The Measurement on

Digital Contribution to GDP

Phase II

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

2021

Preface

The Office of the National Digital Economy and Society Commission (ONDE) has completed the project on measuring the digital contribution to GDP phase II for the fiscal year of 2020, continuing from the previous phase of 2019, with the objective on enhancing the database quality and overall valuation of the digital economy and its contribution to growth as the macroeconomic indicators to capture the current situation of digital economy in Thailand.

This phase II study on the estimation of the digital contribution to GDP is based on the concept on 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) as in phase I, 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, and would also be in consistent to both the definitions and measurement methodology according to the widely international standardized System of the National Accounts. This would be used as an important analytical tool for measuring the digital contribution as well as growth from digital to GDP, including the related statistics efficiently, up-to-dated, and internationally standardized, for which could be able to make comparisons to other countries and could be further applied for the relevant academic research studies in the future.

This report presents the definitions, the valuations, the measuring methodology and 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 - 19, including the defined classifications for further related analyses.

The Office of the National Digital Economy and Society Commission is thankful to various public and private organizations and all the privileged people who have continuously contributed the valuable data, including the constructive comments and corrective suggestions to the phase II project in completion at this stage. ONDE wishes to further cooperate for the future development.

Executive Summary

The Project on the Measurement of the digital contribution to GDP phase II is issued by Office of the National Digital Economy and Society Commission (ONDE) for the fiscal year 2020 with the purpose on further collecting the related relevant data and measuring the digital contribution to GDP and of the growth of the digital economy via production, income and expenditure approaches (with digital and non-digital concept), including the balance among those three approaches, so as to be the credible and insightful indicators for policy implications and policy recommendations to the digital economy and society of Thailand.

The study 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 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, that is in accordance 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 macroeconomic statistics efficiently, up-to-dated, and internationally standardized, enabling for any comparison to other countries.

The adjustments from phase I to phase II, especially on the definitions and the exact scope of the digital economy, are focused on the conceptual framework following international academic advancements on measuring transitional digital economy in accordance with the economic transitions of each country where the economy and the related economic behaviors have been vastly altering, particularly through digital channels.

For definitions of categories. OECD has released the conceptual framework on digital economy in five 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".

- **The Narrow measure:** Core measure + "Economic activity reliant on digital inputs"

- **The Broad measure:** Narrow measure + "Economic activity significantly enhanced by digital inputs".

- **The Digital Society**: Broad measure + "Other activity reliant on or significantly enhanced by digital inputs".

- **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 of the digital contribution on GDP in this 2nd phase applies this OECD concept while considering the current data collection possibility and the concurrent plausibility of measurement methodology with the SNA. Despite the related limitation, the measurement covers the broad measure including the alternative one of economic activity, though still incomplete in some areas owing to the fact that the definitions are in the process of adoption and OECD case studies are in the pilot process. The measurement still centers on three GDP calculation approaches: Production, Expenditure, and Income approaches, to show the linkages between the macro - economy and the digital economy.

The research methodology for this phase II continues the combination between desk research and field survey research, in a blend of both quantitative and qualitative approach, including the secondary data collection and recommendations from public and private sectors, academic scholars and digital economy development specialists, covering digital product, digital platform, and digital services, to process for the estimation and development of the economic indicators for measurement of the digital economy in all three GDP calculation approaches. This represents the transition trends including digital contribution to GDP and source of growth of the digital contribution. Furthermore, apart from the continuing processes of the

development of DESA to obtain the Digital Supply and Use Tables, this 2nd phase adds on the real-term measurement using the technique of Chain Volume Measures: CVM, following the method employed for real GDP calculation. Real terms represent the change in quantity in a period of time, without the price effects.

The economic valuation of the digital contribution to GDP for year 2017 - 2019, revising earlier 2017-8 series of phase I, is as following.

Production approach

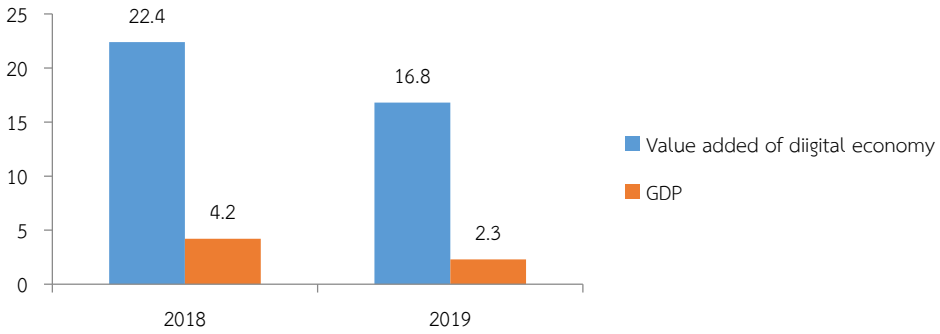
The gross output on production of the digital economy has an increasing trend from 2017-2019 with value added of 2017 at current market prices for 1,322,061million baht, 1,619,448 million baht in 2018 and, for 1,902,652 million baht in 2019, respectively, or the growth of 22.5 percent in 2018 and 17.5 percent in 2019.

Comparing to the GDP at current market prices of 15,488,664 million baht, 16,368,711 million baht and 16,898,086 million baht in 2017-19, the digital economy has the value added shares in GDP (digital contribution to GDP) of 8.54 percent 9.89 percent and 11.26 percent, respectively. The digital contribution has the rising trend through three-year period, reflecting the transition of the Thai economy to the new era, which concentrates on enhancement of productivity, trade and investment through the higher portion of digital activities (ICT or internet) comparing to the traditional economy.

Table 1 Digital Contribution to GDP, 2017 - 2018

	Value at current market price (Million baht)			% change	
	2017	2018	2019	2018	2019
Value added of digital economy	1,322,061	1,619,448	1,902,652	22.5	17.5
GDP	15,488,664	16,368,711	16,898,086	5.68	3.23
%Digital Contribution to GDP	8.54%	9.89%	11.26%		

Figure 1 comparison of growth of digital economy and GDP in real-term (CVM) 2018 - 19 (%)



The digital economy, in real-term CVM, expands 22.4 percent and 16.8 percent in 2018 and 2019, respectively. This results from the rising trend of e-commerce, ICT, digital services and activities related to internet. Comparing to the real GDP (CVM) which expands 4.2 percent in 2018 and 2.3 percent in 2019, this echoes the lower growth of other activities within that two-year period, which stems from the declining trend of export and tourism.

Expenditure approach

Private final consumption expenditure on digital activities at current market prices accounts for 356,889.19 million baht in 2017, 393,224.68 million baht in 2018, or a surge of 10.18 percent, and 402,053.03 million baht in 2019, or a rise of 2.25 percent.

ICT expenditure, including telephone and internet bills is the highest with value of 191,601.47 million baht 218,890.37 million baht, and 213,087.93 million baht in 2017-2019, respectively. This accounts about 54.2 percent on average of 2017-19. Expenditure on entertainment and culture, which includes the purchase of televisions and computers, gains the share of 27 percent on average and miscellaneous items, which include financial and insurance services, accounts for 13.42 percent, respectively.

Real - term private final consumption expenditure on digital activities (CVM) expands 10.04 percent in 2018 and 2.35 percent in 2019. ICT expenditure expands greatly to 14.30 percent in 2018, but distracts 2.61 in 2019.

Government final consumption expenditure on digital activities at current market prices accounts 16,409 million baht, 15,423 million baht, and 17,846 million baht in 2017-2019, respectively. This includes material costs and public services 7,932 million baht and 8,476 million baht in 2017, 8,634 million baht and 6,789 million baht in 2018 and 17,846 million baht 10,913 million baht in 2019.

Government final consumption expenditure on digital activities at current market prices declines 6.01 percent in 2018, coming from the decrease in public expenses 19.91 percent following the drop in telephone and internet services both central and local governments, whereas other items expand. In 2019, the expenditure increases 15.71 percent resulting from higher material expenses of 26.39 percent and public services of 2.12 percent.

Real-term Government final consumption expenditure declines 6.21 percent in 2018 as a consequence of the drop in public services expenses (19.91 percent), following the decline in telephone and internet services expenses. In 2019, the real-term Government final consumption expenditure expands 15.50 percent from the expansion of material expenses (26.03 percent), importantly on computer and fixing expenses.

For the digital gross fixed capital formation at current market prices in 2017-2019, this accounts 165.707 million baht, 183.660 million baht, and 194.706 million baht, respectively. By item, the gross fixed capital formation on equipment and engines reaches the highest value of 102.262 million baht, 106.595 million baht, and 117.782 million baht, respectively, or about 60.49 percent of the total gross fixed capital formation on digital activities in 2019, the second rank is the electronics parts and the third rank is the software & application development expenses at 19.15 percent and 19.15 percent, respectively.

The real-term digital gross fixed capital formation (CVM) in 2018 grows 7.69 percent, as a consequence of the expansion of the digital products, especially computers and parts, telephone and parts, television/radio and parts, the sonar test instrument & equipment, and the watchmaker tools & test equipment. For 2019, the real-term contracts 7.69 percent from the decline in digital hardware such as smart devices and electronics and computer parts.

Exports of digital commodities and services at current market prices 2,142,908 million baht 2,133,924 million baht and 2,038,015 million baht from 2017-19, respectively. Important exporting items are the computers and parts, which share 26.79 percent of total. However, the decline to 509,150 million baht in 2019 results from lower global demand & the international trade competition, which partly stems from the technology change that makes the shifts to other kinds of computer parts, instead of those made in Thailand. The second rank is the electronics and communication parts, which share 10.23 percent in 2019, while export of digital services, the important item is travel booking services (excluding accommodation) whose share is 7.87 percent, is with the declining trend.

For imports of digital commodities and services gives rise to 1,674,698 million baht, 1,780,457 million baht, and 1,694,096 million baht in 2017-2019, respectively. Many importing items decline following the drop of the local demand i.e. electronics parts and radio transmitter. The important items on importing services are travel

booking services (excluding accommodation) with a rise in 2018, but declining in 2019 from the lower outbound tourism.

Income approach

Measurement on income approach categorizes the five items of the returns on the primary factors (e.g. compensations of employee or wages & rents) from the production within the boundary of digital economy. Compensations of employee are worth 517,443 million baht, 598,939 million baht, and 722,300 million baht in 2017-2019, respectively. Operating surpluses are worth 640,482 million baht in 2019, which accounts about 33.66 percent. Mixed income, which is the return on private businesses, increases from 89,874 million baht in 2017 to 183,670 million baht and 275,553 million baht, which share 11.34 percent and 14.48 percent in 2018-2019, respectively, resulting from the sharp rise of online businesses. Net taxes on production and depreciation account 5.77 percent and 8.12 percent of total, accordingly.

Table 2 Returns on the factors of production in digital economy (Million Baht) 2017-2019

	Value (Million Baht)			Share (%)		
	2017	2018	2019	2017	2018	2019
Compensation of employee	517,443	598,939	722,300	39.14	36.98	37.96
Mixed income	89,874	183,670	275,553	6.80	11.34	14.48
Operating surplus	492,828	589,954	640,482	37.28	36.43	33.66
Net taxes on production	98,983	106,939	109,776	7.49	6.60	5.77
Depreciation	122,934	139,947	154,541	9.30	8.64	8.12
Total	1,322,061	1,619,448	1,902,652	100.00	100.00	100.00

Although this phase II has further developed from the first phase in many issues, there are still many limitations on measuring the digital contribution to GDP in various weakpoints i.e. definition framework, scope of digital activity, data availability on measuring regarding the three SNA approaches. Issues such as valuation of the public digital services, valuation of inventory on digital products/services as part of expenditure side are to be further determined in the future. However, the initial results in this phase are able to reflect the size of the digital economy and its crucial components, those are the engine of growth other than traditional drivers, in priority. Agencies and interested entities are welcome to use this set of statistical and economic indicators, yet to consider the shortcomings as abovementioned.

Contents

List of Tables

Page

Table

List of Tables (Continued)

Page

Table

List of Figure

Page

Figure

List of Figure (Continued)

Page

Figure

1. Introduction

The Office of the National Digital Economy and Society Commission (ONDE), as the principal entity that administering the policies for digital economy and society, has recognized the importance of the measurement of the digital contribution to GDP and its growth that represents the technology transition and new business models in the digital age. ONDE, thus, continuously puts forward fine-tuning the database development to arrange as an economic tool to indicate the digital contribution on economic growth, of which began in 2019. The phase II is managed to cover the additional digital activities those were not in phase I to capture more details for a better measurement on all SNA's production, income, and expenditure approaches (with digital and non-digital concept), including balancing, so as to be reliable along with the international standard and to designate the policy implications to further enhance the digital competitiveness of Thailand.

2. Objectives

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 of Thailand with the digital contribution to GDP, covering the digital activities in all production, markets, 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 five groups of sectors those are digital industry, digital tourism, digital trade, digital services, and digital finance, of which being categorized in, at least, forty sub-sectors

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: SNA2008 and 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, that is in accordance 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 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, which has set up the Advisory Group on Measuring GDP in a Digitalised Economy to improve the measurement

of the digital economy linking to the macro-economy, of which in the meantime, in the process of determining the Central Framework, with the important issues as the boundary of the digital economy, where some parts are outside the production boundary of the Systems of National Accounts, the comprehensive digital definition of the economic transactions, the characteristics of the digital products and non-digital products, the definitions of digital services and the scopes of the digital industries. OECD has released the Potential Satellite Accounts Framework as well and 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, OECD (2020) has released the conceptual framework on digital economy in five 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".

The Narrow measure: Core measure + "Economic activity reliant on digital inputs"

The Broad measure: Narrow measure + "Economic activity significantly enhanced by digital inputs".

The Digital Society: Broad measure + "Other activity reliant on or significantly enhanced by digital inputs".

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".

Following the academic progress, it can be said that the internationally acceptable definitions and the exact meanings of the digital economy are still in the study and development process concerning the current transitional situation. For Thailand, to follow the international organization, the 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 commodities 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: SNA2008, 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 commodities /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. For the case which has no quantity and price such as services, the direct revenue and intermediate consumption or the expenses on

purchasing the commodities and services for all production activities and calculated for value added from the difference between gross output and intermediate costs. Then, the summation of all value added of all sectoral activities is the Aggregate Supply or Gross Domestic Products: GDP from the total production in the country. Likewise, the digital contribution to GDP on production approach, the summation of the value added of all digital production activities would be the digital contribution to GDP of the country, and for this is at the current market prices, while there are those with the current market prices and real prices for the national nominal GDP and the real GDP or GDP at Chain volume measure: CVM).

