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Faculty of Economics and Management

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Master's Thesis

Digital Economy Impact on Development in Cambodia

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Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Sophearom Chheang

Economics and Management

Thesis title

Digital Economy impact on development in Cambodia

Objectives of thesis

The thesis focus on the digital economy and economic development in Cambodia.
The research question is:
What is the impact of the digital economy on economic development and growth?

Methodology

The preparation of the thesis can be divided into several sub-steps. The titles of the chapters may be different, but they must meet their objectives in terms of content.

In the introduction, the author briefly introduces the topic and explains why the topic is relevant for processing.

In the following chapter, entitled “Objectives”, the author specifies the research question, the aim of the work and the hypotheses associated with the processing of the work. At the same time, he explains the potential contribution of his work to the current research or practical application.

The creation of a literary search will follow. This section will provide a detailed overview of the literature and the current state of knowledge, focusing on the digital economy and economic development . It will include a critical analysis of the most important studies, including the methods used, the results found and, where appropriate, the problematic points. Methodically, this part of the work will be the analysis of documents.

The literary search will provide a basis for the author to specify the methods used for the analytical part of the work. The chapter entitled “Methodology” will present in detail all the methods used; it will also include the source of the data, their description and the process of their preparation for the analysis.

In the next step (analytical part), the author applies the knowledge gained during the literature study to analyse the obtained data using the methods specified in the methodology. This part is a core component of the thesis. This part of the thesis will contain the analysis results and a comparison of the results with other authors focused on the same topic (discussion). This part may also contain recommendations for policy makers or other interested parties.

In the final part (Conclusion), the author will summarise his findings, mention the limitations of the research and indicate possible possibilities for further research.

The proposed extent of the thesis

60 – 80 stran

Keywords

Digital technologies, transformation, economic growth, GDP, sustainability

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Recommended information sources

Abendin, S. and Duan, P. (2021) 'International trade and economic growth in Africa: The role of the digital economy', Cogent Economics and Finance. Cogent OA, 9(1). doi: 10.1080/23322039.2021.1911767.

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Declaration

I declare that I have worked on my diploma thesis titled "Digital Economy Impact on Development in Cambodia" by myself. I have used some AI tools for only supporting my writing and paraphrasing, Zotero tool for Citation and referencing and Grammarly for checking grammar errors and plagiarism purposes. I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break any person's copyright.

In Prague on March 11th, 2024

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Sophearom Chheang

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Digital Economy Impact on Development in Cambodia

Abstract

In recent years, the rapid advancement of digital technologies has transformed economies worldwide, ushering in the era of the digital economy. Cambodia embraces digitalization and information technology, with a growing interest in understanding the implications of the digital economy on the country's overall economic growth. This research aims to investigate the impact of the digital economy on Cambodia's economic development using quantitative econometric analysis.

The study starts with a review of existing literature on the digital economy, economic growth, and the digitalization experiences of other countries. With this foundation, we compiled a comprehensive dataset that includes digital indicators (Mobile Cellular Subscriptions, Fix Broadband Subscription, Mobile Network Coverage) and macroeconomic variables for Cambodia (Capital and Labour). Econometric analysis OLS techniques have been employed in the model to measure the relationship between digital economy factors and Cambodia's GDP per capita output. The research aims to investigate the impact of digital on economic development reflected by GDP per capita. The analysis assessed the significance of digital infrastructure, capital, and labour force in driving economic growth in Cambodia.

The result reveals that Digital infrastructure, foreign direct investment (FDI), and labour force participation significantly influence GDP per capita. The econometric model shows a statistically significant relationship between our independent (explainatory) variables and dependent (explained) variables.

Overall, this research has shown the positive impact of digital economy on Cambodia's development. However, the digital infrastructure variable still needs to be improved and the negative relationship of Mobile Network Coverage has to be further investigated. The evidence-based can recommend that policymakers formulate effective policies and interventions that harness the digital economy's full potential for sustainable and equitable economic development in the country.

