# The Measurement on Digital Contribution to GDP 2023

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

# Preface

Office of the National Digital Economy and Society Commission (ONDE) Measuring the digital contribution to GDP and the activity measuring the digital contribution to GDP for the fiscal year 2023 with the efficiency on database development and valuation of the digital economy and and its growth to further capture the current situation of digital for Thailand Digital Economy and Society Development Plan.

The estimation of the digital contribution to GDP in 2023 is based on the concept of the System of the National Accounts 2008 (2008 SNA) and the preliminary guidelines on the development of the Digital Supply and Use Table (DSUT) of the Organization of Economic Cooperation and Development (OECD), with the further aim on developing the Digital Economy Satellite Account (DESA), of which is one of the satellite accounts of the system of national income accounts of Thailand. The practice is consistent to both the definitions and statistical methodology according to the suggestions of the international organizations and could be used as an analytical tool for measuring the digital contribution including growth from digital economy to GDP, efficiently, up-to-dated, and internationally standardized. This could support relevant policy recommendations and be able to use as the key indicator for digital transformation and make international comparisons.

This report offers definitions, concepts, scopes, classifications, and methodology, of which is more up-to-date, including the results of the estimation of the digital contribution to GDP in all three conventional approaches of GDP measurement: production, income, and expenditure, of year 2017 – 2022.

Office of the National Digital Economy and Society Commission thanks to many public and private agencies and all the honored people who have continuously contributed the treasured data, including the constructive comments and corrective suggestions to the project on measuring digital contribution to GDP of Thailand digital contribution to GDP of Thailand in completion at this stage. ONDE wishes this report be useful for those relevant entities and scholars in any future fruitful applications it may further raise.

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# Executive Summary

The digital contribution to GDP 2023 is issued by Office of the National Digital Economy and Society Commission (ONDE) with the aim on the digital economy contribution to GDP, corresponding to economic structure trend for planning, policy formulation, and digital development strategy for Thai economy and society. This covers the definitions, scope of the digital economy, and internationally standardized measurement methodology to be appropriately applied for the Thai economy, including the balancing among economic activities, so as to be internationally credible and insightful for policy implications and policy recommendations to the digital economy and society of Thailand.

The digital contribution to GDP in 2023, as a continuation from 2017, has been managed according to the guidelines on the Digital Supply and Use Tables (DSUT) of OECD. For this phase, the Digital Supply and Use Table for Thailand (TDSUT) is further established to continue the development of the Digital Economy Satellite Account (DESA), which is one of the Satellite accounts of the SNA, according to the definitions, scope, classifications and measurements, of the international standards, to be the analytical tool for measuring the digital contribution to GDP, its growth, and other macroeconomic statistics efficiently, up-to-dated, and internationally standardized, enabling for any comparison to other countries.

The **conceptual framework** for measuring the digital economy is applied from the OECD published paper in 2020 with definition of the digital economy as the economic activities arose from digital activities as the significant driving factor both digital technology, digital infrastructure, digital services and various data covering producers, consumers, and public

authorities, for which brought digital technology as the factor for those economic activities.

For definitions of categories, OECD has released the conceptual framework on digital economy into four tiers as follows:

- **The Core measure**: Digital Economy covers economic activities related to the production of digital technology products and services.
- **The Narrow measure**: Digital Economy in the Narrow measure covers Core measure + "economic activities reliant on digital inputs".
- **The Broad measure**: Digital Economy in the Broad measure covers Narrow measure + "economic activities significantly enhanced by digital inputs".
- **Digital society**: Digital society covers Broad measure + "Other activities reliant on or significantly enhanced by digital inputs".

The Digital Contributed to GDP or Digital GDP, is processed in the form of national income accounting in 3 approaches: Production approach, Expenditure approach and Income approach as well as measuring the national GDP.

- Production approach: Calculation of value added from the production of goods and services within the boundary of digital economy.
- Expenditure approach: Calculation of final demand within the boundary of digital economy.
- Income approach: Calculation of the return to factors of primary production.


**Sources of data** are the secondary data from public and private sectors, covering digital product, digital platform, and digital services in many sectors. This includes data on the revenue and the expense of the production side, survey on the electronic commerce, survey on the software, financial transactions and insurance, socioeconomic survey, public spending from GFMIS and ELAAS For the primary source, the study surveys corporate business and household sample, including the public authorities and state agencies.

## Digital contribution to GDP in 2017 – 2022e

Note : Growth rate-Chain Volume Measures (CVM)

**In 2022e, it was found that the rate of expansion of the digital economy Decelerated by 1.90 percent** compared to an expansion of 11.83 percent in 2021, which is a result of the economic conditions of Thailand and the world economy that slowed down following the war situation in Europe and high oil prices.

### Production approach

**The gross output on production of the digital economy in 2022 increases, with the value added in 2022 of 2,117,259.05 million baht at the current market prices,** from the value in 2021 of 2,045,930.25 million baht at current market prices (or 3.49 percent growth), compared to 11.48 percent growth in 2021, due to the economic recovery in 2022 as higher COVID-19 vaccination rate, which results in COVID-19 pandemic subsided, and border reopening for foreign tourists, normalizing every economic sector especially restoration of normal operations although exports of digital goods and services declined in 2021. Consequently, GDP

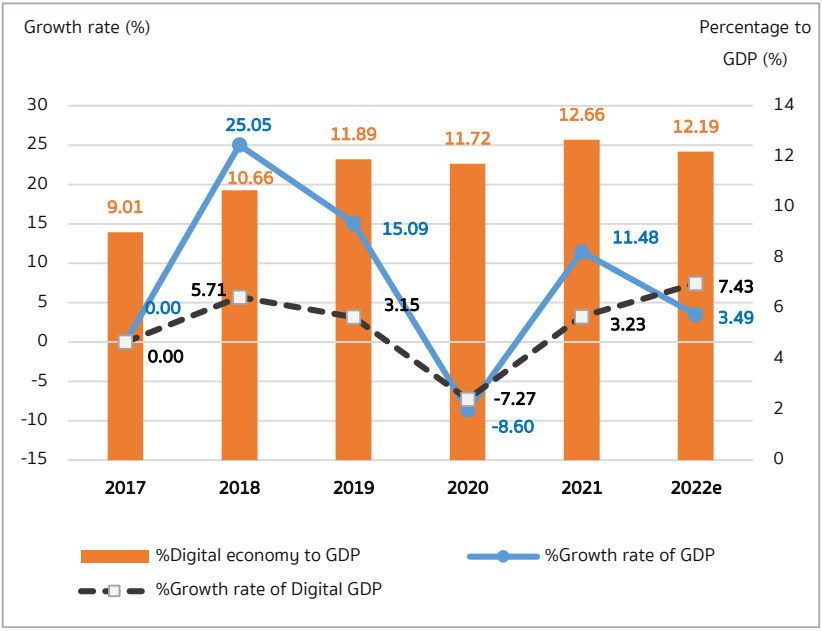
at current market prices in 2022 accounts 17,367,310.00 million baht (or 7.43 percent growth), increasing from 16,166,598.00 million baht (or 3.23 percent growth) in 2021.

**The digital economy has value added shares in GDP (digital contribution to GDP)** of 12.19 percent in 2022e, bit decline from 12.66 percent in 2021. Nevertheless, the digital contribution has the rising trend through since 2017 though a bit decline in 2022, due to the business transition in a short-term due to impact of COVID-19, reflecting the transition of the Thai economy to the new era, which concentrates on the higher portion of digital transformation with higher adaptability comparing to the traditional economy.

**Table : Digital Contribution to GDP in 2017 – 2022e**

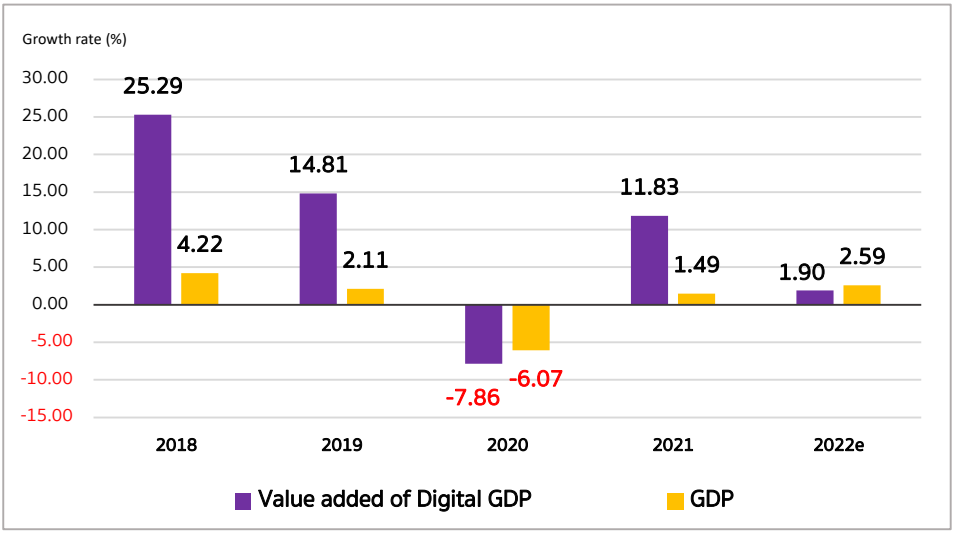
| | Value at current market price (million baht) | | | | | | % change | |
|---|---|---|---|---|---|---|---|---|
| | 2560 | 2561 | 2562 | 2563 | 2564 | 2565e | 2564 | 2565e |
| Value added of digital economy | 1,395,095.48 | 1,744,618.04 | 2,007,827.07 | 1,835,237.15 | 2,045,930.25 | 2,117,259.05 | 11.48 | 3.49 |
| GDP | 15,488,664.00 | 16,373,340.00 | 16,889,169.00 | 15,661,150.00 | 16,166,598.00 | 17,367,310.00 | 3.23 | 7.43 |
| % Digital Contribution to GDP | 9.01 | 10.66 | 11.89 | 11.72 | 12.66 | 12.19 | - | - |

Figure : Digital Contribution to GDP, growth rate of digital GDP and growth rate of national GDP at current market price in 2017 – 2022e




**The digital economy in real-term CVM** (with 2017 as reference year) expands 1.90 percent in 2022e, which decelerates from 11.83 percent in 2021. This reflects the adaptability of digital economy which results from eased impact of COVID-19 and the recovery trend of exports and tourism.

Figure : Growth rate of digital economy and national GDP in real-term (CVM)



## Income approach

Total returns are worth 2,117,259.05 million baht in 2022e, increasing from 2,045,930.25 million baht in 2021. The compensations of employee are worth 920,734.25 million baht and 1,017,627.03 million baht in 2021 - 2022, respectively, which share 45.00 percent and 48.06 percent of total returns. Operating surpluses and mixed income, which are the return on businesses both corporate and private, decreases from 809,765.15 million baht or 39.58 percent in 2021 to 747,423.12 million baht or 35.30 percent.

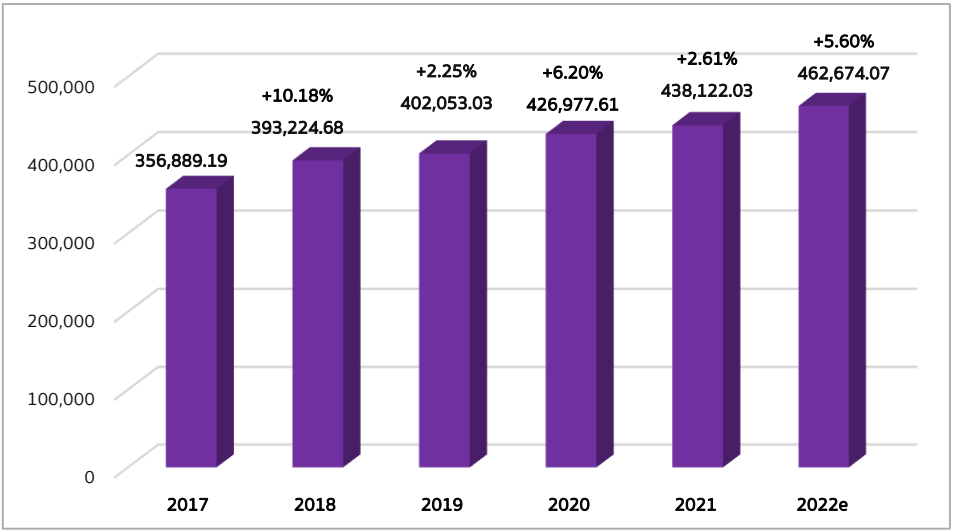
**Table : Returns on the factors of production in digital economy, 2017 – 2022e (million baht)**

| | Value (million baht) | | | | | | Share (%) | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| Compensation of employee | 733,250.63 | 923,043.78 | 935,562.86 | 802,129.87 | 920,734.25 | 1,017,627.03 | 45.00 | 48.06 |
| Operating surplus | 410,503.17 | 483,315.01 | 538,684.19 | 594,336.97 | 677,901.53 | 649,135.02 | 33.13 | 30.66 |
| Mixed income | 41,667.49 | 96,948.28 | 270,111.17 | 155,627.58 | 131,863.62 | 98,288.10 | 6.45 | 4.64 |
| Net tax on production | 82,169.97 | 95,625.72 | 108,001.67 | 106,107.65 | 119,795.01 | 123,074.17 | 5.86 | 5.81 |
| Depreciation | 127,504.22 | 145,685.25 | 155,467.18 | 177,035.08 | 195,635.84 | 229,134.73 | 9.56 | 10.82 |
| **Total** | **1,395,095.48** | **1,744,618.04** | **2,007,827.07** | **1,835,237.15** | **2,045,930.25** | **2,117,259.05** | **100.00** | **100.00** |

### Private final consumption expenditure

Private final consumption expenditure on digital activities at current market prices accounts for 462,674.07 million baht in 2022e, expanding from 438,122.03 million baht in 2021.

**Figure : Private final consumption expenditure on digital activities, 2017 - 2022e (million baht)**



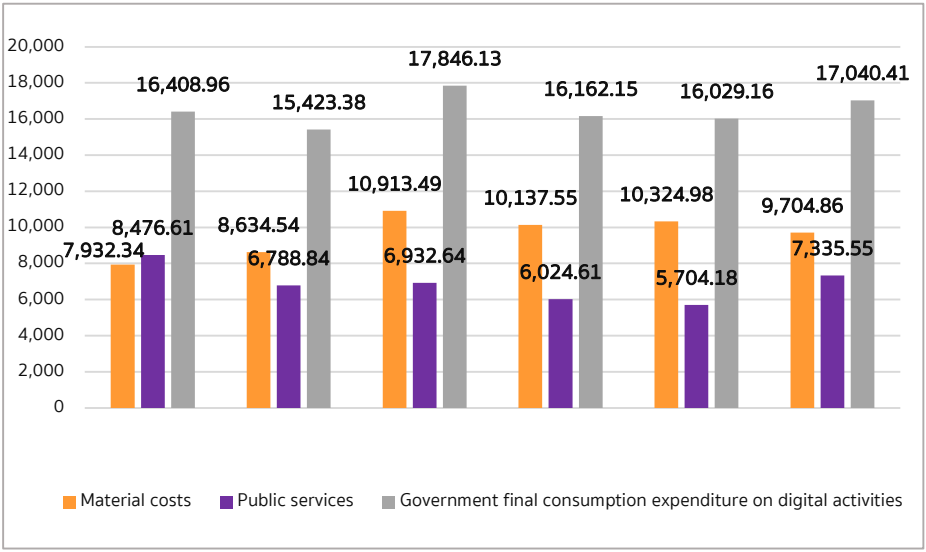

ICT expenditure, including telephone and internet bills is the highest value of 254,914.96 million baht and 254,550.01 million baht in 2021 – 2022e, respectively. This accounts about 58.18 percent and 55.02 percent. Expenditure on entertainment and culture, which includes the purchase of televisions and computers, accounts the share of 26.61 percent and 24.08 percent, respectively and miscellaneous items, which contain financial and insurance services, gains 13.28 percent and 12.29 percent, respectively.

Real-term private final consumption expenditure on digital activities (CVM) is worth 438,705.99 million baht in 2022e, which declines from 461,718.08 million baht in 2021 or 5.25 percent decrease, compared to 2.53 percent expansion in 2021 due to the expansion of entertainment and culture expenditure at the rate of 18.13 percent, miscellaneous at the rate of 8.39 percent from 0.92 percent in 2021. The communication expenditure which is important in 2022e is slightly shrinked 0.14 percent compared to the expansion rate of 3.55 percent in 2021.

## Government final consumption expenditure on digital activities

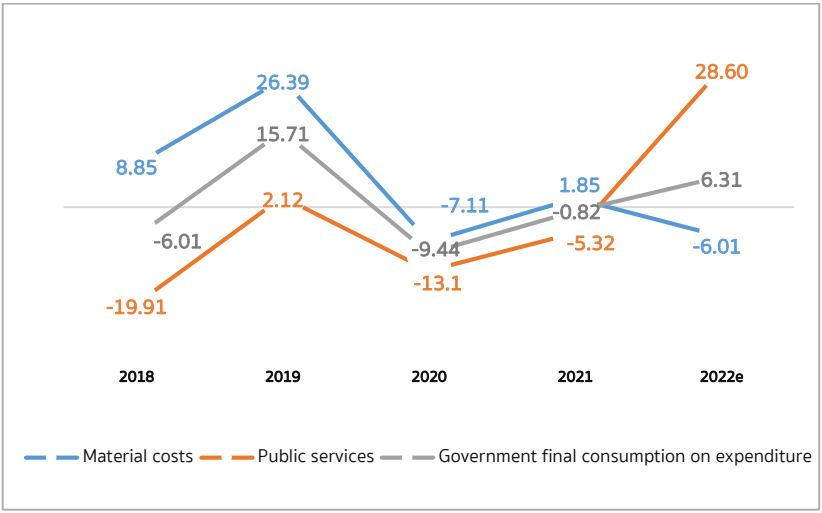
Government final consumption expenditure on digital activities at current market prices accounts 17,040.41 million baht in 2022e, increasing from 16,029.15 million baht in 2021. This includes material costs, which comprise computer repairs and electronic devices, website development services, banking fee and computer parts, for 9,704.86 million baht in 2022e, decreasing from 10,324.98 million baht in 2021. Public services, comprising telephone bill and internet expense, account 7,336.55 million baht in 2022e, increasing 5,704.18 million baht in 2021.