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)

$\Rightarrow$ Value added= Gross output - Intermediate cost

Gross output *means the value of commodities 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*

consumable or 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

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

Private Final Consumption Expenditure: PCE. To obtain PCE, it is to estimate from the overall Final Expense, mostly, from the secondary survey such as the Social economic survey of the National Statistical Office (NSO), 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 Economy Promotion 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: GCE 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, and non-profit state enterprises. For local government composes of Bangkok Metropolitan Area, municipal cities, Provincial administration organizations, Tambon administration organizations and Pattaya City special administrative organization. These data are collected from the expenses from both the National Budget and Off-National Budget.

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 commodities/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 for the direct expenses related to the digital activities.

Gross fixed capital formation: GFCF composes 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 Custom department, Ministry of Finance and the calculation on the international trade of digital commodities/services considers only the digital commodities 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 means the approach on 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 the phase II, as continuing from phase I, is the mixture between desk research and field survey research, including the secondary data collection 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 and primary data from the private sectors. In phase II, the survey is extended to cover the private/personal businesses to reflect the online activities of the SMEs. The project also has the focus groups, both public and private sectors, and interview visits in various local areas to gather the viewpoints from the related parties and to capture the transitional situation concerning the digital transformation.

Procedures for the phase II are

1) Review of the related literature, including progresses of DESA framework development of OECD, SNA 2008, the progresses on NESDC's National Accounts, other countries' studies on the digital contribution to GDP and reviews of the related work & surveys concerning digital economy of NESDC, the National Statistics Office (NSO), Electronic Transactions Development Agency (ETDA) and other agencies to supplement the framework and indicator development

for the measurement of the digital economy in all three approaches of contribution to GDP calculation.

2) Consideration of database status and 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), NESDC, Bank of Thailand, Digital Economy Promotion Agency, etc., especially the primary survey on household expenses and ICT usages and authorities from central and local governments.

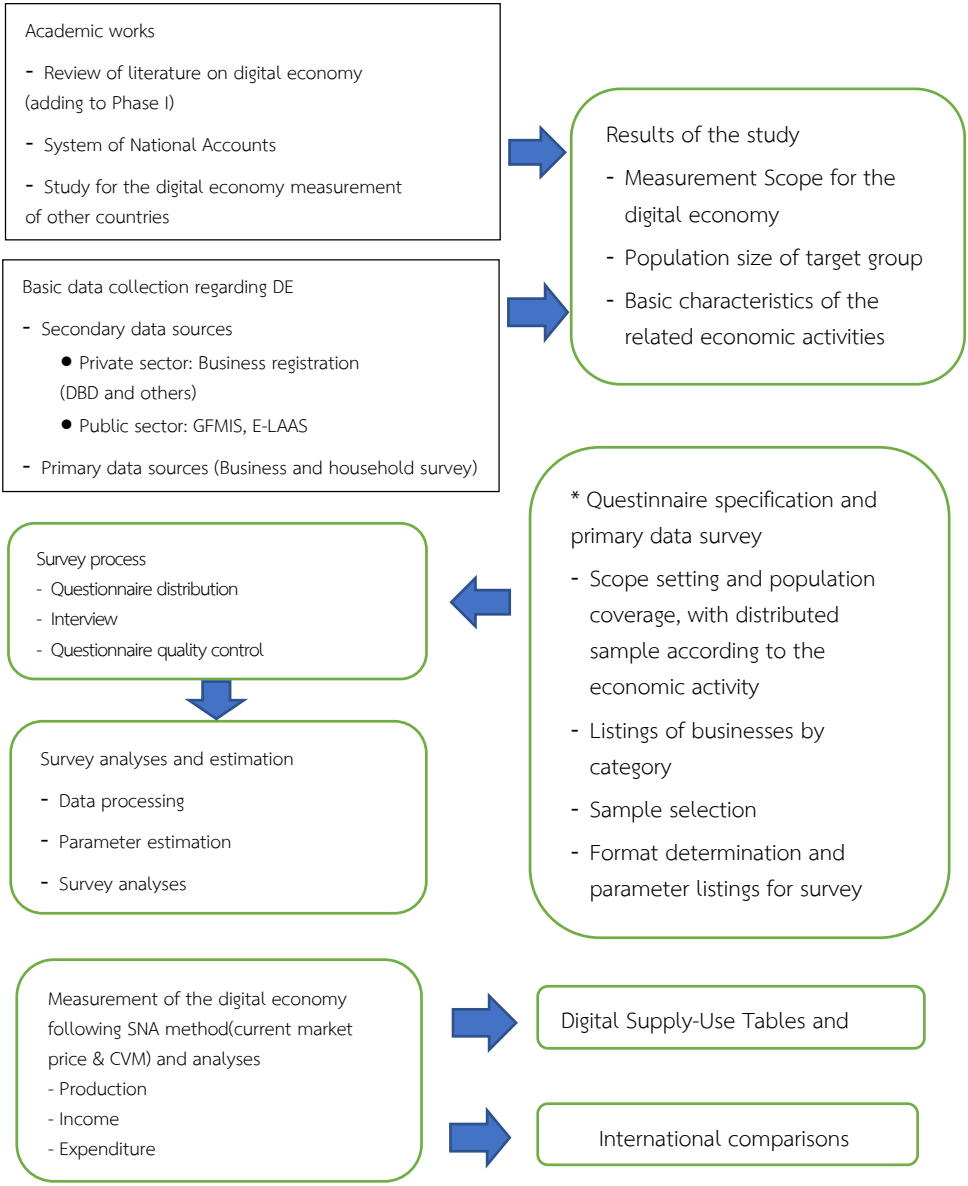
3) The arrangement on primary data collection composes of, first, the data collection from surveys and interviews the CEOs of the relevant targeted businesses and entities in digital industries, digital platform services and other industries with digital products, including household economic agents and public authorities. The data collection method is (1) the determination of relevant sampling population of those digital industries, digital platforms, digital services with the digital products and all the economic entities under the concept of digital economy. Setting up of the sample and sample size according to the scope, with the coverage of the production, income and expenditure sides, with the distributed sample following the proportion of the population and attentive areas. This also includes the distribution of the sample according to the pilot sectors

settled by ONDE: digital industry, digital tourism, digital trade, digital finance, and digital services, and following the standard statistical methodology (2) Specification of variables and required data and developing tools on data collection and survey questionnaires (3) Collection of the surveyed data from the face-to-face interview, especially the samples of relevant households and businesses, mixing with the telephone interviews, to control the data quality to lessen the possible non-sampling errors (4) there are the processes on data quality control on survey procedure to maintain the validity and reliability. For validity, the consideration on content validity and the check up on coverage and efficiency is settled from the focus groups to obtain the viewpoints and suggestions with ONDE and other academic scholars and related relevant parties from both public and private sectors. This includes the reliability test of the statistics.

4) Estimation of the digital contribution to GDP in all three approaches of GDP calculation: Production Approach on the value added from the digital activities regarding the definition and the scope of the digital economy, Income Approach with the composition of compensation of all primary factors such as employee, capital, and associate production taxes, and Expenditure Approach with the composition of Private and Government Final Consumption Expenditures, Gross fixed capital formation, Net Exports (the difference of Imports and Exports)

5) The development of Digital Supply and Use Table under the framework of Supply and Use Table, 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 for further development of Digital Economy Satellite Accounts: DESA

Overview of the procedure for the measurement of the Digital Contribution to GDP phase II



5. Estimated measurement of the Digital Economy in 2017 - 2019

For phase II, the estimation of the measurement of the digital economy takes three annual periods (2017 - 2019) at the current market prices for all three calculation approaches. The valuation with real-terms using Chain volume measures has been calculated only for production and expenditure sides, with year 2017 as the reference year.

5.1 Production approach

Overall digital economy

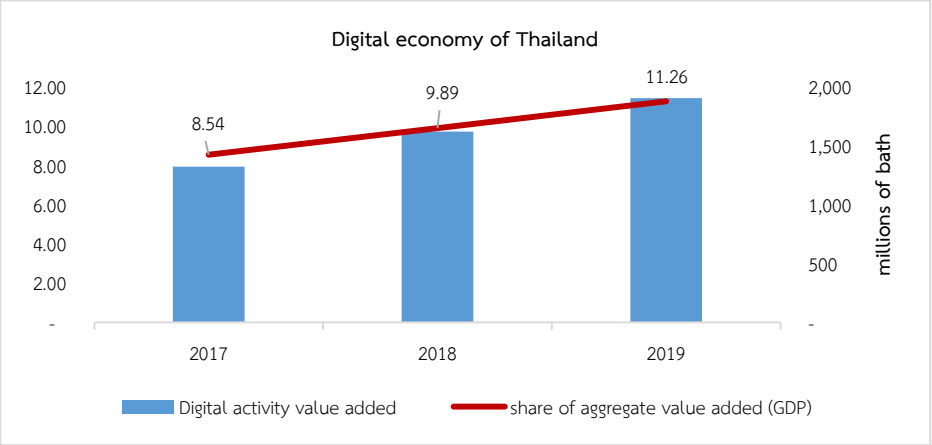
The gross output on production of the digital economy has an increasing trend from 2017-2019 with value added of 2017 at current market prices for 1,322,061 million baht, 1,619,448 million baht in 2018 and, for 1,902,652 million baht in 2019, respectively, or the growth of 22.5 percent in 2018 and 17.5 percent in 2019.

Comparing to the GDP at current market prices of 15,488,664 million baht, 16,368,711 million baht and 16,898,086 million baht in 2017 - 19, the digital economy has the value added shares in GDP (digital contribution to GDP) of 8.54 percent 9.89 percent and 11.26 percent, respectively. The digital contribution has the rising trend through three-year period, reflecting the transition of the Thai economy to the new era, which concentrates on enhancement of productivity, trade and investment through the higher portion of digital activities (ICT or internet) comparing to the traditional economy, which is in the declining trend as a conseqence of the slow growth of the global economy due to fierce competition.

Table 3 Size of the Digital Economy comparing to GDP, 2017 - 2019

At current market prices	Unit	2017	2018	2019
1. Digital economy				
- Gross output	MB	2,845,353	3,385,191	3,711,264
- Intermediate cost	MB	1,523,292	1,765,743	1,808,612
- Value added	MB	1,322,061	1,619,448	1,902,652
- Growth rate	%	-	22.5	17.5
2. GDP	MB	15,488,664	16,368,711	16,898,086
3. Digital contribution to GDP	%	8.54	9.89	11.26

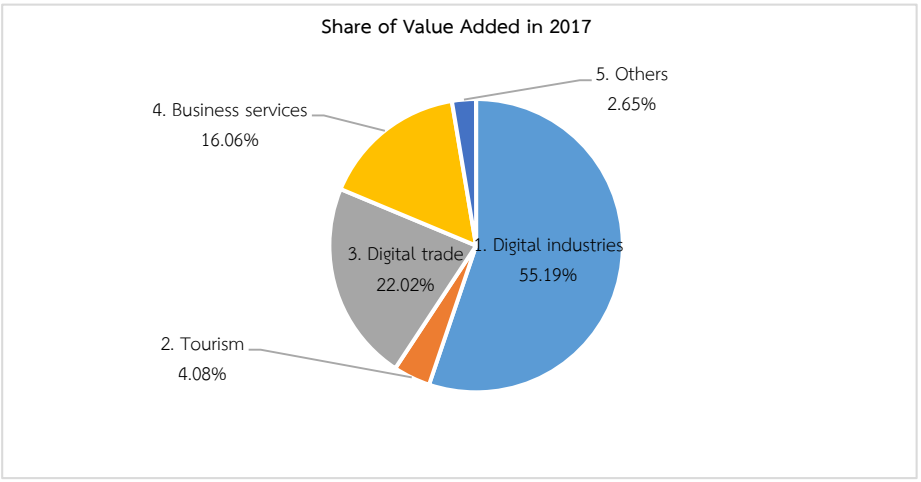
Figure 2 Digital economy (left axis) and contribution to GDP (right axis) 2017 - 2019

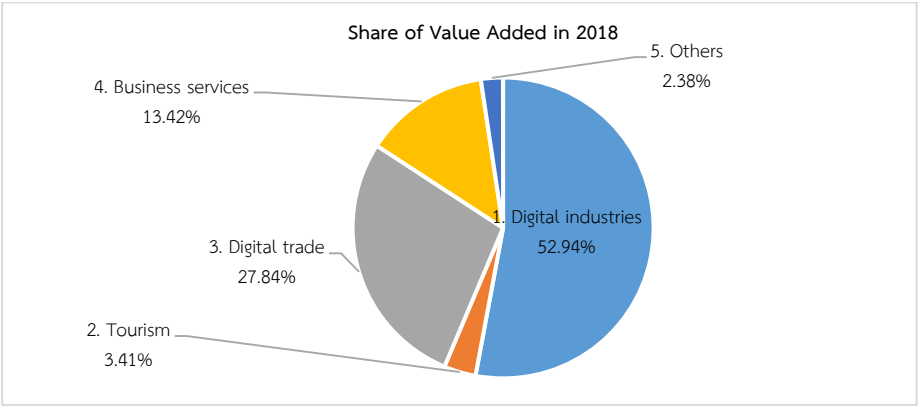


Considering value added of digital activity classified by five main digital sectors, Thai economy has vitally transformed to embrace the digital technology. Digital industry in 2017 and 2018 has the value added of 729,707 milion baht and 857,393 million baht or with the share of 55.19 percent and 52.94 percent of the total digital

activity, respectively. With five sub-sectors of smart devices, hardware, software, digital service, communication and digital content, the important sub-sectors are hardware and communication, for which account the high proportion for those years. But, in 2019, the value added of digital industry slightly drops to 853,322 million baht or with the share of 44.85 percent, while the value added of digital trade becomes higher sharply to 685,990 million baht in 2019 or with the proportion of 36.05 percent, expressively echoing the market transition to online trade. The decline in the digital industry generally stems from the drop in hardware, which comprises of electronic parts and hard disk drives, those were with important role as the high value added and export booster, previously. Digital trade, meanwhile, extensively expands, mainly from the popularity of the retail trade via internet including related services. Other sectors account with descending shares such as tourism and transportation.