Keywords: Digital Economy, Digitalization, Economic Development, Economic Growth, Digital Transformation, Digital Technology, GDP, Sustainability

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List of Abbreviation

- UNCTAD = United Nations Conference on Trade and Development
- GDP = Gross Domestic Product
- GDP per capita = Gross Domestic Product per capita
- A = Technological Progress
- K = Capital Stock
- L = Labour
- Y = Output of GDP per capita
- MCS = Mobile Cellular Subscriptions
- MNC = Mobile Network Coverage
- FBS = Fixed Broadband Subscriptions
- ε = Error term or residual
- $\beta 0, \beta 1, \beta 2, \beta 3,$ = Coefficients in the econometric model equations
- ln = Natural logarithm (used with variables in econometric modelling)
- OECD = Organisation for Economic Co=operation and Development
- ADB = Asian Development Bank
- UNCTAD = United Nations Conference on Trade and Development
- IMF = International Monetary Fund
- UAE = United Arab Emirates
- HDI = Human Development Index
- ILO = International Labour Organization
- GPI = Gender Parity Index
- ASEAN = Association of Southeast Asian Nations.
- ASEAN+3 Association of Southeast Asian Nations plus three additional countries: China, Japan, and South Korea

- ICT = stands for Information and Communication Technology
- ITU = International Telecommunication Union
- IDI = ICT Development Index
- DAI = Digital Adoption Index
- AI = Artificial Intelligence
- IoT = Internet of Things
- Fintech = Financial Technology
- SMEs = Small and Medium Enterprises

- MEF = Ministry of Economy and Finance of Cambodia
- MPTC = Ministry of Post and Telecommunications of Cambodia
- MISTI = Ministry of Industry, Science, Technology & Innovation
- CGCC = Credit Guarantee Corporation of Cambodia
- UNDP = United Nations Development Programme
- OLS = Ordinary Least Squares
- S.D = Standard Deviation

1. Introduction

The rise of technology over the last decade has become a key driver of economic growth. Global digitalization is a major force propelling us towards a new industrial revolution and innovation. Technological progress allows for more productivity and expands the improvement of goods and services, on which prosperity depends (Harvard University, 2024).

Cambodia is a developing country in Southeast Asia that is ready for substantial development. Incorporating digital technologies into the economy presents both unprecedented opportunities and significant challenges. Historically, Cambodia's economy has demonstrated resilience and potential for rapid growth, which is increasingly influenced by digitalization, a global phenomenon reshaping the parameters of economic development (UNCTAD, 2019). To respond to the fast growth of technologies, Cambodia's government has released the Digital Economy and Society Policy Framework (Supreme National Economic Council, 2021) in order to obtain the benefits of this digitalization.

This Diploma thesis critically examines the digital economy's impacts on Cambodia's development, comprehensively analyzing its potential to drive progress. The research aims to investigate the complex relationship between digital technology contributed to GDP per capita output in Cambodia. It hypothesizes that adopting digital technologies, characterized by the rise of digital government initiatives, fintech, digital payments, and internet and mobile penetration, significantly correlates with positive economic output indicators. Methodologically, this thesis employs the Solow Growth Model as a theoretical lens to frame the investigation, adapting its precepts to the digital age (Solow, 1956). The model's integration with modern econometric techniques helps us better understand the interplay between digital economy variables and economic growth. A strict data definition and collection process underpins the analysis, ensuring a robust empirical basis for the study's conclusions.

The next part is the objective and methodology, which will explain more about the primary purpose of this diploma thesis and deepen the drawing of the hypothesis, data, economic model, and econometric model. The third is a literature review that briefs about the definition of the digital economy and how it is happening in Cambodia. After that, the analytical part presents quantitative analysis using the econometric model, followed by a conclusion in the last section.

2. Objective and Methodology

2.1. Objective

The objective of this research is to **investigate the impact of the digital economy on Cambodia's development**. In this diploma thesis, we will define the digital economy and how we can determine technology effect on the GDP per capita output. This research has sought evidence of the impact on the output and the challenge of implementing a digital economy in Cambodia. Research also aims to discover Cambodia's digital economy's potential for sustainable and inclusive development.