Figure : Government final consumption expenditure on digital activities 2017 - 2022e (million baht)

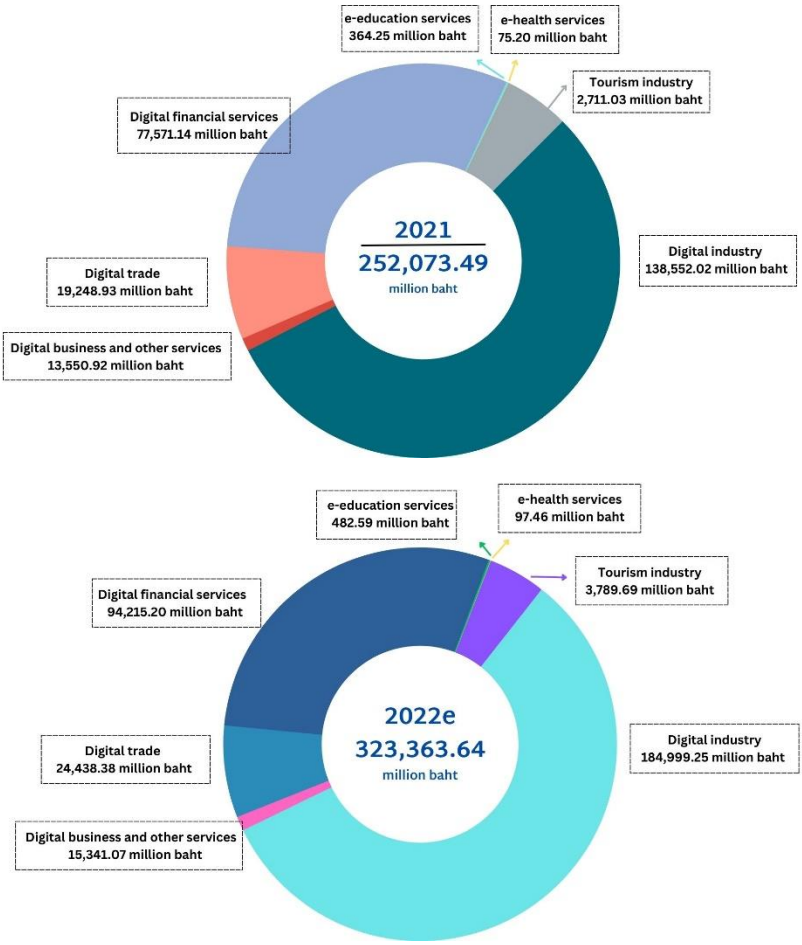



Real-term government final consumption expenditure on digital activities expands in 2022e by 6.31 percent, despite the drop in material costs by 6.01 percent, as a consequence of the rise in public sevice expenses by 28.60 percent as following the rising of internet and telephone services expenses. Though other expenses drop, the real-term government final consumption expenditure increases due to rising public sevice expenses from the expansion of internet and telephone services expenses.

Figure : Growth Rate of Real-term Government Final Consumption Expenditure on Digital activities in 2018 – 2022e (%)



## The digital gross fixed capital formation



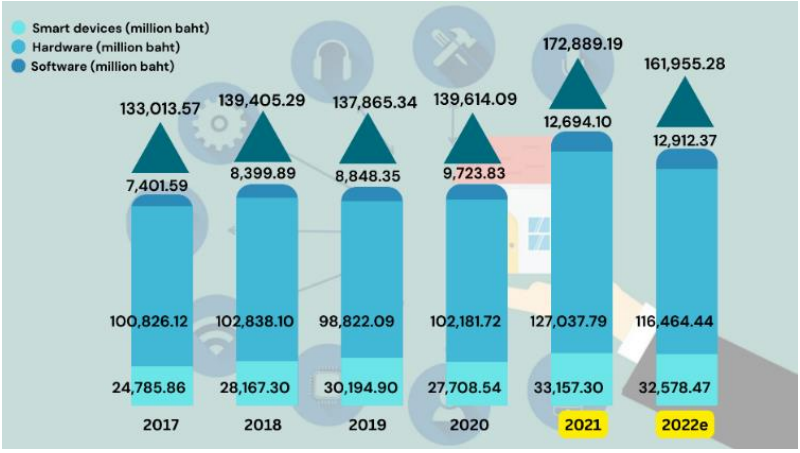

The digital gross fixed capital formation at current market prices in 2022e accounts 323,363.64 million baht, expanding from 252,073.49 million baht in 2021. By item, the gross fixed capital formation on digital industry, such as hardware, software, and ICT services, reaches the highest value of 184,999.25 million baht. The second rank is the digital financial

services, of which account of 94,215.20 million baht. The third rank is the digital trade, including digital trade and electronic commerce, accounts 24,438.38 million baht. The others also account increasing gross fixed capital formation.

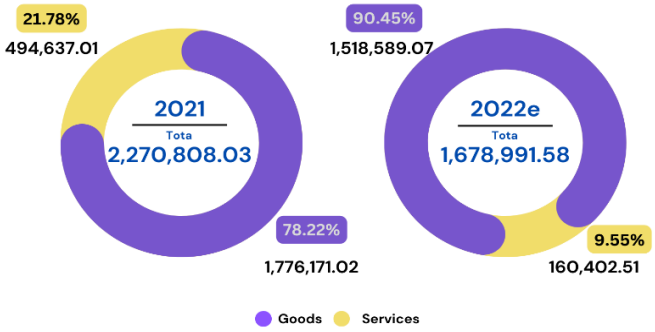
Considering gross fixed capital formation of digital products, including hardware and software, communication device, and smart devices accounts 161,955.28 million baht in 2022e, declining from 172,889.19 million baht in 2021, with computer hardware as the highest value, followed by smart devices and computer software, respectively.

Real Gross Fixed Capital Formation in real-term (CVM) values 161,783.57 million baht in 2022e, 8.27 percent reduction, compared to the expansion of 24.47 percent in 2021, as a result of reduction in gross fixed capital formation of electronics and integrated circuit, computer and connecting devices, communication equipment and domestic appliances, and smart devices.

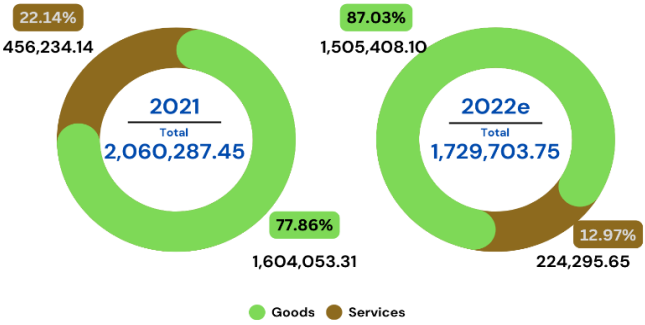
**Figure : The digital gross fixed capital formation by item 2017 - 2022e (million baht)**



**Exports of Digital Goods and Services**




**Imports of Digital Goods and Services**




## Exports and imports of digital goods and services

Exports of digital goods and services at current market prices (FOB) values 1,678,991.58 million baht in 2022e, increasing from 2,270,808.03 million baht in 2021. With the rising trend of that amount, exports of digital goods account 1,563,785.79 million baht, which share 72.05 percent. The digital services account 606,688. 1 8 million baht, which share 27. 95 percent.

Imports of digital goods and services values 1,729,703.75 million baht in 2022e, dropping from 2,060,287.45 million baht in 2021. Of that amount, imports of digital goods account 1,505,408.10 million baht, which share 87.03 percent. The import of digital services 224,295.65 million baht or 12.97 percent.

Summary on calculation of digital contribution to GDP on expenditure approach as in table following:

**Table : Digital Contribution to GDP on Expenditure Approach at Current Market Price in 2017 - 2022e**

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| **Million baht** | | | | | | |
| C : Private Final Consumption Expenditure | 356,889.19 | 393,224.68 | 402,053.03 | 426,977.61 | 438,122.03 | 462,674.07 |
| G : Government Final Consumption Expenditure | 16,408.96 | 15,423.38 | 17,846.13 | 16,162.15 | 16,029.16 | 17,040.41 |
| I : Gross Fixed Capital Formation | 255,539.25 | 280,949.26 | 288,838.76 | 255,378.63 | 252,073.49 | 323,363.64 |
| X : Export of Goods & Services (+) | 2,381,293.44 | 2,377,962.38 | 2,283,258.18 | 2,030,530.16 | 2,270,808.03 | 1,678,991.58 |
| M : Import of Goods & Services (-) | 1,868,855.61 | 1,986,467.82 | 1,898,946.96 | 1,727,856.24 | 2,060,287.45 | 1,729,703.75 |
| x-m : Net export of goods & services | 512,437.83 | 391,494.56 | 384,311.22 | 302,673.92 | 210,520.58 | -50,712.17 |
| GDE : Gross Domestic Expenditure | **1,141,275.23** | **1,081,091.88** | **1,093,049.14** | **1,001,192.31** | **916,745.26** | **752,365.95** |
| **% share** | | | | | | |
| C : Private Final Consumption Expenditure | 31.27 | 36.37 | 36.78 | 42.65 | 47.79 | 61.5 |
| G : Government Final Consumption Expenditure | 1.44 | 1.43 | 1.63 | 1.61 | 1.75 | 2.26 |
| I : Gross Fixed Capital Formation | 22.39 | 25.99 | 26.43 | 25.51 | 27.5 | 42.98 |
| X : Export of Goods & Services (+) | 208.65 | 219.96 | 208.89 | 202.81 | 247.7 | 223.16 |
| M : Import of Goods & Services (-) | 163.75 | 183.75 | 173.73 | 172.58 | 224.74 | 229.9 |
| x-m : Net export of goods & services | 44.9 | 36.21 | 35.16 | 30.23 | 22.96 | -6.74 |
| GDE : Gross Domestic Expenditure | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |

Summary on calculation of digital contribution to GDP on expenditure approach in real-term (CVM) as as in table following:

**Table : Digital Contribution to GDP on Expenditure Approach in Real-term (CVM) in 2017 - 2022e**

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| **Million baht** | | | | | | |
| C : Private Final Consumption Expenditure | 356,889.19 | 392,725.38 | 401,882.73 | 427,885.31 | 438,705.99 | 461,718.08 |
| G : Government Final Consumption Expenditure | 16,408.96 | 15,390.76 | 17,777.04 | 16,175.44 | 16,012.78 | 16,730.95 |
| I : Gross Fixed Capital Formation | 133,013.57 | 140,782.29 | 139,179.46 | 141,695.02 | 176,371.80 | 161,783.57 |
| X : Export of Goods & Services (+) | 2,381,293.47 | 2,310,767.37 | 2,178,963.21 | 1,897,594.08 | 1,856,458.62 | 1,321,181.60 |
| M : Import of Goods & Services (-) | 1,868,855.61 | 1,928,011.00 | 1,757,097.98 | 1,536,472.68 | 1,732,276.67 | 1,360,429.32 |
| **Growth rate (%)** | | | | | | |
| C : Private Final Consumption Expenditure | | 10.04 | 2.33 | 6.47 | 2.53 | 5.25 |
| G : Government Final Consumption Expenditure | | -6.21 | 15.50 | -9.01 | -1.01 | 4.48 |
| I : Gross Fixed Capital Formation | | 5.84 | -1.14 | 1.81 | 24.47 | -8.27 |
| X : Export of Goods & Services (+) | | -2.96 | -5.70 | -12.91 | -2.17 | -28.83 |
| M : Import of Goods & Services (-) | | 3.17 | -8.86 | -12.56 | 12.74 | -21.47 |

## Structure of Digital Goods and Services Production

From the digital input-output table in 2021 the digital economy value 35,901,046.00 million baht, categorized into digital sector, accouting 4,296,857.00 million baht or 13.01 percent. Excluding intermediate transaction of 2,114,649.00 million baht, value added accounts 2,040,125.00 million baht or percentage share of 47.48. Non-digital sector value 31,604,189.00 million baht or percentage share of 86.99. Excluding intermediate transaction of 18,104,016.00 million baht, value added accounts 13,642,256.00 million baht or percentage share of 43.17 percent.

Comparing percentage share of value added of digital sector and non-digital sector contribution to GDP, the value added of digital sector shares 13.01 percent of GDP and non-digital sector shares 86.99 percent of GDP.

Summary of the structure of digital and non-digital goods and services (million baht)

| | Digital sectors | Non-digital sectors | Total |
|---|---|---|---|
| **Intermediate Transaction** | 2,114,649.00 | 18,104,016.00 | **20,218,665.00** |
| Share per output | 49.21 | 57.28 | **56.32** |
| **Value added** | 2,040,125.00 | 13,642,256.00 | **15,682,381.00** |
| Share per output | 47.48 | 43.17 | **43.68** |
| **Total Output** | 4,296,857.00 | 31,604,189.00 | **35,901,046.00** |
| Value added per total GDP (% VA/ total GDP) | 13.01 | 86.99 | **100.00** |
| Gross output per total gross output (% GO/ total GO) | 11.97 | 88.03 | **100.00** |

## Data utilization

Digital contribution to GDP as the size of the digital economy is a part of the system of national accounts called digital economy satellite accounts. Thus, it is appropriate to apply for various economic analyses on macroeconomic measurement of the economy for the analyses with the national income accounting for the overall economy. With this kind of dataset, it is the main basic determinant for policy planning and further policy decision taking from the appropriate and logical strategic planning for both public and private sectors, considering some statistical indicators e.g. percentage share of digital economy to GDP, overall growth of digital economy. This dataset could be applied to support the policy planning and economic strategies including monitoring the success assessment for both public and private sectors. Time series data from all three approaches are useful for economic modeling in order to estimate the parameters to study the related policy impacts. This also includes the advantage on international comparison, as from the same concept and standard of measurement of the digital economy, it could effectively pave the way to assess the advancement of the economic development of each country in comparison.

## 1. Introduction

Impact from high inflation and consequently cost of living crisis in many countries including tight monetary conditions, Russo-Ukrainian War and COVID-19 pandemic affect world economic growth. Consequently, International Monetary Fund (IMF) projects global economic growth at 3.2 percent in 2022 and decelerate to 2.7 percent expansion in 2023. For Thailand, Office of the National Economic and Social Development Council (NESDC) projects economic growth of 3.2 percent due to recovery of private consumption expenditure after easing COVID-19 restrictions and continuous recovery of tourism.

Office of the National Digital Economy and Society Commission (ONDE), as the main entity driving the policies for digital economy and society, has noticed the importance of the measurement of the digital contribution to GDP and its growth, which is currently vital to the economic system. With the pandemic as one main factor that increases the importance of the technology transition and internet in the digital age, ONDE, thus, puts forward developing the economic tool to monitor the digital contribution on economic growth in 2023 with the aim on further studying and developing the measurement of the digital economy contribution to GDP, corresponding to economic structure trend for planning, policy formulation, and digital development strategy for Thai economy and society.

## 2. Objectives and Targets

The project on the measurement of the digital contribution to GDP is meant to provide the statistical indicators for strategic planning and policy implications for the digital development of Thailand, with the primary objective on setting up the framework, including definitions, scope, and guidelines, on the measurement of the digital economy in line with the international concept, covering the digital activities in all production, markets, transportation and logistics, and consumption. And this, in turn, is applied as the tool for the valuation of the digital economy according to the international standard of Systems of National Accounts (SNAs) comprising all production, expenditure, and income approaches of calculation, with at least seven groups of sectors those are digital industry, Tourism industry, digital trade, digital services, digital finance, digital education, digital health, and other services, of which being categorized in, at least, fifty sub-sectors, continuing from the previous phase and reports in series of 2017-2022. Of these, most of the reported data in 2022 is a preliminary estimate, and adjustment of Digital Input Output Table (DIOT) of Thailand to enhance completeness and efficiency.

## 3. Definitions and Measurements

The framework on digital contribution to GDP has been administered according to the international standards, of which are the Systems of National Accounts 2008: SNA 2008 and the guidelines on the Digital Supply and Use Tables (DSUT) of OECD. For this phase, the development is further established to be in accordance to the definitions, scope, classifications and measurements, of the international standards, to be the tool for measuring the digital contribution to GDP, its growth, and macroeconomic statistics efficiently, up-to-dated, and internationally standardized, enabling for any comparison to other countries.

**3.1 Concept and Definition** The study on the measurement on the digital contribution to GDP refers to the OECD paper, Digital supply–use tables: A step toward making digital transformation more visible in economic statistics (2021), which gives primary concern on the ICT sector & content and media sector, including e-commerce which relates to the trade, advertisement through electronic channels such as telephone, television, radio broadcasts, internet. Nevertheless, the OECD document: A Roadmap Toward a Common Framework for Measuring the Digital Economy (2020) has defined the digital economy as:

"The Digital Economy incorporates all economic activity reliant on, or significantly enhanced by the use of digital inputs, including digital technologies, digital infrastructure, digital services and data. It refers to all producers and consumers, including government, that are utilizing these digital inputs in their economic activities"

Furthermore, the latest study of OECD in 2020 also gives the scope on the measurement of the digital economy for four tiers as follows:

• **The Core measure**: digital economy as output produced by firms that are "intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display". This includes computer devices and parts, connecting devices, digital communication devices, software, communication services in digitaland internet services, digital content[1] and electronic data services.

• **The Narrow measure:** Core measure + "Economic activity reliant on digital inputs". This includes smart devices, electronic commerce, platform services, business services, transportation services, travel and accommodation services, financial and insurance services, educational services, health services, entertainment services, sports and recreational services, and those with the digital transmission.

• **The Broad measure:** Narrow measure + **"Economic activity significantly enhanced by digital inputs".** This includes industrial production, agricultural production, general business activities, all those enhanced by the digital inputs, for example, electronic and digital devices, automation, robotics those become engaged or substitutes for human resources as factor production (labor substitutes) or services for customers.

• **Digital society:** Broad measure + **"Other activity reliant on or significantly enhanced by digital inputs".** This includes free digitalservices such as internet platform activities i.e. health knowledge sharing, information & experience exchange by

[1]Define as information, news, documentary, music, movies, animation, advertisement and other social media serving digital communication system, including reuse rights

individual or organizations, public information sharing, and Wikipedia or similar web-services.

The additional measure economic activity, digitally ordered and/ or digitally delivered: The alternative measure of the digital economy considers characteristics of activity rather than output or production process, this would include **"all goods and services that are digitally ordered and / or digitally delivered".**

The measurement on digital contribution to GDP in 2023 covers the core and narrow measure, though still incomplete in some areas of the broad and digital society measure owing to the fact that the definitions are in the process of adoption and OECD case studies are in the pilot process. The study considers the characteristics of most economic activities within the economy whether they follow the OECD definition, thus this phase of measurement could still be underestimated due to the limiteddata resources representing such definition, with the wait for the further formal framework and in progress OECD guidelines.

Following the academic progress, it can be said that the internationally acceptable definitions and the exact meanings of the digital economy consequently began to be more definite but in the guideline development process, concerning the current transitional situation, for the conclusive international standard applicable for all countries.

For Thailand, to follow the international organization and become domestically acceptable, Office of the National Economic and Social Development Committee (NESDC) has applied the definition of the digital economy as follow: "System of economy and society with the digital application to enhance the efficiency on production of goods and services and to improve the facilitation for people. This covers the devices, ICT infrastructure, ICT services, hardware & software for computers and digital

devices, digital media, digital information, knowledge & entertainment, including the trading transactions, financial and insurance, and logistics, which operates via internet."

**3.2 Valuation** The measurement of the digital contribution on GDP follows the international concept on Systems of the National Accounts: SNA 2008, especially the three GDP calculation approaches: Production approach, Expenditure approach, and Income approach. This could represent the linkages of the macro economy and the digital economy through digital demands and supplies accordingly. The measurement on digital economy regarding SNA comprises of categorization, measurement methodology, and necessary details for developing the Digital Supply and Use Table, which requires to be in line with the country's Supply and Use Tables.

Three approaches on SNA can be summarized as follows:

1) **Production approach** means the approach on value added calculation from the goods/services production processes. Value added is calculated by the gross output or the revenue which could be calculated from the quantity produced multiplied by the associate commodity (or service) prices. This study collects data for the digital contribution measurement with the category of 134 sub-activities.

Value added = Gross output - Intermediate cost

***Gross output*** *means the value of goods and services produced from the production activities (In this case, calculated only digital economic activities) in according to the accounting period at producer prices, which exclude trade margins and transportation costs, but include tax on production such as value added taxes paid to the government.*

***Intermediate cost*** *means the intermediate expenses belong to the producers (who operate the digital businesses) which are consumableor spent within the production processes in the accounting period (e.g. one year) such*

*as expenses on raw materials, material costs, packaging costs, public services, fixing costs, office operation costs which follow the concept of the System of the National income accounts.*

In short, the calculation for the digital contribution to GDP for the production approach is to find the value added of the digital production and the summation of all digital production activities is equal to the digital contribution to GDP (current price). This study measures both at the current market prices and real prices, similar to the national nominal GDP and the real GDP or GDP at chain volume measure: CVM).