Figure 3 Share of digital activities value added classified by digital sector, 2017 - 2019





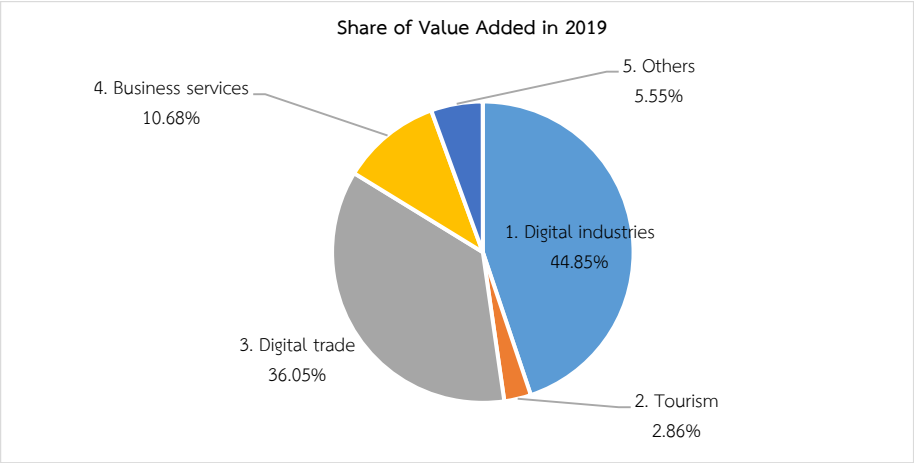

Share of Value Added in 2019
5. Others
5.55%
4. Business services
10.68%
1. Digital industries
44.85%
3. Digital trade
36.05%
2. Tourism
2.86%

Table 4 Digital economy classified by digital sector (Million Baht) in 2017 - 2019

Digital sectors at current market price (Million Baht)	Value Added			%		
	2017	2018	2019	2017	2018	2019
1. Digital industry	729,707	857,393	853,322	55.19	52.94	44.85
1.1 Smart devices	15,285	18,559	28,249	1.16	1.15	1.48
1.2 Hardware	378,996	393,002	344,720	28.67	24.27	18.12
1.3 Software	66,327	69,568	78,165	5.02	4.30	4.11
1.4 Digital services	62,345	72,568	73,324	4.72	4.48	3.85
1.5 Communication	174,276	271,214	294,291	13.18	16.75	15.47
1.6 Digital content	32,478	32,482	34,572	2.46	2.01	1.82
2.Digital tourism	53,917	55,275	54,427	4.08	3.41	2.86
2.1 Rental of transport equipment and leasing	26,200	28,021	33,010	1.98	1.73	1.73
2.2 Travel agencies and other reservation services	25,938	25,187	18,915	1.96	1.56	0.99
2.3 Sport and recreation activity	1,778	2,067	2,503	0.13	0.13	0.13
3. Digital trade	291,111	450,909	685,990	22.02	27.84	36.05
3.1 wholesale trade	94,354	98,263	168,337	7.14	6.07	8.85
3.2 retail trade	50,142	52,183	68,337	3.79	3.22	3.59
3.3 Retail trade via internet (e-commerce)	146,615	300,464	449,315	11.09	18.55	23.62
4. Business services	212,326	217,361	203,245	16.06	13.42	10.68
4.1 internet services: digital platform digital order digital delivery and other business services	212,326	217,361	203,245	16.06	13.42	10.68

Digital sectors at current market price (Million Baht)	Value Added			%		
	2017	2018	2019	2017	2018	2019
5. Others	35,000	38,511	105,668	2.65	2.38	5.55
5.1 other services: education, health	32,512	37,212	103,971	2.46	2.30	5.46
5.2 freight transport (delivery)	2,488	1,299	1,697	0.19	0.08	0.09
Total	**1,322,061**	**1,619,448**	**1,902,652**	100.00	100.00	100.00

Value added of digital activities in real-term (CVM) (20 17is reference year) for 2017– 2019 are 1,322,061 milion baht1, 618,400 million baht and 1,890,125 million baht with Chain index as 100.0 122.4 and 143.0 The digital economy, in real-term CVM, expands 22.4 percent and 16.8 percent in 2018 and 2019, respectively. This results from the rising trend of e-commerce, ICT, digital services and activities related to internet. Comparing to the real GDP (CVM) which expands 4.2 percent in 2018 and 2.3 percent in 2019, this echoes the lower growth of other activities within that two-year period, which stems from the declining trend of export and tourism (as reported by NESDC in 2019).

Table 5 Digital economy and GDP in real terms (CVM)

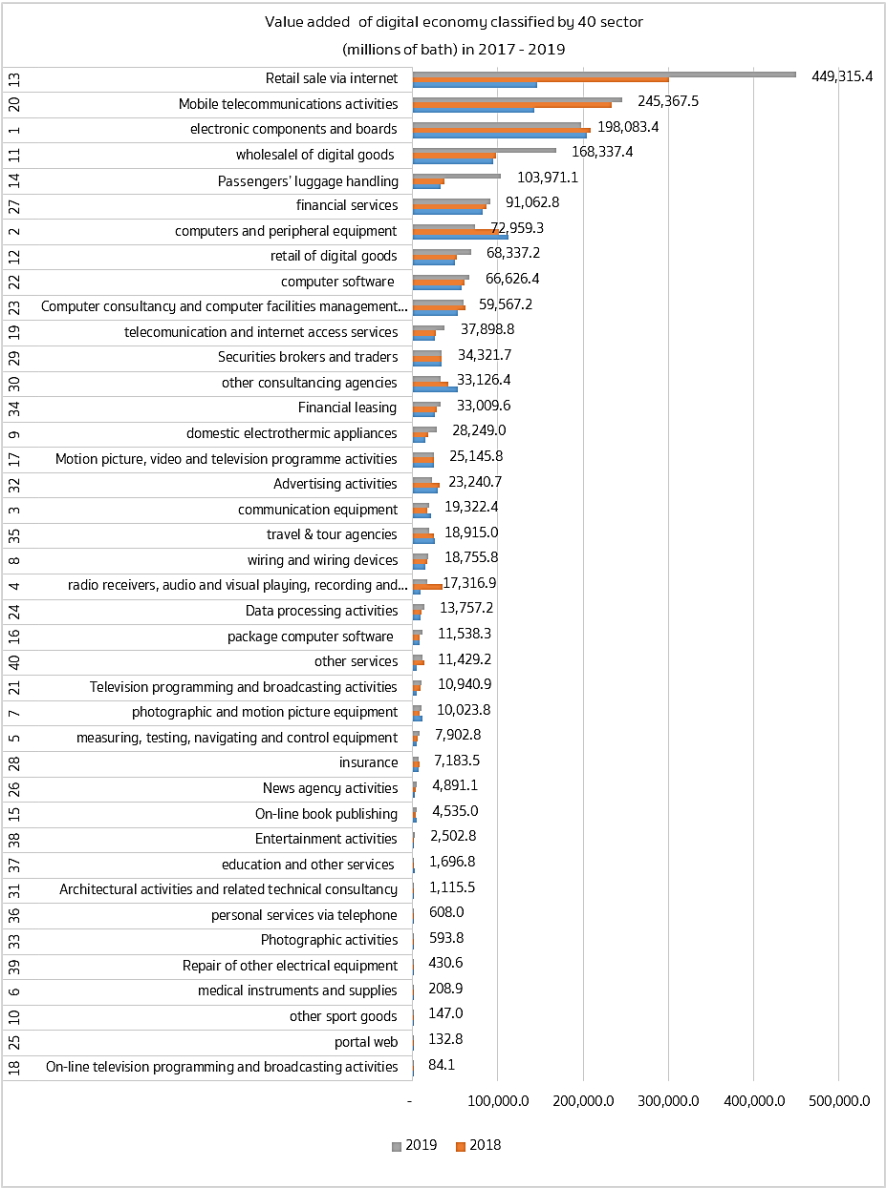
	unit	2017	2018	2019
Value added in real-terms (CVM)				
Value added (digital econ) (ref year = 2017)	MB	1,322,061	1,618,400	1,890,125
GDP (reference year = 2002)	MB	10,259,941	10,689,791	10,932,066
chain index				
Value added of digital economy	2017 = 100	100.0	122.4	143.0
GDP	2002 = 100	177.8	185.3	189.5
growth rate				
Value added of digital economy	%	-	22.4	16.8
GDP	%	4.2	4.2	2.3

Note: GDP from National Income of Thailand, 2019, NESDC.

Considering 40 sub-sectors of digital activityby ranking the value added in 2019 from the highest to the lowest, there are 5 sub-sectors with the high value added, those are retail trade via internet 449,315 million baht or with the proportion of 24.29 percent of the total value added of the digital activity; the high growth of this sub-sector comes from the domestic consumer taste change and high-rate of service provider's adaptation to modernize with digital application development along the fiercer competition. The second ranking is mobile services and wireless internet services, which accounts 245,367 million baht or the share of 12.90 percent, reflecting the higher amount of clients on mobile and online services for the new generations. The third ranking is electronics and related parts, of which gains 198,083 million baht or the proportion of 10.71 percent, this category stands as export production base and domestic use. The

fourth ranking is wholesale trade on digital products, of which records 168,337 million baht or with the share of 8.85 percent and the fifth ranking is passengers' luggage handing services with value added of 103,971 million baht or 5.46 percentage share, as a result of expention of e-commerce, Other sub-sectors gain value added descendingly, most are the activites related to those five sub-section above such as digital financial services, trade of digital products, web and software services, consultancy on digital and computer services shown in Figure as following

Figure 4 Value added of digital economic activities (Million Baht)
Classified by 40 sub-sectors in 2017 - 2019


Value added of digital economy classified by 40 sector
(millions of bath) in 2017 - 2019
13 Retail sale via internet 449,315.4
20 Mobile telecommunications activities 245,367.5
1 electronic components and boards 198,083.4
11 wholesalel of digital goods 168,337.4
14 Passengers' luggage handling 103,971.1
27 financial services 91,062.8
2 computers and peripheral equipment 72,959.3
12 retail of digital goods 68,337.2
22 computer software 66,626.4
23 Computer consultancy and computer facilities management... 59,567.2
19 telecomunication and internet access services 37,898.8
29 Securities brokers and traders 34,321.7
30 other consultancing agencies 33,126.4
34 Financial leasing 33,009.6
9 domestic electrothermic appliances 28,249.0
17 Motion picture, video and television programme activities 25,145.8
32 Advertising activities 23,240.7
3 communication equipment 19,322.4
35 travel & tour agencies 18,915.0
8 wiring and wiring devices 18,755.8
4 radio receivers, audio and visual playing, recording and... 17,316.9
24 Data processing activities 13,757.2
16 package computer software 11,538.3
40 other services 11,429.2
21 Television programming and broadcasting activities 10,940.9
7 photographic and motion picture equipment 10,023.8
5 measuring, testing, navigating and control equipment 7,902.8
28 insurance 7,183.5
26 News agency activities 4,891.1
15 On-line book publishing 4,535.0
38 Entertainment activities 2,502.8
37 education and other services 1,696.8
31 Architectural activities and related technical consultancy 1,115.5
36 personal services via telephone 608.0
33 Photographic activities 593.8
39 Repair of other electrical equipment 430.6
6 medical instruments and supplies 208.9
10 other sport goods 147.0
25 portal web 132.8
18 On-line television programming and broadcasting activities 84.1
- 100,000.0 200,000.0 300,000.0 400,000.0 500,000.0
2019 2018

5.2 Income approach

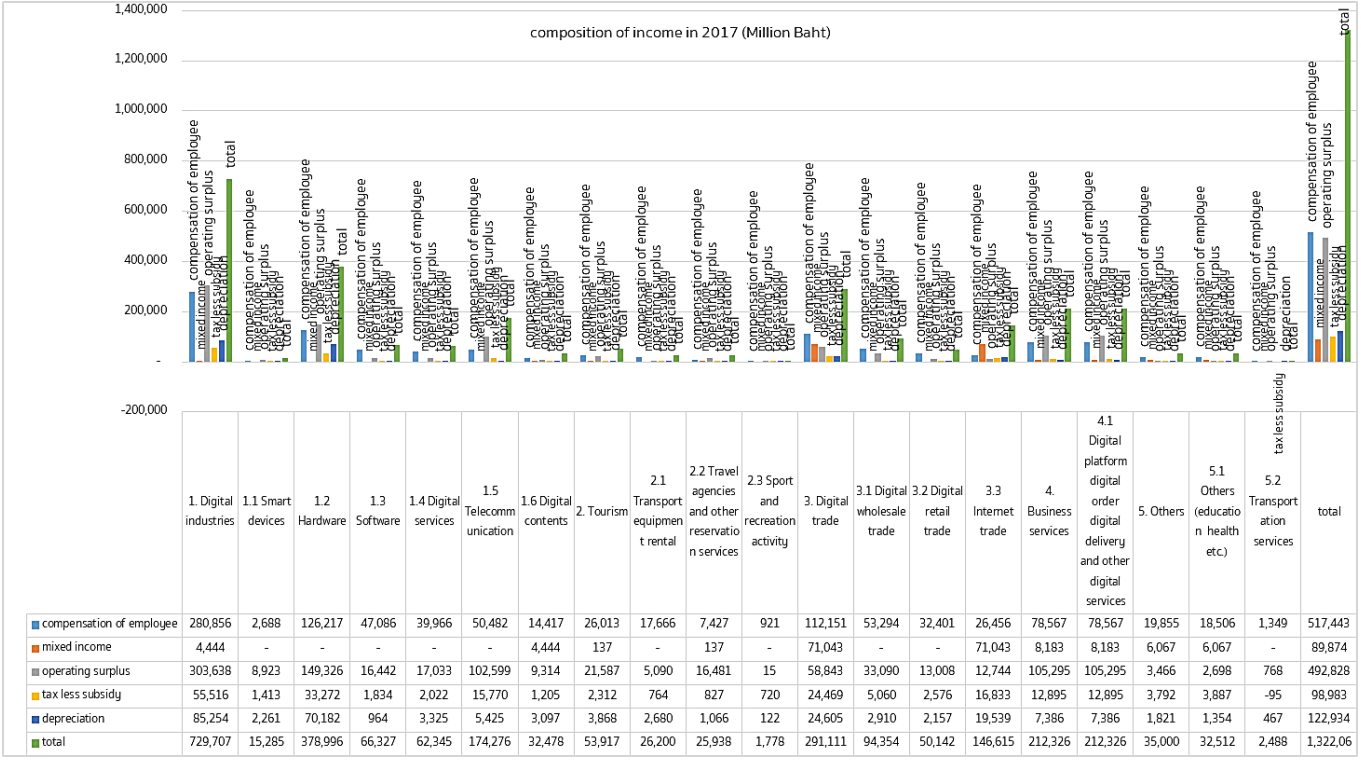
Overall income generated by digital economy activities consisting of compensation of employee which valued at 517,443 million baht, 598,939 million baht and 722,300 million baht in 2017, 2018 and 2019, respectively. The highest proportion which is 39.14, 36.98 and 37.96 percent during the series, respectively. Ranking in the second is the operating surpluses, income of the business owners, are worth 640,482 million baht in 2019, accounting for 33.66 percent. Mixed income, which is the income of personal business, it is likely to increase from 89,874 million baht in 2017to 183,670 million baht and 275,553 million baht in 2018 and 2019, accounting for 11.34 percent and 14.48 percent, respectively, as a result of an increase in online sales of products and services. That continued to grow significantly. Taxes on production and depreciation accounted for 5.77 percent and 8.12 percent of total income, respectively.

