NBC Working Paper[1]

Digitalization and Its Impact on Resilience Growth: Evidence from Different Income Groups

MON Sreyleak[a], CHHEANG Chhay[b]

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Abstract

Resilience growth is the ability of one economy to adapt and bounce back during bad times. More precisely, to maintain resilience growth, an economy might need to diversify economic activities; where for the current trend, digitalization plays a crucial role in everyday life as there is a sharp increase in the use of the internet and various social media globally. In 2021, 63 countries were classified as the world's most digitally competitive countries (IMD World Digital Competitiveness Ranking, 2021). In this paper, we use these 63 countries and categorize them into high-income, emerging and developing economies. There are 3 sections in this paper. First, we examined the impact of digitalization, proxied by fixed broadband subscriptions suggested in the Data, Digitalization, and Governance of the World Bank 2021 report, on growth. We employed a structural equation model (SEM) to explain this study by controlling some highly relevant variables such as research and development expenditures in technology, high-technology exports, ease of doing business, individuals using the Internet, domestic credit to the private sector, and the net inflow of foreign direct investments. Second, we overviewed Cambodia's digital economy development. Third, we proposed to use the Supply and Use framework to record digital economic activities.

Keywords: *Digital Economy, Resilience Growth, Supply and Use Framework*

[a] *Senior Economist, National Bank of Cambodia*

[b] *Researcher, National Bank of Cambodia*

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Part 1: Study on the Effect of Digitalization on Economic Growth

1.1 Introduction

The definition and scope of the digital economy are defined differently according to the context that the authors want to study. According to the Cambodia Digital Economy and Society Policy Framework 2021-2035, the definition and scope of coverage of the digital economy remain unclear and may vary from country to country. In a narrow sense, the digital economy is a market that relies on digital technology to facilitate the exchange of goods and services through E-commerce, or in other words, the use of digital technologies based on the Internet in the production process and the exchange of goods and services. In a broad sense, the digital economy refers to economic, social, and cultural communication systems that rely on the use of ICT and digital systems. In economic terms, the digital economy is the advances in science and technology that create new business models, change the production process, consumption, and distribution of goods and services, and gradually improve the work norm to increase productivity and enhance economic efficiency (Royal Government of Cambodia, 2021). The digital economy is primarily in terms of the internet and related information and communications technologies (Kevin et. al., 2018)[2]. The OECD definition of the digital economy: (1) the digital‑enabling infrastructure needed for a computer network to exist and operate, (2) the digital transactions that take place using that system ("e‑commerce"), and (3) the content that digital economy users create and access ("digital media").

The study confirms statically the link between digitalization and economic growth via improving the inflow of foreign direct investment by applying the variables that are highly relevant. Then, this paper explains the recent development of Cambodia's digital economy and identifies its challenges, opportunities, and prospects. This analysis is important for all economic agents as it will provide a concrete understanding of the industrial revolution and highlight the factors that are driving the economy.

This paper consists of three main parts. Part 1 studies the effect of digitalization on economic growth with evidence from 63 countries that are classified as highly digitalization. Part 2 captures the development of Cambodia's digital economy. Then, part 3 explains the Supply and

[2] This definition is generally consistent with the internationally accepted definition of the ICT sector used and developed by the statistical offices of the OECD and United Nations.

Use framework that is applied to quantify the level of digitalization and provides some case studies.

1.2 Literature Review

The adoption of digital technologies has the potential to increase productivity, profit margins, cost reductions, increased revenue, customer loyalty and retention, the ability to offer new products and services, and global competitiveness, thus promoting sustainable growth with resiliency. According to World Bank Group COVID-19 surveys, firms that adopted digital platforms have experienced about 7 percent higher employment growth and are about 10 percent less probable to go bankrupt than digitally constrained firms. Responses to COVID-19 have also speeded up the adoption of digital technologies by several years across regions. Companies have accelerated the digitization of their customer and supply chain interactions and of their internal operations by three to four years (McKinsey Global Survey). The share of digital or digitally enabled products in their portfolios has accelerated by an astounding seven years. The leap is even greater—ten years—in developed Asia. An IDC survey of more than 1,500 business leaders in the Asia Pacific region listed the following as among the top benefits their organizations reaped from their digital transformation initiatives: improved profit margins, productivity, and customer loyalty and retention, along with cost reductions, ability to offer new products and services, and increased revenue. According to a study by the Centre for Economic Policy Research, countries with mobile phone penetration of 10 per cent of the population have a 0.59 per cent higher GDP per capita growth rate (Ndulu 2007). Furthermore, strong empirical evidence suggests that investment in ICT and higher education—partly by allowing for the better use of ICT—strongly improves global competitiveness (Ndulu and others 2007).

Digitalization is a key driver of long-term economic growth. It drives productivity by enhancing coordination, reducing operational costs, delivering economies of scale, and increasing firm efficiency (World Bank, 2022). The most digital-intensive industries have driven labour productivity growth in European countries and have contributed to as much as 86 percent of labour productivity growth in the United States. In addition, digital adoption is associated with productivity gains, having a deep impact on productivity in industries such as manufacturing and those with routine-intensive activities (Van Ark et al., 2019 and Gal et al., 2019).

The adoption of digital technologies in the banking sector also has the potential to promote financial inclusiveness and improve the delivery of financial services. According to Honohan and Beck (2007), the adoption of ICT and mobile/internet banking helped improve the delivery of financial services and promote financial inclusion, especially in developing countries.

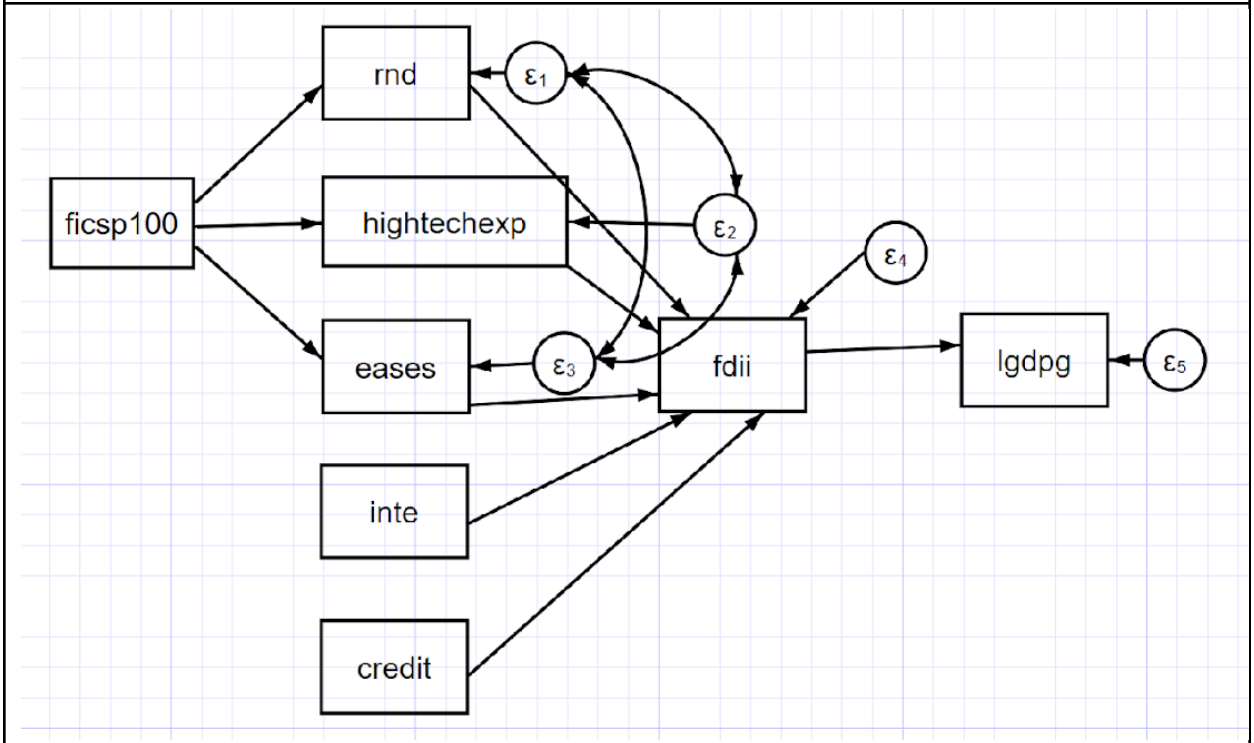
1.3 Data and Methodology

According to World Bank (2021) reported on the data, digitalization, and governance that the number of fixed broadband subscriptions per 100 people should be a good proxy for the degree of digitalization of the economy. The internet is being used by an increasing portion of the world's population on a regular and daily basis. Some studies confirm that a higher degree of social network usage indicates a higher level of digitalization. The social network depends mainly on better internet speed and the strength of information and communications technology level.