2.2. Research Hypothesis

The central hypothesis posits that the digital economy has a significant positive impact on Cambodia's economic development. The development of digital technology and the enhancement of digital infrastructure will correlate with improved GDP per capita output.

Specifically, we have designed the hypothesis to focus on:

- Effect of Technological Progress (A):
    - Null Hypothesis (H0): There is no significant relationship between technological progress (A) and the level of output (Y).
    - Alternative Hypothesis (H1): There is a significant positive or negative relationship between technological progress (A) and the level of output (Y).
- Effect of Capital Stock (K):
    - Null Hypothesis (H0): There is no significant relationship between the level of the capital stock (K) and the level of output (Y).
    - Alternative Hypothesis (H): There is a significant positive or negative relationship between the level of the capital stock (K) and the level of output (Y).
- Effect of Labour (L):
    - Null Hypothesis (H0): There is no significant relationship between labour (L) and the level of output (Y).
    - Alternative Hypothesis (H1): There is a significant positive or negative relationship between the product of human capital and labour (L) and the level of output (Y).

2.3. Methodology

2.3.1. Variable Selection

Key variables have been selected based on their relevance to the impact of technology and economic development. These will include, but are not limited to, metrics of digital infrastructure (mobile cellular subscriptions, fix broadband subscription, mobile network coverage) and economic indicators (labour, capital). In Table 1, we have described each variable in detail, including both dependent and independent variables.

Table 1: Variable and Data Description

Variables	Description
Y	is GDP per capita (USD current price)
A	is known as a production function. In this formula, we will use it as technological progress.
K	is the capital which represented by Foreign direct investment, net inflow (percentage of GDP) in Cambodia
L	is the Labour force participation rate, total (percentage of total population ages 15-64) in Cambodia
MCS	Mobile Cellular Subscriptions refers to the percentage of people per population have subscripted mobile telephone service that provides access to the public switched telephone network using cellular technology in Cambodia
MNC	is Mobile Network Coverage, the percentage of people per population within range of a mobile cellular signal, regardless of whether they are subscribers or users.
FBS	is Fixed Broadband Subscriptions, the percentage of people per population access to the high speed public internet at downstream speeds at least 256 kilobit per second
ε	Error term or residual

2.3.2. Model Specification

In this Diploma thesis, we used economic theory transform to an econometric model for analysis. Solow-Swan's economic theory (Solow, 1956) mentions that output growth comes from the combination of labour and capital with the production function we know as technology progresses.

Solow-Swan Economic Model: $Y = F(A K^{\alpha} L^{1-\alpha})$ **(1)**

Econometric Model: $\ln(Y) = \beta 0 + \beta 1 \cdot \ln(A) + \beta 2 \cdot \ln(K) + \beta 3 \cdot \ln(L) + \varepsilon$ **(2)**

However, Technology Progress (A) has focused on Digital Infrastructure such as Mobile Cellular Subscriptions (MCS), Mobile Network Coverage (MNC), and Fixed Broadband Subscriptions (FBS). So, the Technology Progress output will be:

$$A = \beta 0 + \beta 1 \cdot MNC + \beta 2 \cdot MNC + \beta 3 \cdot FBS + \varepsilon \quad (3)$$

Finally, based on models (1), (2), and (3), we have constructed the Econometric model below:

$$\ln(Y) = \beta 0 + \beta 1 \cdot \ln(MCS) + \beta 2 \cdot \ln(MNC) + \beta 3 \cdot \ln(FBS) + \beta 4 \cdot \ln(K) + \beta 5 \cdot \ln(L) + \varepsilon \quad (4)$$

While β0 is the intercept, β1, β2, to β5 are the coefficients for each independent variable. ε is the error term.

2.3.3. Data Collection

The data for this diploma thesis covered fifteen years, from 2008 to 2022 and was collected from multiple secondary sources, including the World Bank and the International Telecommunication Union.