There are many sources of data for production measurement, both primary and secondary sources e.g. businesses' financial statements, survey for electronic commerce, survey for software services, sample survey on entrepreneurs for digital market output, etc.

**2) Expenditure approach**

Expenditure approach is the final consumption expenditure calculation approach or Aggregate Final Demand of the economy. It comprises of:

- **Private Final Consumption Expenditure: PFCE,** estimating from the overall Final Expense, mostly, from the secondary survey such as the Socioeconomic survey of the National Statistical Office (NSO), releases annually, which is the main source for digital PCE calculation, and the household survey on the digital expenses, including the survey on digital content of the Digital EconomyPromotion Agency (DEPA). Other methods applied to estimating the PCE are Commodity Flow Method, which is the indirect estimation of the household expenses using the value of production deducted by the export value of commodity/service and added up by the import value of that commodity/service, including margin and transportation cost, and other methods those are appropriate for different items e.g. services production, using the direct expenses instead.

• **Government Final Consumption Expenditure: GFCE** obtains from the current consumption of the authorities comprising of the central government, in the case of Thailand are ministries and their subsidiaries, independent entities, public entities, public fund, public organization and non-profit state enterprises, and local government, composing of Bangkok Metropolitan Area, municipal cities, Provincial Administration Organizations, Tambon Administration Organizations and Pattaya City Special Administrative Organization.

For the case of Digital GCE, this study collects the secondary data from the Comptroller General's Department, Ministry of Finance, for the expenses on digital goods/services of the central government via the GFMIS system and from the Department of Local Administration for the local government via the E-LAAS system, including the survey from many entities both from public and private sectors.

• **Gross Fixed Capital Formation: GFCF,** in SNA, comprises of buildings and machinery. Investment in machinery, in digital part, or in other words, digital GFCF in this context covers only digital machinery & software, of which being used more than one year. For private sector, it could be calculated by the commodity flows or the direct-surveyed data such as from the financial statement in the investment section of the digital entrepreneurs or digital businesses, while the public gross fixed capital formation for digital machinery collects the data from the central government and local governments and the direct survey from the central and local authorities, the same as the method used for the government final consumption expenditure.

• **Exports and Imports of goods and services:** the values are obtained from the international trade statistics according to the Harmonized Commodity Description and Coding System of the tariff statistics (HS Code) of the Customs Department, Ministry of Finance and the calculation on the

international trade of digital goods/services considers only the digital goods e.g. ICT and Content & Media. For the international trade on digital services, the values mostly obtained from the details of the Balance of Payments, Bank of Thailand.

3) **Income approach** measures in the boundary of the digital economy with the calculation of income or compensation of the primary factors, which are compensation of employees or the return to labors, Depreciation, the production taxes, and operating surplus which is the return on capital or rent, and in SNA, there is an item classified as mixed income, or the income/returns for private/personal businesses to be separately measured. This could apply with the data from the income statement of corporations and the survey sampling of the private/personal businesses with the data from the production measurement, to give more details on income from digital activities.

## 4. Methodology

The research methodology for this year, as continuing from phase I, II & III in both concept framework and data collection, for example, OECD's DESA conceptual framework, SNA 2008, National Income Accounts by NESDC, digital economy measurement studies by other countries, with data collections, and recommendations from related parties in public and private sectors, academic scholars and digital economy development specialists covering digital product, digital platform, and digital services thorough research project period. The research approach is also a combination of both qualitative research and quantitative research, of which including surveys on secondary data, either statistical or financial data from related data sources, and primary data from the private sectors. The project also has the focus groups for quality research, both public and private sectors, and interview visits in various local areas to gather the viewpoints from the related parties, including local authorities and entrepreneurs, and to capture the transitional situation concerning the digital transformation.

## 5. Construction of digital input-output table

Construction digital input-output table (I-O table) is followed by the same framework of Thaialnd's national input – output table, released by Office of the National Economic and Social Development Council (NESDC). The main differences between the two tables is the production sectors in digital I-O table mainly focuses on digital production and digital I-O table categories by 85 sectors, less than 180 sectors in national I-O table.

Moreover, the construction of digital I-O table in this project was emphasized on primary data from the field survey, which was different from the previous project that mainly used secondary data.

## 6. Data source and compilation

Collection of data selection both primary and secondary sources from documentation, reports, and necessary resources such as balance sheet and financial statement from the Department of the Business Development (DBD), the Comptroller General's Department (CGD), the Department of the Local Administration (DLA), the National Statistics Office (NSO), Office of the National Economic and Social Development Council (NESDC), Bank of Thailand (BOT), The Stock Exchange of Thailand (SET), Digital Economy Promotion Agency (DEPA), and Electronic Transactions Development Agency (ETDA), etc.

Collection of primary data sources from demographic study in industrial sector with digital products, digital platform services, and digital services together with household economy and quantitative data collected by government agencies via face-to-face interview especially census and telephone interview. Additionally, qualitative data is collected from public hearing in cooperation with project steering committee and meeting with focus group in cooperation with the representatives from involved governmental and private agencies.

The study follows the estimation of the digital contribution to GDP in all three approaches of GDP calculation: production, income, and expenditure approaches as ever mentioned. The development of digital supply and use table under the OECD framework, for which represents the linkages of the calculation of the digital contribution to GDP of all three approaches, especially the value added by digital activities, including all other relevant data to obtain the digital contribution to GDP.

# 7. Estimated measurement of the Digital Economy in 2021 – 2022e

## 7.1 Production approach

### Digital Economy Outlook

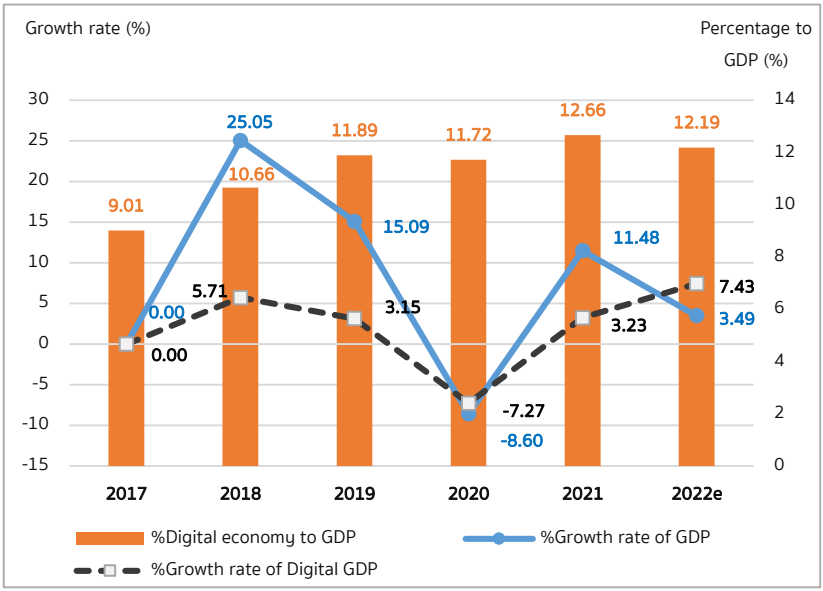
The gross outputs measured in the boundary of the digital economy have the value of 4,438,618.32 million baht in 2022e, compared to the value of 4,296,856.66 million baht in 2021. With the value added on production of the digital economy of 2,045,930.25 million baht and 2,117,259.05 million baht in 2021 and 2022e at current market prices, respectively (or 11.48 percent and 3.49 percent expansions in 2021 and 2022e, respectively). After the COVID-19 impact subsides in 2022, the economy becomes normalized. Comparing to the GDP at current market prices, released by NESDC, of 16,166,598.00 million baht and 17,367,310.00 million baht in 2021 and 2022e, respectively, the digital economy has value added shares in GDP (digital contribution to GDP) of 12.66 percent and 12.19 percent in 2021 and 2022e, respectively.

Considering growth rate of digital economy compared to GDP growth, the average growth rate of the digital economy between 2017 – 2022e is 9.30 percent per year, higher than the average overall growth rate of 2.45 percent, reflecting digital economic transformation as one of the driving mechanisms of the overall economy. Digital economic transformation in each year impacts the overall economy in the same way with more fluctuation.

## Table 1 : Digital Contribution to GDP, 2017 – 2022e (million baht)

| Current market prices | Unit | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|---|
| Gross output of digital economy | million baht | 3,020,699.43 | 3,619,562.15 | 4,005,594.38 | 3,860,424.89 | 4,296,856.66 | 4,438,618.32 |
| Value added (Digital Contribution) | million baht | 1,395,095.48 | 1,744,618.04 | 2,007,827.07 | 1,835,237.15 | 2,045,930.25 | 2,117,259.05 |
| Growth rate of value added (Digital) | % | | 25.05 | 15.09 | -8.60 | 11.48 | 3.49 |
| GDP at current market prices | million baht | 15,488,664.00 | 16,373,340.00 | 16,889,169.00 | 15,661,150.00 | 16,166,598.00 | 17,367,310.00 |
| Percentage of Digital Contribution to GDP | % | 9.01 | 10.66 | 11.89 | 11.72 | 12.66 | 12.19 |
| Growth rate of GDP (current market price) | | | 5.71 | 3.15 | -7.27 | 3.23 | 7.43 |

**Figure 1 : Digital Contribution to GDP, growth rate of digital GDP and growth rate of national GDP at current market price in 2017 – 2022e**



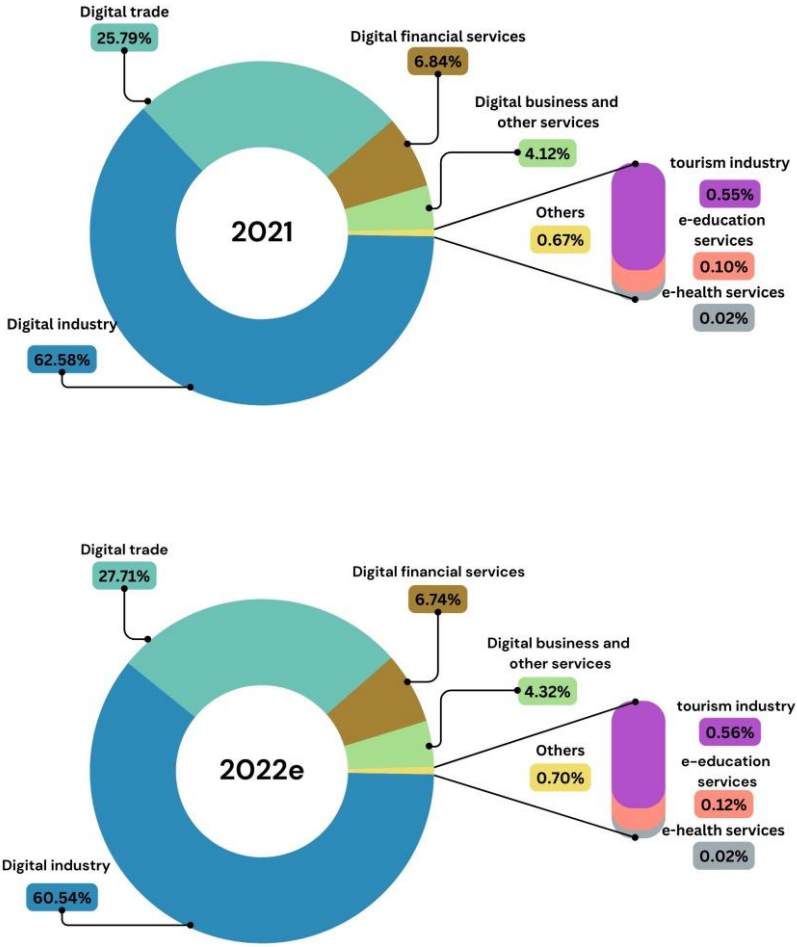

For digital sectors, which are classified according to the ONDE's digital transformation policy into 7 major categories, it is found that the economic structure of the digital economy has concentrated format in 2022e. The first 2 categories, sharing 88.37 percent of the total value added of the digital economy, are 1) digital industry, constituting 62.58 percent (over 3 out of 5) and 2) digital trade, constituting 25.79 percent (over 1 out of 5). Therefore, promotion in digital industry and digital trade will enhance such total value added. Meanwhile, if the risk occurs, it will detrimentally impact the overall economy.

Digital industry constitutes the highest value added of 60.54 percent of the total value added of the digital economy in 2022, followed by digital trade (27.71 percent), digital financial services (6.74 percent),

digital business and other services (4.32 percent), Tourism industry (0.56 percent), e-education services (0.12 percent), and e-health services (0.02 percent) respectively.

Considering shares of 7 categories in 2021 – 2022e, it is found that the shares of digital business and other services, e-education services, and tourism industry slightly increase. This reflects the rising role of the digital economy in such business activities Nevertheless, e-health services has steady share as health service is required of specific skill e.g. diagnosis, lab test, medical procedure, etc, which results digital technology not applicable as expected.

Figure 2 : Percentage Share of Digital Economy Classified by Digital Sectors in 2021 – 2022e



## Table 2 : Digital Economy Classified by Digital Sectors in 2017 – 2022e (million baht)

| Value at current market price | Value added | | | | | | % share | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| **1. Digital industry** | **793,959.34** | **925,645.55** | **980,678.43** | **1,122,059.81** | **1,280,422.80** | **1,281,749.85** | **62.58** | **60.54** |
| 1.1 Smart devices | 52,406.20 | 78,677.32 | 87,058.70 | 88,719.43 | 118,235.39 | 81,478.95 | 5.78 | 3.85 |
| 1.2 Hardware | 354,427.18 | 345,591.78 | 311,323.33 | 500,226.24 | 618,696.60 | 432,827.43 | 30.24 | 20.44 |
| 1.3 Software | 66,509.30 | 69,553.86 | 75,994.50 | 46,859.07 | 54,531.66 | 60,190.98 | 2.67 | 2.84 |
| 1.4 Digital services (services on digital platform digital order digital delivery) | 63,074.03 | 73,432.79 | 88,177.68 | 61,956.64 | 64,102.38 | 65,926.22 | 3.13 | 3.11 |
| 1.5 Communication | 192,006.66 | 292,667.80 | 355,203.06 | 379,791.68 | 388,731.48 | 593,645.89 | 19.00 | 28.04 |
| 1.6 Digital content | 65,535.97 | 65,722.00 | 62,921.16 | 44,506.75 | 36,125.29 | 47,680.38 | 1.77 | 2.25 |
| **2. Tourism industry** | **35,893.20** | **42,028.90** | **35,962.88** | **19,092.21** | **11,197.31** | **11,776.60** | **0.55** | **0.56** |
| 2.1 Accommodation for visitors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.2 Food and beverage serving activity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.3 Transport equipment rental | 8,317.58 | 10,552.58 | 12,458.76 | 8,363.34 | 4,615.26 | 5,756.01 | 0.23 | 0.27 |
| 2.4 Travel agencies and other reservation services) | 25,237.30 | 28,358.78 | 19,401.34 | 6,995.12 | 2,564.09 | 926.71 | 0.13 | 0.04 |
| 2.5 Cultural activity | 28.93 | 58.52 | 16.88 | 37.86 | 63.28 | 73.84 | 0.00 | 0.00 |
| 2.6 Sport and recreation activity | 2,309.39 | 3,059.02 | 4,085.90 | 3,695.89 | 3,954.68 | 5,020.04 | 0.19 | 0.24 |
| 2.7 Retail trade of country-specific tourism characteristic goods) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.8 Other country-specific tourism characteristic activity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **3. Digital trade** | **317,596.84** | **533,152.01** | **685,161.88** | **469,529.47** | **527,688.41** | **586,687.74** | **25.79** | **27.71** |
| 3.1 Trade on digital goods | 144,714.28 | 151,903.32 | 234,304.73 | 201,344.09 | 240,305.05 | 289,252.59 | 11.75 | 13.66 |
| 3.2 Online trade | 172,882.56 | 381,248.69 | 450,857.15 | 268,185.38 | 287,383.36 | 297,435.15 | 14.05 | 14.05 |
| **4. Digital financial services** | **136,891.46** | **140,939.27** | **140,781.62** | **132,464.77** | **139,901.63** | **142,603.70** | **6.84** | **6.74** |
| 4.1 Digital banking services | 95,353.47 | 96,869.89 | 95,225.41 | 90,431.87 | 84,065.60 | 93,984.61 | 4.11 | 4.44 |
| 4.2 Other financial services | 41,537.99 | 44,069.38 | 45,556.21 | 42,032.90 | 55,836.03 | 48,619.09 | 2.73 | 2.3 |
| **5. E-education services** | **2,289.68** | **1,092.61** | **1,467.71** | **2,076.34** | **2,107.81** | **2,528.11** | **0.10** | **0.12** |
| 5.1 E-education services | 2,289.68 | 1,092.61 | 1,467.71 | 2,076.34 | 2,107.81 | 2,528.11 | 0.10 | 0.12 |
| **6. e-health services** | **196.9** | **205.91** | **228.76** | **265.54** | **394.14** | **400.48** | **0.02** | **0.02** |

| Value at current market price | Value added | | | | | | % share | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| 6.1 e-health services | 196.9 | 205.91 | 228.76 | 265.54 | 394.14 | 400.48 | 0.02 | 0.02 |
| **7. Digital business and other services** | **108,268.06** | **101,553.79** | **163,545.79** | **89,749.01** | **84,218.15** | **91,512.57** | **4.12** | **4.32** |
| 7.1 Postal and courier services | 86,454.86 | 79,262.11 | 139,383.05 | 73,584.84 | 67,461.50 | 74,461.54 | 3.30 | 3.52 |
| 7.2 Other digital business services | 21,813.20 | 22,291.68 | 24,162.74 | 16,164.17 | 16,756.65 | 17,051.03 | 0.82 | 0.81 |
| **Total** | **1,395,095.48** | **1,744,618.04** | **2,007,827.07** | **1,835,237.15** | **2,045,930.25** | **2,117,259.05** | **100.00** | **100.00** |

Note: Sectors not shown in Table are sectors not included in this study since they are not included in Core and Narrow levels.


For **50 digital sub-sectoral categorizations** (applied from the TSIC standard category rev. year 2009), ranking by value, 5 sub-sectors with highest value added are:

- Wireless communications 530,206.12 million baht
- Electronics and Integrated Circuit 318,449.52 million baht
- Internet Retail 295,527.68 million baht
- Wholesale Trade on Digital Products 169,502.75 million baht
- Retail Trade on Digital Products 121,657.31 million baht

Top 5 rankings constitute total value added of 1,435,343.38 million baht or percentage share of 67.79 percent from 50 digital sub-sectoral categorization. Wireless communications are with the highest percentage share of 25.04 percent, reflecting potential and strength of Thai digital economy as 1 out of 4 of value added generated from infrastructure activities.