Table 6 income of digital economy classified by type of primary income. (Million Baht) in 2017 - 2019

Return to primary factors income	Value (Million Baht)			Share (%)		
	2017	2018	2019	2017	2018	2019
Compensation of employee	517,443	598,939	722,300	39.14	36.98	37.96
Mixed income	89,874	183,670	275,553	6.80	11.34	14.48
Operating surpluses	492,828	589,954	640,482	37.28	36.43	33.66
Taxes on production	98,983	106,939	109,776	7.49	6.60	5.77
Depreciation	122,934	139,947	154,541	9.30	8.64	8.12
Total	1,322,061	1,619,448	1,902,652	100.00	100.00	100.00

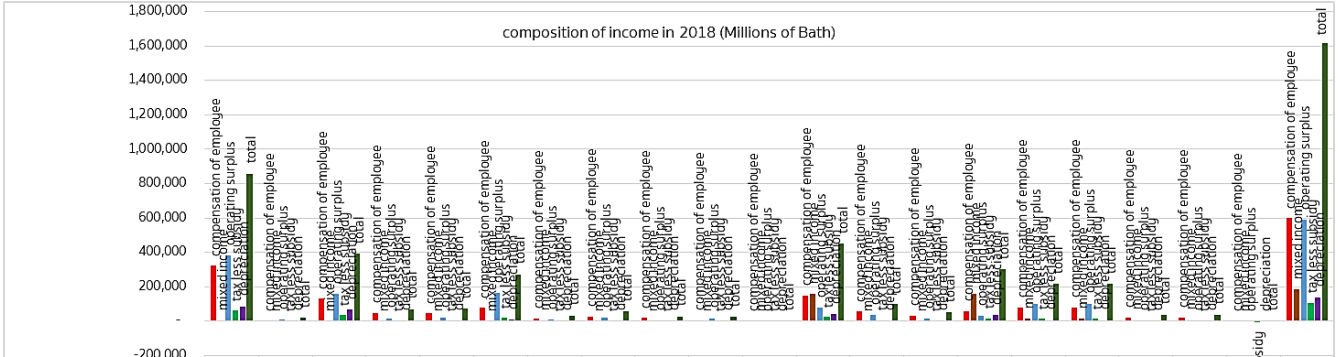
Considering income by digital sectors, it was found that digital industry which included hardware, software and telecommunication industries generated most of compensation of employee during 2017-2019 with a value of 280,856 million baht, 322,157 million baht and 323,214 million baht, respectively. This is the result of the hardware industry being hugely employed. However, in 2019, the digital trade sector has raised the bar in job creation, resulting in compensation of employee of 220,045 million baht from the high growth employment of the internet services. The category that played a role in generating income from compensation of employee, ranking in the second is digital business services with the valued at 74,576 million baht in 2019, as well as the 29,650 million baht in tourism industry, which grew from the platform business service. Digital industry also plays a role in operating surplus income which is the income that the business owner has received continuously at a high level, valued at 303,638 million baht, 383,204 million baht and 383,829 million baht in 2017 - 2019, respectively. Mixed income is mainly shown in the digital trade category with worth of 71,043 million baht, 159,453 million baht and 240,432 million baht in 2017-2019, respectively. Details of income shown in the figure below.

Figure 5 Income classified by digital sector and type of income in 2017 - 2019



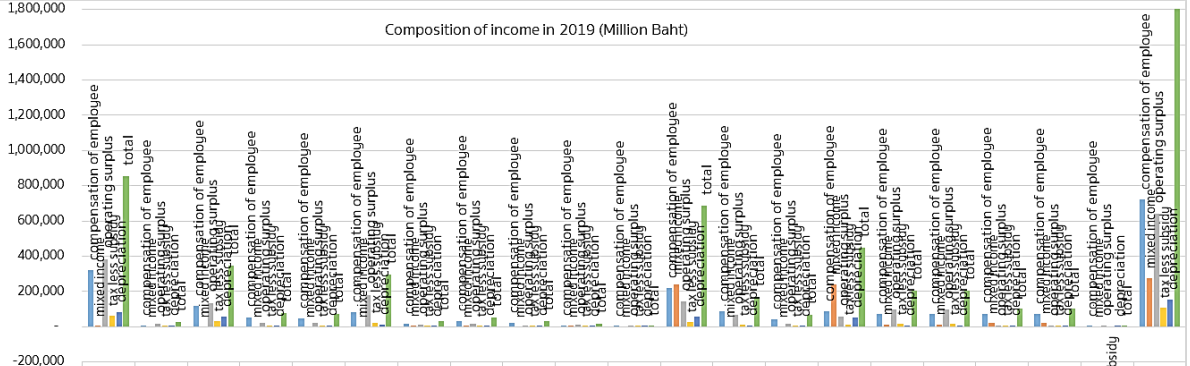
	1. Digital industries	1.1 Smart devices	1.2 Hardware	1.3 Software	1.4 Digital services	1.5 Telecommunication	1.6 Digital contents	2. Tourism	2.1 Transport equipment rental	2.2 Travel agencies and other reservation services	2.3 Sport and recreation activity	3. Digital trade	3.1 Digital wholesale trade	3.2 Digital retail trade	3.3 Internet trade	4. Business services	4.1 Digital platform digital order digital delivery and other digital services	5. Others	5.1 Others (education health etc.)	5.2 Transportation services	total
compensation of employee	280,856	2,688	126,217	47,086	39,966	50,482	14,417	26,013	17,666	7,427	921	112,151	53,294	32,401	26,456	78,567	78,567	19,855	18,506	1,349	517,443
mixed income	4,444	-	-	-	-	-	4,444	137	-	137	-	71,043	-	-	71,043	8,183	8,183	6,067	6,067	-	89,874
operating surplus	303,638	8,923	149,326	16,442	17,033	102,599	9,314	21,587	5,090	16,481	15	58,843	33,090	13,008	12,744	105,295	105,295	3,466	2,698	768	492,828
tax less subsidy	55,516	1,413	33,272	1,834	2,022	15,770	1,205	2,312	764	827	720	24,469	5,060	2,576	16,833	12,895	12,895	3,792	3,887	-95	98,983
depreciation	85,254	2,261	70,182	964	3,325	5,425	3,097	3,868	2,680	1,066	122	24,605	2,910	2,157	19,539	7,386	7,386	1,821	1,354	467	122,934
total	729,707	15,285	378,996	66,327	62,345	174,276	32,478	53,917	26,200	25,938	1,778	291,111	94,354	50,142	146,615	212,326	212,326	35,000	32,512	2,488	1,322,06

Figure 5 Income classified by digital sector and type of income in 2017-2019 (Continued)



	1. Digital industries	1.1 Smart devices	1.2 Hardware	1.3 Software	1.4 Digital services	1.5 Telecommunication	1.6 Digital contents	2. Tourism	2.1 Transport equipment rental	2.2 Travel agencies and other reservation services	2.3 Sport and recreation activity	3. Digital trade	3.1 Digital wholesale trade	3.2 Digital retail trade	3.3 Internet trade	4. Business services	4.1 Digital platform digital order digital delivery and other digital services	5. Others	5.1 Others (education health etc.)	5.2 Transportation services	total
compensation of employee	322,15	3,216	130,60	49,531	45,698	77,769	15,339	26,452	19,056	6,353	1,043	148,24	55,306	33,554	59,380	80,278	80,278	21,812	21,109	703	598,93
mixed income	3,326	-	-	-	-	-	3,326	133	-	133	-	159,45	-	-	159,45	13,710	13,710	7,048	7,048	-	183,67
operating surplus	383,20	10,673	160,38	16,987	20,848	164,98	9,330	22,035	5,073	16,885	76	78,555	34,709	13,825	30,021	102,45	102,45	3,709	3,308	401	589,95
tax less subsidy	61,892	1,881	34,769	2,025	2,184	19,827	1,206	2,334	767	767	800	24,624	5,231	2,560	16,833	13,927	13,927	4,162	4,204	-42	106,93
depreciation	86,813	2,789	67,249	1,025	3,837	8,634	3,280	4,321	3,125	1,048	148	40,038	3,017	2,244	34,777	6,995	6,995	1,780	1,544	236	139,94
total	857,39	18,559	393,00	69,568	72,568	271,21	32,482	55,275	28,021	25,187	2,067	450,90	98,263	52,183	300,46	217,36	217,36	38,511	37,212	1,299	1,619,

Figure 5 Income classified by digital sector and type of income in 2017 - 2019 (Continued)



	1. Digital industries	1.1 Smart devices	1.2 Hardware	1.3 Software	1.4 Digital services	1.5 Telecommunication	1.6 Digital contents	2. Tourism	2.1 Transport equipment rental	2.2 Travel agencies and other reservation services	2.3 Sport and recreation activity	3. Digital trade	3.1 Digital wholesale trade	3.2 Digital retail trade	3.3 Internet trade	4. Business services	4.1 Digital platform digital order digital delivery and other digital services	5. Others	5.1 Others (education health etc.)	5.2 Transportation services	total
compensation of employee	323,21	4,979	116,88	54,977	47,036	83,222	16,118	29,650	22,789	5,319	1,542	220,04	87,733	42,776	89,536	74,576	74,576	74,814	73,894	919	722,30
mixed income	3,408	-	-	-	-	-	3,408	166	-	166	-	240,43	-	-	240,43	12,052	12,052	19,494	19,494	-	275,55
operating surplus	383,82	17,134	135,92	19,663	20,137	180,36	10,604	17,611	5,756	11,827	28	142,14	66,419	19,432	56,290	95,635	95,635	1,267	738	529	640,48
tax less subsidy	61,830	1,967	33,240	2,365	2,229	20,883	1,146	2,388	843	804	741	25,558	9,564	3,239	12,755	14,543	14,543	5,457	5,520	-62	109,77
depreciation	81,041	4,169	58,670	1,159	3,923	9,824	3,296	4,612	3,622	798	192	57,814	4,622	2,890	50,302	6,438	6,438	4,636	4,325	311	154,54
total	853,32	28,249	344,72	78,165	73,324	294,29	34,572	54,427	33,010	18,915	2,503	685,99	168,33	68,337	449,31	203,24	203,24	105,66	103,97	1,697	1,902,

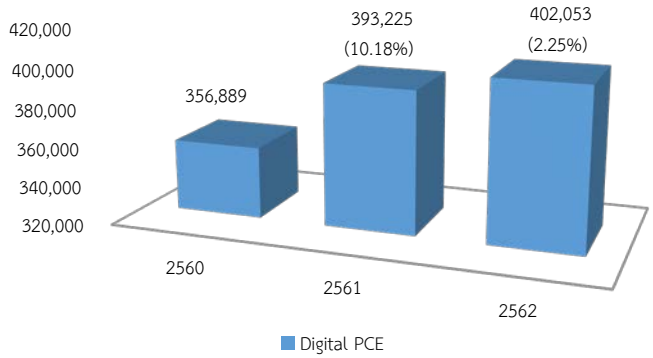
5.3 Expenditure approach

1) Private final consumption expenditure

Private final consumption expenditure on digital products at current market prices accounted for 356,889.19 million baht, 393,224.68 million baht, and 402,053.03 million baht in 2017 - 2019, respectively. Total expenses in 2018 increases by 10.18 percent, it however slows down by 2.25 percent in 2019. In addition, Private final consumption expenditure on digital products to the total private final consumption expenditure shows a proportion of 4.70, 4.91, and 4.78 percent in the period of 2017 - 2019, or a 4.80 percent share on average.

Figure 6 Private final consumption expenditure on digital products

At current market prices in 2017 - 2019



Private final consumption expenditure on digital products especially the communication item shows the highest proportion with

the value of 191,601.47 million baht, 218,890.37 million baht, and 213,087.93 million baht in 2014-2019, respectively, representing an average ratio of 54.12 percent to total value. In term of growth rate, Private final consumption expenditure on digital products rose by 14.24 percent in 2018 and decelerated to 2.65 percent in 2019.

The second ranking, entertainment and culture which includes the important digital products especially television sets, and computers and parts recorded the value of 98,080 million baht in 2017, 103,793.12 million baht in 2018, and 109,012.75 million baht in 2019, with an average proportion of 27.00 percent to total expenditure. In addition, its expenditure rose by 5.82 percent and 5.03 percent in 2018 and 2019, relatively.

Miscellaneous goods and services which include the important items such as financial services and insurance services is on the third rank, following the communication, and the entertainment and culture with an average share of 13.42 percent to total expenditure. Household expense on miscellaneous goods and services increased by 6.01 percent in 2018 and accelerated to 13.87 percent in 2019.

