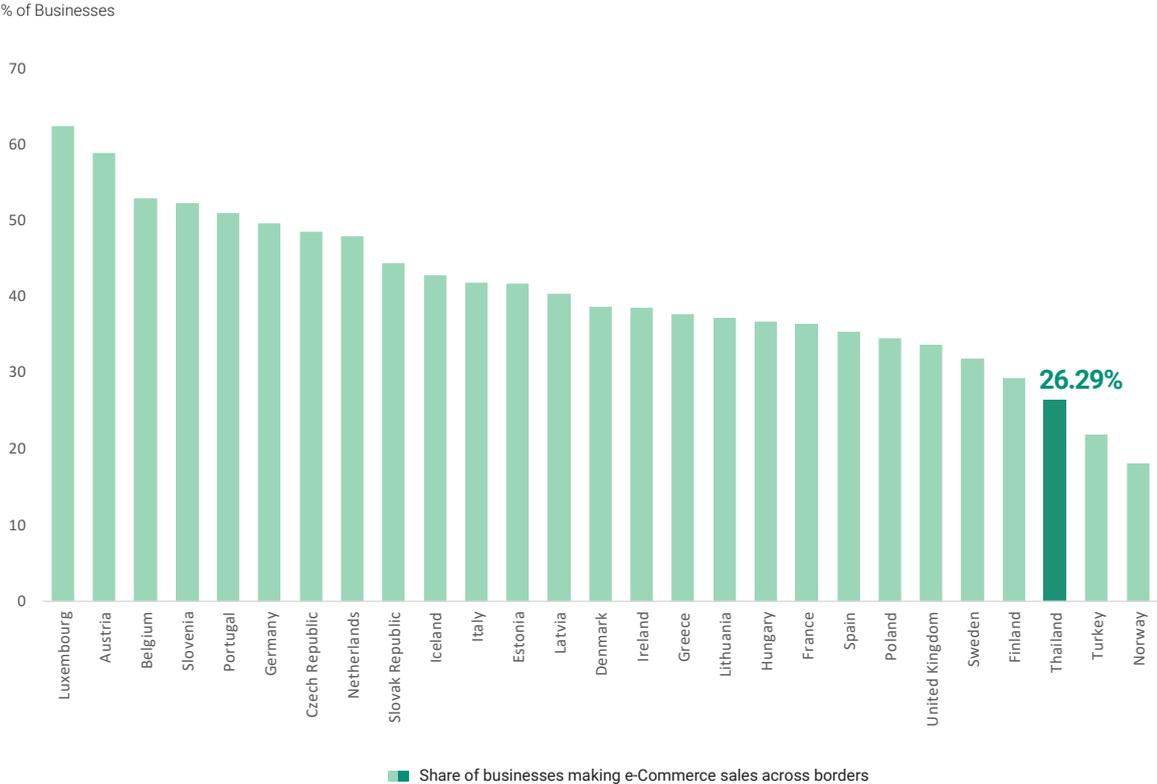
M1 : Share of businesses making e-Commerce sales across borders

This indicator assesses businesses’ incorporation of e-Commerce sales into their strategy to enhance business potentials as well as to access and penetrate foreign clients through cross-border e-Commerce.

The results from the Enterprises Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 26.29 percent of businesses in Thailand had conducted e-Commerce sales across the borders which was an increase from 2021 when only 3.20 percent of businesses did so. This was due to the COVID-19 outbreak which had forced businesses to adapt their operations and incorporate online sales platforms in addition to their traditional means of commerce.

Comparatively, Thailand had a low share of businesses making e-Commerce sales across borders where the average share of OECD countries was 40.90 percent. For this indicator, Luxembourg had the highest ranking with over 62.36 percent of their businesses having made e-Commerce sales across borders.

Share of businesses making e-Commerce sales across borders



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Enterprises Survey of Thailand Digital Outlook 2022 Project.

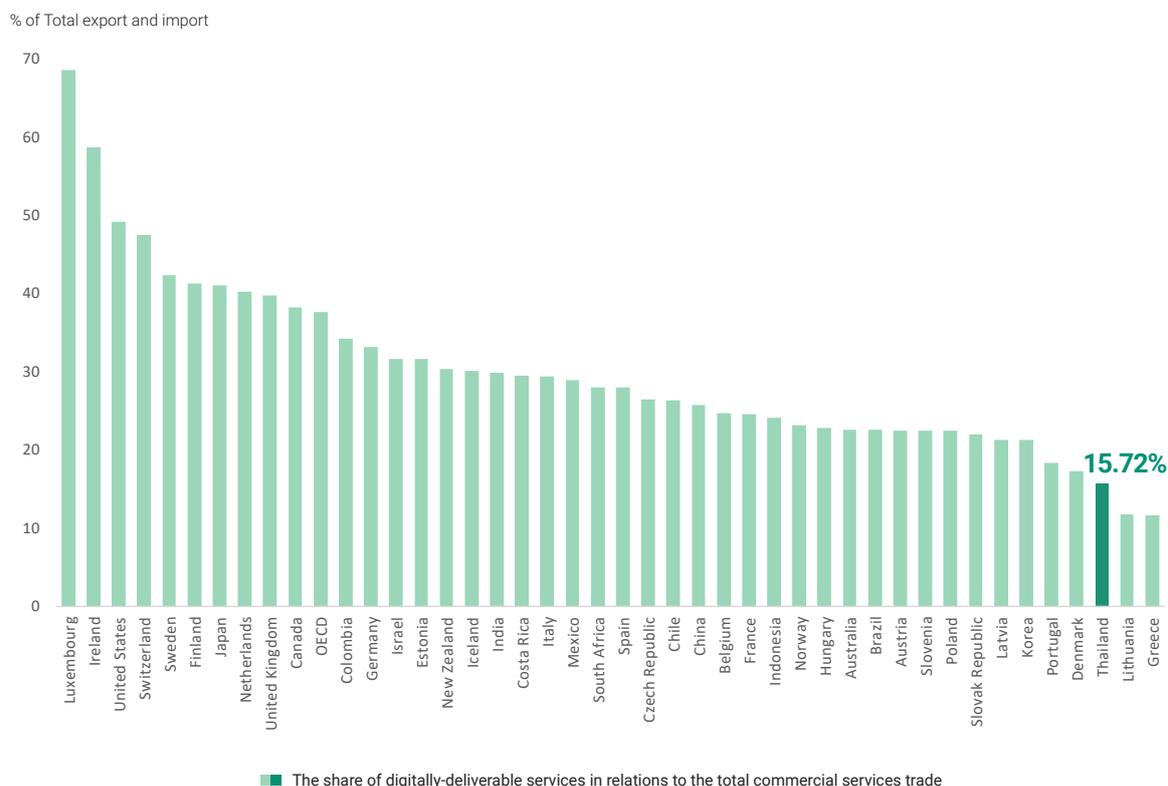
M2 : Digitally-deliverable services as a share of commercial services trade

This indicator reflects the share of businesses offering 5 digitally-deliverable services, including insurance services; financial services; intellectual property services; telecommunication, computer, and information services; audio-visual service; and related services. It will show the level of digital services in the country in relation to the total commercial services trade.