Additionally, the growth rate of top 5 rankings is 10.82 percent in 2022, compared to the growth rate of total digital economy of 3.49 percent. Considering top 5 rankings, 4 out of 5 sub-sectors are related to digital services, whilst only one is involved to digital production

**Table 3 : Value Added on Digital Activities at Current Market Prices Categorized by Top 5 Ranking in 2020 – 2022e (million baht)**

| Rank | Sub-sectors | Value Added | | | Share | | | % change | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2020 | 2021 | 2022e | 2020 | 2021 | 2022e | 2020 | 2021 | 2022e |
| 1 | Wireless communications | 340,242.29 | 347,863.02 | 530,206.12 | 18.54 | 17.00 | 25.04 | +26.52 | +2.24 | +52.42 |
| 2 | Electronics and Integrated Circuit | 304,457.69 | 419,682.09 | 318,449.52 | 16.59 | 20.51 | 15.04 | +53.97 | +37.85 | -24.12 |
| 3 | Internet Retail | 266,199.53 | 285,692.42 | 295,527.68 | 14.50 | 13.96 | 13.96 | -40.75 | +7.32 | +3.44 |
| 4 | Wholesale Trade on Digital Products | 136,993.41 | 139,995.12 | 169,502.75 | 7.46 | 6.84 | 8.01 | -20.44 | +2.19 | +21.08 |
| 5 | Retail Trade on Digital Products | 66,336.53 | 102,000.88 | 121,657.31 | 3.61 | 4.99 | 5.75 | +4.22 | +53.76 | +19.27 |
| | **Total (Top 5 Rankings)** | **1,114,229.45** | **1,295,233.53** | **1,435,343.38** | **60.71** | **63.31** | **67.79** | **-3.26** | **+16.24** | **+10.82** |
| | Others | 721,007.70 | 750,696.72 | 681,915.67 | 39.29 | 36.69 | 32.21 | -15.77 | +4.12 | -9.16 |
| **Total** | | **1,835,237.15** | **2,045,930.25** | **2,117,259.05** | **100.00** | **100.00** | **100.00** | **-8.60** | **+11.48** | **+3.49** |

**The digital economy, in real-term CVM with 2017 as reference year,** exhibits the value of 2,067,648.84 and 2,106,900.43 million baht in 2021 and 2022e. And the digital economy was expanded to 11.83 percent and 1.90 percent in 2021 and 2022e respectively. The decreased in the digital economy expansion came from the high base value at the previous year and the declining in the production of computer devices and parts sub-sector, significant to digital economy system defined by ONDE, is affected

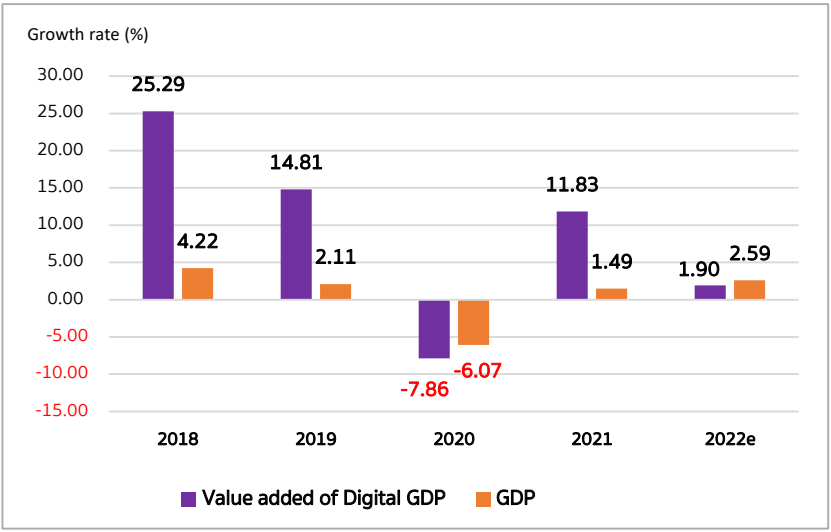
by global situation. However, the growth of national GDP was increased from 1.49 percent in 2021 to 2.59 percent in 2022e from the recovery of tourism sector.

**Table 4 : Real value of the digital economy and Real GDP (CVM)**

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| **Real term in chain volume measure** | | | | | | |
| Digital economy (Ref = 2017) | 1,395,095.50 | 1,747,879.69 | 2,006,735.13 | 1,848,970.44 | 2,067,648.84 | 2,106,900.43 |
| Real GDP (Ref = 2002) | 10,259,941.00 | 10,693,204.00 | 10,919,319.00 | 10,256,852.00 | 10,409,894.00 | 10,680,003.00 |
| **Growth rate** | | | | | | |
| Digital economy (Ref = 2017) | - | 25.29 | 14.81 | -7.86 | 11.83 | 1.90 |
| Real GDP (Ref = 2002) | 4.18 | 4.22 | 2.11 | -6.07 | 1.49 | 2.59 |

Note: GDP refers to report on national income accounts of Thailand year 2021 and and Quarterly GDP of NESDC

Figure 3 : Growth rate of digital economy and national GDP in real-term (CVM)




## 7.2 Income approach

**Total income** of the primary factors within the boundary of digital economy values 2,117,259.05 million baht in 2022e. For the measurement of the returns on the primary factors within the boundary of digital economy, the compensations of employee are worth 1,017,627.03 million baht, which share the highest proportion of 48.06 percent of total income in 2022e, followed by operating surpluses, worth 649,135.02 million baht or 30.66 percent. Meanwhile, depreciation, net production taxes, and mixed income are worth 229,134.73 million baht, 123,074.17 million baht, and 98,288.10 million baht, respectively, or 10.82 percent, 5.81 percent, and 4.64 percent, respectively.

The compensations of employee accounts the highest expansion of 10.52 percent in 2022e. Meanwhile, operating surpluses drops 4.24 percent in 2022e, reflecting the first decline of profit ever in 2022e.

The overall average of total income is 1,857,661.17 million baht, consisting of compensations of employee 888,724.74 million baht, operating surplus 558,979.32 million baht, mixed income 132,417.71 million baht, net production taxes 105,795.70 million baht, and depreciation 171,743.72 million baht with the average shares of 47.84, 30.09, 7.13, 5.70, and 9.25 percent, respectively. The share of operating surplus in 2021 – 2022e are higher than the average value, reflecting in continuing increase in operating profit, while the share of compensations of employee has been less than the average value since 2018, reflecting reduction in the labor force in digital economy due to more applications of technology.

**Table 5 : Returns of the primary factors in the digital economy 2017 – 2022e (million baht)**

| | Value (million baht) | | | | | | (%) Share | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| Compensation of employee | 733,250.63 | 923,043.78 | 935,562.86 | 802,129.87 | 920,734.25 | 1,017,627.03 | 45.00 | 48.06 |
| Operating surplus | 410,503.17 | 483,315.01 | 538,684.19 | 594,336.97 | 677,901.53 | 649,135.02 | 33.13 | 30.66 |
| Mixed income | 41,667.49 | 96,948.28 | 270,111.17 | 155,627.58 | 131,863.62 | 98,288.10 | 6.45 | 4.64 |
| Net production taxes | 82,169.97 | 95,625.72 | 108,001.67 | 106,107.65 | 119,795.01 | 123,074.17 | 5.86 | 5.81 |
| Depreciation | 127,504.22 | 145,685.25 | 155,467.18 | 177,035.08 | 195,635.84 | 229,134.73 | 9.56 | 10.82 |
| **Total** | **1,395,095.48** | **1,744,618.04** | **2,007,827.07** | **1,835,237.15** | **2,045,930.25** | **2,117,259.05** | **100.00** | **100.00** |

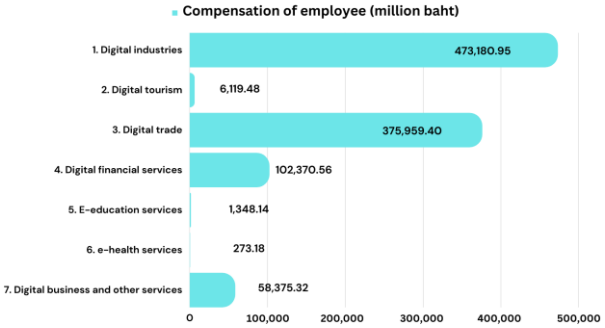
Considering **returns on primary factors by digital sector,** categorized by ONDE sector categories, digital industries on hardware, software and ICT services with the value of 1,281,749.84 million baht or 60.54 percent. The second rank is digital trade, worth 586,687.74 million baht or 27.71 percent.

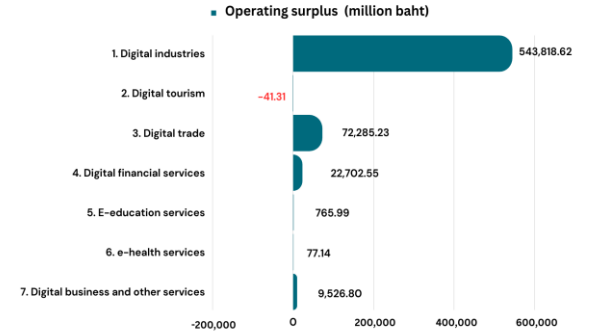
Digital sectors have the crucial role in operating surplus, worth 543,818.62 million baht or 83.78 percent of all categories. Meanwhile, mixed income, which are the earnings for personal businesses, is mostly belongs to the digital trade.

Digital sectors share the highest share of return on factors of production in every component except mixed income, with the least share among 7 sectors, as, the main factor, digital sectors are formed by obvious business structures, capable of standardized bookkeeping, distinguishable between compensation of employee and operating surplus obviously, which contradicts other digital business and services, which operates as individual or home office.

Returns on factors classified by digital industries, shown in figure below.

Figure 4 : Income Classified by Sector and Returns on Factors in 2022e (million baht)



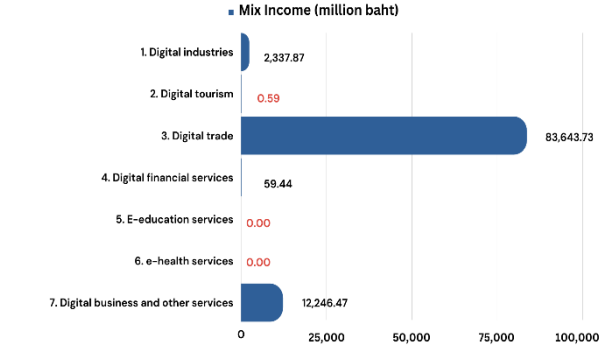



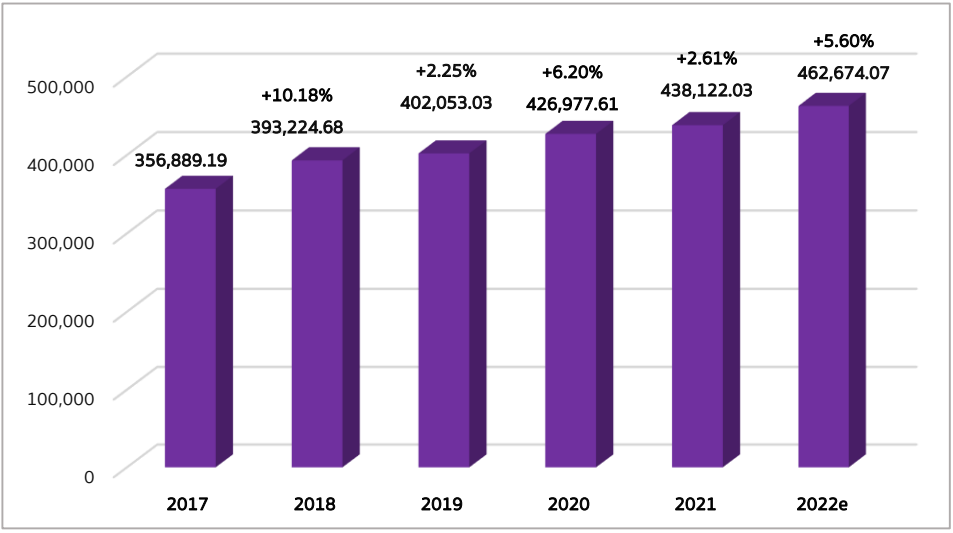
Figure 4 : Income Classified by Sector and Returns on Factors in 2022e (million baht) (Cont.)

## 7.3 Expenditure approach

### 1) Private final consumption expenditure

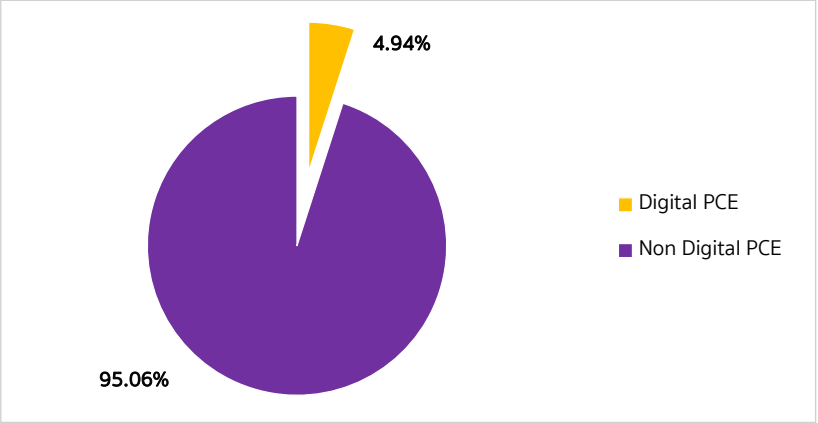
Private final consumption expenditure on digital activities in 2022e derives from private final consumption expenditure from quarterly GDP by NESDC and producing statistics on the digital economy. Private final consumption expenditure on digital activities accounts for 462,674.07 million baht in 2022e at current market prices with the expansion of 5.60 percent. And since 2017 the private final consumption expenditure on digital activities was increased from 356,889.19 million baht in 2017 to 462,674.07 million baht in 2022e

**Figure 5 : Private Final Consumption Expenditure at Current Market Price in 2017 - 2022e (million baht) with Growth Rates in Percentage**



In addition, the proportion of private final consumption expenditure on digital activities to the total private final consumption expenditure[2], during 2017 – 2022e in average is 4.94 percent.

**Figure 6 : Percentage of Digital Private Final Consumption Expenditure at Current Market Price in 2017 – 2022e on Average**

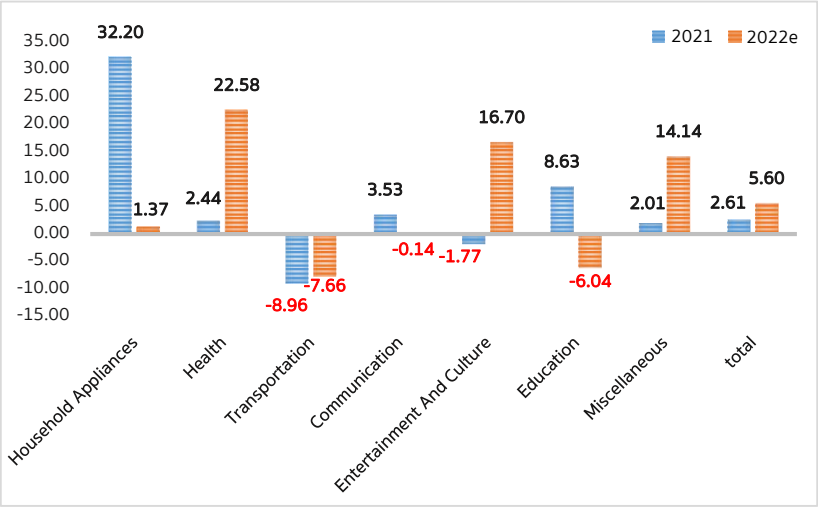



**Private final consumption expenditure on digital activity classified by COICOP** at current market prices expands 5.60 percent in 2022e as the expansion of health, entertainment and culture, miscellaneous and household appliances expanding 22.58 percent, 16.70 percent, 14.14 percent, and 1.37 percent respectively.

Meanwhile, transportation, communication and education decline 7.66 percent, 0.14 percent, and 6.04 percent, respectively.

[2] National Income of Thailand 2020 Chain Volume Measures and Quarterly GDP, NESDC

Figure 7 : Growth Rate of Private Final Consumption Expenditure on Digital Activity Classified by COICOP in 2021 – 2022e (%)

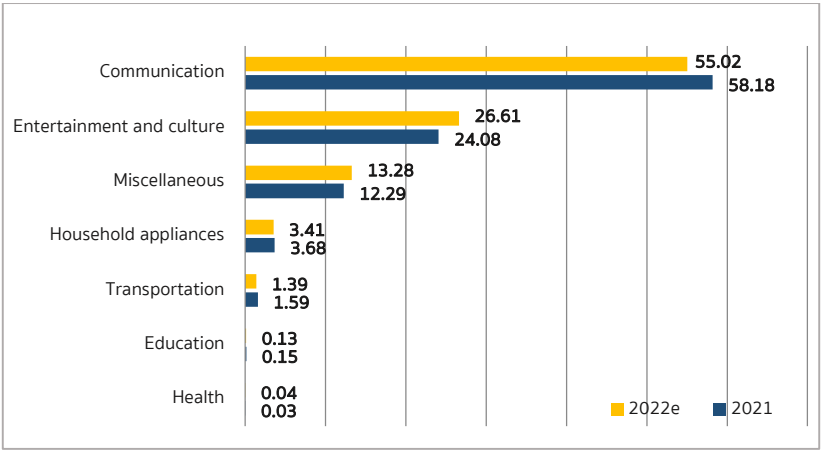



Private final consumption expenditure on digital activity in 2022e comprises of communication, covering telephone and communication expenses and internet expenses, the highest rank, which brings in 254,550.01 million baht, or percentage share of 55.02.

The second rank is entertainment and culture, including television and computer costs, worth 123,113.26 million baht in 2022e, or percentage share of 26.61. Miscellaneous, with the significance of Financial Intermediation Services Indirectly Measured (FISIM) and insurance especially life insurance, values 61,481.56 million baht, or percentage share of 13.28. Others are other personal effects and household appliances accounts 16,328.85 million baht, or percentage share of 3.41. Commuting & transportation, covering of transport equipment rents & logistic services, costs 6,429.55 million baht, or percentage share of 1.39. Education is worth 595.13 million baht, or percentage share of 0.13. For health, additional

medical service expenses e.g. laboratory service and x-ray center, accounts the least value of 175.71 million baht, or percentage share of 0.04.

**Figure 8 : Private Final Consumption Expenditure at Current Market Price in 2021-2022e Classified by Type of Expense (% Share)**



## Table 6 : Private Final Consumption Expenditure at Current Market Price Categories of COICOP in 2017 – 2022e

| | | Value (million baht) | | | | | |
|---|---|---|---|---|---|---|---|
| COICOP | **List** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022e** |
| 05 | Furniture, Furnishing and routing maintenance | 13,084.46 | 12,836.19 | 13,861.52 | 12,185.38 | 16,108.62 | 16,328.85 |
| 06 | Health | 125.39 | 131.77 | 144.83 | 139.94 | 143.35 | 175.71 |
| 07 | Transportation | 6,214.35 | 6,942.17 | 8,239.36 | 7,647.67 | 6,962.69 | 6,429.55 |
| 08 | Communication | 191,601.47 | 218,890.37 | 213,087.93 | 246,220.37 | 254,914.96 | 254,550.01 |
| 09 | Entertainment and culture | 98,080.10 | 103,793.12 | 109,012.75 | 107,397.24 | 105,494.31 | 123,113.26 |
| 10 | Education | 429.66 | 430.97 | 545.05 | 583.08 | 633.38 | 595.13 |
| 12 | Miscellaneous products and services | 47,353.76 | 50,200.09 | 57,161.59 | 52,803.93 | 53,864.72 | 61,481.56 |
| | **Total** | **356,889.19** | **393,224.68** | **402,053.03** | **426,977.61** | **438,122.03** | **462,674.07** |

**Private final consumption expenditure on digital goods and services** classified by 7 main categories, it is found that, in 2017 – 2022e, digital industry, the highest rank, gains 395,994.66 million baht, or percentage share of 85.59. Financial services value 52,335.80 million baht or percentage share of 11.31. Tourism industry gets 13,572.77, or percentage share of 2.93. Last two are e-education services and e-health services, with e-education services gains 595.13 million baht, whilst e-health services costs 175.71 million baht.