The main variables include:

- FICSP100: Fixed broadband subscriptions (per 100 people) which is the proxy of digitalization level.
- RND: Research and development expenditure in technology (% of GDP)
- HIGHTECHEXP: High-technology exports (% of manufactured exports)
- EASES: Ease of doing business score (0 = lowest performance to 100 = best performance)
- INTE: Individuals using the Internet (% of population)
- CREDIT: Domestic credit to private sector (% of GDP)
- FDII: Foreign direct investment, net inflows (% of GDP)
- LGDPG: Natural Log of constant GDP growth rate

Figure 1.1: Structural Equation Model



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The Structural Equations Model (SEM) is also known as the Linear Structural Relations (LISREL) model. Structural relations refer to the core concept of SEM which handles the relationships between variables. SEM is very flexible because it deals not only with a single simple or multiple linear regression but with a system of regression equations. Different from ordinary regression analysis, SEM considers several equations simultaneously. The same variable may represent a predictor (regressor) in one equation and a criterion (regressand) in another equation. Such a system of equations is called model.

In these structural equations model (SEM), we first estimate the RND, HIGHTECHEXP, and EASES using the explanatory variable - FICSP100, the proxy of digitalization level. Then, FDII is estimated by controlling RND, HIGHTECHEXP, EASES, INTE, and CREDIT. The ultimate objective is to study the effect on LGDPG using these structural equations. There are in total 63 countries based on the classification of IMD World Digital Competitiveness Ranking 2021. In those 63 countries, 43 countries are classified as high-income economies according to the World Bank Classification. The rest 20 countries are emerging and developing economies.

Table 1.1: Key Statistics

Variables	Observations	Mean	Standard Deviation
FICSP100	1,290	16.4859	13.4388
RND	1,305	1.3649	0.9985
HIGHTECHEXP	824	15.7775	11.6542
EASES	315	73.6740	9.0457
INTE	1,959	37.8266	34.1390
CREDIT	1,709	76.8436	50.3752
FDII	2,323	4.3912	13.6029
LGDPG	1,929	1.2018	0.8463

1.4 Key Findings

The results show consistency among the three samples – full sample, high-income countries, and emerging and developing countries. The increase in the level of fixed broadband subscriptions (FICSP100) is associated with the increase in research and development expenditures on technology (RND), high-technology exports (HIGHTECHEXP), and ease of doing business (EASES). Then we examined the impact of these variables on the net inflow of FDI (FDII). A higher level of RND is associated with the decline of FDII given the reason that if the companies are required to spend more on research and development in technology, they might reconsider whether to increase the investments. Then, the increase in high-technology exports, ease of doing business, domestic credit to the private sector, and individuals using the internet are in line with more FDI inflows. Greater access to the internet and ICT devices also boosts productivity and efficiency, thus enabling people to generate more income. Next, we estimate the impact of FDI inflow on growth. We confirmed that the increase in FDI inflows improves economic growth. If we consider the impact magnitude, the regression coefficients of high-income countries are higher than those of emerging and developing countries as high-income economies seem to have better telecommunication infrastructure investments in

place and more people with sufficient financial resources to afford such services, thus having better access. High-income economies also seem to develop more advanced labour market that drives more demand for white-collar workers with standard and advanced ICT skills, thus benefiting more from digitalization.

Table 1.2: Regression Results

		Full Sample	High-income	Emerging and Developing Countries
		Coefficient	Coefficient	Coefficient
Structural				
rnd				
	ficsp100	0.0594***	0.0683***	0.0155**
		(0.0044)	(0.0095)	(0.0066)
	_cons	-0.0494	-0.3678	0.4294***
		(0.1281)	(0.3150)	(0.0827)
hightechexp				
	ficsp100	0.2148***	0.4489***	-0.0307
		(0.0594)	(0.1048)	(0.2418)
	_cons	10.7862***	2.4717	13.087***
		(1.7156)	(3.4581)	(3.0277)
eases				
	ficsp100	0.3587***	0.2214***	0.3088***
		(0.0269)	(0.0447)	(0.1127)
	_cons	65.8278***	70.5060	65.0325***
		(0.7789)	(1.4770)	(1.4113)
fdii				
	rnd	-5.4149***	-5.2775***	-2.1410

		(1.2380)	(1.5441)	(2.9091)
	hightechexp	0.2093**	0.5016***	-0.0141
		(0.1053)	(0.1592)	(0.0665)
	eases	0.2831	0.7984**	0.0144
		(0.2468)	(0.3990)	(0.1482)
	credit	0.1093***	0.1694***	-0.0059
		(0.0261)	(0.0368)	(0.0282)
	inte	0.1948**	-0.2304	0.0984*
		(0.0919)	(0.1981)	(0.0556)
	_cons	7.2733	73.8078***	0.0657
		(14.5061)	(28.6418)	(8.8866)
lgdpg				
	fdii	0.0060***	0.0061***	0.0274*
		(0.9391)	(0.0019)	(0.0145)
	_cons	0.6047***	0.8915***	1.0033***
		(0.07116)	(0.0455)	(0.0940)

(*): the significant level where 1% is ***, 5% is **, and 10% is *.

The number in the parenthesis () represents the OIM standard error.

Part 2: Cambodia's Digital Economy Development

2.1 Digitalization as a New Source of Resilient Growth

Although Cambodia has reached a lower-middle-income status since 2015 after two decades of stellar growth and massive poverty reduction facilitated by preferential trade treatment, generous development assistance and strong foreign direct investment inflows, growth and job creation have been driven by relatively low value-added activities, such as garment manufacturing, rice cropping, and construction.

Global public health and economic crisis like no other, COVID-19 negatively affected three main sectors of Cambodia's economy: tourism, manufacturing exports, and construction, which together contributed more than 70 percent of the country's economic growth and 39 percent of its total paid employment in 2019 (World Bank Economic Update, May 2020). As a result, Cambodia's economy registered a 3.1 percent contraction in 2020, the worst performance since 1994.

To live up to the official aspiration of attaining upper-middle-income status by 2030 in the economic context of rapidly increasing wages against slow productivity growth, rising external competition and the COVID-19 new normal, Cambodia will need to develop new sources of growth. Cambodia can leverage its youthful demographic dividend with high internet penetration to fertile digital economy development and promote technological adoption by all economic agents which can play a critical role in boosting productivity, strengthening economic resiliency and competitiveness, and diversifying the economy.