According to the Bank of Thailand (BOT) and the Digital Economy Promotion Agency (DEPA), the value of imported digitally-deliverable services in 2021 was 358,243.12 million baht or 17.03 percent of total imports while the value of exported digitally-deliverable services was 95,733.00 million baht or 12.20 percent of total exports. Thus, the share of digitally-deliverable services accounted for 15.72 percent of commercial services trade, which was an increase from the previous year when the share was 15.62 percent.

Thailand had a low share of digitally-deliverable services compared to the average share of OECD countries was 30.23 percent. For this indicator, Luxembourg had the highest ranking where digitally-deliverable services accounted for 68.47 percent of commercial services trade.

Digitally-deliverable services as a share of commercial services trade



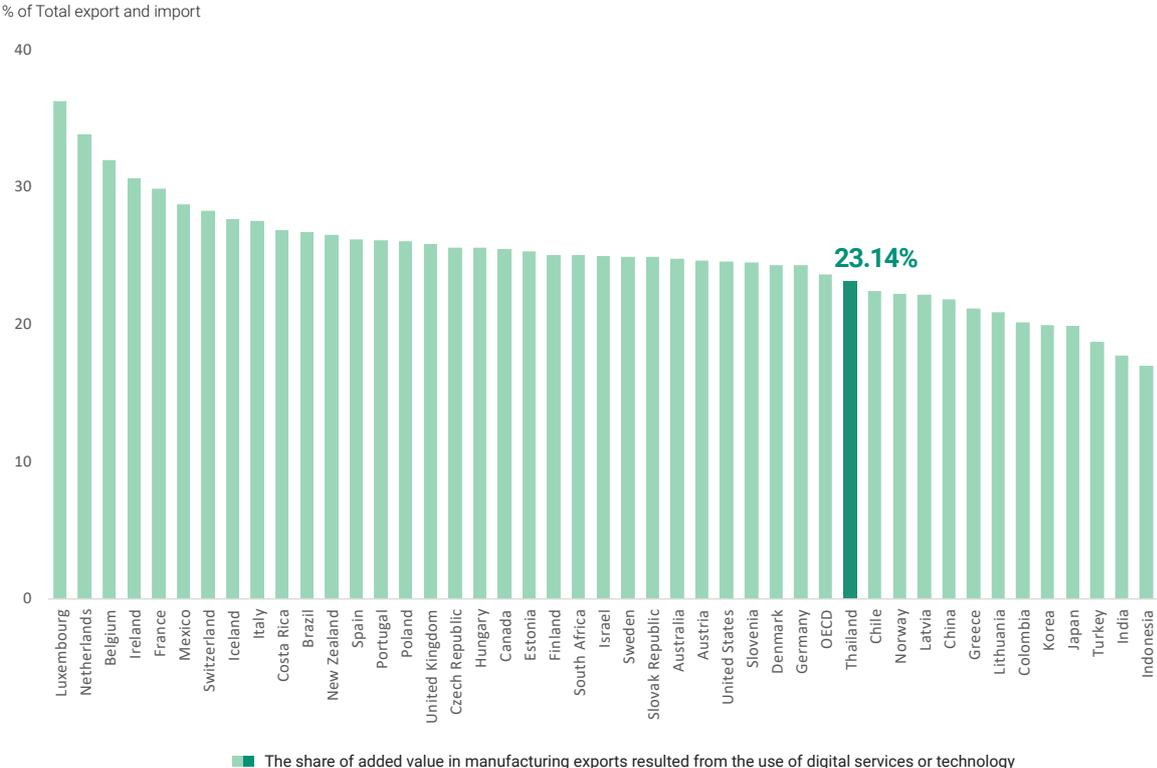
M3 : Digital-intensive services value added embodied in manufacturing exports, as a percentage of manufacturing export value

This indicator reflects the utilization of digital technology in the transition to digital forms of commerce which could provide added value to businesses and their operations. The focus is placed on the added value of businesses with moderate to high-level use of digital technology with exports to foreign countries. Such value is compared to the country's total manufacturing export value.

Data compiled by the OECD in 2015 found that the share of digital-intensive services value added embodied in manufacturing exports accounted for 23.14 percent of the total manufacturing export value.

Thailand had a similar share with that of OECD countries whose digital-intensive-services value added embodied in manufacturing exports averaged at 24.99 percent. For this indicator, Luxembourg had the highest ranking where such added value accounted for 36.22 percent of their manufacturing export value.

Digital-intensive services value added embodied in manufacturing exports, as a percentage of manufacturing export value



Source: OECD Going Digital Toolkits (as of 2 August 2022) and Trade in Value-Added (TiVA) database (OECD).

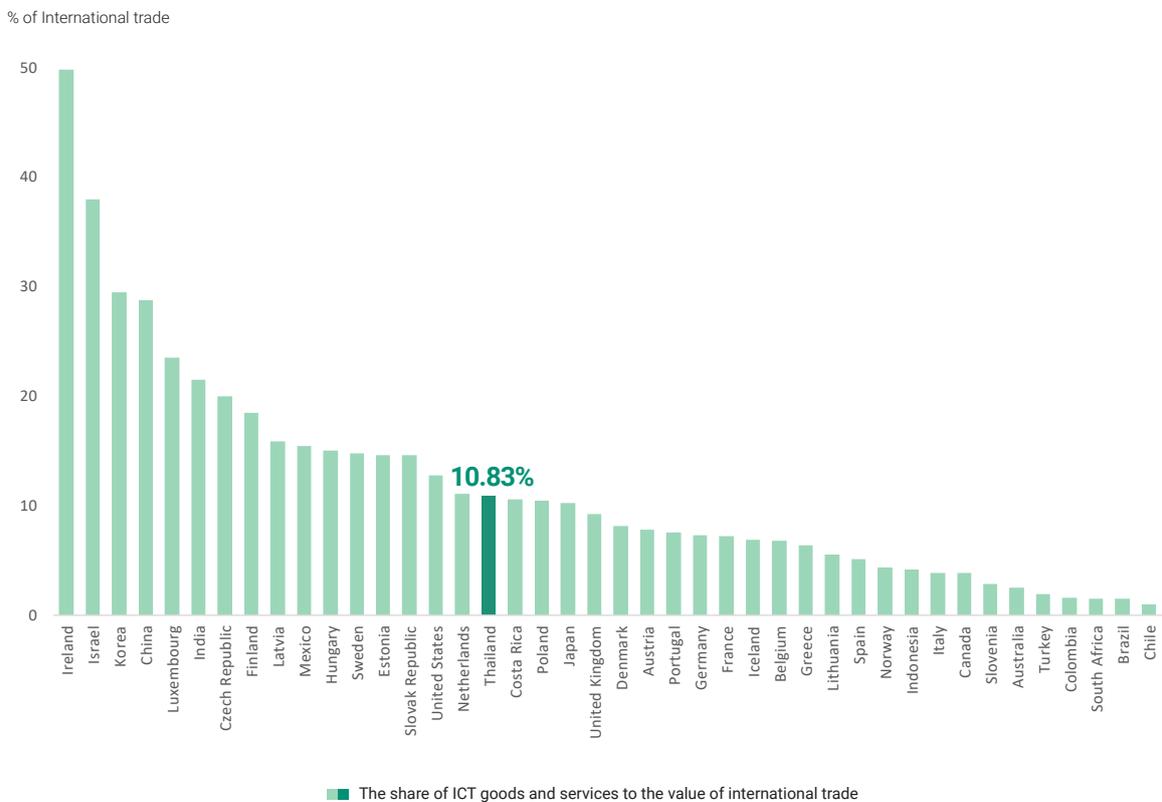
M4 : ICT goods and services as a share of international trade