The factor that makes the digital industry having the highest value is that the digital industry covers many sub-sectoral items e.g. communication, which covers telephone and internet services; the highest digital expense by household. Hardware covers the expense on computerand related parts, including smart devices and digital household appliance, of which television and related smart appliance are included.

For private expense through digital platform or e-marketplace, in case that the item could have its commission fee classified and categorized, it could be recorded as digital industries, tourism industry and other services only. However, if this expense belongs to the general business services, this would not appear as a record for the household expense. Private final consumption expenditure on digital goods and services does not cover digital trade and digital business as digital trade (covering wholesale and retail), digital goods, and online trade are included in goods price, spending private purchase goods and services at purchaser prices or retail prices, which includes trade margin in both wholesale and retail sells, whether online purchasing or non-online purchasing.

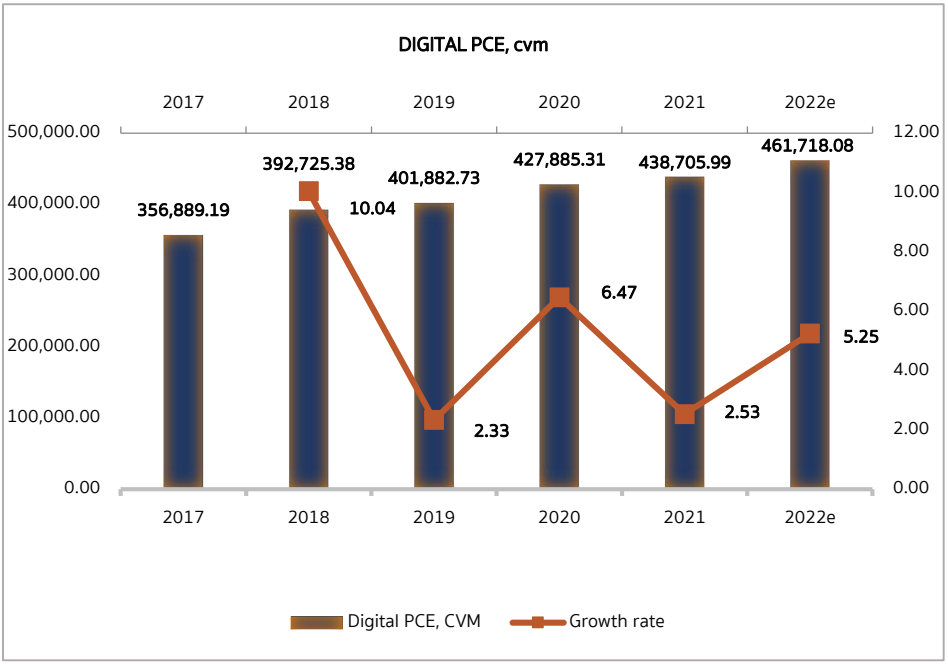
Nonetheless, if the private sectors pay for platform or marketplace to purchase goods and services or platform fee and are able to distinguish expenditures, such expenditure will be able to be categorized as household expenditure in involved categories for business service group as general business service instead of private expenditure.

## Table 7 : Private Final Consumption Expenditure on Digital Activities by 7 Categories in 2017 – 2022e

| Category | Value (million baht) | | | | | |
|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
| **1. Digital industry** | **300,901.00** | **331,166.65** | **339,166.49** | **368,568.32** | **381,606.61** | **395,994.66** |
| 1.1 Smart devices | 23,892.17 | 23,146.00 | 30,059.38 | 22,677.40 | 24,537.80 | 23,379.23 |
| 1.2 Hardware | 44,102.07 | 45,603.86 | 48,804.41 | 50,484.83 | 46,074.14 | 48,321.30 |
| 1.3 Software | 10,236.67 | 11,119.12 | 11,667.20 | 10,993.61 | 10,662.81 | 10,993.68 |
| 1.4 Digital services such as digital platform, digital order, digital delivery | 12,639.52 | 13,315.98 | 13,951.46 | 11,329.55 | 16,034.56 | 16,348.54 |
| 1.5 Communication | 189,447.21 | 215,159.65 | 209,100.94 | 242,025.58 | 250,483.07 | 250,065.08 |
| 1.6 Digital content | 20,583.36 | 22,822.04 | 25,583.10 | 31,057.35 | 33,814.23 | 46,886.83 |
| **2. Tourism industry** | **17,451.16** | **19,229.93** | **18,770.73** | **11,593.33** | **10,450.14** | **13,572.77** |
| **3. Digital trade** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **4. Digital financial services** | **37,981.97** | **42,265.36** | **43,425.93** | **46,092.95** | **45,288.54** | **52,335.80** |
| **5. E-education services** | **429.66** | **430.97** | **545.05** | **583.08** | **633.38** | **595.13** |
| **6. E-health services** | **125.39** | **131.77** | **144.83** | **139.94** | **143.35** | **175.71** |
| **7. Digital business and other services** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Total** | **356,889.19** | **393,224.68** | **402,053.03** | **426,977.61** | **438,122.03** | **462,674.07** |

**Real-term private final consumption expenditure on digital activities** (CVM) gain 438,705.99 million baht in 2021 and 461,718.08 million baht in 2022e, which expands 2.53 percent in 2021 and 5.25 percent in 2022e. Higher growth comes from entertainment and culture expenditure, which hugely expands to 18.13 percent. Miscellaneous expands 8.39 percent in 2022 from 0.92 percent in 2021. However, ICT expenditure slightly drops by 0.14 percent in 2022, compared to 2021 which expands 3.55 percent.

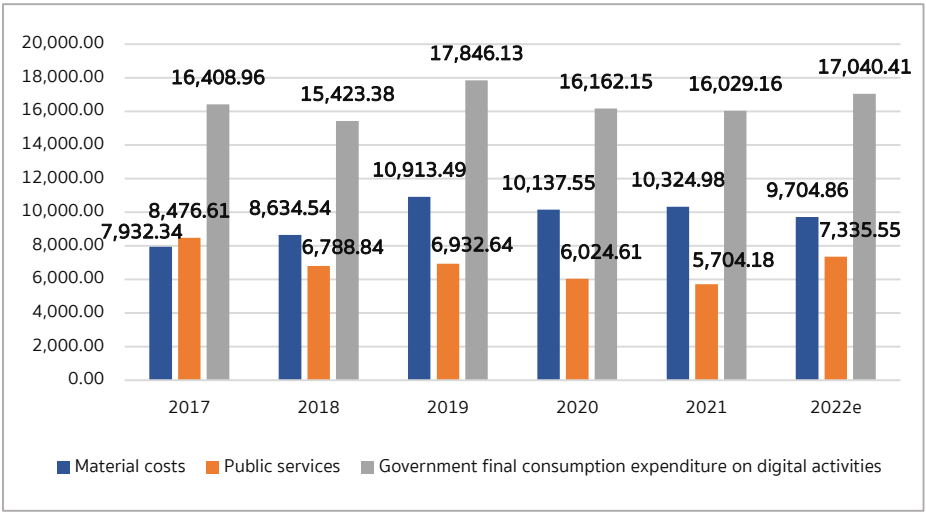
**Figure 9 : Real Term and Real Growth of Private Final Consumption Expenditure on Digital Activities (CVM) in 2017 - 2022e (%)**



## 2) Government final consumption expenditure: GFCE

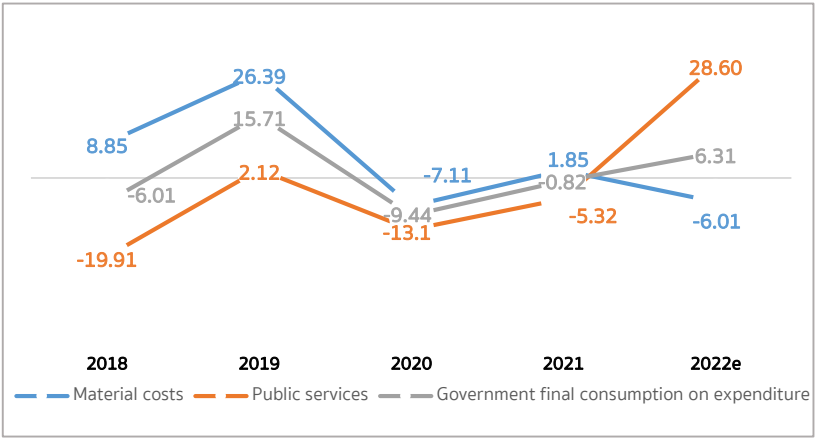
Government final consumption expenditure on digital activities at current market prices accounts 17,040.41 million baht in 2022e, which expands by 6.31 percent from 2021. This includes material costs for 10,324.98 million baht and 9,704.86 million baht in 2021 and 2022, respectively, and public services account 5,704.18 million baht and 7,335.55 million baht in 2021 and 2022, respectively.

**Figure 10 : Structure of the Government Final Consumption Expenditure on Digital Activities Classified by Type of Expenditure at Current Market Prices in 2017-2022e (million baht)**




Consequently, the overall expenditure in 2022e expands 6.31 percent from 2021. Although material costs drop 6.01 percent and other expenditures decline, public services rise 28.60 percent especially internet services and telephone fee.

Figure 11 : Growth rate of the Government Final Consumption Expenditure on Digital Activities in 2018 – 2022e (%)




For structure of the expenditure, material costs account more share than public utility services, with the shares of 56.95 percent and 43.05 percent in 2022, respectively, compared to the shares of 64.41 percent and 35.59 percent in 2021, respectively. This concludes that the share of material costs drops from last year, whilst public services earn more share than last year. Therefore, the expenditure gap between material costs and public services becomes smaller than last year.

Internet services are the outstanding item which shares 44.39 percent, followed by telephone services (only mobile phones) which share 5.26 percent of the total GFCE in 2022e. For material costs, the important items are web development and maintenance services with the share of 10.59% and 1.42% of total GFCE in 2022e.

Table 8 : Government Final Consumption Expenditure on Digital Activities Classified by Type of Expenditure, Current Market Prices, in 2017 – 2022e

| Expenditure items | Value (million baht) | | | | |
|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | 2022e |
| **1. Material cost** | **8,634.54** | **10,913.49** | **10,137.55** | **10,324.98** | **9,704.86** |
| 1.1 Repair and maintenance | 4,114.61 | 4,530.04 | 4,549.11 | 4,593.73 | 4,658.98 |
| 1.2 Web development | 322.23 | 1,777.93 | 792.33 | 781.33 | 864.07 |
| 1.3 Banking fee | 42.00 | 378.56 | 375.68 | 382.35 | 60.54 |
| 1.4 Computer components | 3,871.38 | 3,817.90 | 4,156.83 | 4,353.94 | 3,704.38 |
| 1.5 System maintenance expenses | 19.75 | 0.00 | 22.36 | 23.14 | 263.82 |
| 1.6 Public relations expenses | 143.14 | 159.36 | 132.40 | 101.77 | 89.53 |
| 1.7 Other expenses | 121.43 | 249.70 | 108.85 | 88.74 | 63.54 |
| **2. Public services** | **6,788.84** | **6,932.64** | **6,024.61** | **5,704.18** | **7,335.55** |
| 2.1 Telephone services | 1,384.79 | 1,377.15 | 1,384.28 | 1,179.96 | 1,241.98 |
| 2.2 Internet services | 4,493.53 | 5,090.12 | 4,174.50 | 3,983.81 | 5,752.16 |
| 2.3 Satellite communication services expenses | 37.36 | 38.45 | 39.65 | 41.78 | 42.91 |
| 2.4 Cable TV services | 3.19 | 0.64 | 0.79 | 0.80 | 0.68 |
| 2.5 Satellite TV services | 2.76 | 0.54 | 0.07 | 0.07 | 0.00 |
| 2.6 Internet network expenses | 286.01 | 95.22 | 84.17 | 93.34 | 73.90 |
| 2.7 Installation expenses | 89.79 | 118.27 | 47.45 | 95.95 | 70.54 |
| 2.8 Others | 491.42 | 212.27 | 293.70 | 308.49 | 153.38 |
| **Total** | **15,423.38** | **17,846.13** | **16,162.15** | **16,029.16** | **17,040.41** |

**Considering the Government final consumption expenditure on digital activities by 7 major sectors,** it could be seen that GFCE was spent mostly in digital industry and the sector that has GFCE the highest is communication, worth of 7,335.55 million baht in 2022e, as percentage share of 43.05. The important items are telephone service and internet service.

Second ranking is digital service sector, with about 4,922.80 million baht, as percentage share of 28.89. The important items are devices repair and maintenance services and hardware, covering the related items for computer components accounts 3,704.38 million baht, as percentage share of 21.74.

Real-term Government final consumption expenditure on digital activities (CVM) in 2022 increases 8.52 percent as a consequence of the expansion of software, digital services, and communication. In contrast, hardware and digital content decline, additionally with the decline in digital financial services, accounting the least value, of 84.17 percent.

**Figure 12 : Government Final Consumption Expenditure, Digital Activities Classified by Digital Sectors in 2017 – 2022e**

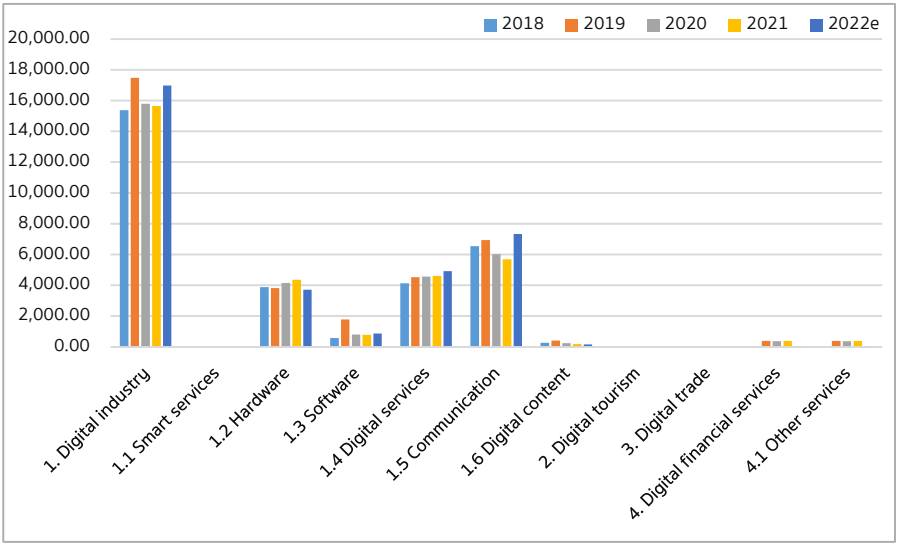
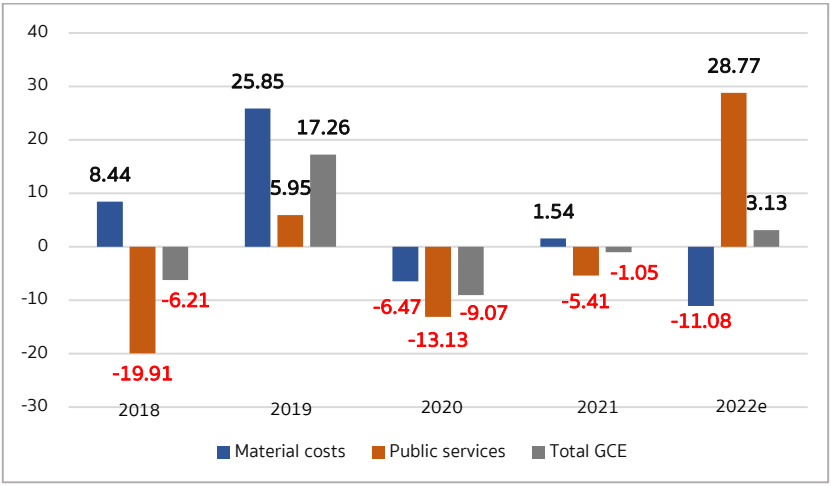


Figure 13 : Real-term Government Final Consumption Expenditure on Digital Activities (CVM) in 2018 - 2022e




The real value in 2022e expanded as a result of utility expenses expanding 28.77 percent following increased spending on internet and telephone services. Meanwhile, the expense category decreased by 11.08 percent, important items such as bank fees. Public relations costs and computer material costs

### 3) Gross fixed capital formation: GFCF

For this study, the gross fixed capital formation of the digital activity is worth 323,363.64 million baht in 2022e, rising by 28.28 percent from 2021. Considering by types of fixed capital, the capital investment on machinery and tools is worth 206,468.07 million baht, increasing by 45,189.53 million baht or 28.02 percent from 2021, sharing 63.85 percent and 65.25 percent on average during 2017 – 2022e. This reflects Thailand still invests in machinery and tools although declining value from the average in 2021 – 2022e. The second rank, other assets accounts 31,020.92 million baht, or a share of 9.59 percent, whilst investment in high-value software and applications accounts 6,766.71 million baht, or a share of 2.09 percent.