Other expenses are reported in order as follow. Furniture and furnishing and routine maintenance valued at 13,084.46 million baht, 12,836.19 million baht, and 13,861.52 million baht in the period of 2017-2019, respectively, or equivalent to the average ratio of 3.46 percent to total expense. Transportation which includes

rental of vehicles and goods transport reported the amount of 6,214.35 million baht, 6,942.17 million baht, and 8,239.36 million baht in 2017 - 2019, relatively. This accounted for the average ratio of 1.85 percent in the same period. Expense on education represents the average share of 0.12 percent with the value of 429.66 million baht, 430.97 million baht, and 545.05 million baht in 2017 -2019, respectively, The lowest household expense on digital product was health which includes supporting medical services such as laboratory and X-ray center. Its share to total expense was only 0.03 percent on average.

Table 7 Private final consumption expenditure on digital products at current prices

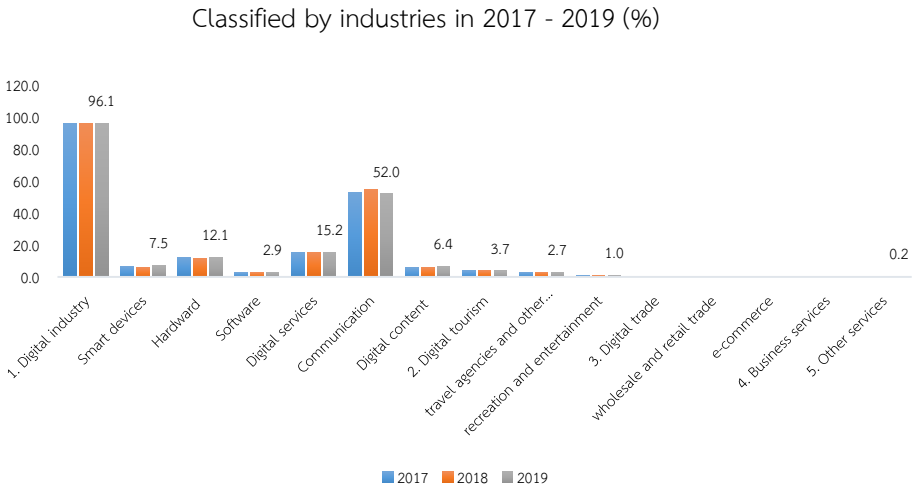
Classified by COICOP in 2017 - 2019

Digital PCE		Value at current prices (million baht)			Growth (%)		Share (%)
COICOP	categories	2017	2018	2019	2018	2019	2017-19
05	Furniture, furnishing and routine maintenance	13,084.46	12,836.19	13,861.52	-1.90	7.99	3.46
06	Health	125.39	131.77	144.83	5.09	9.91	0.03
07	Transportation	6,214.35	6,942.17	8,239.36	11.71	18.69	1.85
08	Communication	191,601.47	218,890.37	213,087.93	14.24	-2.65	54.12
09	Entertainment and culture	98,080.10	103,793.12	109,012.75	5.82	5.03	27.00
10	Education	429.66	430.97	545.05	0.30	26.47	0.12
12	Miscellaneous	47,353.76	50,200.09	57,161.59	6.01	13.87	13.42
	Total Digital PCE	**356,889.19**	**393,224.68**	**402,053.03**	**10.18**	**2.25**	**100.00**

Considering by commodity/service categories, it could be seen that in the year 2017, 2018 and 2019, the household expenditure on the digital industry (commodity/service) accounted for 342,049.59 million baht 377,024.31 million baht, and 386,445.76 million baht,

respectively, represents the highest share of 95.95 percent. The main driver is the Communication, of which includes telephone services and internet services and they are recognized as the highest digital household expense. For the digital tourism is worth 14,284 million baht in 2017, 15,637.63 million baht in 2018, and 14,917.40 million baht in 2019, equivalent to the average ratio of 3.90 percent of total expense. The remaining 0.61 percent in the period of 2017 to 2019 is other services including health and education with the value of 5 5 5 .05 million baht, 5 6 2.74 million baht, and 6 89.87 million baht, respectively.

Figure 7 Structure of Household final consumption expenditure on digital products



In real terms (Chain Volume Measure: CVM), Household final consumption expenditure on digital products in 2017-2019 is shown in the figure 8 below. The real value increased by 10.04 percent in 2018 compared to a deceleration of 2.35 percent in 2019. This was a result of communication expense, the highest share, which rose significantly by 14.30 percent in 2018 and dropped to 2.61 percent in 2019.

Figure 8 Growth rate of Household final consumption expenditure on digital products in 2018 - 2019 (%)

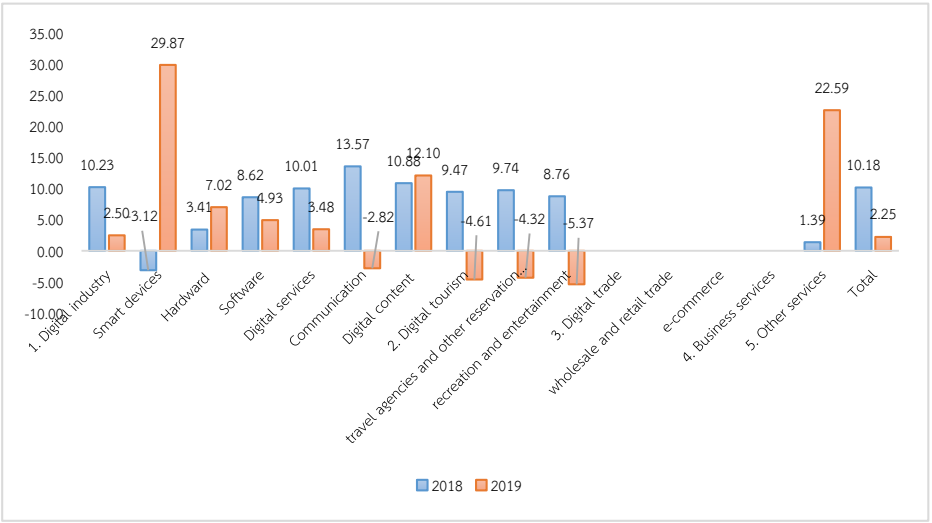
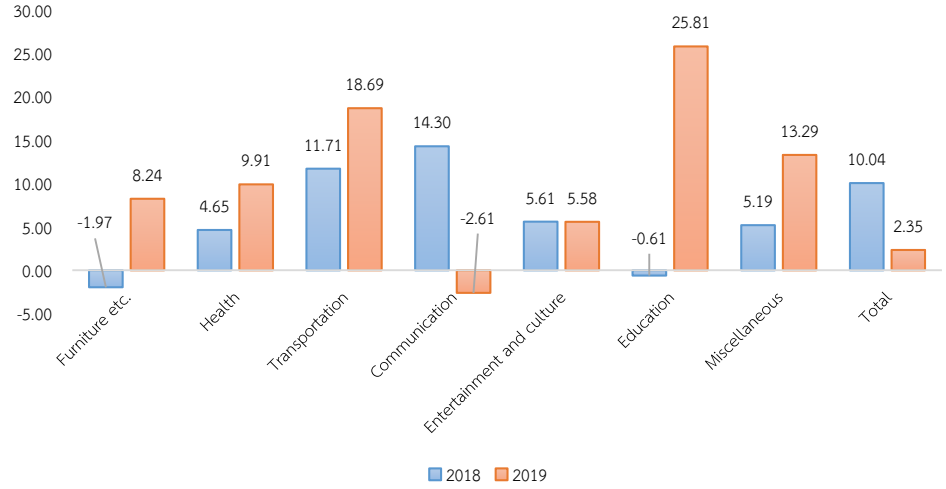


Figure 9 Growth of Real household final consumption expenditure on digital products

(CVM) in 2018-2019(%)



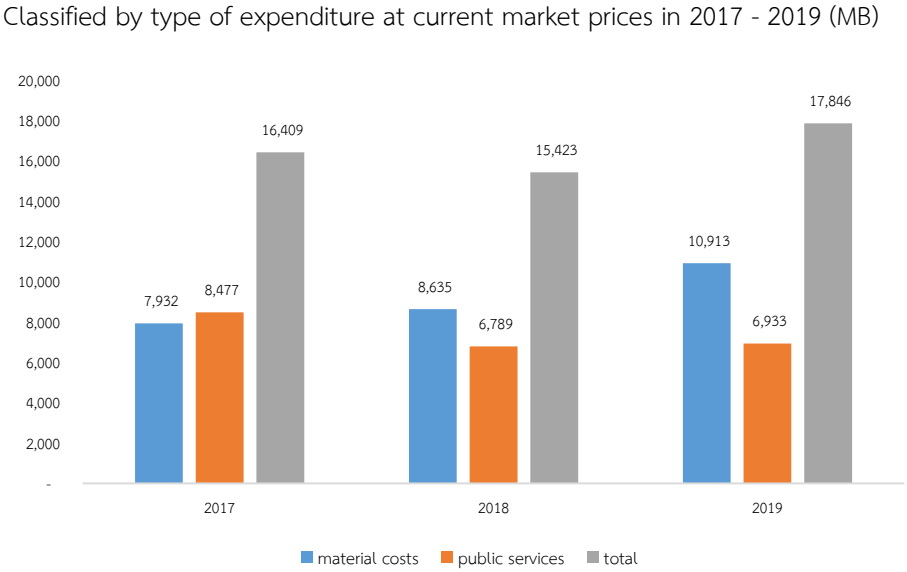
2) Government final consumption expenditure: GFCE

In 2017 - 2019 Government final consumption expenditure on digital products at current market prices valued at 16,409 million baht, 15,423 million baht, and 17,846 million, respectively. It can be seen that GFCE on digital products contracted by 6.01 percent in 2018 whereas in 2019 GFCE showed the higher growth rate of 15.71 percent.

Government final consumption expenditure on digital products comprises expenses on material costs and expenses on public services, which bring about 7,932 million baht and 8,477 million

baht in 2017, relatively. In 2018, Government final consumption expenditure was 8,635 million baht on material costs and 6,789 million baht on public service expenses. Moreover, the Government final consumption expenditure on digital products in 2019 at current market prices with the value of 17,846 million baht consisted of 10,913 million baht of material cost and 6,933 million baht of public services.

Figure 10 Government final consumption expenditure on digital products



In 2018, GFCE on digital products at current market prices declined to 6.01 percent due to a decrease of public services expenses by 19.91 percent. This was from a reduction of telephone services and

internet service usage. Nevertheless, other expenses still increased such as website services, public relation fee, and other digital expenses. For material costs, its expense rose by 8.85 percent as a result of an increase in computer and part maintenance and repair, and computer material. In 2018, government expenses increased by 15.71 percent owing to an expansion of both material cost and public services expenses by 26.39 percent and 2.21 percent, respectively.

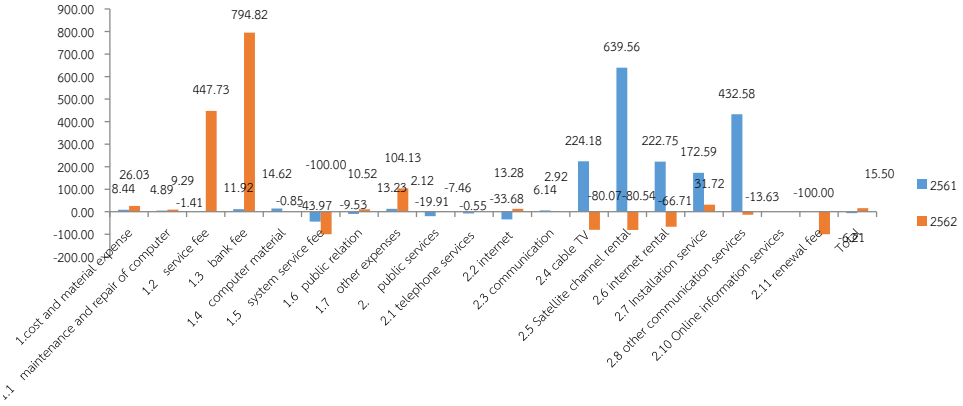
In term of digital industry grouping, It can be seen that most of GFCE on digital products included in digital industry group. The highest proportion in this group is communication industry which generated value of 8,477 million baht in 2017, 6,543 million baht in 2018, and 6,933 million baht in 2019. Its proportions to total value were 51.66 percent, 42.42 percent, and 38.85 percent, respectively. Telephone services and internet services were the important items.

Table 8 Government final consumption expenditure on digital products classified by digital sector 2017 - 2019

Government final consumption expenditure	Value (thousand baht)			Growth (%)		Share (%)		
	2560	2561	2562	2561	2562	2561	2561	2562
1. Digital industry	16,408,956.88	15,423,377.31	17,846,126.02	-6.01	15.71	100.00	100.00	100.00
1.1 Smart devices	-	-	-	-	-	-	-	-
1.2 Hardware	3,391,854.33	3,871,381.36	3,817,894.60	14.14	-1.38	20.67	25.10	21.39
1.3 Software	323,462.12	566,321.21	,777,931.37	75.08	213.94	1.97	3.67	9.96
1.4 Digital services	3,954,301.88	4,176,364.55	4,908,604.61	5.62	17.53	24.10	27.08	27.51
1.5 Communication	8,476,599.18	6,543,200.19	6,932,639.76	22.81	5.95	51.66	42.42	38.85
1.6 Digital content	262,739.37	266,110.01	409,055.68	1.28	53.72	1.60	1.73	2.29
2.Digital tourism	-	-	-					
2.1 Travel agencies and other reservation services	-	-	-	-	-	-	-	-
2.2 sport and recreation activity	-	-	-	-	-	-	-	-
3. Digital trade	-	-	-	-	-	-	-	-
3.1 wholesale trade	-	-	-	-	-	-	-	-
3.2 retail trade	-	-	-	-	-	-	-	-
4. Business services	-	-	-	-	-	-	-	-
4.1 Internet services	-	-	-	-	-	-	-	-
Total	16,408,956.88	15,423,377.31	17,846,126.02	-6.01	15.71	100.00	100.00	100.00

GFCE on digital products in real terms (CVM), (reference year = 2017) valued at 16,409 million baht. It fell to 15,391 million baht in 2018, a 6.21percent decrease. This was due to a reduction of public services by 19.91 percent as a result of a decline of internet services and telephone service. On the other hand, the real GFCE on digital products showed the higher value of 17,777 million baht or increases by 15.50 percent following the expansion of the government expense on public services especially computer and parts repair and maintenance.