Similar to M2, this indicator reflects the volume of both the exports and imports of ICT goods and services in relation to the country's international trade.

Data from the Customs Department in 2021 found that the volume of ICT goods and services trades totalled at 1.85 trillion baht which accounted for 10.83 percent of Thailand's international trade which was an increase from 2020 when such trades made up 14.27 percent.

Comparatively, Thailand had a similar share with that of OECD countries whose ICT goods and services trades accounted for an average of 11.72 percent of the total international trade. For this indicator, Ireland had the highest ranking with ICT goods and services trades accounting for over 49.77 percent of international trade.

ICT goods and services as a share of international trade



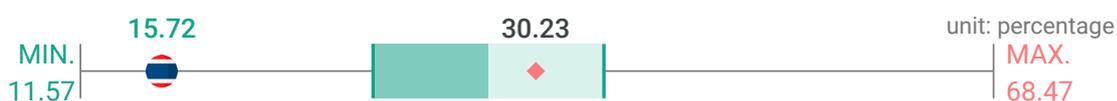
Source: OECD Going Digital Toolkits (as of 2 August 2022) and imports and exports data compiled by the Customs Department and BOT.

Summary of Thailand's Digital Development in the Market Openness Dimension

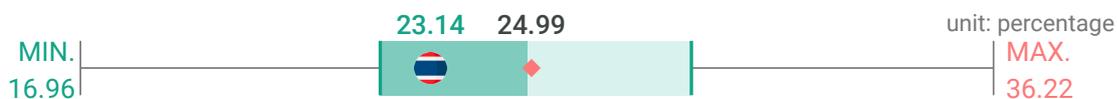
► Share of businesses making e-commerce sales that sell across borders (M1)



► Digitally-deliverable services as a share of commercial services trade (M2)



► Digital-intensive services value added embodied in manufacturing exports as a share of manufacturing export value (M3)¹



► ICT goods and services as a share of international trade (M4)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Source: ¹Data of 2015 from OECD Database



Based on comparative assessments of the digital development of Thailand and OECD members,

within the Market Openness Dimension, it was found that more pushes are needed to support transnational sales of digital goods/services where the current share of such trade is relatively lower than the average of OECD countries.

At the same time, the digital-intensive services value added embodied in manufacturing exports has been rather low while the share of businesses making e-Commerce sales across borders has been considerably lower than that of other OECD countries.



“10”

Thailand's Digital Development in the Growth & Well-being Dimension

Digital technology enhances economic growth by increasing the efficiency and effectiveness of productions which would add value to the products or services. At the same time, it would also add convenience and efficiency to people's way of life and work as they could utilize the internet and various digital technologies. Thus, digital technology impacts both living conditions and the growth of the country's digital economy.

For the **Growth & Well-being Dimension**, ONDE had referenced the OECD Frameworks to study relevant indicators on the impact of digital technology and the growth of the digital economy and society which impact individuals and businesses in the country whose general living and operations would be influenced by the various technologies.

There are 11 indicators that were studied and 3 of them were comparable to OECD countries. However, only 7 indicators are presented in this chapter as 4 other indicators* were taken from the Society and Trust Dimension.

* Note: Indicators from other Dimensions include G2/S3 (Percentage of individuals who use digital equipment at work that telework from home once a week or more), G4/S2 (Percentage of individuals who live in households with income in the lowest quartile using the internet), G6/T1 (Percentage of internet users experiencing abuse of personal information or privacy violations), and G7/S7 (E-waste generated, kilogram per inhabitant).

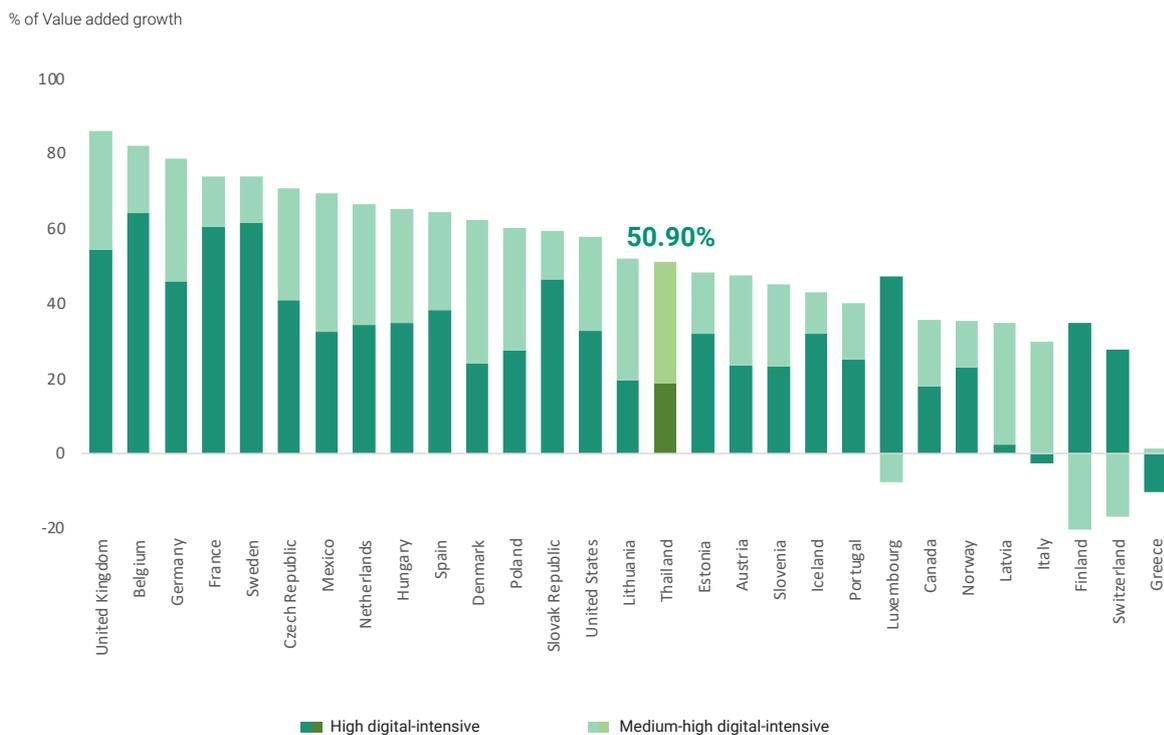
G1 : Digital-intensive sectors' contribution to value added growth

This indicator assesses the growth of digital businesses in the moderate-to-high and high digital-intensive sectors as defined by the OECD framework by considering the volume of value added growth generated by such sectors.