**Table 9 : Gross Fixed Capital Formation of Digital Economy at Current Market Price in 2017 – 2022e**

| | Land | Building & Construction | Machinery and tools | Software | Investment in High-value Software and Applications | Other Assets | Total |
|---|---|---|---|---|---|---|---|
| Value at current market price (million baht) | | | | | | | |
| 2017 | 22,759.92 | 36,402.58 | 166,099.09 | 8,251.25 | 3,027.21 | 18,999.20 | **255,539.25** |
| 2018 | 24,027.58 | 38,021.19 | 186,338.29 | 9,437.26 | 3,519.88 | 19,605.06 | **280,949.26** |
| 2019 | 23,635.75 | 40,443.47 | 190,966.56 | 9,534.70 | 4,916.04 | 19,342.24 | **288,838.76** |
| 2020 | 20,506.84 | 34,335.25 | 169,480.65 | 8,602.33 | 3,875.37 | 18,578.19 | **255,378.63** |
| 2021 | 20,122.61 | 36,127.72 | 161,278.54 | 8,554.58 | 4,036.91 | 21,953.13 | **252,073.49** |
| 2022e | 21,611.72 | 43,317.26 | 206,468.07 | 14,178.96 | 6,766.71 | 31,020.92 | **323,363.64** |
| Share (%) | | | | | | | |
| 2017 | 8.91 | 14.25 | 65.00 | 3.23 | 1.18 | 7.43 | **100.00** |
| 2018 | 8.55 | 13.53 | 66.32 | 3.36 | 1.25 | 6.98 | **100.00** |
| 2019 | 8.18 | 14.00 | 66.12 | 3.30 | 1.70 | 6.70 | **100.00** |
| 2020 | 8.03 | 13.44 | 66.36 | 3.37 | 1.52 | 7.27 | **100.00** |
| 2021 | 7.98 | 14.33 | 63.98 | 3.39 | 1.60 | 8.71 | **100.00** |
| 2022e | 6.68 | 13.40 | 63.85 | 4.38 | 2.09 | 9.59 | **100.00** |

Figure 14 : Gross Fixed Capital Formation Classified by Assets at Current Market Prices in 2017 – 2022e

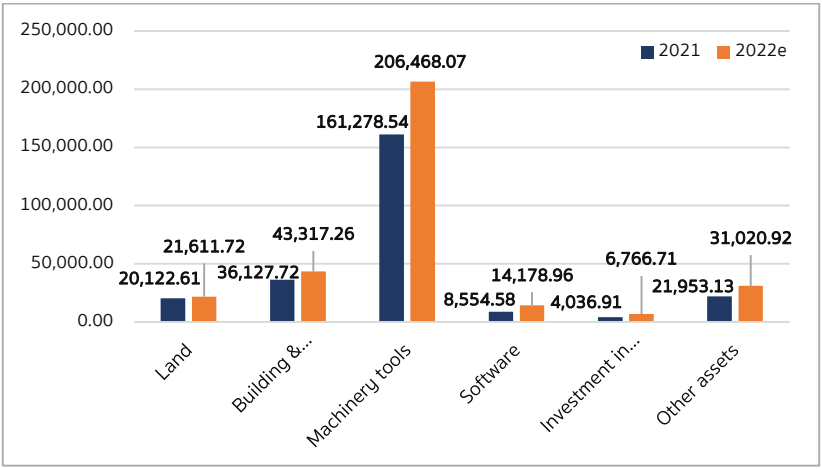
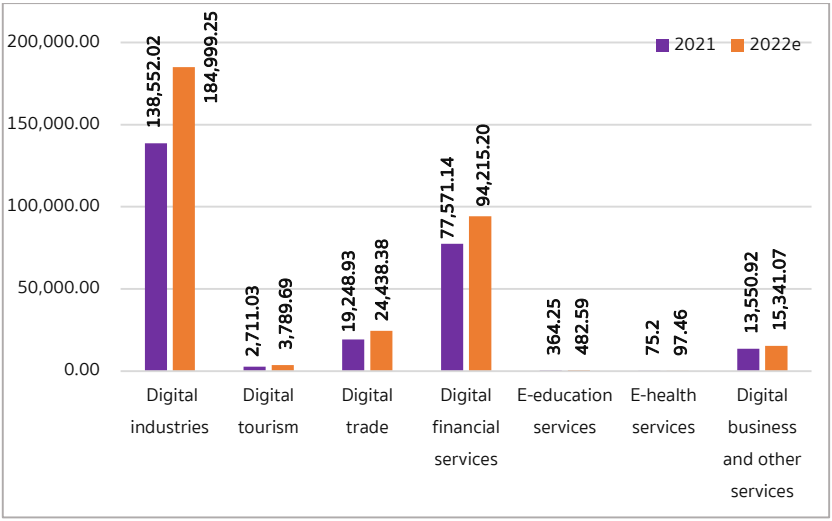



Figure 15 : Gross Fixed Capital Formation Classified by Digital Sector at Current Market Prices in 2021 – 2022e



Considering **investment classified by digital sectors** (following ONDE), the digital industry which composes of hardware, software, and telecommunication gain the highest value of investment in gross fixed capital formation comparing to others, with the investment of 184,999.25 million baht in 2022e. The second digital activity with high capital formation is the financial service, worth 94,215.20 million baht and the digital trade, including including trade of digital goods and previously high growth of E-commerce, values 24,438.38 million baht. Others are digital business, e-education services, e-health services, and Tourism industry are clearly found with the expansion of the gross fixed capital formation.

**Gross fixed capital formation classified by digital goods** applies gf/go share according to Input-Output Table (following NESDC). Gross fixed capital formation in computer and parts, software, and smart devices are worth 161,955.28 million baht at current market prices in 2022e. Considering by types of such goods, hardware accounts the highest share of 71.91 percent, followed by smart devices, a share 20.12 percent and software 7.97 percent, respectively. Nevertheless, the capital formation shows diminishing growth of -6.32 percent in 2022, due to the decline in hardware, as a main commodity, dropping by -8.32 percent and smart devices, dropping by -1.75 percent, respectively.

Besides, considering average gross fixed capital formation during 2017-2022e, such values in 2021 and 2022 are higher than the average, showing continuous investment despite of fluctuation.

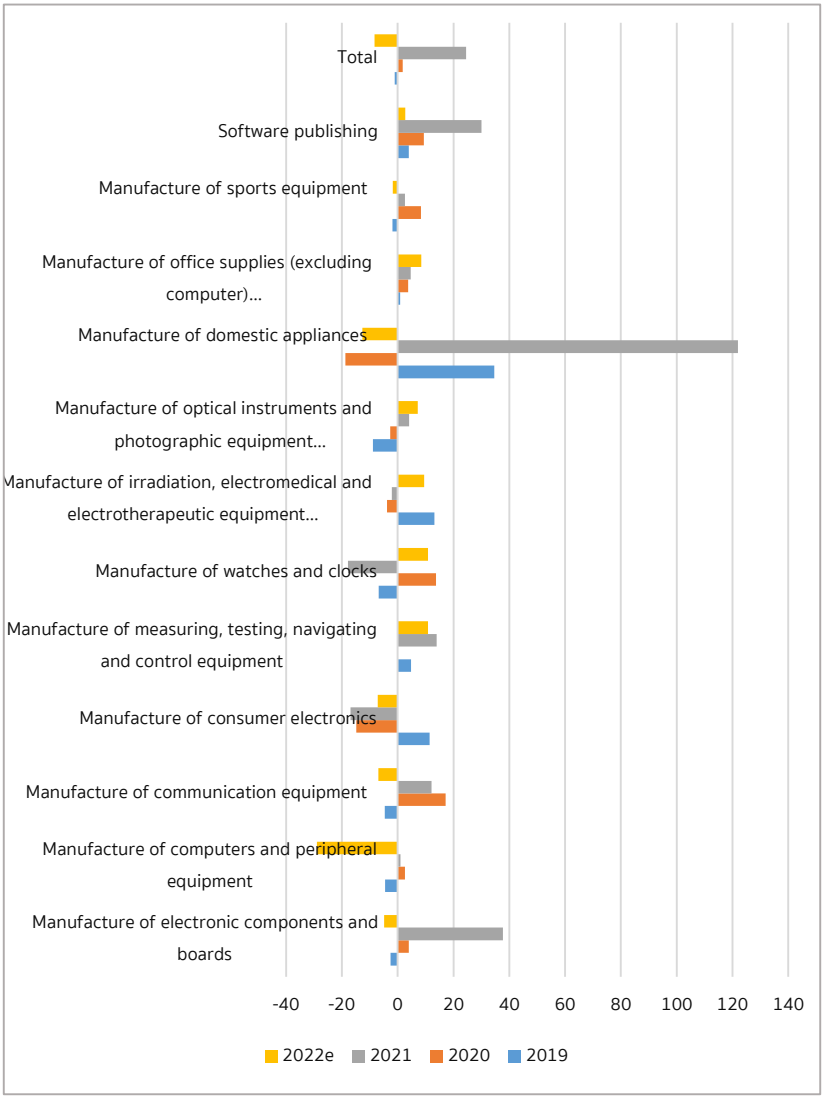
Table 10 : Gross Fixed Capital Formation Classified by Digital Goods, at current market prices in 2017 – 2022e

| Digital industry | Value (million baht) | | | | | |
|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
| Smart devices | 24,785.86 | 28,167.30 | 30,194.90 | 27,708.54 | 33,157.30 | 32,578.47 |
| Hardware | 100,826.12 | 102,838.10 | 98,822.09 | 102,181.72 | 127,037.79 | 116,464.44 |
| Software | 7,401.59 | 8,399.89 | 8,848.35 | 9,723.83 | 12,694.10 | 12,912.37 |
| **Total** | **133,013.57** | **139,405.29** | **137,865.34** | **139,614.09** | **172,889.19** | **161,955.28** |
| **Digital industry** | **Share (%)** | | | | | |
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
| Smart devices | 18.63 | 20.21 | 21.90 | 19.85 | 19.18 | 20.12 |
| Hardware | 75.80 | 73.77 | 71.68 | 73.19 | 73.48 | 71.91 |
| Software | 5.57 | 6.02 | 6.42 | 6.96 | 7.34 | 7.97 |
| **Total** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |
| **Digital industry** | **Change (%)** | | | | | |
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
| Smart devices | | +13.64 | +7.20 | -8.23 | +19.66 | -1.75 |
| Hardware | | +2.00 | -3.91 | +3.40 | +24.33 | -7.83 |
| Software | | +13.49 | +5.34 | +9.89 | +30.55 | +1.75 |
| **Total** | | **+4.81** | **-1.10** | **+1.27** | **+23.83** | **-6.32** |

The **real-term digital gross fixed capital formation** (CVM: Reference year of 2017) shows the value of 161,783.57 million baht in 2022e, declining 8.27 percent compared to the expansion of 24.47 percent in 2021, as the decline of the electronic components and boards, computer and peripheral equipment, communication equipment and domestic appliances.

Considering the reason of inconsistency between CVM growth and growth at current market prices, this occurs due to rising Producer Price Index and Consumer Price Index in 2022e, impact of Russo-Ukrainian war, and higher energy price, resulting in soaring current market prices in 2022e.

Figure 16 : Real-term Growth of Gross Fixed Capital Formation (CVM) in 2019 – 2022e (%)



### 4) Imports and Exports of digital goods and services

Exports of digital goods and services at current market prices (FOB) value 1,678,991.58 million baht in 2022e. Of that amount, exports of digital goods account 1,518,589.07 million baht, or a share of 90.45 percent. Besides, the exports of digital services value 160,402.51 million baht, which share 9.55 percent.

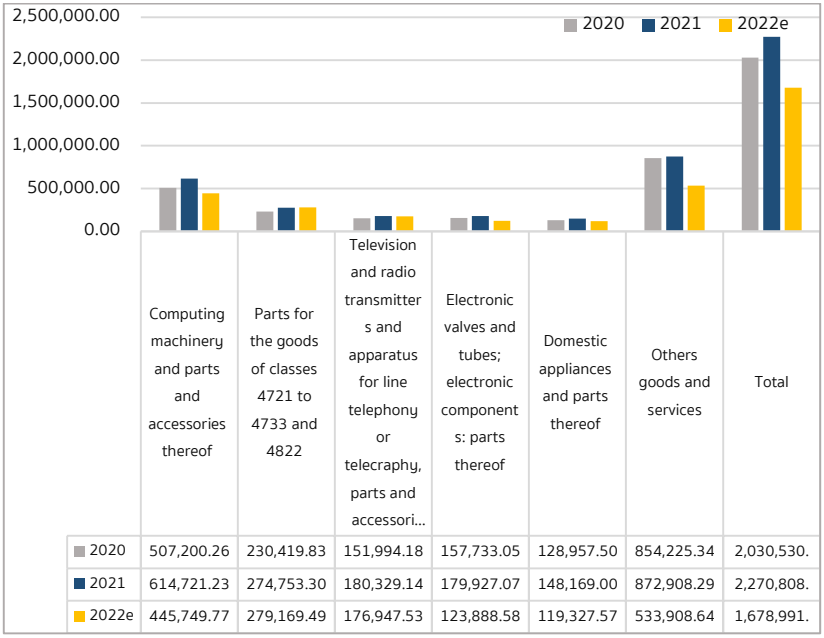
Imports of digital goods and services values 1,729,703.75 million baht in 2022e. Of that amount, imports of digital goods account 1,505,408.10 million baht, or a share of 87.03. Besides, the import of digital services are worth 224,295.65 or a share of 12.97 percent.

**Table 11 : Imports and Exports of Digital Goods and Services in 2017 – 2022e (million baht)**

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| **Export of goods and services** | **2,381,293.44** | **2,377,962.38** | **2,283,258.18** | **2,030,530.16** | **2,270,808.03** | **1,678,991.58** |
| Goods | 1,576,390.29 | 1,564,162.66 | 1,462,797.93 | 1,484,603.74 | 1,776,171.02 | 1,518,589.07 |
| Services | 804,903.15 | 813,799.72 | 820,460.25 | 545,926.42 | 494,637.01 | 160,402.51 |
| **Import of goods and services** | **1,868,855.61** | **1,986,467.82** | **1,898,946.96** | **1,727,856.24** | **2,060,287.45** | **1,729,703.75** |
| Goods | 1,383,058.63 | 1,434,718.34 | 1,332,079.06 | 1,294,419.63 | 1,604,053.31 | 1,505,408.10 |
| Services | 485,796.98 | 551,749.48 | 566,867.90 | 433,436.61 | 456,234.14 | 224,295.65 |
| **Export of goods and services** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |
| Goods | 66.20 | 65.78 | 64.07 | 73.11 | 78.22 | 90.45 |
| Services | 33.80 | 34.22 | 35.93 | 26.89 | 21.78 | 9.55 |
| **Import of goods and services** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |
| Goods | 74.01 | 72.22 | 70.15 | 74.91 | 77.86 | 87.03 |
| Services | 25.99 | 27.78 | 29.85 | 25.09 | 22.14 | 12.97 |

**Exports of digital goods/services,** concerning first five ranking, comprise of: computer and computer parts, with the highest gain of 445,749.77 million baht in 2022e. The following ranks are the sub-categories of electronic parts, telecommunication devices, television and radio transmitters, electronic components and devices, and domestic appliances, of which get 279,169.49 million baht, 176,947.53 million baht, 123,888.58 million baht, and 119,327.57 million baht, respectively.

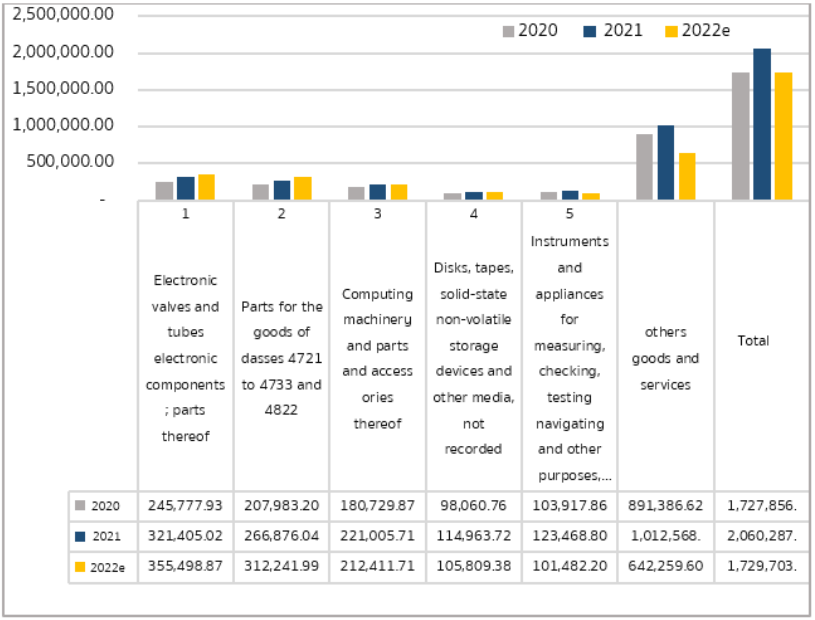
**Figure 17 : Value of Exports of Digital Goods/Services by Top 5 Rankings in 2020 – 2022e (million baht)**




| | Computing machinery and parts and accessories thereof | Parts for the goods of classes 4721 to 4733 and 4822 | Television and radio transmitters and apparatus for line telephony or telecraphy, parts and accessori... | Electronic valves and tubes; electronic components: parts thereof | Domestic appliances and parts thereof | Others goods and services | Total |
|---|---|---|---|---|---|---|---|
| 2020 | 507,200.26 | 230,419.83 | 151,994.18 | 157,733.05 | 128,957.50 | 854,225.34 | 2,030,530. |
| 2021 | 614,721.23 | 274,753.30 | 180,329.14 | 179,927.07 | 148,169.00 | 872,908.29 | 2,270,808. |
| 2022e | 445,749.77 | 279,169.49 | 176,947.53 | 123,888.58 | 119,327.57 | 533,908.64 | 1,678,991. |

**Imports of digital goods/services,** concerning first five ranking, comprise of: electronic components and devices, with the highest gain of 355,498.87 million baht in 2022e. The following ranks are the sub-categories of electronic parts, television and radio transmitters, computer and computer parts, recording media (unrecorded), and measuring and navigating instrument, of which get 312,241.99 million baht, 212,411.71 million baht, 105,809.38 million baht, and 101,482.20 million baht, respectively.

**Figure 18 : Value of Imports of Digital Goods/Services by Top 5 Rankings in 2020 – 2022e (million baht)**

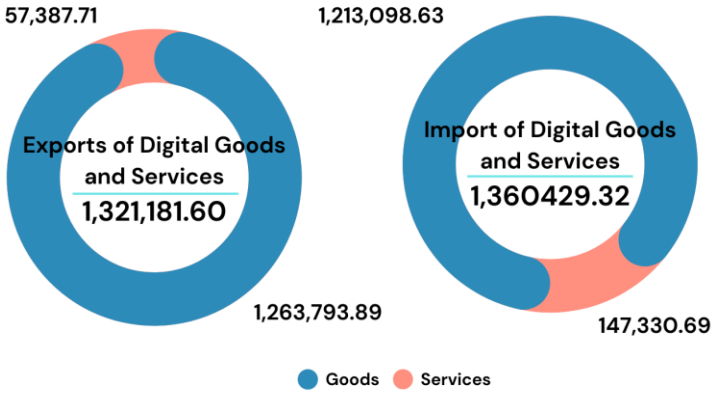



| | 1 Electronic valves and tubes electronic components ; parts thereof | 2 Parts for the goods of dasses 4721 to 4733 and 4822 | 3 Computing machinery and parts and access ories thereof | 4 Disks, tapes, solid-state non-volatile storage devices and other media, not recorded | 5 Instruments and appliances for measuring, checking, testing navigating and other purposes,... | others goods and services | Total |
|---|---|---|---|---|---|---|---|
| 2020 | 245,777.93 | 207,983.20 | 180,729.87 | 98,060.76 | 103,917.86 | 891,386.62 | 1,727,856. |
| 2021 | 321,405.02 | 266,876.04 | 221,005.71 | 114,963.72 | 123,468.80 | 1,012,568. | 2,060,287. |
| 2022e | 355,498.87 | 312,241.99 | 212,411.71 | 105,809.38 | 101,482.20 | 642,259.60 | 1,729,703. |

**Exports and Imports of Digital Goods and Services in Real-term (CVM)**

The exports and imports of digital goods and services in real-term (CVM) in 2022e exhibit the values of 1,321,181.60 million baht and 1,360,429.32 million baht, respectively. The 2022 export real-term decline of 28.83 percent and import real-term deterioration of 21.47 percent, were consequences of Russo-Ukrainian war and rising fuel price, affecting exports and imports of digital goods and services.

**Figure 19 : Real-term Value of Exports & Imports of Digital Goods and Services (CVM) in 2022e (million baht)**



### 5) Summary on calculation of digital contribution to GDP on expenditure approach

Considering at current prices, the digital contribution to GDP on Expenditure approach is worth 916,745.26 million baht in 2021 declines to 752,365.95 million baht in 2022e as a consequence of the Global COVID-19 pandemic since 2020, which dwindles the overall economy.