Figure 11 Growth rate of Real Government final consumption expenditure on digital products in 2018 - 2019 classified by type of expenditure (%)



3) Gross fixed capital formation: GFCF

Gross fixed capital formation means the expenditure that the economic agent pays to obtain the fixed capital (assets) with the lifetime period over one year and uses them for producing commodities and services in the economy. For this study, overall

Gross fixed capital formation of the digital products in the economy is worth 184,943 million baht in 2017 and increases to 204,624 and 216,833 million baht in 2018 and 2019, respectively. The main component was machinery and equipment with the value of 120,902 million baht 128,966 million baht and 139,143 million baht in 2017-2019, relatively. Its proportion to the total value was 64.17 percent in 2019. Other fixed asset was the second most with its value of 29,955 million baht, 35,692 million baht and 37,587 million baht or equivalent to 17.33 percent share in 2019. The rest was software and application development expenses which worth of 4,561 5,537 5,602 million baht in 2017-2019, showing its share of 2.58 percent in 2019.

Table 9 Gross fixed capital formation in digital activities at current prices in 2017 - 2019

	Land	Construction	Machinery and equipment	Software	Software and application development (high value)	Other assets	Total
Value at current market prices (MB)							
2017	4,947	23,173	120,902	1,406	4,561	29,955	184,943
2018	6,371	26,619	128,966	1,439	5,537	35,692	204,624
2019	7,108	28,113	139,143	1,348	5,602	37,587	216,833
Share (%)							
2017	2.67	12.53	65.37	0.76	2.47	16.20	100.00
2018	3.11	13.01	63.03	0.70	2.71	17.44	100.00
2019	3.28	12.97	64.17	0.62	2.58	17.33	100.00

Considering investment classified by digital commodity/service, the digital industry (commodity/service) gains the highest value of investment comparing to others, with the investment of 111,788 million baht, 130,378 million baht and 132,408 million baht in 2017,

2018, and 2019, respectively. The important digital industries in this group with high capital formation are hardware, software, and communication. second rank is the digital trade, including e-commerce, worth 52,560 million baht, 53,319 million baht, and 67,524 million baht in 2017 - 2019, respectively. Next, business services is worth 16,177 million baht in 2017, 16,667 million baht in 2018 and 13,611 million baht in 2019. In addition, GFCF on other sectors showed the continuous increase as well.

Figure 12 Gross fixed capital formation in 2017 - 2019

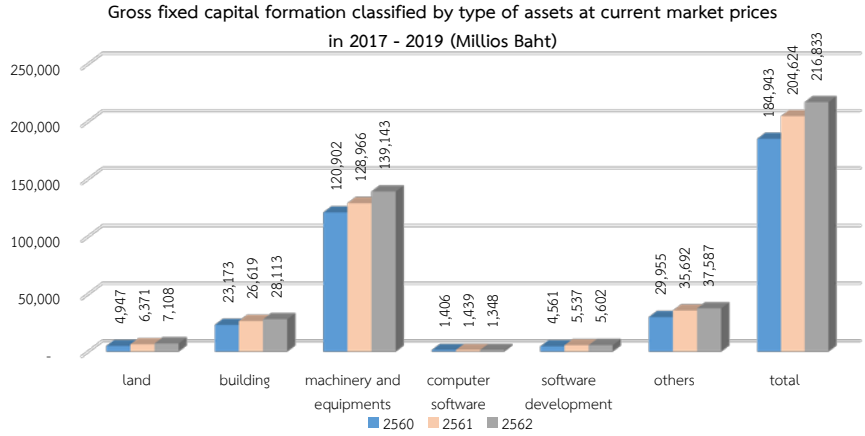
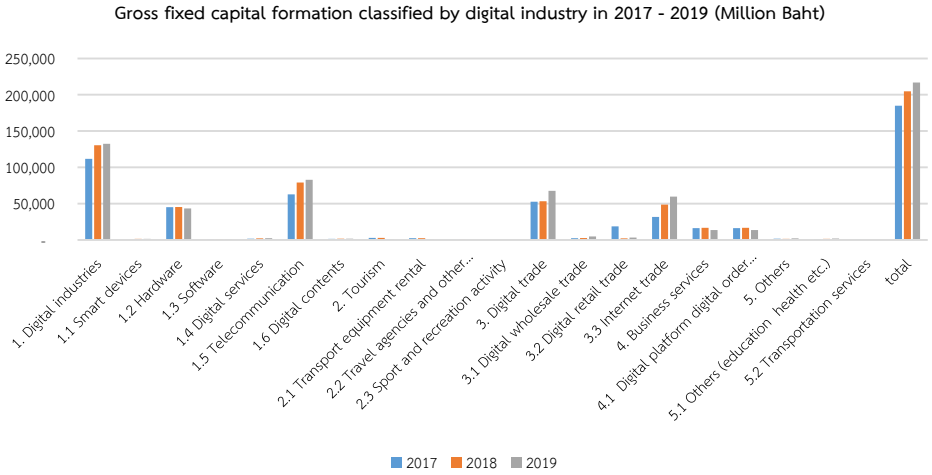


Figure 13 Gross fixed capital formation classified by digital industry in 2017 - 2019

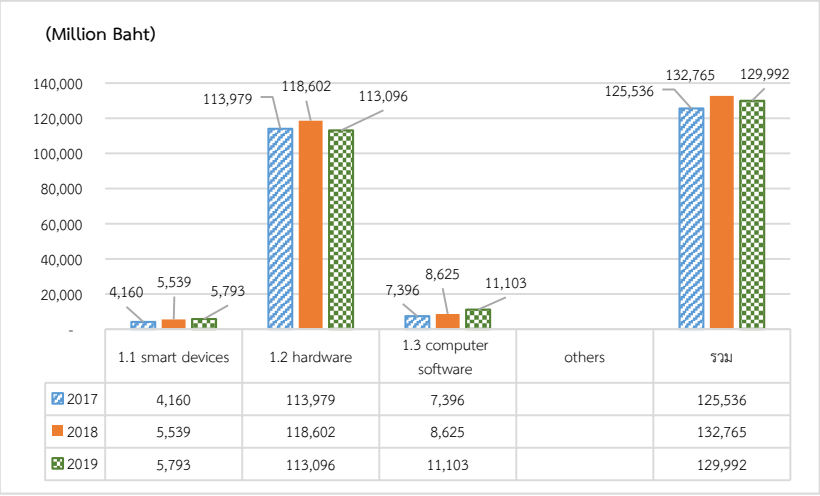


Gross fixed capital formation on digital products which consists of computer and parts, software, and smart devices shows the value of 125,536 million baht and 132,765 million baht in 2017 and 2018, respectively. In 2019, the value reduces to 129,992 million baht as a result of a drop of hardware products from 118,602 million baht in 2018 to 113,096 million baht in 2019 or its share to total in 2019 is 87.00 percent, smaller than 89.33 percent in 2018. On the other hand software products tends to increase from 7,396 million baht in 2017 to 8,624 million baht in 2018 and 11,103 million baht in 2019 or equivalent to an 8.54 percent share of total in 2019. Moreover, smart devices also show a rising trend from the value of 4,160 million baht in 2017 to 5,792 million baht in 2019, a 4.46 percent share in 2019. The details have been shown in table 10 below.

Table 10 Gross fixed capital formation in digital products in 2017 - 2019

	2017	2018	2019
Value at current market prices (THB)			
1. Smart devices	4,160,242	5,538,634	5,792,659
2. Hardware	113,979,203	118,602,278	113,096,441
3. Software	7,396,208	8,624,561	11,103,194
Total	125,535,653	132,765,473	129,992,294
Share (%)			
1. Smart devices	3.31	4.17	4.46
2. Hardware	90.79	89.33	87.00
3. Software	5.89	6.50	8.54
Total	100.0	100.0	100.0

Figure 14 Gross fixed capital formation (digital products) at current prices in 2017 - 2019



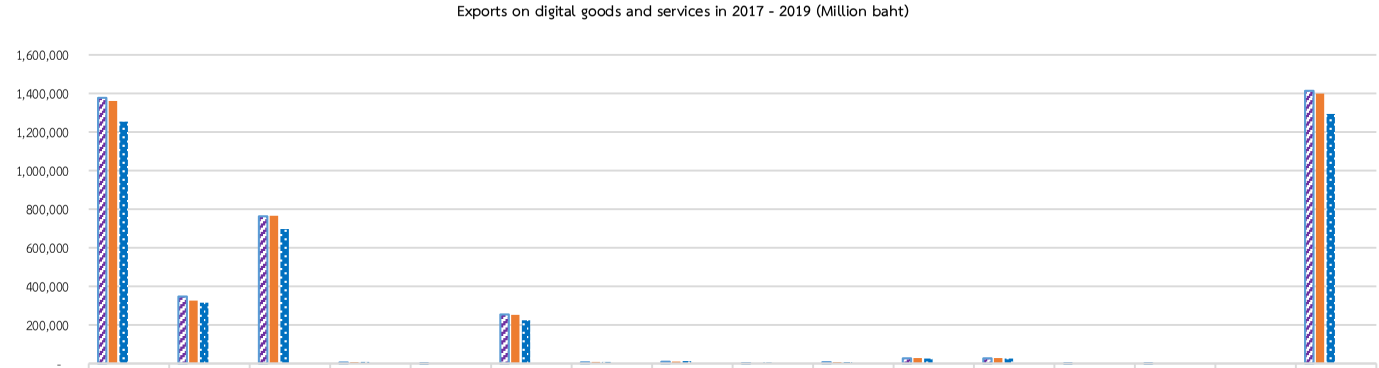
4) Exports and Imports of Goods and Services.

Exports of digital goods and services.

Exports of digital commodities/services accounted for 1,414,296 million baht and 1,399,786 million baht in 2017 and 2018, respectively. It then dropped to 1,293,842 million baht in 2019, following the competition in the international market. Export value of important products classified by digital industry, including hardware industry valued at 763,513 million baht and 766,233 million baht in 2017 and 2018, accounting for 54.74 percent of the total digital product export in 2018. However, after that, the export value dropped to 697,595 million baht in 2019 due to sluggish demand in the global market. In addition, it is partly the result of technological change that buyers have turned to other products to replace components made in Thailand. The next most important item was the communication industry. There was a slowdown in export value as well, with a value of 224,333 million baht or 17.34% of the total export value of goods and services in 2019.

As for the export of services, the high-value items are Internet services and related services, valued at 27,462 million baht, 28,066 million baht and 26,334 million baht in 2017-2019, respectively, accounting for 2.04 percent of total exports in 2019, followed by sports and recreation activities and travel agents, the export value was 7,761 million baht and 5,333 million baht, representing 0.48 percent and 0.41 percent, respectively, in 2019

Figure 15 Value of exports digital goods and services in 2017 - 2019 (Million baht)

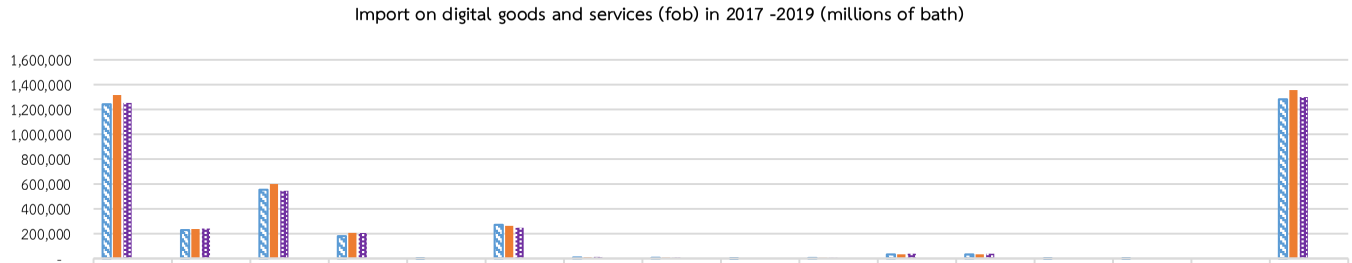


	1. Digital industries	1.1 Smart devices	1.2 Hardware	1.3 Software	1.4 Digital services	1.5 Telecommunication	1.6 Digital contents	2. Tourism	2.2 Travel agencies and other reservation services	2.3 Sport and recreation activity	4. Business services	4.1 Digital platform digital order digital delivery and other digital services	5. Others	5.1 Others (education health etc.)	5.2 Transportation services	total
2017	1,377,105	347,198	763,513	5,311	23	254,187	6,872	9,492	2,546	6,946	27,462	27,462	237	237	0	1,414,296
2018	1,361,075	326,094	766,233	7,388	21	252,587	8,752	10,380	3,064	7,316	28,066	28,066	266	266	0	1,399,786
2019	1,254,133	315,338	697,595	8,662	21	224,333	8,184	13,094	5,333	7,761	26,334	26,334	281	281	0	1,293,842
share (%) 2017	97.37	24.55	53.99	0.38	0.00	17.97	0.49	0.67	0.18	0.49	1.94	1.94	0.02	0.02	0.00	100.00
share (%) 2018	97.23	23.30	54.74	0.53	0.00	18.04	0.63	0.74	0.22	0.52	2.01	2.01	0.02	0.02	0.00	100.00
share (%) 2019	96.93	24.37	53.92	0.67	0.00	17.34	0.63	1.01	0.41	0.60	2.04	2.04	0.02	0.02	0.00	100.00

Imports of digital goods and services.

Imports of digital commodities/ services accounted 1,281,223 million baht and 1,355,910 million baht in 2017 and 2018, respectively, and has dropped to 1,298,955 million baht in 2019. This is because the main items have decreased in value following the slowdown in the domestic economy. Especially the high value category is the hardware industry, which recorded a value of 553,392 million baht and 599,317 million baht in 2017 and 2018, after which it has dropped to 545,145 million baht accounting for 41.97 percent of the total import value of goods and services in 2019. The value of the communications industry also dropped to 247,880 million baht in the proportion of 19.08 percent, including the software industry valued at 205,750 million baht or 15.84 percent of the total import value of digital goods and services, which likely decreased as well. The import of services are internet services and related services, its value has increased from 33,571 million baht in 2018 to 39,429 million baht or 3.04 percent of the total import value of digital goods and services in 2019.