According to the data from the Office of the National Economic and Social Development Council, the value added growth generated by the digital-intensive sectors from 2017 - 2021 accounted for 11.90 percent of the country's total value added growth where 50.90 percent of that came from the Medium-high and High Digital-intensive Sectors whose contribution in the previous year was only 50.86 percent.

Comparatively, Thailand had a similar share with that of OECD countries whose value added growth generated by the digital-intensive sectors accounted for an average of 51.17 percent of the total value added growth. For this indicator, the United Kingdom had the highest ranking with the value added growth generated by the digital-intensive sectors accounting for over 86.10 percent of the country's total value added growth.

Digital-intensive sectors' contribution to value added growth



Source: OECD Going Digital Toolkits (as of 2 August 2022) and data of Quarterly Gross Domestic Production: Chain Volume Measure (QGDP - CVM) from NESDC.

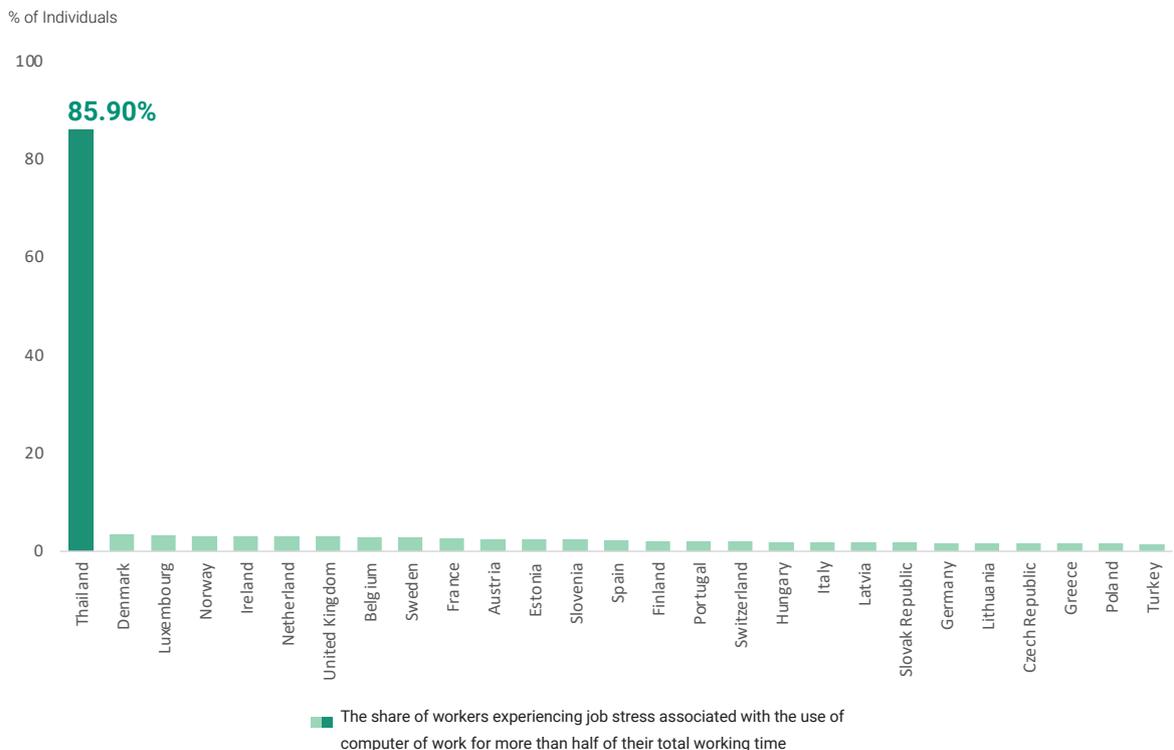
G3 : Workers experiencing job stress associated with frequent computer use at work

This indicator reflects the level of anxiety of workers in the country who had to use the computer for more than half of their work time.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 85.90 percent of workers experienced anxiety when using computers at work which was an increase from the previous year when it was only 61.30 percent.

However, it may appear that more share of Thai workers experienced job stress associated with computer use at work than those in OECD countries where only 2.20 percent of workers felt such anxiety for the same reason. However, the calculation for this indicator differed in Thailand and in OECD countries which meant the comparison may not be as accurate though it clearly showed a high share of experiencing job stress from frequent computer use. Additionally, Turkey had the highest ranking for this indicator with only 1.10 percent of their workers experiencing job stress due to prolonged usage of the computer at work.

Workers experiencing job stress associated with frequent computer use at work



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project.

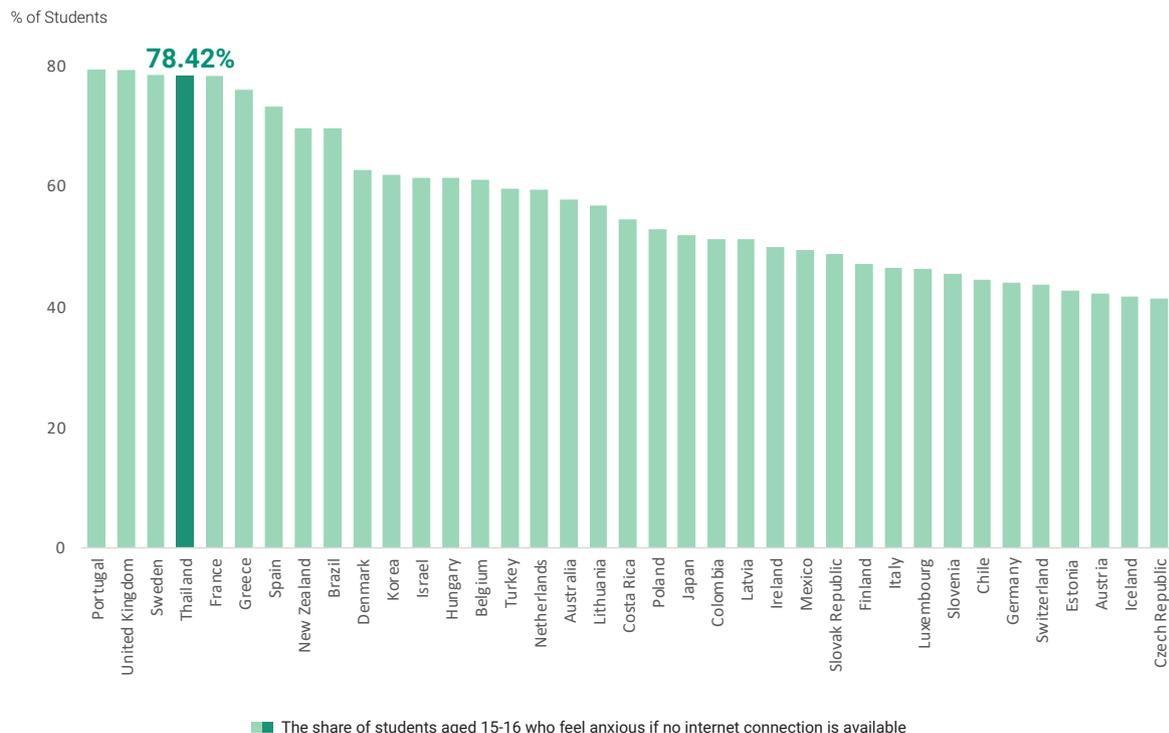
G5 : Students aged 15-16 who feel anxious if no internet connection is available