Structurally, the digital contribution to GDP on Expenditure side has the continuous rise of the Private Final Consumption Expenditure from the percentage share of 47.79 in 2021 to 61.50 in 2022e, which shows the crucial role as the main economic driver for the country. Fixed Capital Formation, secondly, consecutively shares higher percentage from 27.50 in 2021 to 42.98 in 2022e, while Government Final Consumption Expenditure maintains moderate share about 1.75 in 2021 but with a slight increase to 2.26 in 2022e of the total digital contribution to expenditure. Exports and Imports of the digital goods and services still gain a vital role as the major contribution of the economy since Thailand is the key export production hub for hardware e.g. computer parts and components and some other electronic parts with high export ratios. Nonetheless, in 2021 this portion drops, though with an increase in 2022e due to better situation of international trade. In addition, as Thailand has been depending on high-valued capital goods from abroad, both hardware and software, despite of declining in 2021, imports of digital goods and services rebounds higher for the imports of digital goods and services in 2022e. The net trade balance (x-m), becomes negative during 2021-22e due to the fact that the situation on exports of digital goods and services still could not maintain the competitiveness as it should be. Details could be seen from the table as following:

## Table 12 : Overview of the digital contribution to GDP, expenditure approach (million baht)

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| **Million baht** | | | | | | |
| C : Private Final Consumption Expenditure | 356,889.19 | 393,224.68 | 402,053.03 | 426,977.61 | 438,122.03 | 462,674.07 |
| G : Government Final Consumption Expenditure | 16,408.96 | 15,423.38 | 17,846.13 | 16,162.15 | 16,029.16 | 17,040.41 |
| I : Gross Fixed Capital Formation | 255,539.25 | 280,949.26 | 288,838.76 | 255,378.63 | 252,073.49 | 323,363.64 |
| X : Export of Goods & Services (+) | 2,381,293.44 | 2,377,962.38 | 2,283,258.18 | 2,030,530.16 | 2,270,808.03 | 1,678,991.58 |
| M : Import of Goods & Services (-) | 1,868,855.61 | 1,986,467.82 | 1,898,946.96 | 1,727,856.24 | 2,060,287.45 | 1,729,703.75 |
| x-m : Net export of goods & services | 512,437.83 | 391,494.56 | 384,311.22 | 302,673.92 | 210,520.58 | -50,712.17 |
| GDE : Gross Domestic Expenditure | 1,141,275.23 | 1,081,091.88 | 1,093,049.14 | 1,001,192.31 | 916,745.26 | 752,365.95 |
| **% share** | | | | | | |
| C : Private Final Consumption Expenditure | 31.27 | 36.37 | 36.78 | 42.65 | 47.79 | 61.5 |
| G : Government Final Consumption Expenditure | 1.44 | 1.43 | 1.63 | 1.61 | 1.75 | 2.26 |
| I : Gross Fixed Capital Formation | 22.39 | 25.99 | 26.43 | 25.51 | 27.5 | 42.98 |
| X : Export of Goods & Services (+) | 208.65 | 219.96 | 208.89 | 202.81 | 247.7 | 223.16 |
| M : Import of Goods & Services (-) | 163.75 | 183.75 | 173.73 | 172.58 | 224.74 | 229.9 |
| x-m : Net export of goods & services | 44.9 | 36.21 | 35.16 | 30.23 | 22.96 | -6.74 |
| GDE : Gross Domestic Expenditure | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Overview of the digital contribution to GDP, expenditure approach in Real-term (CVM) in 2017-2022e (million baht) (Ref = 2017)

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| **Million baht** | | | | | | |
| C : Private Final Consumption Expenditure | 356,889.19 | 392,725.38 | 401,882.73 | 427,885.31 | 438,705.99 | 461,718.08 |
| G : Government Final Consumption Expenditure | 16,408.96 | 15,390.76 | 17,777.04 | 16,175.44 | 16,012.78 | 16,730.95 |
| I : Gross Fixed Capital Formation | 133,013.57 | 140,782.29 | 139,179.46 | 141,695.02 | 176,371.80 | 161,783.57 |
| X : Export of Goods & Services (+) | 2,381,293.47 | 2,310,767.37 | 2,178,963.21 | 1,897,594.08 | 1,856,458.62 | 1,321,181.60 |
| M : Import of Goods & Services (-) | 1,868,855.61 | 1,928,011.00 | 1,757,097.98 | 1,536,472.68 | 1,732,276.67 | 1,360,429.32 |
| **Growth rate (%)** | | | | | | |
| C : Private Final Consumption Expenditure | | 10.04 | 2.33 | 6.47 | 2.53 | 5.25 |
| G : Government Final Consumption Expenditure | | -6.21 | 15.50 | -9.01 | -1.01 | 4.48 |
| I : Gross Fixed Capital Formation | | 5.84 | -1.14 | 1.81 | 24.47 | -8.27 |

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| X : Export of Goods & Services (+) | | -2.96 | -5.70 | -12.91 | -2.17 | -28.83 |
| M : Import of Goods & Services (-) | | 3.17 | -8.86 | -12.56 | 12.74 | -21.47 |

### 7.4 Summary of 2021 digital input-output table at consumer price (85 x 85 sector classification)

The creation of 2021 digital input-output table at consumer price (85 x 85 sector classification) is categorized into 50 digital sectors and 35 non-digital sectors, total of 85 sectors. 2021 DIOT has been completed and summarized as below.

Input-output table (I-O table) is categorized into structure and final demand.

- **Structure** includes gross output (GO or code 210) intermediate cost (IC or code 190) and value added (or code 209)
- **Final demand** includes private consumption expenditure (PCE or code 301), government consumption expenditure (GCE or code 302) and gross fixed capital formation (GFCF or code 303), change in inventory (code 304), export goods (code 305), and special export (code 306).
- **Supply** includes import goods (code 401), duty (code 402), tax (code 403), special import (code 404), wholesale margins (code 501), retail margins (code 502), transport cost (code 503) and gross output (code 600).

Structure and final demand of digital input-output table (DIOT) (85 x 85 sector classification) are summarized as below.

Table 13 : Production structure of digital sector and non-digital sector (million baht)

| | Digital sector | Non-digital sector | Total |
|---|---|---|---|
| **Intermediate Transaction** | 2,114,649.00 | 18,104,016.00 | **20,218,665.00** |
| Share per output | 49.21 | 57.28 | **56.32** |
| **Value Added** | 2,040,125.00 | 13,642,256.00 | **15,682,381.00** |
| Share per output | 47.48 | 43.17 | **43.68** |
| **Total Output** | 4,296,857.00 | 31,604,189.00 | **35,901,046.00** |
| Value added per total GDP (% VA/ total GDP) | 13.01 | 86.99 | **100.00** |
| Gross output per total gross output (% GO/ total GO) | 11.97 | 88.03 | **100.00** |


## 8. Statistical Usage and Applications

The main objective of the statistical measurement for the digital economy is based on the same principle and framework of the National Income Accounting of the System of the National Accounts and belongs as the crucial part to the macroeconomic statistics. Thus, it is appropriate to apply for various economic analyses on macroeconomic measurement of the economy both for the direct valuation of the digital economy and for the analyses with the national income accounting for the overall economy. With this kind of dataset, it is the main basic determinant for policy planning and further policy decision making from the appropriate and logical strategic planning. This kind of the statistical usage and applications could be clearly identified in some points as follow:

### 8.1 Situation and economic behavioral pattern monitoring

1) Some concluding remark e.g. the percentage shares of the digital contribution to GDP are the mainstream macroeconomic statistics with statistical specification popular to analysts, policy makers, scholars, journalists, businesses and private sector. Statistics, which give the overall movement of the changing behavioral patterns, could be used to assess the economy and, for this reason, it could be informed if the policy implementation, by either public or private, is successful or with failure.

2) Statistical datasets in this project cover important economic activities e.g. production, household consumption, government spending, investment, export, import, etc. This could monitor the economic movement both value and quantity change. Moreover, more information regarding some indicators from balancing method and percentage share from accounting framework e.g. budget surplus or deficit, earning share, investment share of each economic group and trade balance, etc. In addition, datasets in the form of National Income Accounts could be the basic base data to support the measurement of the movement of the short-term economic indicators, for example, monthly production indicators; the data usage for production or manufacturer/consumer could be applied to assess and monitor the changes in the behavioral pattern, which could crucially be better or worse, to, at least, presentand report as the annual datasets even if it is difficult to have the accounting and statistics more frequently than once a year.

### 8.2 Macro-economic Analysis

1) Digital conomic datasets could, overall, be used to investigate causal and mechanism within the economic system. Such analyses could be performed in terms of parameter estimation of the relationship among different economic variables by constructing the economic model, which bases on the time series of the datasets, both in terms of value and quantity, under the National Income Accounting framework similar to the macroeconomic analyses for the country. The types of macroeconomic models might be different regarding the school of economic theory and the purpose of the studies. However, the digital economic datasets, which follow National Income Accounting framework, are flexible enough to be applicable for various kinds of economic theories or models, on condition that the basic concept of the economic composition of the economy e.g. production, consumption, earning, etc. is generally acceptable.

2) Short-term policy making can be determined upon the basic assessment on the behavior of economic agents and current economic situation, including the views or expectations on the future development trend from the analyses of the digital economic datasets reported by periods. Short-term expectation, in general, uses the macroeconometric model that can explain future situations, whilst mid-term or long-term may consider from the time-series statistics. To establish the economic policy planning, it is also to determine the context of the economic strategies for the related activities or sectors. The datasets of the project could be applied for the structure, the source, and the important composition of the digital economic activities and the changing trend of the period of intereststo set the benchmark and appropriate indicators for the successful assessment of policy planning by all economic agents.

3) Policy making and decision taking happen in every level of the institutions, both public and private, companies, corporations e.g. transnational corporations. Such institutions are able to construct the macroeconomic model, with flexibility according to their own purposes. There are demands for such datasets, which follow the framework of the System of the National Accounts, to support the institution's investment policy to be in line with the country's long-term economic development. Moreover, there are some specialists in the agencies where the macroeconomic forecasts are required to give views on the country's economic vibes for the customers in order to obtain fee, such agencies demand such datasets in details.

### 8.3 International comparison

For international comparison, it is a requirement to report the international digital economic information in terms of the National Income Accounting, which follows the international standard of concepts, definitions, and acceptable categories such as the GDP or the percentage share to GDP, including the comparison of structural statistics e.g. ratios of taxes or investment to GDP. Such comparisons are used by the economists, journalists or policy analysts to assess and monitor the economic situations among countries alike. Such economic datasets also politically support the success or the popularity of the direction of policy agenda for economic development in various term. Mostly, it contains the SNA's style datasets, for comparison, with the time-seriesand cross-sectional formats in support for various kinds of economic model to give the full macro-economic picture.

# Statistical table

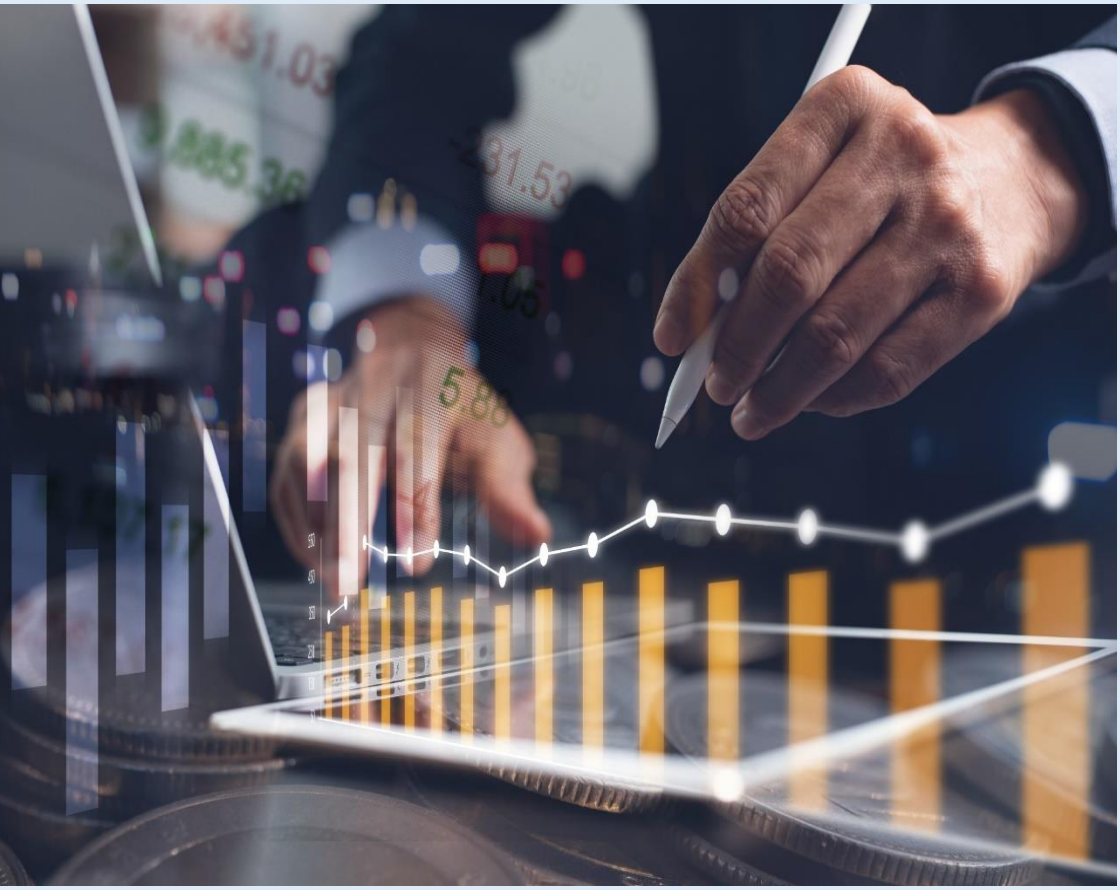


Table 14 : Value Added of Digital Economy Classified by Digital Sector at Current Market Prices in 2017 – 2022e (million baht)

| | Value added (million baht) | | | | | | % Share | | Growth rate (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e | 2021 | 2022e |
| **1. Digital industry** | **793,959.34** | **925,645.55** | **980,678.43** | **1,122,059.81** | **1,280,422.80** | **1,281,749.85** | **62.58** | **60.54** | **14.11** | **0.10** |
| 1.1 Smart devices | 52,406.20 | 78,677.32 | 87,058.70 | 88,719.43 | 118,235.39 | 81,478.95 | 5.78 | 3.85 | 33.27 | -31.09 |
| 1.2 Hardware | 354,427.18 | 345,591.78 | 311,323.33 | 500,226.24 | 618,696.60 | 432,827.43 | 30.24 | 20.44 | 23.68 | -30.04 |
| 1.3 Software | 66,509.30 | 69,553.86 | 75,994.50 | 46,859.07 | 54,531.66 | 60,190.98 | 2.67 | 2.84 | 16.37 | 10.38 |
| 1.4 Digital services such as digital platform, digital order, digital delivery | 63,074.03 | 73,432.79 | 88,177.68 | 61,956.64 | 64,102.38 | 65,926.22 | 3.13 | 3.11 | 3.46 | 2.85 |
| 1.5 Communication | 192,006.66 | 292,667.80 | 355,203.06 | 379,791.68 | 388,731.48 | 593,645.89 | 19.00 | 28.04 | 2.35 | 52.71 |
| 1.6 Digital content | 65,535.99 | 65,722.00 | 62,921.17 | 44,506.73 | 36,125.30 | 47,680.37 | 1.77 | 2.25 | -18.83 | 31.99 |
| **2.Tourism industry** | **35,893.20** | **42,028.90** | **35,962.88** | **19,092.21** | **11,197.30** | **11,776.60** | **0.55** | **0.56** | **-41.35** | **5.17** |
| 2.3 Transport equipment rental | 8,317.58 | 10,552.58 | 12,458.76 | 8,363.34 | 4,615.26 | 5,756.01 | 0.23 | 0.27 | -44.82 | 24.72 |
| 2.4 Travel agencies and other reservation services | 25,237.30 | 28,358.78 | 19,401.34 | 6,995.12 | 2,564.09 | 926.71 | 0.13 | 0.04 | -63.34 | -63.86 |
| 2.5 Cultural activity | 28.93 | 58.52 | 16.88 | 37.85 | 63.28 | 73.84 | 0.00 | 0.00 | 67.19 | 16.69 |
| 2.6 Sport and recreation activity | 2,309.39 | 3,059.01 | 4,085.90 | 3,695.89 | 3,954.68 | 5,020.04 | 0.19 | 0.24 | 7.00 | 26.94 |
| **3. Digital trade** | **317,596.84** | **533,152.01** | **685,161.88** | **469,529.47** | **527,688.42** | **586,687.74** | **25.79** | **27.71** | **12.39** | **11.18** |
| 3.1 Trade on digital goods | 144,714.28 | 151,903.32 | 234,304.73 | 201,344.09 | 240,305.05 | 289,252.59 | 11.75 | 13.66 | 19.35 | 20.37 |
| 3.2 Online trade | 172,882.56 | 381,248.69 | 450,857.15 | 268,185.38 | 287,383.36 | 297,435.15 | 14.05 | 14.05 | 7.16 | 3.50 |

| | Value added (million baht) | | | | | | % Share | | Growth rate (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e | 2021 | 2022e |
| **4. Digital financial services** | **136,891.46** | **140,939.27** | **140,781.62** | **132,464.77** | **139,901.63** | **142,603.70** | **6.84** | **6.74** | **5.61** | **1.93** |
| 4.1 Digital banking services | 95,353.47 | 96,869.89 | 95,225.41 | 90,431.87 | 84,065.60 | 93,984.61 | 4.11 | 4.44 | -7.04 | 11.80 |
| 4.2 Other financial services | 41,537.99 | 44,069.38 | 45,556.21 | 42,032.90 | 55,836.03 | 48,619.09 | 2.73 | 2.30 | 32.84 | -12.93 |
| **5. E-education services** | **2,289.68** | **1,092.61** | **1,467.71** | **2,076.34** | **2,107.81** | **2,528.11** | **0.10** | **0.12** | **1.52** | **19.94** |
| 5.1 E-education services | 2,289.68 | 1,092.61 | 1,467.71 | 2,076.34 | 2,107.81 | 2,528.11 | 0.10 | 0.12 | 1.52 | 19.94 |
| **6. E-health services** | **196.9** | **205.91** | **228.76** | **265.54** | **394.14** | **400.48** | **0.02** | **0.02** | **48.43** | **1.61** |
| 6.1 E-health services | 196.9 | 205.91 | 228.76 | 265.54 | 394.14 | 400.48 | 0.02 | 0.02 | 48.43 | 1.61 |
| **7. Digital business and other services** | **108,268.06** | **101,553.79** | **163,545.79** | **89,749.01** | **84,218.14** | **91,512.57** | **4.12** | **4.32** | **-6.16** | **8.66** |
| 7.1 Postal and courier services | 86,454.85 | 79,262.11 | 139,383.05 | 73,584.84 | 67,461.50 | 74,461.54 | 3.30 | 3.52 | -8.32 | 10.38 |
| 7.2 Other digital business services | 21,813.19 | 22,291.68 | 24,162.74 | 16,164.17 | 16,756.65 | 17,051.03 | 0.82 | 0.81 | 3.67 | 1.76 |
| **Total** | **1,395,095.48** | **1,744,618.04** | **2,007,827.07** | **1,835,237.15** | **2,045,930.25** | **2,117,259.05** | **100.00** | **100.00** | **11.48** | **3.49** |