The Royal Government of Cambodia recognized the importance of digital economy development and technological adoption by all economic agents and has issued several related policy documents. The Rectangular Strategy Phase III 2013-2018 (RSP III) highlighted the need to further develop e-Government and encouraged the private sector to invest in technology. In line with the RSP III implementation, the Cambodia ICT Master Plan 2020 was approved in 2014 which aimed to improve the ICT industry, human resources development, internet connectivity, cybersecurity, and government e-services. Then, the Telecoms and ICT Policy was adopted in 2016 which outlined policy measures and associated targets to expand ICT infrastructure and develop ICT human capacity. More recently, the Royal Government also set

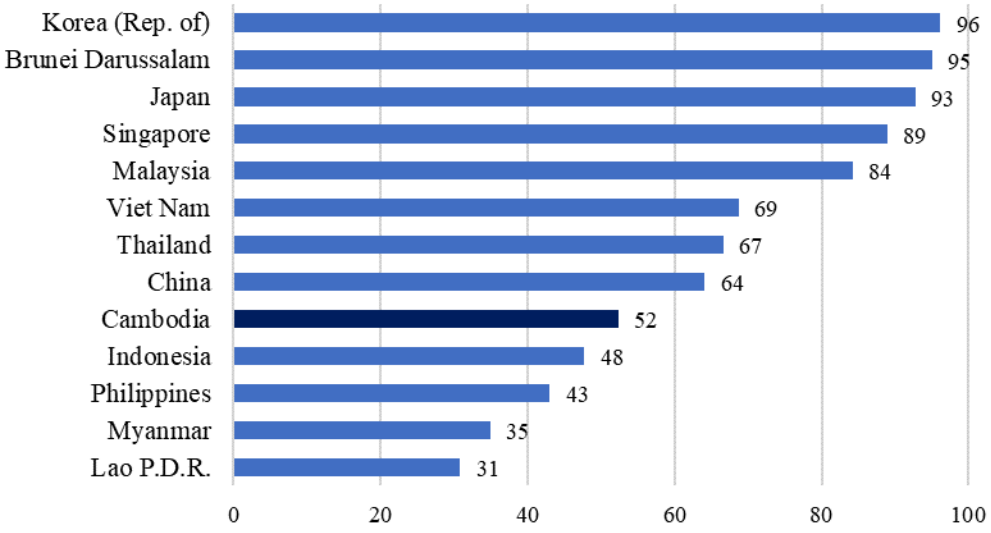
out the Cambodia Digital Economy and Society Policy Framework 2021-2035 as a roadmap for digital transformation and maximizing the benefits of the forthcoming Fourth Industrial Revolution based on the long-term vision of building a vibrant digital economy and society by developing the necessary infrastructures; building readiness and confidence in the digital system, promoting digital adoption and transformation in all stakeholders of society including government, citizens and businesses and mitigating the negative impacts.

In line with the implementation of the Cambodia Digital Economy and Society Policy Framework 2021-2035, the Royal Government has also established the National Digital Economy and Society Council with three major committees such as Digital Government Committee, Digital Economy and Business Committee and Digital Security Committee, and has set out the Cambodia Digital Government Policy 2022-2035 with the vision of "establish a digital government to improve the citizens' quality of life and build their trust through better public service provision." Numerous government institutions were tasked with implementing these policy measures and strategies, including the Ministry of Economy and Finance (MEF), the Ministry of Post and Telecommunications (MPTC), the Ministry of Commerce (MOC), the Ministry of Industry, Science, Technology and Innovation, the National Bank of Cambodia, etc.

2.2 Cambodia's Digital Economy Development: Digital Divide

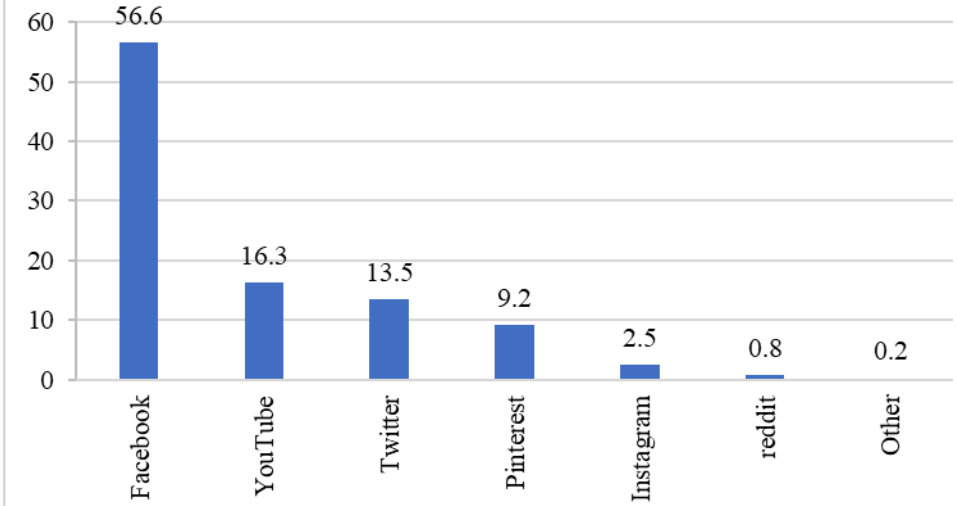
52% of the Cambodian population (8.3 million people) were using the internet in 2019, which was higher than in Lao, Myanmar, Philippines and Indonesia (as illustrated in Fig 2.1). 56.6% of the social media users in Cambodia were Facebook users, 16.3% were YouTube users, 13.5% were Twitter users, 9.2% were Pinterest users, 2.5% were Instagram users, 0.8% were reddit users and another 0.2% were using other platforms (as illustrated in Fig 2.2).

Fig 2.1 Individuals using the Internet, total (%)



Source: International Telecommunication Union (ITU), 2019

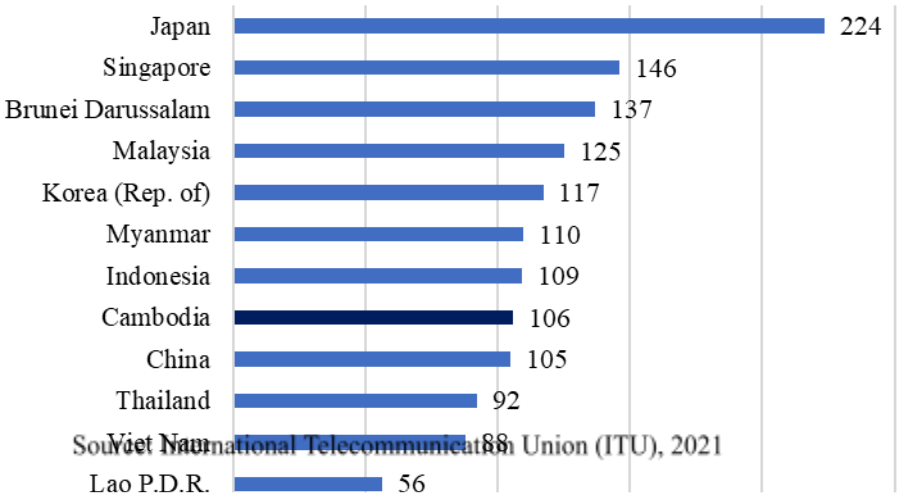
Fig 2.2 Average Social Media Market Share (%). (Jan 2020 - Oct 2022)