This indicator assesses the impact of digital technology on the behaviors of users and more specifically students aged 15-16 whose online studies and educational activities had made internet connection a vital concern.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 78.42 percent of Thai students of the age of 15-16 felt anxious when no internet connection was available which was an increase from 2021 when such share was only 71.20 percent.

Comparatively, Thailand had a high share of students aged 15-16 who felt anxious with the lack of internet connection while such a share of OECD countries was only 56.73 percent. For this indicator, the Czech Republic had the highest ranking with only 41.43 percent of their 15-16 years old students experiencing such anxiety.

Students aged 15-16 who feel anxious if no internet connection is available



Source: OECD Going Digital Toolkits (as of 2 August 2022) and the Individuals Survey of Thailand Digital Outlook 2022 Project.

G8 : Share of students who first accessed the Internet at age 6 or under

This indicator assesses the internet coverage, digital equipment, computer skills, and digital technologies for learning and education purposes as accessed and used by students.

According to the results of the 2018 PISA Survey compiled by the Institute for the Promotion of Teaching Science and Technology (IPST), 14.60 percent of 15-16-years-old students first accessed the internet at age 6 or under which meant Thai students on average first accessed the internet relatively late while the global average for this indicator was at 21.05 percent.



G9 : Share of 15-year-old students who spent between 2-6 hours on the Internet on regular days

This indicator reflects the volume of internet use for various online activities and the development of skills related to digital technologies.

According to the results of the 2018 PISA Survey, 37.26 percent of Thai 15-year-old students spent 2-6 hours on the internet on regular days outside school and 23.42 percent of Thai 15-year-old students used the internet on regular days in school. This was an increase from the data compiled in 2013 where the share of students using the internet outside school increased by 3.08 percent while the share of students using the internet inside school increased by 7.70 percent.



GX1 : Attitudes towards Teleworking

This indicator assesses the attitudes towards teleworking/Work From Home (WFH) which had replaced working at the office in this age of New Normal. Such information would provide relevant public and private agencies with relevant information to better enhance conditions of workers in the digital age in terms of their efficiency and mental health.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 65.27 percent were “familiar with teleworking/WFH” or “felt convenient when allowed to choose teleworking/WFH over working at the office” or “felt safe when allowed to choose teleworking/WFH over working at the office.” Additionally, 54.12 percent were “confused, disorganized, and unable to concentrate” and “felt stressed and exhausted during Teleworking.”



GX2 : Attitudes towards e-Learning/Online Learning

Similar to GX1, this indicator assesses the attitudes towards e-Learning/Online Learning of respondents following the development of digital technology and the advent of the New Normal which had impacted learners the most who had to adjust their studies.

The results from the Individuals Survey of Thailand Digital Outlook 2022 Project collected by ONDE found that 61.39 percent were “familiar with e-Learning/Online Learning” or “felt convenient when allowed to choose e-Learning/Online Learning over classroom learning” or “felt safe when allowed to choose e-Learning/Online Learning over classroom learning.” Additionally, 59.94 percent were “confused, disorganized, and unable to concentrate” and “felt stressed and exhausted during e-Learning/Online Learning”



Summary of Thailand's Digital Development in the Growth & Well-being Dimension

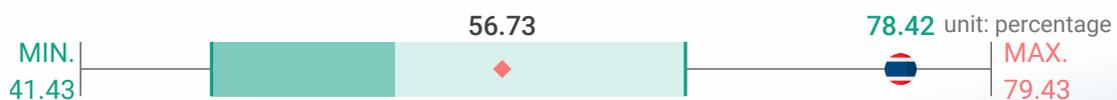
► Digital-intensive sectors' contribution to value added growth (G1)



► Workers experiencing job stress associated with frequent computer use at work (G3)



► Students aged 15-16 years who feel bad if no internet connection is available (G5)



Note: Indicator data of OECD countries were downloaded from the OECD Going Digital Toolkit database on 2 August 2022.

Based on comparative assessments of the digital development of Thailand and OECD members,

within the Growth and Well-being Dimension, it was found that the Thai digital business sector has not been able to generate much added value which means more emphasis needs to be given on the use of technology in adding productivity and values to businesses.

Among Thai employees, it was found that they have been experiencing stress from prolonged use of computer partly because of the need to work-from-home.



Meanwhile, the share of students aged 15-16 years who feel bad if no internet connection is available has been high when compared to other OECD countries which reflected the need to use the internet among students today who are engaged in various studying, communicating, and entertaining activities.

Summary of Thailand Digital Outlook 2022 Indicators

According to data collection through surveys in 3 sample groups (Individuals, Enterprises, and Primary Services) and from secondary data sources (both public and private agencies) which in accordance with OECD frameworks, ONDE had statistic data to analyze and establish Thailand Digital Outlook indicators. Such indicators made ONDE able to compare Thailand data between the past 2 years as well as with OECD countries' data. The table below shown the summary of Thailand Digital Outlook 2022 indicators.

Table 1: Summary of Thailand Digital Outlook 2022 Indicators

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
		Access Dimension 16 Indicators						
1	A1	Fixed broadband subscriptions per 100 inhabitants	14.90 ¹	16.85 ¹	19.24	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	31.38
2	A2	M2M (machine-to-machine) SIM cards per 100 inhabitants	1.83	2.27 ²	2.60	Latest Data: 2021 Frequency: Annually	Annual Report of Telecommunication Service Providers	27.89
3	A3	Mobile broadband subscription per 100 inhabitants	88.76	92.56	96.68	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	106.51
4	A4	Share of households with broadband connections	74.60 ³	85.20	88.00	Latest Data: Q2/2022 Frequency: Quarterly	The Household Survey on the Use of Information and Communication Technology by NSO	85.61
5	A5	Share of businesses with broadband contracted speed of 30 Mbps or more	78.40	89.80	63.92	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	75.51
6	A6	Share of the population covered by at least 4G mobile network	-	98.00	98.00	Latest Data: 2022 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	97.73