Note: Data not available in some categories

## Table 15 : Income from Digital Economy Activities Classified by Digital Sector in 2022e

| | 2022e | | | | | |
|---|---|---|---|---|---|---|
| | Compensation of employee | Operating surplus | Mixed Income | Net production taxes | Depreciation | Total |
| **Value (million baht)** | | | | | | |
| 1. Digital industry | 473,180.95 | 543,818.62 | 2,337.87 | 73,626.26 | 188,786.14 | 1,281,749.84 |
| 2. Tourism industry | 6,119.48 | -41.31 | 0.59 | 183.48 | 5,514.35 | 11,776.59 |
| 3. Digital trade | 375,959.40 | 72,285.23 | 83,643.73 | 39,180.93 | 15,618.45 | 586,687.74 |
| 4. Digital financial services | 102,370.56 | 22,702.55 | 59.44 | 4,636.90 | 12,834.25 | 142,603.70 |
| 5. E-education services | 1,348.14 | 765.99 | 0.00 | 0.00 | 413.99 | 2,528.12 |
| 6. E-health services | 273.18 | 77.14 | 0.00 | 0.00 | 50.15 | 400.47 |
| 7. Digital business and other services | 58,375.32 | 9,526.80 | 12,246.47 | 5,446.60 | 5,917.40 | 91,512.59 |
| **Total** | **1,017,627.03** | **649,135.02** | **98,288.10** | **123,074.17** | **229,134.73** | **2,117,259.05** |
| **Share (%)** | | | | | | |
| 1. Digital industry | 46.50 | 83.78 | 2.38 | 59.82 | 82.39 | 60.54 |
| 2. Tourism industry | 0.60 | -0.01 | 0.00 | 0.15 | 2.41 | 0.56 |
| 3. Digital trade | 36.94 | 11.14 | 85.10 | 31.84 | 6.82 | 27.71 |
| 4. Digital financial services | 10.06 | 3.50 | 0.06 | 3.77 | 5.60 | 6.74 |
| 5. E-education services | 0.13 | 0.12 | 0.00 | 0.00 | 0.18 | 0.12 |
| 6. E-health services | 0.03 | 0.01 | 0.00 | 0.00 | 0.02 | 0.02 |
| 7. Digital business and other services | 5.74 | 1.47 | 12.46 | 4.43 | 2.58 | 4.32 |
| **Total** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |

Table 16 : Private Final Consumption Expenditure Classified by Digital Sector at Current Market Prices in 2017 - 2022e

| Industry | Value (thousand baht) | | | | | | Share (%) | | อัตราเพิ่ม (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e | 2021 | 2022e |
| **1. Digital industry** | **300,901.00** | **331,166.65** | **339,166.49** | **368,568.32** | **381,606.61** | **395,994.66** | **87.10** | **85.59** | **3.54** | **3.77** |
| 1.1 Smart devices | 23,892.17 | 23,146.00 | 30,059.38 | 22,677.40 | 24,537.80 | 23,379.23 | 5.60 | 5.05 | 8.20 | -4.72 |
| 1.2 Hardware | 44,102.07 | 45,603.86 | 48,804.41 | 50,484.83 | 46,074.14 | 48,321.30 | 10.52 | 10.44 | -8.74 | 4.88 |
| 1.3 Software | 10,236.67 | 11,119.12 | 11,667.20 | 10,993.61 | 10,662.81 | 10,993.68 | 2.43 | 2.38 | -3.01 | 3.10 |
| 1.4 Digital services such as digital platform, digital order, digital delivery | 12,639.52 | 13,315.98 | 13,951.46 | 11,329.55 | 16,034.56 | 16,348.54 | 3.66 | 3.53 | 41.53 | 1.96 |
| 1.5 Communication | 189,447.21 | 215,159.65 | 209,100.94 | 242,025.58 | 250,483.07 | 250,065.08 | 57.17 | 54.05 | 3.49 | -0.17 |
| 1.6 Digital content | 20,583.36 | 22,822.04 | 25,583.10 | 31,057.35 | 33,814.23 | 46,886.83 | 7.72 | 10.13 | 8.88 | 38.66 |
| **2. Tourism industry** | **17,451.16** | **19,229.93** | **18,770.73** | **11,593.33** | **10,450.14** | **13,572.77** | **2.39** | **2.93** | **-9.86** | **29.88** |
| **3. Digital trade** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **4. Digital financial services** | **37,981.97** | **42,265.36** | **43,425.93** | **46,092.95** | **45,288.54** | **52,335.80** | **10.34** | **11.31** | **-1.75** | **15.56** |
| **5. E-education services** | **429.66** | **430.97** | **545.05** | **583.08** | **633.38** | **595.13** | **0.14** | **0.13** | **8.63** | **-6.04** |
| **6. E-health services** | **125.39** | **131.77** | **144.83** | **139.94** | **143.35** | **175.71** | **0.03** | **0.04** | **2.44** | **22.57** |
| **7. Digital business and other services** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Total** | **356,889.19** | **393,224.68** | **402,053.03** | **426,977.61** | **438,122.03** | **462,674.07** | **100.00** | **100.00** | **2.61** | **5.60** |

Table 17 : Gross Fixed Capital Formation of Digital Economy at Current Market Price in 2017 – 2022e (million baht)

| | Land | Building & Construction | Machinery and tools | Software | Investment in High-value Software and Applications | Other Assets | Total |
|---|---|---|---|---|---|---|---|
| **Value at current market price (million baht)** | | | | | | | |
| 2017 | 22,759.92 | 36,402.58 | 166,099.09 | 8,251.25 | 3,027.21 | 18,999.20 | 255,539.25 |
| 2018 | 24,027.58 | 38,021.19 | 186,338.29 | 9,437.26 | 3,519.88 | 19,605.06 | 280,949.26 |
| 2019 | 23,635.75 | 40,443.47 | 190,966.56 | 9,534.70 | 4,916.04 | 19,342.24 | 288,838.76 |
| 2020 | 20,506.84 | 34,335.25 | 169,480.65 | 8,602.33 | 3,875.37 | 18,578.19 | 255,378.63 |
| 2021 | 20,122.61 | 36,127.72 | 161,278.54 | 8,554.58 | 4,036.91 | 21,953.13 | 252,073.49 |
| 2022e | 21,611.72 | 43,317.26 | 206,468.07 | 14,178.96 | 6,766.71 | 31,020.92 | 323,363.64 |
| **Average** | **22,110.74** | **38,107.91** | **180,105.20** | **9,759.85** | **4,357.02** | **21,583.12** | **276,023.84** |
| **Share (%)** | | | | | | | |
| 2017 | 8.91 | 14.25 | 65.00 | 3.23 | 1.18 | 7.43 | 100.00 |
| 2018 | 8.55 | 13.53 | 66.32 | 3.36 | 1.25 | 6.98 | 100.00 |
| 2019 | 8.18 | 14.00 | 66.12 | 3.30 | 1.70 | 6.70 | 100.00 |
| 2020 | 8.03 | 13.44 | 66.36 | 3.37 | 1.52 | 7.27 | 100.00 |
| 2021 | 7.98 | 14.33 | 63.98 | 3.39 | 1.60 | 8.71 | 100.00 |
| 2022e | 6.68 | 13.40 | 63.85 | 4.38 | 2.09 | 9.59 | 100.00 |
| **Average** | **8.01** | **13.81** | **65.25** | **3.54** | **1.58** | **7.82** | **100.00** |

## Table 18 : Gross Fixed Capital Formation Classified by Digital Sector in 2017 – 2022e (million baht)

| Digital sector | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
|---|---|---|---|---|---|---|
| Digital industry | 105,279.31 | 120,205.68 | 129,684.07 | 126,744.13 | 138,552.02 | 184,999.25 |
| Tourism industry | 4,542.86 | 5,136.90 | 5,279.90 | 4,658.72 | 2,711.03 | 3,789.69 |
| Digital trade | 21,878.26 | 26,900.32 | 30,952.73 | 25,800.50 | 19,248.93 | 24,438.38 |
| Digital financial services | 110,253.77 | 114,754.04 | 106,080.29 | 83,673.23 | 77,571.14 | 94,215.20 |
| E-education services | 484.74 | 234.66 | 334.53 | 358.81 | 364.25 | 482.59 |
| E-health services | 44.97 | 47.71 | 52.37 | 50.67 | 75.2 | 97.46 |
| Digital business and other services | 13,055.34 | 13,669.95 | 16,454.87 | 14,092.57 | 13,550.92 | 15,341.07 |
| **Total** | **255,539.25** | **280,949.26** | **288,838.76** | **255,378.63** | **252,073.49** | **323,363.64** |

## Table 19 : Gross Fixed Capital Formation Classified by Digital Goods in 2017 – 2022e (million baht)

| Digital industry | Value (million baht) | | | | | | Share (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e |
| Smart devices | 24,785.86 | 28,167.30 | 30,194.90 | 27,708.54 | 33,157.30 | 32,578.47 | 18.63 | 20.21 | 21.90 | 19.85 | 19.18 | 20.01 |
| Hardware | 100,826.12 | 102,838.10 | 98,822.09 | 102,181.72 | 127,037.79 | 117,094.80 | 75.80 | 73.77 | 71.68 | 73.19 | 73.48 | 71.93 |
| Software | 7,401.59 | 8,399.89 | 8,848.35 | 9,723.83 | 12,694.10 | 13,109.01 | 5.57 | 6.02 | 6.42 | 6.96 | 7.34 | 8.06 |
| **Total** | **133,013.57** | **139,405.29** | **137,865.34** | **139,614.09** | **172,889.19** | **162,782.28** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |

Table 20 : Imports and Exports of Digital Goods and Services in 2017 – 2022e (million baht)

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | Average |
|---|---|---|---|---|---|---|---|
| **FOB at current market prices** | | | | | | | |
| **Export of goods and services** | **2,381,293.44** | **2,377,962.38** | **2,283,258.18** | **2,030,530.16** | **2,270,808.03** | **1,678,991.58** | **2,170,473.96** |
| Goods | 1,576,390.29 | 1,564,162.66 | 1,462,797.93 | 1,484,603.74 | 1,776,171.02 | 1,518,589.07 | 1,563,785.78 |
| Services | 804,903.15 | 813,799.72 | 820,460.25 | 545,926.42 | 494,637.01 | 160,402.51 | 606,688.18 |
| **Import of goods and services** | **1,868,855.61** | **1,986,467.82** | **1,898,946.96** | **1,727,856.24** | **2,060,287.45** | **1,729,703.75** | **1,878,686.31** |
| Goods | 1,383,058.63 | 1,434,718.34 | 1,332,079.06 | 1,294,419.63 | 1,604,053.31 | 1,505,408.10 | 1,425,622.85 |
| Services | 485,796.98 | 551,749.48 | 566,867.90 | 433,436.61 | 456,234.14 | 224,295.65 | 453,063.46 |
| **Share (%)** | | | | | | | |
| **Export of goods and services** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |
| Goods | 66.20 | 65.78 | 64.07 | 73.11 | 78.22 | 90.45 | 72.05 |
| Services | 33.80 | 34.22 | 35.93 | 26.89 | 21.78 | 9.55 | 27.95 |
| **Import of goods and services** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |
| Goods | 74.01 | 72.22 | 70.15 | 74.91 | 77.86 | 87.03 | 75.88 |
| Services | 25.99 | 27.78 | 29.85 | 25.09 | 22.14 | 12.97 | 24.12 |

Table 21 : Exports of Digital Goods and Services Classified by Digital Sectors in 2017 – 2022e (million baht)

| Industry | Export value | | | | | | Share (%) | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| **1. Digital industries** | **1,952,292.71** | **1,950,866.59** | **1,854,227.60** | **1,862,606.18** | **2,135,165.13** | **1,525,290.91** | **94.03** | **90.85** |
| 1.1 Smart devices | 529,799.85 | 508,987.40 | 472,194.48 | 468,998.09 | 539,985.95 | 506,424.74 | 23.78 | 30.16 |
| 1.2 Hardware | 968,733.43 | 981,324.24 | 923,132.97 | 963,459.69 | 1,166,277.94 | 924,894.38 | 51.36 | 55.09 |
| 1.3 Software | 1,854.00 | 2,150.00 | 2,514.00 | 2,269.00 | 2,324.00 | 2,324.00 | 0.10 | 0.14 |
| 1.4 Digital services such as digital platform, digital order, digital delivery | 74,354.99 | 70,721.53 | 73,262.80 | 75,922.27 | 73,655.67 | 6.76 | 3.24 | 0.00 |
| 1.5 Communication | 339,304.28 | 354,411.04 | 349,815.01 | 318,713.85 | 319,787.64 | 81,755.00 | 14.08 | 4.87 |
| 1.6 Digital content | 38,246.16 | 33,272.38 | 33,308.34 | 33,243.28 | 33,133.93 | 9,886.03 | 1.46 | 0.59 |
| **2. Tourism industry** | **290,985.91** | **288,473.89** | **289,859.27** | **102,343.60** | **78,539.35** | **93,420.26** | **3.46** | **5.56** |
| 2.1 Accommodation for visitors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.2 Food and baverage serving activity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.3 Transport equipment rental | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.4 Travel agencies and other reservation services | 232,443.05 | 228,735.34 | 228,995.26 | 89,462.75 | 74,122.33 | 76,134.60 | 3.26 | 4.53 |
| 2.5 Cultural activity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.6 Sport and recreation activity | 41,523.03 | 38,986.15 | 36,460.76 | 8,196.10 | 2,716.95 | 7,295.16 | 0.12 | 0.43 |
| 2.7 Retail trade of country-specific tourism characteristic goods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Industry | Export value | | | | | | Share (%) | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| 2.8 Other country-specific tourism charactoristic activity | 17,019.83 | 20,752.40 | 24,403.25 | 4,684.75 | 1,700.07 | 9,990.50 | 0.07 | 0.60 |
| **3. Digital trade** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| 3.1 Trade on digital goods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.2 Online trade | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **4. Digital financial services** | **86,246.15** | **33,508.04** | **33,207.33** | **34,419.47** | **34,477.48** | **25,590.85** | **1.52** | **1.52** |
| 4.1 Digital banking services | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4.2 Other financial services | 86,246.15 | 33,508.04 | 33,207.33 | 34,419.47 | 34,477.48 | 25,590.85 | 1.52 | 1.52 |
| **5. E-education services** | **110.34** | **112.51** | **114.54** | **27.74** | **12.43** | **35.71** | **0.00** | **0.00** |
| 5.1 E-education services | 110.34 | 112.51 | 114.54 | 27.74 | 12.43 | 35.71 | 0.00 | 0.00 |
| **6. E-health services** | **39,685.88** | **40,512.83** | **41,291.20** | **8,105.66** | **2,252.01** | **11,152.06** | **0.10** | **0.66** |
| 6.1 E-health services | 39,685.88 | 40,512.83 | 41,291.20 | 8,105.66 | 2,252.01 | 11,152.06 | 0.10 | 0.66 |
| **7. Digital business and other services** | **11,972.46** | **64,488.53** | **64,558.25** | **23,027.52** | **20,361.63** | **23,501.79** | **0.90** | **1.40** |
| 7.1 Postal and courier services | 983.08 | 1,349.60 | 1,132.49 | 531.97 | 403.22 | 3,993.54 | 0.02 | 0.24 |
| 7.2 Other digital business services | 10,989.38 | 63,138.93 | 63,425.76 | 22,495.55 | 19,958.41 | 19,508.25 | 0.88 | 1.16 |
| **Total** | **2,381,293.44** | **2,377,962.38** | **2,283,258.18** | **2,030,530.16** | **2,270,808.03** | **1,678,991.58** | **100.00** | **100.00** |

## Table 22 : Imports of Digital Goods and Services Classified by Digital Sectors in 2017-2022e (million baht)

| Industry | Import value | | | | | | Share (%) | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| **1. Digital industries** | **1,645,962.33** | **1,750,815.23** | **1,653,665.66** | **1,575,862.13** | **1,892,222.55** | **1,531,929.76** | **91.84** | **88.57** |
| 1.1 Smart devices | 487,180.06 | 482,161.02 | 466,516.61 | 427,879.50 | 513,185.24 | 334,504.70 | 24.91 | 19.34 |
| 1.2 Hardware | 823,603.45 | 876,770.12 | 791,537.19 | 801,282.99 | 1,011,741.61 | 1,070,380.49 | 49.11 | 61.88 |
| 1.3 Software) | 34,459.00 | 36,165.00 | 40,691.00 | 33,341.00 | 34,154.00 | 34,154.00 | 1.66 | 1.97 |
| 1.4 Digital services such as digital platform, digital order, digital delivery | 50,786.60 | 56,880.84 | 59,458.11 | 55,830.59 | 58,333.88 | 2,620.55 | 2.83 | 0.15 |
| 1.5 Communication | 224,091.56 | 272,520.49 | 269,259.17 | 234,204.65 | 250,087.42 | 83,968.86 | 12.14 | 4.85 |
| 1.6 Digital content | 25,841.66 | 26,317.76 | 26,203.58 | 23,323.40 | 24,720.40 | 6,301.16 | 1.20 | 0.36 |
| **2. Tourism industry** | **124,885.88** | **131,100.19** | **136,300.32** | **77,875.17** | **89,412.01** | **91,140.63** | **4.34** | **5.27** |
| 2.1 Accommodation for visitors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.2 Food and baverage serving activity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.3 Transport equipment rental | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.4 Travel agencies and other reservation services | 121,623.04 | 127,514.25 | 132,753.44 | 76,526.17 | 88,246.48 | 87,398.96 | 4.28 | 5.05 |
| 2.5 Cultural activity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.6 Sport and recreation activity | 2,314.26 | 2,340.24 | 2,124.77 | 858.37 | 716.93 | 1,579.12 | 0.03 | 0.09 |
| 2.7 Retail trade of country-specific tourism characteristic goods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.8 Other country-specific tourism charactoristic activity | 948.59 | 1,245.71 | 1,422.11 | 490.63 | 448.60 | 2,162.55 | 0.02 | 0.13 |

| Industry | Import value | | | | | | Share (%) | |
|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022e | 2021 | 2022e |
| **3. Digital trade** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| 3.1 Trade on digital goods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.2 Online trade | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **4. Digital financial services** | **65,190.49** | **45,564.03** | **51,124.17** | **50,270.05** | **53,644.38** | **58,157.13** | **2.60** | **3.36** |
| 4.1 Digital banking services | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4.2 Other financial services | 65,190.49 | 45,564.03 | 51,124.17 | 50,270.05 | 53,644.38 | 58,157.13 | 2.60 | 3.36 |
| **5. E-education services** | **47.35** | **50.95** | **49.89** | **19.19** | **14.69** | **31.13** | **0.00** | **0.00** |
| 5.1 E-education services | 47.35 | 50.95 | 49.89 | 19.19 | 14.69 | 31.13 | 0.00 | 0.00 |
| **6. E-health services** | **22,373.66** | **24,572.66** | **23,965.68** | **7,040.95** | **4,921.98** | **13,848.26** | **0.24** | **0.80** |
| 6.1 E-health services | 22,373.66 | 24,572.66 | 23,965.68 | 7,040.95 | 4,921.98 | 13,848.26 | 0.24 | 0.80 |
| **7. Digital business and other services** | **10,395.89** | **34,364.74** | **33,841.23** | **16,788.78** | **20,071.85** | **34,596.84** | **0.97** | **2.00** |
| 7.1 Postal and courier services | 774.14 | 1,118.09 | 1,010.51 | 656.96 | 740.77 | 6,600.95 | 0.04 | 0.38 |
| 7.2 Other digital business services | 9,621.75 | 33,246.65 | 32,830.72 | 16,131.82 | 19,331.08 | 27,995.89 | 0.94 | 1.62 |
| **Totalทั้งสิ้น** | **1,868,855.61** | **1,986,467.82** | **1,898,946.96** | **1,727,856.24** | **2,060,287.45** | **1,729,703.75** | **100.00** | **100.00** |

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