Source: Statcounter

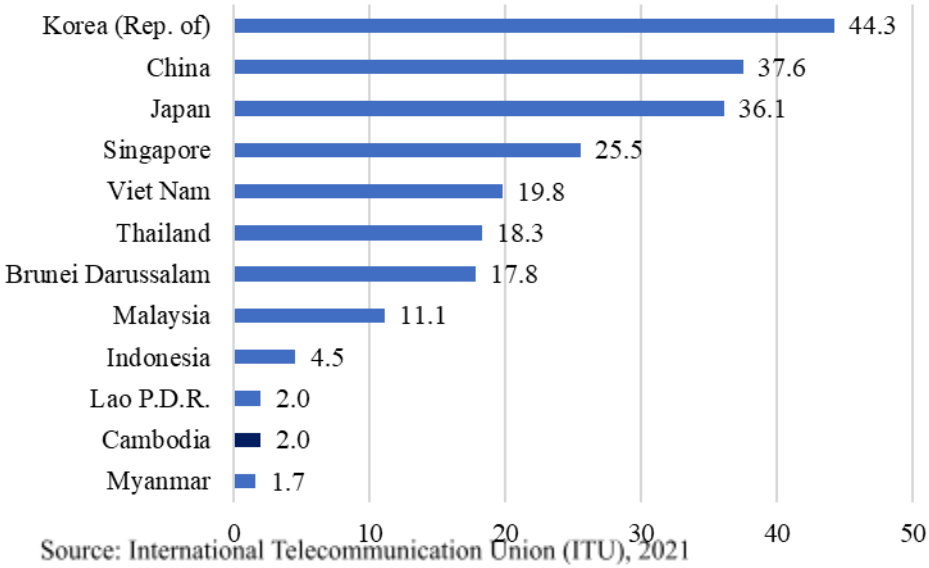
Penetration of mobile broadband subscriptions in Cambodia reached a record 106 subscriptions per 100 inhabitants in 2021 with 96% of the population covered by at least 4G network, higher than in Lao, VN, TH, and China (as illustrated in Fig 2.3). Penetration of fixed broadband subscriptions in Cambodia reached 2 subscriptions per 100 inhabitants in 2021 with 86% of the subscriptions were high-speed internet (>10Mbit/s), still below most ASEAN+3 countries (as illustrated in Fig 2.4).

Fig 2.3 Active mobile-broadband subscriptions per 100 inhabitants



Source: International Telecommunication Union (ITU), 2021

Fig 2.4 Fixed broadband subscriptions per 100 inhabitants

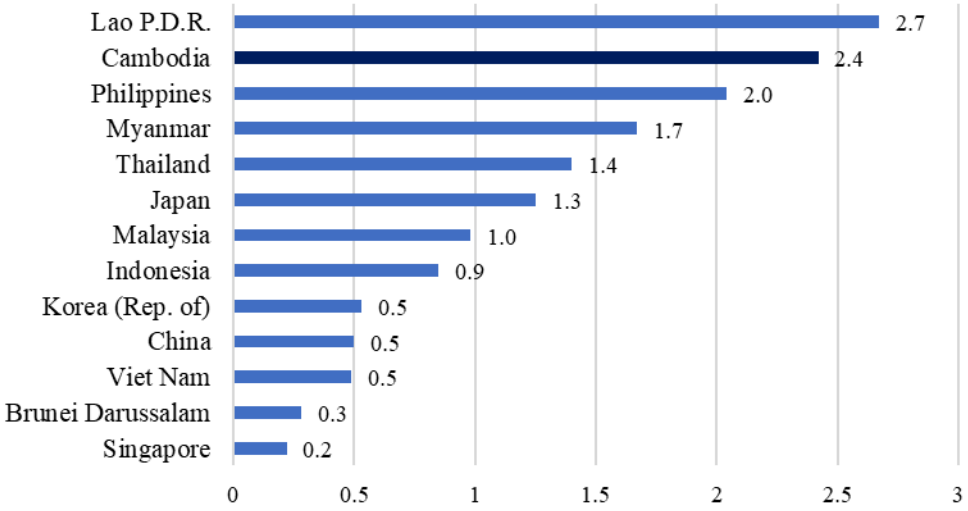


Source: International Telecommunication Union (ITU), 2021

Mobile broadband price basket as a % of GNI p.c. was 2.4% in 2021, higher than most ASEAN+3 countries, suggesting the need to further improve its affordability, especially for the

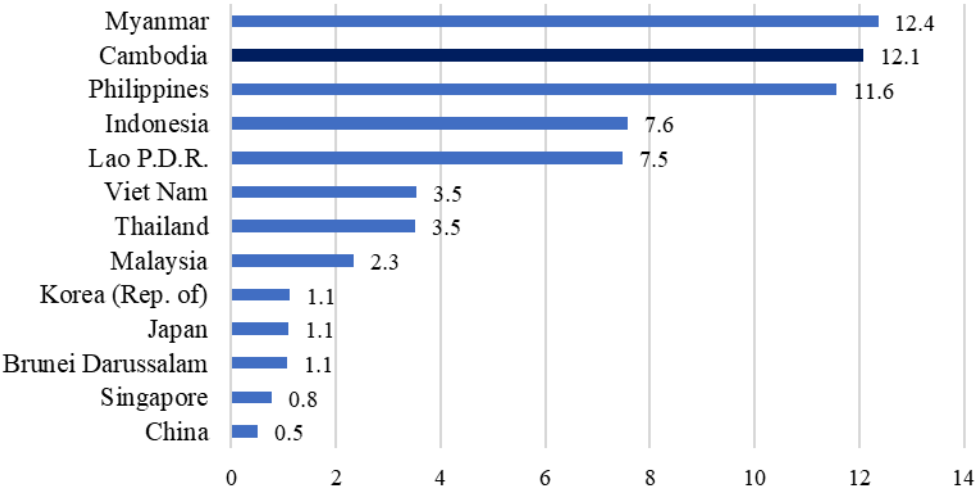
low-income population (as illustrated in Fig 2.5). This also might be due to the underestimation of the GNI p.c due to the large informal sector. Fixed broadband price basket as a % of GNI p.c. was 12.1% in 2021, higher than most ASEAN+3 countries, suggesting the need to further improve its affordability, especially for the low-income population (as illustrated in Fig 2.6). This also might be due to the underestimation of the GNI p.c due to the large informal sector.

Fig 2.5 Mobile broadband basket as a % of GNI p.c.



Source: International Telecommunication Union (ITU), 2021

Fig 2.6 Fixed broadband basket as a % of GNI p.c.

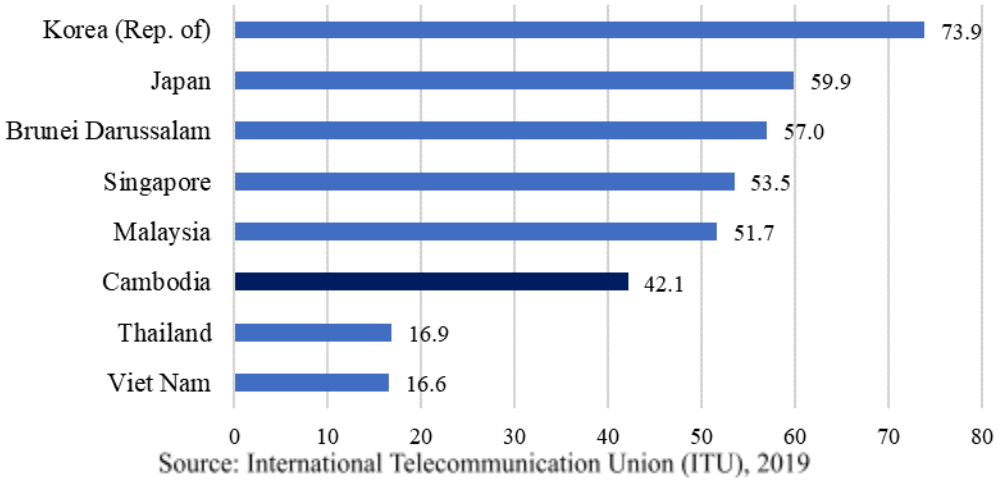


Source: International Telecommunication Union (ITU), 2021

42.1% of individuals in Cambodia reported having carried out one of the activities that comprise basic ICT skills in 2019, e.g. computer-based activities: copying or moving a file or

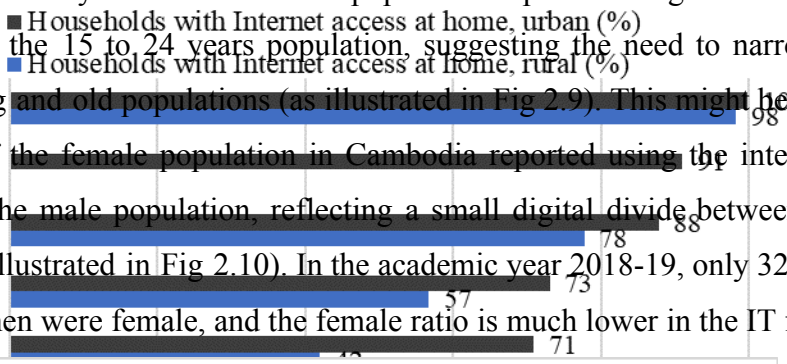
folder; using copy and paste tools to duplicate or move information within a document; sending emails with attached files; and transferring files between a computer and other devices (as illustrated in Fig 2.7). Only 30% of rural households in Cambodia reported having access to the internet compared to 50% of urban households in 2017, suggesting the need to narrow the digital divide between urban and rural households (as illustrated in Fig 2.8). This might be due to the lack of ICT infrastructure and electricity in the rural area coupled with the affordability and ICT skills gap underlying the economic gap between the rich and the poor.