Figure 16 Value of imports of goods and services in 2017 - 2019 (Million Baht)



	1. Digital industries	1.1 Smart devices	1.2 Hardware	1.3 Software	1.4 Digital services	1.5 Telecommunication	1.6 Digital contents	2. Tourism	2.2 Travel agencies and other reservation services	2.3 Sport and recreation activity	4. Business services	4.1 Digital platform digital order digital delivery and other digital services	5. Others	5.1 Others (education health etc.)	5.2 Transportation services	total
2017	1,242,257	228,445	553,392	179,623	18	272,110	8,669	5,434	1,237	4,197	33,383	33,383	150	149	0	1,281,224
2018	1,315,661	237,553	599,317	206,587	18	262,787	9,399	6,483	1,366	5,117	33,571	33,571	196	196	0	1,355,911
2019	1,252,497	240,638	545,145	205,750	19	247,880	13,064	6,821	1,676	5,144	39,429	39,429	209	209	0	1,298,955
share (%) 2017	96.96	17.83	43.19	14.02	0.00	21.24	0.68	0.42	0.10	0.33	2.61	2.61	0.01	0.01	0.00	100
share (%) 2018	97.03	17.52	44.20	15.24	0.00	19.38	0.69	0.48	0.10	0.38	2.48	2.48	0.01	0.01	0.00	100
share (%) 2019	96.42	18.53	41.97	15.84	0.00	19.08	1.01	0.53	0.13	0.40	3.04	3.04	0.02	0.02	0.00	100

Exports and Imports of goods and services in real terms (CVM)

The value of exported digital goods and services in real terms (CVM: 2017 as the reference year) registered at 1,414,296 million baht, 1,365,123 million baht and 1,286,173 million baht in 2017, 2018 and 2019, respectively. The real value decreases by 3.48 percent in 2018 and 9.06 percent in 2019.

The value of imported digital goods and services in real terms posted at 1,281,224 million baht, 1,335,702 million baht and 1,232,784 million baht in 2017, 2018 and 2019, respectively, when compared to the rate of change from the previous year. It was found that in 2018 it expanded by 4.25 percent compared to a drop of 7.71 percent in 2019 due to the slowdown in overall economic growth of the country in both the manufacturing and export sectors. As a result, the import of digital products most of which were capital goods, which dropped in 2019.

Table 11 Value of exports and imports in the digital products in 2017 - 2019

	Real value (CVM) (Million Baht)			Chain Index			Growth (%)	
	2017	2018	2019	2017	2018	2019	2018	2019
Exports of digital goods and services.	1,414,296	1,365,123	1,286,173	100.00	96.52	87.78	-3.48	-9.06
Imports of digital goods and services.	1,281,224	1,335,703	1,232,784	100.00	104.25	96.22	4.25	-7.71

5) Overview of the compilation of digital contribution to GDP on expenditure approach

Digital contribution to GDP on Expenditure approach composes of Private Final Consumption Expenditure, Government Final Consumption Expenditure, Gross Fixed Capital Formation and Exports and Imports of digital commodities and services, all concerning on digital activities/ products. Considering at current prices, the digital contribution to GDP on Expenditure approach valued at 631,906 million baht and 585,289 million baht in 2017 and 2018 respectively. Furthermore, the value continued to reduce to 544,778 million baht in 2019. Therefore, the overall expenditure shrank continually at the rates of 7.38 and 6.92 percent in 2018 and 2019, respectively.

Considering the expansion of the spending component, the government final consumption expenditure was the highest growth of 15.71 percent in 2019, followed by the private final consumption expenditure which increased by 2.25 percent, while gross fixed capital formation, exports and imports declined by 2.09, 7.57 and 4.20 percent in 2019, respectively.

In term of structure, It can be seen that private final consumption expenditure plays the crucial role in the digital economy of the country. Its proportion to overall expenditure continued to increase from 56.48% and 67.18% in 2017 and 2018 to 73.80% in 2019. Gross fixed capital formation accounted for 23.86 percent in 2019 which continuously increased from 2017, whereas government final consumption portion is only 3.28 percent. Exports and imports of digital goods and services also plays an important role

in the Thai economy. Since Thailand is a production base for hardware products exports such as computer hardware and parts, and other electronic parts. However, there is a downward trend in 2019. At the same time, Thailand has a high reliance on foreign capital goods in both hardware and ready-made software as well. As a result, the import value of digital goods and services is high. However, when considering net exports of digital goods and services (x-m), they were positive in 2017 and 2018, except in 2019 when net exports of goods and services were negative or down to 0.94 percent due to the sluggish export situation. Details are in the following table.

Table 12 GDP as a result of digital technology expenditure

Spending components	Value at current prices (Million Baht)			Growth (%)	
	2017	2018	2019	2018	2019
Private final consumption expenditure	356,889	393,225	402,053	10.18	2.25
General government final consumption expenditure	16,409	15,423	17,846	- 6.01	15.71
Gross fixed capital formation	125,536	132,765	129,992	5.76	- 2.09
Plus : Exports of goods and services	1,414,296	1,399,786	1,293,842	- 1.03	- 7.57
Less : Imports of goods and services	1,281,224	1,355,911	1,298,955	5.83	- 4.20
Net exports of goods and services	133,072	43,875	-5,113	- 67.03	- 111.65
Expenditure on Gross domestic products	631,906	585,289	544,778	- 7.38	- 6.92
Structure (%)					
Private final consumption expenditure	56.48	67.18	73.80		
General government final consumption expenditure	2.60	2.64	3.28		
Gross fixed capital formation	19.87	22.68	23.86		
Plus: Exports of goods and services	223.81	239.16	237.50		
Less: Imports of goods and services	202.76	231.67	238.44		
Net exports of goods and services	21.06	7.50	- 0.94		
Expenditure on Gross domestic products	100.00	100.00	100.00		

6. Some limitations

This report of digital economy measurements, phase II, some measurement methods have been developed from phase I. However, there are still some limitations in both definition framework and coverage of digital economic activities that are difficult to distinguish between digital and non-digital economic activities. Including the availability of statistical data to support the measurement in all 3 aspects of the national account system. Implementation may be required to impute and some statistical adjustments are appropriate, therefore, the results of this second phase of the digital economy measurement may not be fully completed such as measuring the digital services by government agencies which is difficult to distinguish from normal services. Moreover, to compute change in inventories as part of GDP on expenditure side is much more complicated. However, the measured results can reflect a preliminary picture of the size of the economy and the key components that are the main drivers of the country's digital economy to achieve higher growth than the traditional economy. Public and private sectors including interested parties can make use of this statistical information on the preliminary basis with concerning the limitations mentioned above.

Statistic Tables

Table 13 Digital economy classified by digital sectors (Million Baht) in 2017 - 2019

Digital sectors	Gross Output			Value Added			% Value Added		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
1. Digital industry	1,822,010	2,021,787	2,023,193	729,707	857,393	853,322	55.19	52.94	44.85
1.1 Smart devices	48,397	64,432	67,387	15,285	18,559	28,249	1.16	1.15	1.48
1.2 Hardware	1,020,622	1,070,329	1,023,231	378,996	393,002	344,720	28.67	24.27	18.12
1.3 Software	95,703	105,651	123,423	66,327	69,568	78,165	5.02	4.30	4.11
1.4 Digital services	105,506	113,972	116,288	62,345	72,568	73,324	4.72	4.48	3.85
1.5 Communication	471,562	587,674	616,860	174,276	271,214	294,291	13.18	16.75	15.47
1.6 Digital content	80,221	79,730	76,003	32,478	32,482	34,572	2.46	2.01	1.82
2. Digital tourism	92,192	90,294	95,996	53,917	55,275	54,427	4.08	3.41	2.86
2.1 Rental of transport equipment and leasing	42,885	43,406	47,596	26,200	28,021	33,010	1.98	1.73	1.73
2.2 Travel agencies and other reservation services)	43,516	40,459	42,447	25,938	25,187	18,915	1.96	1.56	0.99
2.3 Sport and recreation activity	5,790	6,430	5,953	1,778	2,067	2,503	0.13	0.13	0.13
3. Digital trade	504,296	810,617	1,084,610	291,111	450,909	685,990	22.02	27.84	36.05
3.1 Wholesale trade	123,300	127,471	233,069	94,354	98,263	168,337	7.14	6.07	8.85
3.2 Retail trade	90,748	90,195	114,096	50,142	52,183	68,337	3.79	3.22	3.59
3.3 E-commerce	290,247	592,951	737,444	146,615	300,464	449,315	11.09	18.55	23.62
4. Business services	287,668	313,072	311,523	212,326	217,361	203,245	16.06	13.42	10.68

Digital sectors	Gross Output			Value Added			% Value Added		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
4.1 Internet services : digital platform digital order digital delivery and other relevant business services	287,668	313,072	311,523	212,326	217,361	203,245	16.06	13.42	10.68
5. Others	139,187	149,421	195,942	35,000	38,511	105,668	2.65	2.38	5.55
5.1 Other services : education, health	133,120	146,209	191,529	32,512	37,212	103,971	2.46	2.30	5.46
5.2 Frights transport	6,067	3,212	4,413	2,488	1,299	1,697	0.19	0.08	0.09
Total	2,845,353	3,385,191	3,711,264	1,322,061	1,619,448	1,902,652	100.00	100.00	100.00

Table 14 Income of digital economic activities classified by type of income and digital sectors in 2017 - 2019

Digital sectors	Income in 2017 (Million Baht)					
	Compensation of employees	mixed income	Operating surplus	Net production taxes	Depreciation	Total
1. Digital industry	280,856	4,444	303,638	55,516	85,254	729,707
1.1 Smart devices	2,688	-	8,923	1,413	2,261	15,285
1.2 Hardware	126,217	-	149,326	33,272	70,182	378,996
1.3 Software	47,086	-	16,442	1,834	964	66,327
1.4 Digital services	39,966	-	17,033	2,022	3,325	62,345
1.5 Communication	50,482	-	102,599	15,770	5,425	174,276
1.6 Digital content	14,417	4,444	9,314	1,205	3,097	32,478
2. Digital tourism	26,013	137	21,587	2,312	3,868	53,917
2.1 Rental of transport equipment and leasing	17,666	-	5,090	764	2,680	26,200

Digital sectors	Income in 2017 (Million Baht)					
	Compensation of employees	mixed income	Operating surplus	Net production taxes	Depreciation	Total
2.2 Travel agencies and other reservation services)	7,427	137	16,481	827	1,066	25,938
2.3 Sport and recreation activity	921	-	15	720	122	1,778
3. Digital trade	112,151	71,043	58,843	24,469	24,605	291,111
3.1 Wholesale trade	53,294	-	33,090	5,060	2,910	94,354
3.2 Retail trade	32,401	-	13,008	2,576	2,157	50,142
3.3 E-commerce	26,456	71,043	12,744	16,833	19,539	146,615
4. Business services	78,567	8,183	105,295	12,895	7,386	212,326
4.1 Internet services : digital platform digital order digital delivery and other relevant business services	78,567	8,183	105,295	12,895	7,386	212,326
5. Others	19,855	6,067	3,466	3,792	1,821	35,000
5.1 Other services : education, health	18,506	6,067	2,698	3,887	1,354	32,512
5.2 Frights transport	1,349	-	768	-95	467	2,488
Total	517,443	89,874	492,828	98,983	122,934	1,322,061

Table 14 Income of digital economic activities classified by type of income and digital sectors in 2017 - 2019 (Continued)

Digital sectors	Income in 2018(Million Baht)					
	Compensation of employees	mixed income	Operating surplus	Net production taxes	Depreciation	Total
1. Digital industry	322,157	3,326	383,204	61,892	86,813	857,393
1.1 Smart devices	3,216	-	10,673	1,881	2,789	18,559
1.2 Hardware	130,604	-	160,380	34,769	67,249	393,002
1.3 Software	49,531	-	16,987	2,025	1,025	69,568
1.4 Digital services	45,698	-	20,848	2,184	3,837	72,568
1.5 Communication	77,769	-	164,985	19,827	8,634	271,214
1.6 Digital content	15,339	3,326	9,330	1,206	3,280	32,482
2. Digital tourism	26,452	133	22,035	2,334	4,321	55,275
2.1 Rental of transport equipment and leasing	19,056	-	5,073	767	3,125	28,021
2.2 Travel agencies and other reservation services)	6,353	133	16,885	767	1,048	25,187
2.3 Sport and recreation activity	1,043	-	76	800	148	2,067
3. Digital trade	148,240	159,453	78,555	24,624	40,038	450,909
3.1 Wholesale trade	55,306	-	34,709	5,231	3,017	98,263
3.2 Retail trade	33,554	-	13,825	2,560	2,244	52,183
3.3 Retail trade via internet (e-commerce)	59,380	159,453	30,021	16,833	34,777	300,464
4. Business services	80,278	13,710	102,451	13,927	6,995	217,361

Digital sectors	Income in 2018(Million Baht)					
	Compensation of employees	mixed income	Operating surplus	Net production taxes	Depreciation	Total
4.1 Internet services : digital platform digital order digital delivery and other relevant business services	80,278	13,710	102,451	13,927	6,995	217,361
5. Others	21,812	7,048	3,709	4,162	1,780	38,511
5.1 Other services: education, health	21,109	7,048	3,308	4,204	1,544	37,212
5.2 Freight transport	703	-	401	-42	236	1,299
Total	598,939	183,670	589,954	106,939	139,947	1,619,448

Table 14 Income of digital economic activities classified by type of income and digital sectors in 2017 - 2019 (Continued)