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
7	A7	Disparity in broadband uptake between urban and rural households	-	7.90	6.60	Latest Data: Q2/2022 Frequency: Quarterly	The Household Survey on the Use of Information and Communication Technology by NSO	6.32
8	A8	Trends in fixed broadband monthly subscription prices	-	-	497.90 THB	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	No Conformity to OECD Going Digital Toolkit
9	A9	Mobile Broadband monthly subscription pricing trends	-	-	235.71 THB	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	No Conformity to OECD Going Digital Toolkit
10	A10	Global Connection Speed	-	-	Fixed Broadband Download Speed: 229.95 Mbps, Upload Speed: 179.20 Mbps Mobile Broadband Download Speed: 67.99 Mbps, Upload Speed: 17.80 Mbps	Latest Data: 2021 Frequency: Monthly, Annually	OOKLA's reports on mobile and broadband internet speed	No Conformity to OECD Going Digital Toolkit
11	AX1	Fixed Broadband Price to GNI per Capita	2.90	2.73 ²	2.53	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC) and Office of the National Economic and Social Development Council (NESDC)	No Conformity to OECD Going Digital Toolkit
12	AX2	Share of high-speed internet connection by type of connection	51.70	58.22	95.35	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	No Conformity to OECD Going Digital Toolkit
13	AX3	Share of primary services with access to the internet	Not yet surveyed	76.40	95.17	Latest Data: 2022 Frequency: Annually	The Primary Services Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
14	AX4	Share of individuals with access to the internet, by type of residence	Not yet surveyed	Not yet surveyed	Horizontal Residences: 84.00% Vertical Residences: 74.75%	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
15	AX5	Share of enterprises with access to digital technology, by technology type	Not yet surveyed	Not yet surveyed	Data Analytics: 86.29% Robotic: 22.80% Artificial Intelligent (AI): 58.53% Internet of Things (IoT): 45.41% 5G Technology: 66.16% Cloud Technology: 61.37% VR/AR Technology: 29.77% Blockchain: 29.09% Metaverse: 22.96%	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
16	AX6	Share of primary services with access to digital technology, by technology type	Not yet surveyed	Not yet surveyed	Data Analytics: 13.32% Robotic: 4.75% Artificial Intelligent (AI): 14.11% Internet of Things (IoT): 8.77% 5G Technology: 47% Cloud Technology: 86.35% VR/AR Technology: 4.75 Blockchain: 8.70 Metaverse: 4.75	Latest Data: 2022 Frequency: Annually	The Primary Services Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
		Use Dimension 14 indicators						
17	U1	Internet users as a share of individuals	66.70	84.30	85.00	Latest Data: Q2/2022 Frequency: Quarterly	The Household Survey on the Use of Information and Communication Technology by NSO	86.99

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
18	U2	Share of individuals using the internet to interact with public authorities	35.30	64.20	65.59	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	61.06
19	U3	Share of internet users who have purchased online in the last 12 months	38.60	78.50	23.09	Latest Data: 2022 Frequency: Annually	The Internet User Behavior (IUB) by ETDA	67.83
20	U4	Share of small businesses making e-Commerce sales in the last 12 months	29.20	36.50	40.39	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	25.34
21	U5	Share of businesses with a web presence	Not yet surveyed	73.90	62.46	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	74.52
22	U6	Share of businesses purchasing cloud services	25.60	51.30	46.56	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	44.31
23	U7	Share of internet users who have purchased online in the last 12 months	12.70 GB ¹	18.00 GB	24.29 GB	Latest Data: 2021 Frequency: Annually	Office of The National Broadcasting and Telecommunications Commission (NBTC)	9.12 GB
24	U8	Share of persons and corporations filed income tax via online	-	-	76.05	Latest Data: 2021 Frequency: Annually	The Revenue Department	No Conformity to OECD Going Digital Toolkit
25	U9	Individuals who did not submit forms to public authorities online due to service availability	Not yet surveyed	Not yet surveyed	42.74	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
26	UX1	Value of digital transactions to 1 individual	Internet Banking: 366,713.00 THB Mobile Banking: 415,090.78 THB*	Internet Banking: 607,372.53 THB* Mobile Banking: 345,054.08 THB*	Internet Banking: 865,373.35 THB Mobile Banking: 410,660.56 THB*	Latest Data: 2022 Frequency: Annually	Bank of Thailand (BOT)	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
27	UX2	Share of agencies using public cloud services	48.02	53.20	74.79 ⁴	Latest Data: 2022 Frequency: Annually	Office of the National Digital Economy and Society Commission (ONDE)	No Conformity to OECD Going Digital Toolkit
28	UX3	Daily time spent on the internet	11 hours 25 minutes	10 hours 36 minutes	7 hours 4 minutes	Latest Data: 2022 Frequency: Annually	The Internet User Behavior (IUB) by ETDA	No Conformity to OECD Going Digital Toolkit
29	UX4	Share of enterprises adopting digital technology, by technology type	Not yet surveyed	Not yet surveyed	Data Analytics: 69.90% Robotic: 1.04% Artificial Intelligent (AI): 40.49% Internet of Things (IoT): 4.20% 5G Technology: 14.69% Cloud Technology: 27.92%	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
30	UX5	Share of primary services adopting digital technology, by technology type	Not yet surveyed	Not yet surveyed	Data Analytics: 10.74% Artificial Intelligent (AI): 4.61% 5G Technology: 8.90% Cloud Technology: 75.41%	Latest Data: 2022 Frequency: Annually	The Primary Services Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
Innovation Dimension 7 Indicators								
31	I1	ICT investment as a percentage of GDP	3.11 ⁶	3.32 ²	3.32	Latest Data: 2021 Frequency: Annually	Digital Economy Promotion Agency (DEPA) and Office of the National Economic and Social Development Council (NESDC)	2.37
32	I2	Business R&D expenditure in information industries as a percentage of GDP	0.06 ⁶	0.08 ²	0.09	Latest Data: 2019 Frequency: Annually	Office of National Higher Education Science Research and Innovation Policy Council (NXPO)	0.38

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
33	I3	Venture capital investment in the ICT sector as a percentage of GDP	0.03 ⁶	0.07 ²	0.06	Latest Data: 2021 Frequency: Annually	Thailand Tech Startup Ecosystem Year in Review Report by Techsauce and Thai Venture Capital Association (TVCA)	0.15
34	I4	Share of start-up firms (up to 2 years old) in the business population	26.30 ⁷	25.83 ⁷	24.57	Latest Data: 2022 Frequency: Annually	Department of Business Development (DBD)	23.94
35	I5	Tertiary graduates in natural sciences, engineering, and ICTs (NSE & ICT), by gender	-	-	Male: 12.19% Female: 10.02%	Latest Data: 2021 Frequency: Annually	Office of The Higher Education Commission (OHEC)	No Conformity to OECD Going Digital Toolkit
36	IX1	Number of ICT-related patents filed in Thailand	43.00 ⁸	56.00 ⁸	64.00	Latest Data: 2021 Frequency: Annually	Department of Intellectual Property (DIP)	No Conformity to OECD Going Digital Toolkit
37	IX2	Ratio of robots used in Thailand's manufacturing industry to 10,000 laborers	58.81	69.39 ²	69.39	Latest Data: 2020 Frequency: Annually	International Federation of Robotics Annual Report	No Conformity to OECD Going Digital Toolkit
		Jobs Dimension 10 Indicators						
38	J1	ICT task-intensive jobs as a percentage of total employment	3.48	3.81 ²	3.42	Latest Data: 2021 Frequency: Annually	National Statistical Office (NSO)	12.42
39	J2	Digital-intensive sectors' share in total employment	34.62 ⁹	34.40 ²	34.40	Latest Data: 2021 Frequency: Annually	National Statistical Office (NSO)	47.15
40	J3	Workers receiving employment-based training, as a percentage of total employment	21.10	44.20	45.80	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	58.98