Fig 2.7 Individuals with basic ICT skills (%)



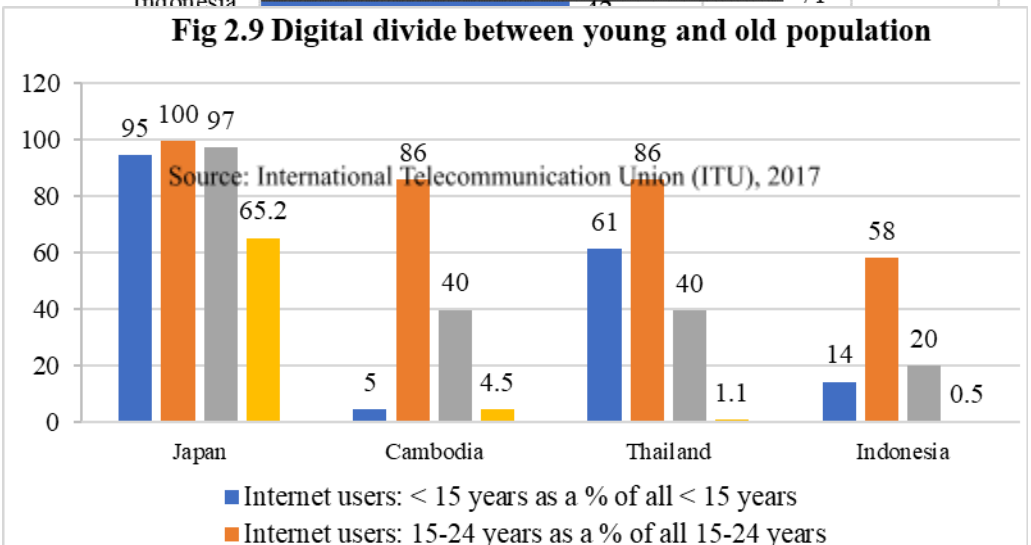
Source: International Telecommunication Union (ITU), 2019

Fig 2.8 Digital divide between urban and rural households



Only 4.5% of the over 75-year-old Cambodian population reported using the internet in 2016 compared to 86% for the 15 to 24 years population, suggesting the need to narrow the digital divide between young and old populations (as illustrated in Fig 2.9). This might be due to the ICT skills gap. 52% of the female population in Cambodia reported using the internet in 2019 compared to 53% of the male population, reflecting a small digital divide between male and female populations (as illustrated in Fig 2.10). In the academic year 2018-19, only 32.7% of STEM undergraduate freshmen were female, and the female ratio is much lower in the IT field at 15.9% (CADT et al., 2021).

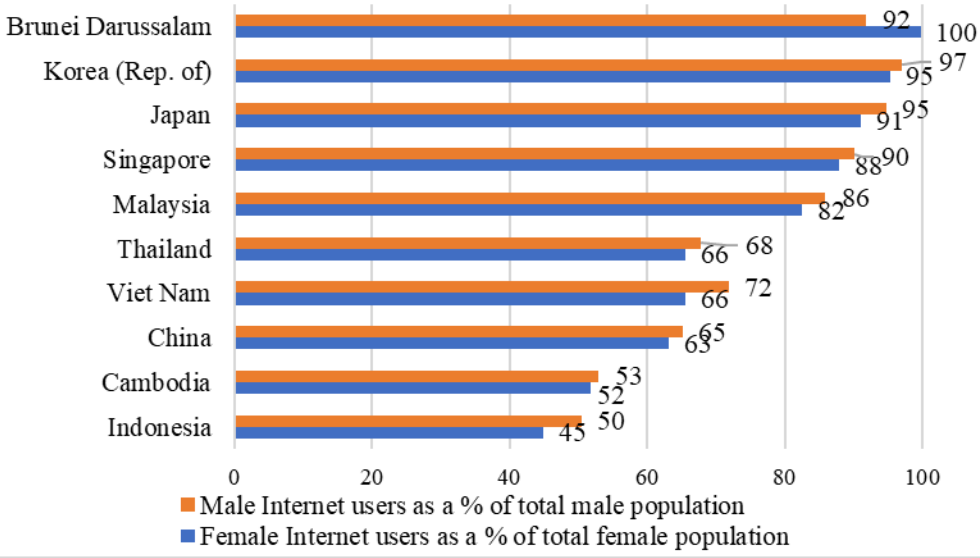
Fig 2.9 Digital divide between young and old population



Source: International Telecommunication Union (ITU), 2017

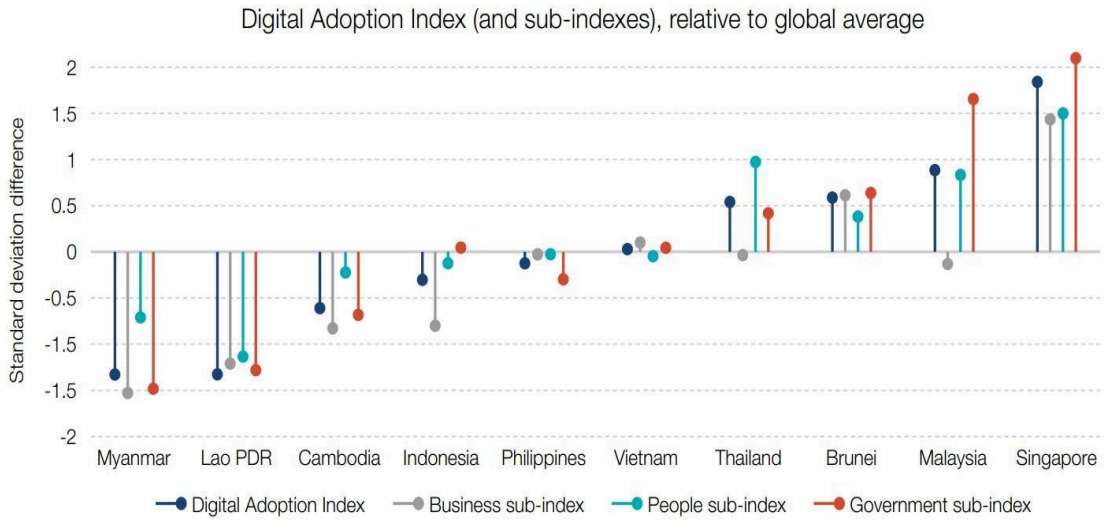
Source: International Telecommunication Union (ITU), 2016

Fig. 10 Digital divide between female and male population



Source: International Telecommunication Union (ITU), 2019

Much work remains in other areas. The World Bank´s Digital Adoption Index which measures the global spread of technology among people, businesses, and governments, showed that digital adoption by Cambodia's firms, government, and people in 2018 was below the global average but above Myanmar and Lao. Given the importance of enterprises to economic growth and job creation, digital adoption by businesses is crucially important. According to World Bank (2018), fewer than 25 percent of businesses had a web presence in 2017, well below the world median of 46 percent. Digital adoption by firms was constrained by the lack of skilled staff, the lack of an adequate legal framework for e-transactions, data protection and privacy, consumer protection for online purchases, and cybercrime prevention (World Bank, 2018).