Digital sectors	Income in 2019 (Million Baht)					
	Compensation of employees	mixed income	Operating surplus	Net production taxes	depreciation	Total
1. Digital industry	323,214	3,408	383,829	61,830	81,041	853,322
1.1 Smart devices	4,979	-	17,134	1,967	4,169	28,249
1.2 Hardware	116,883	-	135,927	33,240	58,670	344,720
1.3 Software	54,977	-	19,663	2,365	1,159	78,165
1.4 Digital services	47,036	-	20,137	2,229	3,923	73,324
1.5 Communication	83,222	-	180,363	20,883	9,824	294,291

Digital sectors	Income in 2019 (Million Baht)					
	Compensation of employees	mixed income	Operating surplus	Net production taxes	depreciation	Total
1.6 Digital content	16,118	3,408	10,604	1,146	3,296	34,572
2. Digital tourism	29,650	166	17,611	2,388	4,612	54,427
2.1 Rental of transport equipment and leasing	22,789	-	5,756	843	3,622	33,010
2.2 Travel agencies and other reservation services	5,319	166	11,827	804	798	18,915
2.3 Sport and recreation activity	1,542	-	28	741	192	2,503
3. Digital trade	220,045	240,432	142,141	25,558	57,814	685,990
3.1 Wholesale trade	87,733	-	66,419	9,564	4,622	168,337
3.2 Retail trade	42,776	-	19,432	3,239	2,890	68,337
3.3 Retail trade via internet (e-commerce)	89,536	240,432	56,290	12,755	50,302	449,315
4. Business services	74,576	12,052	95,635	14,543	6,438	203,245
4.1 Internet services : digital platform digital order digital delivery and other relevant business services	74,576	12,052	95,635	14,543	6,438	203,245
5. Others	74,814	19,494	1,267	5,457	4,636	105,668
5.1 other services: education, health	73,894	19,494	738	5,520	4,325	103,971
5.2 freight transport (delivery)	919	-	529	-62	311	1,697
Total	722,300	275,553	640,482	109,776	154,541	1,902,652

Table 15 Private final consumption expenditure on digital products classified by digital sectors in 2017 - 2019

Digital sectors	Value (Thousand Baht)			Growth (%)		Share (%)		
	2017	2018	2019	2018	2019	2017	2018	2019
1. Digital industry	342,049,592	377,024,310	386,445,757	10.23	2.50	95.84	95.88	96.12
1.1 Smart devices	23,892,167	23,146,003	30,059,382	-3.12	29.87	6.69	5.89	7.48
1.2 Hardware	44,102,069	45,603,860	48,804,410	3.41	7.02	12.36	11.60	12.14
1.3 Software	10,236,672	11,119,124	11,667,197	8.62	4.93	2.87	2.83	2.90
1.4 Digital services	53,788,111	59,173,636	61,230,731	10.01	3.48	15.07	15.05	15.23
1.5 Communication	189,447,214	215,159,645	209,100,938	13.57	-2.82	53.08	54.72	52.01
1.6 Digital content	20,583,360	22,822,043	25,583,098	10.88	12.10	5.77	5.80	6.36
2. Digital tourism	14,284,545	15,637,629	14,917,398	9.47	-4.61	4.00	3.98	3.71
2.1 Travel agencies and other reservation services	10,378,921	11,389,756	10,897,836	9.74	-4.32	2.91	2.90	2.71
2.2 Sport and recreation activity	3,905,624	4,247,873	4,019,562	8.76	-5.37	1.09	1.08	1.00
3. Digital trade	-	-	-	-	-	-	-	-
3.1 Wholesale trade	-	-	-	-	-	-	-	-
3.2 Retail trade	-	-	-	-	-	-	-	-
4. Business services	-	-	-	-	-	-	-	-
4.1 Internet services	-	-	-	-	-	-	-	-
5. Others	555,046	562,736	689,873	1.39	22.59	0.16	0.14	0.17
5.1 other services: education, health	555,046	562,736	689,873	1.39	22.59	0.16	0.14	0.17
Total	356,889,184	393,224,675	402,053,027	10.18	2.25	100.00	100.00	100.00

Table 16 Government final consumption expenditure on digital products classified by digital sectors in 2017 - 2019

Digital sectors	Value (Thousand Baht)			Growth (%)		Share (%)		
	2017	2018	2019	2018	2019	2017	2018	2019
1. Digital industry	16,408,956.88	15,423,377.31	17,846,126.02	-6.01	15.71	100.00	100.00	100.00
1.1 Smart devices	-	-	-	-	-	0.00	0.00	0.00
1.2 Hardware	3,391,854.33	3,871,381.36	3,817,894.60	14.14	-1.38	20.67	25.10	21.39
1.3 Software	323,462.12	566,321.21	1,777,931.37	75.08	213.94	1.97	3.67	9.96
1.4 Digital services	3,954,301.88	4,176,364.55	4,908,604.61	5.62	17.53	24.10	27.08	27.51
1.5 Communication	8,476,599.18	6,543,200.19	6,932,639.76	-22.81	5.95	51.66	42.42	38.85
1.6 Digital content	262,739.37	266,110.01	409,055.68	1.28	53.72	1.60	1.73	2.29
2.Digital tourism	-	-	-	-	-	-	-	-
2.1 Travel agencies and other reservation services	-	-	-	-	-	-	-	-
2.2 Sport and recreation activity	-	-	-	-	-	-	-	-
3. Digital trade	-	-	-	-	-	-	-	-
3.1 Wholesale trade	-	-	-	-	-	-	-	-
3.2 Retail trade	-	-	-	-	-	-	-	-
4. Business services	-	-	-	-	-	-	-	-
4.1 Internet services	-	-	-	-	-	-	-	-
Total	16,408,956.88	15,423,377.31	17,846,126.02	-6.01	15.71	100.00	100.00	100.00

Table 17 Gross fixed capital formation classified by type of asset and digital sectors in 2017 - 2019

2017

Digital sectors	Gross fixed capital formation in 2017 (Million Baht)						
	Land	Construction	Machinery and equipment	Software	Computer program development	Other assets	Total
1. Digital industry	1,223	11,249	69,752	1,334	4,486	23,746	111,788
1.1 Smart devices	-	11	74	-	-	1	86
1.2 Hardware	340	2,145	18,391	1,251	93	22,926	45,145
1.3 Software	-	35	470	5	0	176	685
1.4 Digital services	-	58	1,349	0	101	245	1,754
1.5 Communication	246	8,827	48,927	78	4,291	320	62,689
1.6 Digital content	636	173	541	0	-	79	1,429
2. Digital tourism	6	495	1,676	5	1	662	2,846
2.1 Rental of transport equipment and leasing	1	448	1,324	5	1	524	2,304
2.2 Travel agencies and other reservation services	0	38	211	-	0	137	387
2.3 Sport and recreation activity	4	9	141	-	-	2	155
3. Digital trade	1,621	6,764	41,086	61	68	2,961	52,560
3.1 Wholesale trade	312	147	1,692	1	68	156	2,376
3.2 Retail trade	355	10	18,175	3	0	0	18,544
3.3 e-commerce	953	6,607	21,218	57	0	2,804	31,640
4. Business services	2,071	4,328	7,445	6	6	2,321	16,177

Digital sectors	Gross fixed capital formation in 2017 (Million Baht)						
	Land	Construction	Machinery and equipment	Software	Computer program development	Other assets	Total
4.1 internet services : digital platform digital order digital delivery and other relevant business services	2,071	4,328	7,445	6	6	2,321	16,177
5. Others	26	337	944	0	-	266	1,573
5.1 other services : education, health	26	320	726	0	-	196	1,268
5.2 frights transport	-	17	218	-	-	70	305
Total	4,947	23,173	120,902	1,406	4,561	29,955	184,943

2018

Digital sectors	Gross fixed capital formation in 2018 (Million Baht)						
	Land	Construction	Machinery and equipment	Software	Computer program development	Other assets	Total
1. Digital industry	1,483	13,005	84,536	1,398	5,424	24,531	130,378
1.1 Smart devices	-	197	1,231	-	-	10	1,437
1.2 Hardware	317	2,171	17,879	1,303	97	23,560	45,327
1.3 Software	-	38	553	6	0	256	854
1.4 Digital services	-	88	1,521	0	128	288	2,025
1.5 Communication	318	10,291	62,771	89	5,199	339	79,007
1.6 Digital content	848	220	582	0	-	79	1,729
2. Digital tourism	6	503	1,622	5	2	575	2,712

Digital sectors	Gross fixed capital formation in 2018 (Million Baht)						
	Land	Construction	Machinery and equipment	Software	Computer program development	Other assets	Total
2.1 Rental of transport equipment and leasing	2	456	1,299	5	2	503	2,266
2.2 Travel agencies and other reservation services	0	35	168	-	0	70	273
2.3 Sport and recreation activity	4	12	155	-	-	2	173
3. Digital trade	2,715	8,289	34,261	28	105	7,920	53,319
3.1 Wholesale trade	311	196	1,874	0	85	122	2,588
3.2 Retail trade	361	57	1,685	3	20	38	2,165
3.3 e-commerce	2,043	8,036	30,702	25	0	7,759	48,566
4. Business services	2,138	4,463	7,636	8	6	2,415	16,667
4.1 Internet services : digital platform digital order digital delivery and other relevant business services	2,138	4,463	7,636	8	6	2,415	16,667
5. Others	29	359	910	0	-	251	1,549
5.1 other services : education, health	29	350	794	0	-	214	1,387
5.2 frights transport	-	9	115	-	-	37	162
Total	6,371	26,619	128,966	1,439	5,537	35,692	204,624

2019

Digital sectors	Gross fixed capital formation in 2019 (Million Baht)						
	Land	Construction	Machinery and equipment	Software	Computer program development	Other assets	Total
1. Digital industry	1,428	12,334	88,735	1,310	5,386	23,401	132,408
1.1 Smart devices	-	201	1,281	-	-	11	1,493
1.2 Hardware	324	2,179	17,216	1,223	90	22,435	43,315
1.3 Software	-	44	607	7	0	217	875
1.4 Digital services	-	95	1,694	0	166	329	2,285
1.5 Communication	340	9,604	67,367	80	5,129	344	82,864
1.6 Digital content	765	212	570	0	-	65	1,577
2. Digital tourism	6	529	1,770	5	2	665	1,275
2.1 rental of transport equipment and leasing	2	484	1,433	5	2	556	777
2.2 travel agencies and other reservation services	0	37	193	-	0	108	338
2.3 sport and recreation activity	4	9	144	-	-	2	159
3. Digital trade	3,850	11,130	41,077	25	208	11,234	67,524
3.1 Wholesale trade	521	414	3,429	0	190	268	4,822
3.2 Retail trade	559	48	2,444	3	18	66	3,138
3.3 e-commerce	2,769	10,668	35,204	22	0	10,900	59,565
4. Business services	1,786	3,647	6,359	8	6	1,954	13,611
4.1 Internet services : digital platform digital order digital delivery and other relevant business services	1,786	3,647	6,359	8	6	1,954	13,611

Digital sectors	Gross fixed capital formation in 2019 (Million Baht)						
	Land	Construction	Machinery and equipment	Software	Computer program development	Other assets	Total
5. Others	38	472	1,202	0	-	332	2,016
5.1 Other services : education, health	38	460	1,043	0	-	281	1,822
5.2 Frights transport	-	12	159	-	-	51	194
Total	7,108	28,113	139,143	1,348	5,602	37,587	216,833

Table 18 Value of Exports of goods and services on digital products classified by digital sectors in 2017 - 2019

Digital sectors	Value at fob (Million Baht)			Share (%)		
	2017	2018	2019	2017	2018	2019
1. Digital industry	1,377,105	1,361,075	1,254,133	97.37	97.23	96.93
1.1 Smart devices	347,198	326,094	315,338	24.55	23.30	24.37
1.2 Hardware	763,513	766,233	697,595	53.99	54.74	53.92
1.3 Software	5,311	7,388	8,662	0.38	0.53	0.67
1.4 Digital services	23	21	21	0.00	0.00	0.00
1.5 Communication	254,187	252,587	224,333	17.97	18.04	17.34
1.6 Digital content	6,872	8,752	8,184	0.49	0.63	0.63

Digital sectors	Value at fob (Million Baht)			Share (%)		
	2017	2018	2019	2017	2018	2019
2. Digital tourism	9,492	10,380	13,094	0.67	0.74	1.01
2.2 Travel agencies and other reservation services	2,546	3,064	5,333	0.18	0.22	0.41
2.3 Sport and recreation activity	6,946	7,316	7,761	0.49	0.52	0.60
4. Business services	27,462	28,066	26,334	1.94	2.01	2.04
4.1 Internet services	27,462	28,066	26,334	1.94	2.01	2.04
5. Others	237	266	281	0.02	0.02	0.02
5.1 Other services : education, health	237	266	281	0.02	0.02	0.02
5.2 Frights transport	0	0	0	0.00	0.00	0.00
Total	1,414,296	1,399,786	1,293,842	100.00	100.00	100.00

Table 19 Value of Imports of goods and services on digital products classified by digital sectors in 2017 - 2019

Digital sectors	Value at fob (Million Baht)			Share (%)		
	2017	2018	2017	2018	2017	2018
1. Digital industry	1,242,257	1,315,661	1,252,497	96.96	97.03	96.42
1.1 Smart devices	228,445	237,553	240,638	17.83	17.52	18.53
1.2 Hardware	553,392	599,317	545,145	43.19	44.20	41.97
1.3 Software	179,623	206,587	205,750	14.02	15.24	15.84
1.4 Digital services	18	18	19	0.00	0.00	0.00
1.5 Communication	272,110	262,787	247,880	21.24	19.38	19.08
1.6 Digital content	8,669	9,399	13,064	0.68	0.69	1.01
2. Digital tourism	5,434	6,483	6,821	0.42	0.48	0.53
2.2 Travel agencies and other reservation services	1,237	1,366	1,676	0.10	0.10	0.13
2.3 Sport and recreation activity	4,197	5,117	5,144	0.33	0.38	0.40
4. Business services	33,383	33,571	39,429	2.61	2.48	3.04
4.1 Internet services	33,383	33,571	39,429	2.61	2.48	3.04
5. Others	150	196	209	0.01	0.01	0.02
5.1 Other services : education, health	149	196	209	0.01	0.01	0.02
5.2 Frights transport	0	0	0	0.00	0.00	0.00
Total	1,281,224	1,355,911	1,298,955	100.00	100.00	100.00

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