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
41	J4	New tertiary graduates in science, technology, engineering and mathematics, as a percentage of new graduates	21.58	22.86 ²	22.21	Latest Data: 2021 Frequency: Annually	Office of The Higher Education Commission (OHEC)	23.31
42	J5	Public spending on active labour market policies, as a percentage of GDP	0.34 ^{6,10}	0.47 ^{6,10}	0.43	Latest Data: 2021 Frequency: Annually	Comptroller General's Department, Fiscal Policy Office (FPO), Office of SMEs Promotion (OSMEP), Digital Economy Promotion Agency (DEPA) and National Innovation Agency (NIA)	0.45
43	J6	Percentage of all enterprises that reported hard-to-fill vacancies for ICT specialists	Not yet surveyed	Not yet surveyed	5.74	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
44	J7	Digital skills (mis) match at work (as a percentage of individuals who use computers or computerized equipment at work)	Not yet surveyed	Not yet surveyed	Skill Mis-match: 35.02 Skill-Matched 64.98	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
45	J8	Percentage of ICT professionals and technology by gender)	-	-	Male: 3.37 Femal: 3.47	Latest Data: 2021 Frequency: Annually	National Statistical Office (NSO)	No Conformity to OECD Going Digital Toolkit
46	JX1	Average wage of ICT specialists	26,568.00 THB ¹¹	27,147.00 THB ¹²	25,679.00 THB	Latest Data: 2021 Frequency: Annually	National Statistical Office (NSO)	No Conformity to OECD Going Digital Toolkit
47	JX2	Labor productivity in digital-intensive industries	329,618.54 THB per worker ⁶	317,691.16 THB per worker ^{2,6}	334,703.40 THB per worker	Latest Data: 2021 Frequency: Annually	Office of the National Economic and Social Development Council (NESDC) and National Statistical Office (NSO)	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
		Society Dimension 16 Indicators						
48	S1	Percentage of individuals aged 55-74 using the internet	67.40	48.80	63.10	Latest Data: 2022 Frequency: Annually	National Statistical Office (NSO)	78.18
49	S2	Percentage of individuals who live in households with income in the lowest quartile using the internet	60.80	83.20	73.35	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	76.66
50	S3	Percentage of individuals who use digital equipment at work that telework from home once a week or more	35.70	36.70	78.60	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	26.43
51	S4	Women as a share of all 16-24 year-olds who can program	6.00	12.10	14.77	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	9.56
52	S5	Disparity in Internet use between men and women	Not yet surveyed	-0.40	1.00	Latest Data: Q2/2022 Frequency: Quarterly	The Household Survey on the Use of Information and Communication Technology by NSO	0.75
53	S6	Top-performing 15-16 year old students in science, mathematics and reading	2.65	2.65	2.65	Latest Data: 2020 Frequency: Annually	The Institute for the Promotion of Teaching Science and Technology (ISPT)	14.50
54	S7	E-waste generated, kilograms per inhabitant	9.20	9.20	9.20	Latest Data: Q2/2022 Frequency: Quarterly	Global E-waste Monitor Report 2019	15.91
55	S8	Percentage of Gap in Internet use, by educational attainment	Not yet surveyed	Not yet surveyed	20.90		The Household Survey on the Use of Information and Communication Technology by NSO	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
56	S9	Percentage of Individuals who used the Internet to access social networking sites in each age group	Not yet surveyed	Not yet surveyed	Sending/Receiving Emails: 36.24% Chat via application 92.02% Group Conversation:14.39% VDO Call: 56.27%	Latest Data: 2022 Frequency: Annually	The Internet User Behavior (IUB) by ETDA	No Conformity to OECD Going Digital Toolkit
57	S10	Percentage of individuals who used the Internet to access news online	Not yet surveyed	Not yet surveyed	79.60	Latest Data: 2022 Frequency: Annually	The Internet User Behavior (IUB) by ETDA	No Conformity to OECD Going Digital Toolkit
58	SX1	Awareness of digital technology among individuals	Not yet surveyed	Not yet surveyed	Data Analytics: 29.35% Robotic: 31.83% Artificial Intelligent (AI): 33.78% Internet of Things (IoT): 30.46% 5G Technology: 43.84% Cloud Technology: 33.57% VR/AR Technology: 26.76% Blockchain: 27.10% Metaverse: 25.38%	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
59	SX2	Awareness of digital laws among individuals	Not yet surveyed	Not yet surveyed	DES Development Act: 28.71% Digital Government Service Delivery Act: 28.63% Computer-Related Crime Act: 38.96% Cybersecurity Act: 33.74% PDPA Act: 30.41%	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
60	SX3	Awareness of digital technology among enterprises	Not yet surveyed	Not yet surveyed	Data Analytics: 44.15% Robotic: 27.69% Artificial Intelligent (AI): 30.01% Internet of Things (IoT): 30.70% 5G Technology: 52.73% Cloud Technology: 50.54% VR/AR Technology: 33.15% Blockchain: 36.41% Metaverse: 28.07%	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
61	SX4	Awareness of digital laws among enterprises	Not yet surveyed	Not yet surveyed	DES Development Act: 44.02% Digital Government Service Delivery Act: 38.59% Computer-Related Crime Act: 38.63% Cyber Security Act: 39.27% PDPA Act: 39.33%	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
62	SX5	Awareness of digital technology among primary services	Not yet surveyed	Not yet surveyed	Data Analytics: 0.85% Robotic: 23.57% Artificial Intelligent (AI): 23.45% Internet of Things (IoT): 31.59% 5G Technology: 80.00% Cloud Technology: 91.91% VR/AR Technology: 25.22% Blockchain: 20.81% Metaverse: 18.82%	Latest Data: 2022 Frequency: Annually	The Primary Services Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
63	SX6	Awareness of digital laws among primary services	Not yet surveyed	Not yet surveyed	DES Development Act: 68.38% Digital Government Service Delivery Act: 69.83% Computer-Related Crime Act: 66.42% Cyber Security Act: 64% PDPA Act: 64.63%	Latest Data: 2022 Frequency: Annually	The Primary Services Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
Trust Dimension 7 Indicators								
64	T1	Percentage of internet users experiencing abuse of personal information or privacy violations	11.50	6.30	3.40	Latest Data: 2022 Frequency: Annually	The Internet Trust & Security Survey by ETDA	3.26
65	T2	Percentage of individuals not buying online due to payment security concerns	9.50	5.40	17.33	Latest Data: 2022 Frequency: Annually	The Internet Trust & Security (ITS) Survey by ETDA	28.17
66	T3	Percentage of individuals not buying online due to concerns about returning products	11.50	13.60	19.77	Latest Data: 2022 Frequency: Annually	The Internet Trust & Security (ITS) Survey by ETDA	19.55
67	T4	Percentage of businesses in which ICT security and data protection tasks are mainly performed by own employees	26.00	28.60	36.09	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	42.83
68	T5	Health data sharing intensity	-	20.00	95.00	Latest Data: 2022 Frequency: Annually	Ministry of Public Health	65.19