Source: World Bank, 2018.

Part 3: Measuring Cambodia's Digital Economy Using Supply-Use Framework

The pervasive nature of digitalization makes it difficult to isolate and quantify the economic impact of digitalization. The pace of innovation and the application of digital technologies to existing economic activity make it a challenge to ensure comprehensive coverage of economic activities. While the task of quantifying digitalization is difficult there is value in quantifying this activity to better understand its evolution relative to overall economic activity and its impact on labour markets, inflation, societal progress, and so forth.

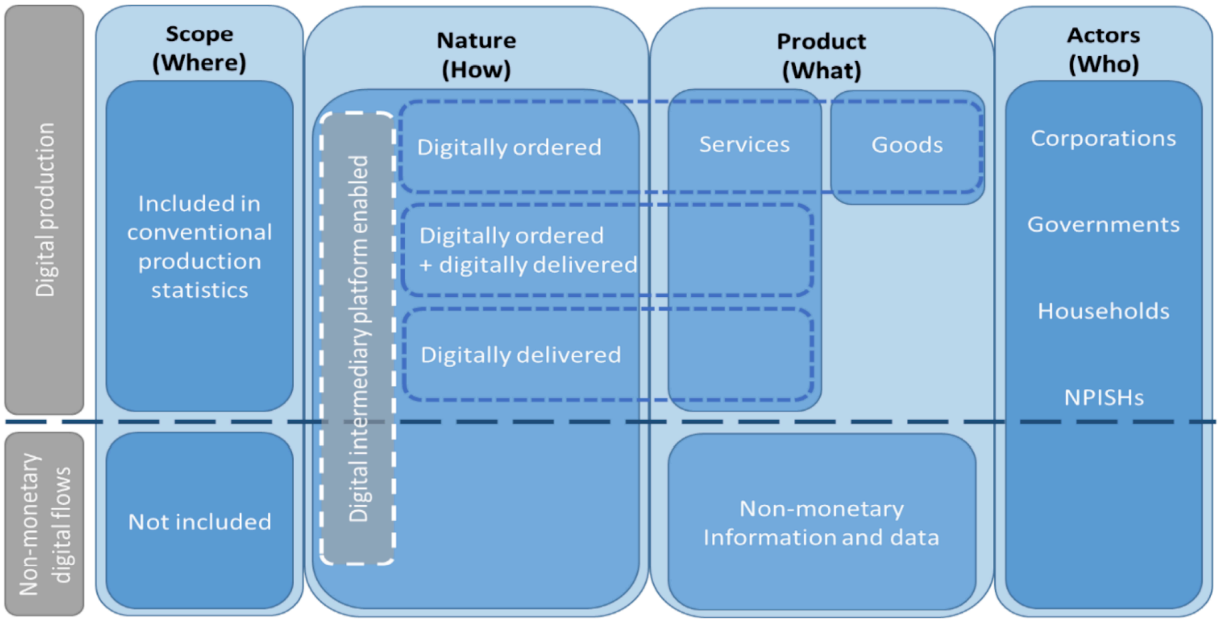
In response to user demand for data, the macroeconomic accounting community is developing guidance that countries can use to quantify the impact of digitalization on their economies. The guidance is designed to meet a wide range of demands and needs. It recommends countries develop a suite of indicators related to e-commerce, digitally delivered products; digital intermediation platforms, expenditures on ICT, Artificial intelligence, cloud computing, and even data.

3.1. Supply-Use Framework: Digital Supply and Use Tables (SUTs)

The G20 Toolkit for Measuring the Digital Economy (G20, 2018), recommended that G20 members should "Work towards improving the measurement of the Digital Economy in existing macroeconomic frameworks, e.g. by developing satellite national accounts."(G20, DETF 2018). In response to this, the OECD has continued to develop a framework for digital SUTs. These tables produce indicators of digital activities in the economy that are aligned with the SNA. Developed under the auspices of the OECD's Informal Advisory Group on Measuring GDP in a Digitalized Economy (the Advisory Group), the framework builds on and expands the conventional supply and use framework; a standard tool in the compilation of national accounts.

The supply-use framework is the breakdown of transactions in a number of directions associated with key aspects of digitalization; in particular, the framework differentiates between digitally ordered and non-digitally ordered goods and services and digitally delivered and non-digitally delivered goods and services. By breaking down the supply and use of these products by the nature of their transaction, the framework can highlight how digitalization has affected the provision of traditional products as well as digital products.

Figure 3.1: Conceptual framework for the Digital Economy proposed for Digital SUTs



Source: OECD

3.2.The application of the Supply-use Table (SUT)

According to Barefoot et. al. (2018), to quantify the level of digitalization, the supply-use framework is applied, and the estimation process includes three main steps:

1) Develop a conceptual definition of the digital economy;
2) Identify goods and services within the supply-use framework relevant for measuring the digital economy defined in the first step; and
3) Use the supply-use framework to identify the industries responsible for producing these goods and services, and estimate the output, value-added, employment, compensation and other variables associated with these activities.

3.2.1. Case of the Philippines

With the technical assistance of the World Bank, the Philippines through the Philippines Statistic Authority (PSA) is the first in Asia (certainly in ASEAN) to attempt to measure the digital economy using a framework developed by the PSA (Virola, PSA & WB, 2020). The Philippine digital economy framework and methodology links with the System of National

Accounts (SNA). Adapts to the Philippine context the methodology followed by the US Bureau of Economic Analysis (BEA) and the Australian Bureau of Statistics (ABS) in the compilation of key measures of the digital economy in the United States and Australia. The PSA compiled and proposed 82 indicators (45 core and 37 non-core) organized into 5 themes which are infrastructure, empowering society, innovation and technology adoption, jobs and growth, and international competitiveness.

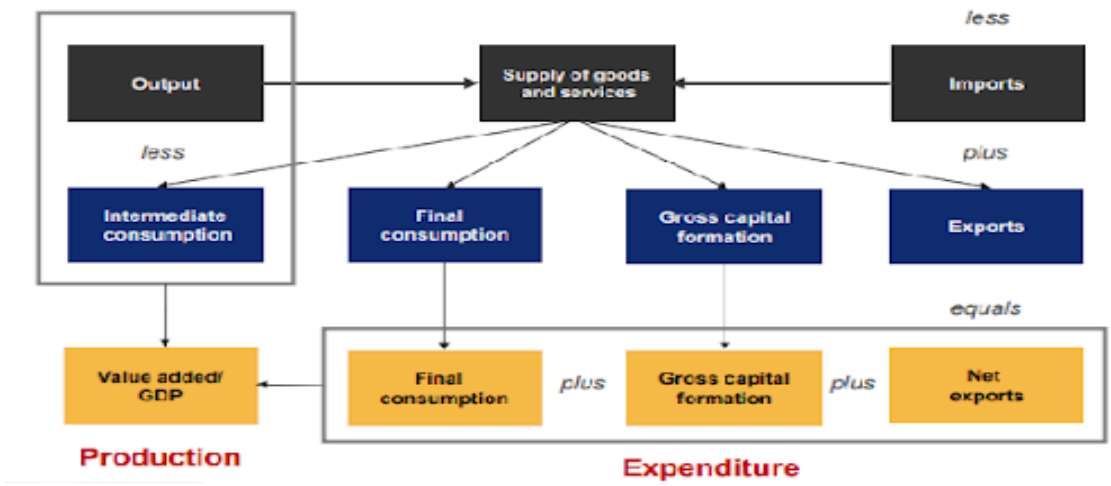
In the SNA, the digital economy distinguishes 4 types of products which are digital in the SNA, non-digital products significantly affected by digitalization, other non-digital products, and digital products outside the SNA production boundary. The Philippines' digital SUT framework consists of e-commerce transactions, digitally delivered services, digital intermediation platforms, e-trailers, transactions in digital goods and services, value-added of digital dependent and purely digital firms, non-monetary transactions in data, and free digital services and assets.