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
69	T6	Percentage of individuals who provided personal information over the Internet in each age group	Not yet surveyed	Not yet surveyed	64.10	Latest Data: 2022 Frequency: Annually	The Internet Trust & Security (ITS) Survey by ETDA	No Conformity to OECD Going Digital Toolkit
70	T7	Percentage of respondents who trust in information accessed on social networks and messaging applications	Not yet surveyed	Not yet surveyed	51.59	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
Market Openness Dimension 4 Indicators								
71	M1	Share of businesses making e-Commerce sales that sell across borders)	20.80	3.20	26.29	Latest Data: 2022 Frequency: Annually	The Enterprises Survey of Thailand Digital Outlook Project by ONDE	40.90
72	M2	Digitally-deliverable services as a share of commercial services trade	8.89	15.62 ²	15.72	Latest Data: 2021 Frequency: Annually	Bank of Thailand (BOT) and Digital Economy Promotion Agency (DEPA)	30.23
73	M3	Digital-intensive services value added embodied in manufacturing exports, as a percentage of	23.14	23.14	23.14	Latest Data: 2015 Frequency: Annually	Trade in Value-added (TiVA) of OECD	24.99
74	M4	ICT goods and services as a share of international trade	-	14.27 ¹⁰	10.83	Latest Data: 2021 Frequency: Annually	Custom Departments and Bank of Thailand (BOT)	11.72
Growth & Well-being Dimension 11 Indicators								
75	G1	Digital-intensive sectors' contribution to value added growth	45.01 ^{6,9}	50.86 ^{2,6,9}	50.90	Latest Data: 2021 Frequency: Annually	Office of the National Economic and Social Development Council (NESDC)	51.17

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
76	G2-S3	Percentage of individuals who use digital equipment at work that telework from home once a week or more	35.70	36.70	78.60	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	26.43
77	G3	Workers experiencing job stress associated with frequent computer use at work	16.40	61.30	85.90	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	2.20
78	G4-S2	Percentage of individuals who live in households with income in the lowest quartile who use the Internet	60.80	83.20	73.35	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	76.66
79	G5	Students aged 15-16 who feel bad if no internet connection is available	65.20	71.20	78.42	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	56.73
80	G6-T1	Percentage of Internet users experiencing abuse of personal information or privacy violations	11.50	6.30	3.40	Latest Data: 2022 Frequency: Annually	The Internet Trust & Security (ITS) Survey by ETDA	3.26
81	G7-S7	E-waste generated, kilograms per inhabitant	9.20	9.20	9.20	Latest Data: 2019 Frequency: Annually	Global E-waste Monitor Report 2019	15.91
82	G8	Percentage of 15 year-old students who first accessed the Internet at age 6 or under	Not yet surveyed	Not yet surveyed	14.60	Latest Data: 2018 Frequency: Annually	The Institute for the Promotion of Teaching Science and Technology (IPST)	No Conformity to OECD Going Digital Toolkit
83	G9	Percentage of 15 year-old students spending two to six hours on the Internet during a typical weekday	Not yet surveyed	Not yet surveyed	Outside: 37.26% Inside: 23.42%	Latest Data: 2022 Frequency: Annually	The Institute for the Promotion of Teaching Science and Technology (IPST)	No Conformity to OECD Going Digital Toolkit

No.	Code	Indicators	Result of Thailand Digital Outlook 2020 Project	Result of Thailand Digital Outlook 2021 Project	Result of Thailand Digital Outlook 2022 Project	Periods and Frequencies of Data Released	Data Sources	Average Indicator's Value of OECD Countries
84	GX1	Attitudes towards Teleworking	Not yet surveyed	Not yet surveyed	“Familiar with / Felt save”: 65.27% “Confused / Felt stressed”: 54.12%	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit
85	GX2	Attitudes towards e-Learning/ Online Learning	Not yet surveyed	Not yet surveyed	“Familiar with / Felt save”: 61.39% “Confused / Felt stressed”: 59.94%	Latest Data: 2022 Frequency: Annually	The Individuals Survey of Thailand Digital Outlook Project by ONDE	No Conformity to OECD Going Digital Toolkit

*Notes:

- 1) The new data is gleaned from the Report of Office of The National Broadcasting and Telecommunications Commission (NBTC) Instead of the original data collected from telecommunications service providers.
- 2) Adjust the calculation method to match the methodology of Thailand Digital Outlook 2020 and Thailand Digital Outlook 2022.
- 3) The new data is data collected from the Office for National Statistics. Instead of the original data collected from the survey results in the project.
- 4) Collect the value of every transaction in the value of mobile banking transaction.
- 5) Adjust the selection of data to meet the guidelines of Thailand Digital Outlook project for the year 2020 and Thailand Digital Outlook project for the year 2022.
- 6) The data changes according to the GDP figures that are updated later.
- 7) Change from the original data using the proportion of newly established entrepreneurs. The proportion of all newly established entrepreneurs under 2 years of age is the sum of the proportion of all newly established entrepreneurs in 3 groups: 1) the proportion of newly established entrepreneurs up to the age of 2 years who are still in operation, 2) the proportion of newly established entrepreneurs up to the age of 1 year who are still in operation 3) The proportion of registration of newly established entrepreneurs at the time of calculation.
- 8) The new data is collected from the Department of Intellectual Property instead of the original data collected from the Office of National Higher Education Science Research and Innovation Policy Council.
- 9) Align the grouping of medium-high and high-level digital industries in accordance with the new OECD standards.
- 10) Adjust the calculation method to match the methodology of Thailand Digital Outlook 2022.
- 11) It uses the average income data of workers with INFORMATION TECHNOLOGY jobs (total) instead of calculating the average income of workers with information technology positions of males and females.
- 12) Updated to 2020 data– means that the data for calculating the indicators has been previously collected by the relevant authorities but has not been used for project studies.
- 13) – means the data for calculating the indicators have been collected by the relevant authorities before, but have not been used for study in the project.
- 14) “No survey” means that the data for calculating the metrics has never been stored before and has not been surveyed to store data in the project.





Office of the National Digital Economy
and Society Commission



Thailand
Digital
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