Digital-enabling infrastructure refers to the physical materials as well as the organizational arrangement and it includes computer hardware and software, telecommunications equipment and services, and so forth. Digital transaction (e-commerce) includes all transactions (i.e., the purchase of goods and services) that happen over computer networks meaning B2B, B2C, P2P e-commerce. Digital media or content refers to the content that people create, access, store or view on digital services. They are in the form of direct sales digital media which can be sold by item or through subscription basis.

The method is implemented as the following:

- Identify digital goods and services in the Supply and Use Framework of the SNA;
- Identify the digital economy industries using the International Standard Industrial Classification (ISIC) vis-à-vis the Philippine System of Industrial Classification;
- Establish parameters and assumptions on the output, intermediate consumption, and so forth for the estimation of the digital goods and services of specific industries.

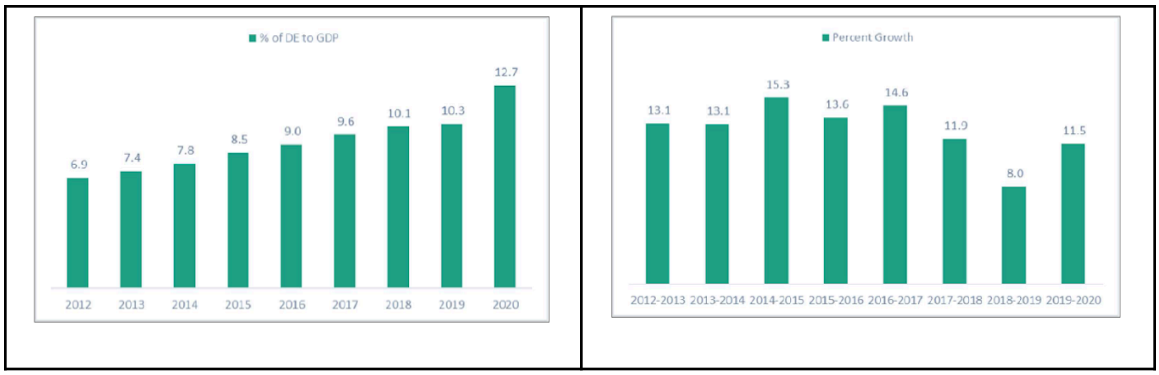
Figure 3.2: Philippines' Supply and Use Framework



Source: PSA

According to the Philippines Economic Update – Strengthening the Digital Economy to Boost Domestic Recovery (World Bank, 2022), digitalization in the Philippines has expanded over the past years and accelerated during the pandemic. The use of digital technology is reshaping service delivery and improving the competitiveness of the economy. The share of the digital economy to GDP has increased gradually from 6.9% in 2012 to 12.7% in 2020 thanks to digital adoption. However, the growth rate of the digital economy does not show a significant increase as the depth of digitalization falls behind regional peers, and its benefits have not been shared equally across firms.

Figure 3.3: Share of Digital Economy to GDP, constant prices 2012 - 2020	**Figure 3.4: Growth Rate of Digital Economy at Constant Prices 2012 - 2020**



Source: Special tabulation done by the Technical Staff of the PSA

3.2.2. Case of United States

Example of Digital economy goods and services included in BEA estimates

Digital economy

Infrastructure

Hardware

Included from NAICS 333

Digital electronic prepress systems, …

Software

Included from NAICS 511

Application software publishing (other than games) …

Support services

Included from NAICS 518

Application service provisioning, website hosting, …

Telecommunications

Included from NAICS 334

Antenna systems, sold separately …

E-commerce and digital media

E-commerce

Business-to-Business

Included from NAICS 425

Wholesale trade margin output, Business-to-Business Electronics Markets …

Business-to-Consumer

Included from NAICS 454

Non-margin retail trade, Electronic Auctions …

Digital Media

Included from NAICS 512

Own account subscription TV program originals …

Figure 3.5: Example of SUT

Supply-table

Commodities/Industries		Total Commodity Output	Imports	2017 (X) Adjustments on imports	Total product supply (basic prices)	Trade margins	Transportation costs	Total trade and transportation margins	Import duties	Taxes on products	Subsidies	Total tax less subsidies on products	Total product supply (purchaser prices)
Code	Commodity Description	T007	MCIF	MADJ	T018	TRADE	TRANS	T014	MDTY	TOP	SUB	T016	T019
111A0	Oilseed farming	41,815	945		42,760	353	5,300	6,051	0	4		4	48,8
111B0	Grain farming	90,867	2,517		93,384	1,435	13,372	14,809	2	66	-7,993	-7,925	100,2
111200	Vegetable and melon farming	13,952	6,103		20,055	13,178	2,949	16,276	4	925		929	37,2
111300	Fruit and tree nut farming	26,069	11,211		40,279	18,901	3,790	22,690	3	1,021		1,027	63,8
111400	Greenhouse, nursery, and floriculture production	21,757	2,229		24,026	8,033	2,243	10,276	1	669		671	35,4
111900	Other crop farming	27,423	1,169		28,397	8,882	2,830	11,812	1	410	-161	-253	40,4
112120	Dairy cattle and milk production	37,155	6		37,231	4,140	2,077	7,216		103		103	44,5
112A0	Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming	77,021	1,864		78,885	5,130	6,523	11,704	0	70		70	90,6
112300	Poultry and egg production	37,979	71		38,050	3,611	1,166	6,670	0	262		262	44,9
112400	Animal production, except cattle and poultry and eggs	32,143	2,908		35,051	5,103	2,993	8,335	3	494		498	43,8
113000	Forestry and logging	17,081	4,268		21,349	4,143	1,026	5,568	2	140		142	30,0
114000	Fishing, hunting and trapping	8,036	11,854		19,890	2,333	1443	3,776	6	739		745	24,4

Use-table

Commodities/Industries		Federal national defense: Gross investment in intellectual property products	Federal national defense: Gross investment in structures	Federal Government nondefense: Consumption expenditures	Federal nondefense: Gross investment in equipment	Federal nondefense: Gross investment in intellectual property products	Federal nondefense: Gross investment in structures	State and local government consumption expenditures	State and local: Gross investment in equipment	State and local: Gross investment in intellectual property products	State and local: Gross investment in structures	Total use of products
Code	Commodity Description	F06N00	F06S00	F07C00	F07E00	F07N00	F07S00	F10C00	F10E00	F10N00	F10S00	T019
111A0	Oilseed farming											48,8
111B0	Grain farming											100,2
111200	Vegetable and melon farming											37,2
111300	Fruit and tree nut farming											63,8
111400	Greenhouse, nursery, and floriculture production											35,4
111900	Other crop farming											40,4
112120	Dairy cattle and milk production											44,5
112A0	Beef cattle ranching and farming, including feedlots and dual											90,6
112300	Poultry and egg production											44,9
112400	Animal production, except cattle and poultry and eggs											43,8
113000	Forestry and logging											30,0

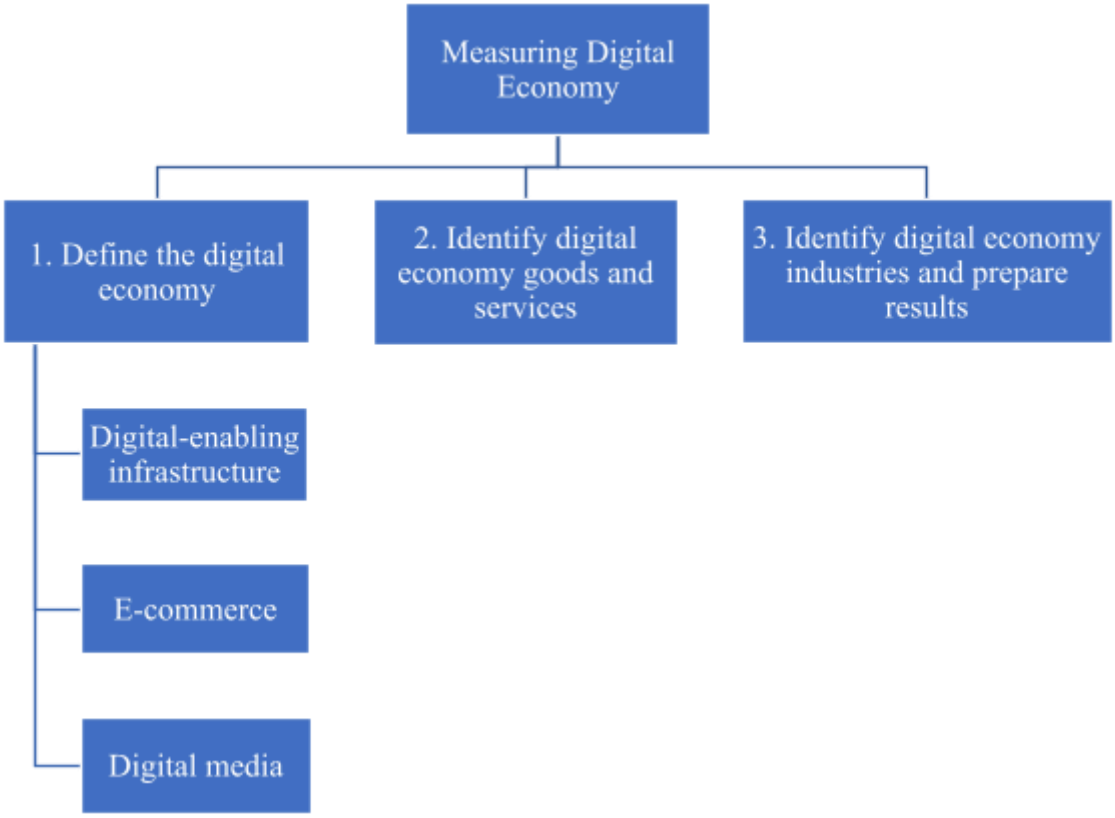
Source: BEA

3.3.Developing Digital Economy Statistics for Cambodia

Constructing statistics for Cambodia's digital economy is a key milestone to understanding better the development in this sector. Investment in data can drive economic growth. We propose the Supply-Use framework applied commonly by many countries. To measure the digital

economy, first, we need to define the digital economy then identify digital goods and services; finally, identify digital industries and prepare results.

Figure 3.6: Measuring Cambodia Digital Economy



Source: Bureau Statistic Analysis of the United States

3.3.1. Define the digital economy

According to Cambodia Digital Economy and Society Policy Framework 2021-2035, the development of the digital economy and society for Cambodia refers to "the digital transformation into all sectors of the economy and society through the use and maximization of the benefits of advances in ICT and digital technology to promote growth and enhance productivity and economic efficiency with the building of a civilized society based on digital citizens who can access to digital services with a high level of inclusiveness, trust, and security while maintaining national identity and culture".

The three main components to develop a digital economy are:

- **Digital-enabling infrastructure** is comprised of the basic physical materials and organizational arrangements that support the existence and use of computer networks and the digital economy. These include computer hardware, software, telecommunications equipment and services, structures, the Internet of Things (IoT), and support services.
- **E-commerce** refers to all purchases and sales of goods and services that occur over computer networks. E-commerce reflects the nature of a transaction for goods and services. E-commerce includes digitally ordered, digitally delivered, or platform-enabled transactions. These transactions include business-to-business (B2B) e-commerce, business-to-consumer (B2C) e-commerce, and peer-to-peer (P2P) e-commerce.
- **Digital media** is defined as the content that people create, access, store, or view on digital devices. It includes direct sale digital media, free digital media, and big data.

3.3.2. Identify digital economy goods and services using the Supply-Use Tables (SUT)

The SUT will be the integral and essential element of the economic accounts. SUT show how industries interact; particularly, they show how industries provide input to and use the output from, each other to produce GDP. The core of the SUT consists of two basic national accounting tables – a "Supply" table and a "Use" table. The supply table shows the inputs to industry production (intermediate inputs) and the commodities that final users consume. The use table is the most frequently requested table because of its applications to the estimates of GDP.

3.3.3. Identify digital economy industries and prepare results

SUT captures the value added, output, compensation, and employment by industry for the digital economy. After identifying the goods and services included in the digital economy, the industries that produce those goods and services are identified using the supply table. Digital economy gross output by industry represents the total value of in-scope gross output produced by each industry across all digital economy goods and services. Value added for the digital economy is derived from the relationship between the industry output for the digital economy and total industry output.

Conclusion

The findings emphasize that digitalization encourages more FDI inflow at least in the last 30+ years. Cambodia's economy should be in a good position for digitalization; however, the cost of mobile and fixed broadband is higher than the peer countries. To understand Cambodia's digital revolution and the overall impact on economic activities, quantifying the digital economy should be considered.

Appendix

1. List of countries based on IMD World Digital Competitiveness Ranking 2021

1. United States	16. Austria	31. Spain	46. India	61. Argentina
2. Hong Kong SAR	17. Israel	32. Kazakstan	47. Slovak Republic	62. Mongolia
3. Sweden	18. Germany	33. Czech Republic	48. Turkey	63. Botswana
4. Denmark	19. Ireland	34. Portugal	49. Jordan	64. Venezuela
4. Singapore	20. Australia	35. Slovenia	50. Romania	
5. Switzerland	21. Iceland	36. Saudi Arabia	51. Brazil	
6. Netherlands	22. Luxembourg	37. Latvia	52. Bulgaria	
7. Taiwan, China	23. New Zealand	38. Thailand	53. Indonesia	
9. Norway	24. France	39. Chile	54. Ukraine	
10. United Arab Emirates	25. Estonia	40. Italy	55. Croatia	
11. Finland	26. Belgium	41. Poland	56. Mexico	
12. Korea Rep.	27. Malaysia	42. Russia	57. Peru	
13. Canada	28. Japan	43. Cyprus	58. Philippines	
14. United Kingdom	29. Qatar	44. Greece	59. Colombia	
15. China	30. Lithuania	45. Hungary	60. South Africa	

Note: In this paper, we do not include Taiwan in the analysis due to data constraint.

2. Countries' classifications

High-income countries according to the World Bank classification: Australia, Austria, Belgium, Canada, Chile, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, China, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Rep., Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Qatar, Romania, Saudi Arabia, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States.

Emerging and developing countries: Malaysia, Kazakstan, Thailand, Russia, India, Turkey, Jordan, Brazil, Bulgaria, Indonesia, Ukraine, Mexico, Peru, Philippines, Colombia, South Africa, Argentina, Mongolia, Botswana, Venezuela

3. Global Initiatives on Quantifying Digital Economy[3]

- ITU Manual for Measuring ICT & by Use of HH, 2014
- UNCTAD Manual for the production of Statistics on Information Economy, 2009
- UNSD Working Party on National Accounts Guide for SUT for the Digital Economy, 2019
- OECD Measuring the Digital Economy, 2011
- G20 Argentina, ToolKit for Measuring Digital Economy, 2018
- UNESCO Institute for Statistics: Guide for Measuring ICT, 2009
- US BEA Defining and Measuring Digital Economy, 2018
- ABS Measuring Digital Activities in the Australia Economy

[3] Source: OECD G20; World Bank, UNCTAD, UNSD, UNESCO, BEA, ABS, PSA

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