Table 2: Selected Variable and Data Sources

Variables	Source of data
Y	World Bank
K	World Bank
L	World Bank
MCS	International Telecommunication Union
MNC	International Telecommunication Union
FBS	International Telecommunication Union

2.3.4. Model Estimation and Validation

Ordinary Least Squares (OLS) regression has been employed to estimate the model coefficients. The model's goodness-of-fit was assessed using R-squared and adjusted R-squared values. The following diagnostic tests were performed to validate the model:

- T-test
- F-test
- Autocorrelation test
- Heterocadasticity test

2.3.5. Limitation

This section describes our limitations in this diploma thesis. The quality and availability of data may limit the research. The technological progress has no exact formula or model. Another part of our model focuses on the output of GDP per capita, which will used to determine the term of development. There is also the potential for omitted variable bias if other significant factors influence the economic output that is not included in the model. Lastly, the study assumes a unidirectional causality from the independent variables to the dependent variable, which may not capture the full complexity of the development process.

3. Literature Review

3.1. Related Economic Theories and Recent Research

3.1.1. Growth Theory

Growth theory, or economic growth theory, is the theory that focuses on understanding the factors, mechanisms, and patterns that drive economic growth in countries or regions. It seeks to explain why some economies grow faster and achieve higher living standards over time while others do not. Growth theory addresses questions related to the sources of economic growth, the role of various factors, and the policies that can promote sustained and inclusive economic growth.

The early theory related to capital is well known from Karl Marx (1909). Based on his ideas, Marxist Growth Theory views economic growth through the conflict between workers and those who own businesses. Marx believed that business owners make money by paying employees under than the real value of their work. This situation leads to business owners getting richer and workers staying poor, creating a system filled with tension and unfairness. Marx thought these problems would eventually lead to big changes, where workers unite to create a society where everyone shares what's produced. In simple terms, Marx's theory is about how the struggle between different social classes can drive societal changes and impact economic growth.

John Maynard Keynes introduced the Keynesian Economic Theory called "The General Theory of Employment, Interest, and Money" (Keynes, 1936), which asserts that aggregate demand is the main driver of economic activity and employment levels. It challenges classical economics' emphasis on supply side factors. Keynes argued for active government intervention to mitigate economic downturns and manage inflation through fiscal policies—adjusting government spending and taxation to influence economic conditions. Central to this theory is the idea that economies can suffer from insufficient demand, leading to unemployment and underutilization of resources and that prices and wages are "sticky," not adjusting quickly to changes in supply and demand. Keynes's advocacy for counter-cyclical fiscal policies to stabilize economic cycles has profoundly influenced macroeconomic policy and thought, highlighting the role of government in smoothing out economic fluctuations and promoting full employment and growth.

Roy F. Harrod and Evsey Domar have introduced the Harrod-Domar model, an economic growth model that integrates Keynesian principles (Harrod, 1939). It emphasizes the importance of savings and investment for economic growth, suggesting that the growth rate is determined by the savings ratio and capital productivity, while the model highlights how economies can achieve steady growth but also points out the potential for economic instability and the importance of maintaining adequate demand to ensure full employment.

Schumpeterian Growth Theory was developed by Joseph Schumpeter, an economist who focuses on innovation, technological change, and the entrepreneurial spirit as the primary drivers of economic growth (Parkes, 1943). Schumpeter argued that economic development is propelled by creative destruction, where old industries and technological processes are incessantly destroyed and replaced by new ones. This cycle of innovation is crucial for long-term economic growth and dynamism. Schumpeter's ideas have profoundly influenced the understanding of how innovations impact economies and have been foundational to the field of evolutionary economics.

Classical growth theory is a modern economic theory developed by economists who wrote about the process and sources of economic growth during the 18th and 19th centuries. Two most essential theorists influent by Adam Smith in his book “The Wealth of Nations” and Davide Ricardo in his book “Principles of Political Economy and Taxation” (Hicks, 1987). The Wealth of Nations is a foundational work in economics that argues for the benefits of a free-market system, the role of individual self-interest in promoting the common good, and the importance of limited government intervention in economic affairs. It remains influential in the study of economics and the development of economic theories and policies. On the other hand, Principles of Political Economy and Taxation are crucial in developing classical economics. Ricardo's ideas on comparative advantage, labour theory of value, economic rent, and public finance have had a lasting impact on economic thought and continue to be subjects of study and debate in economics and political economy.

One significant theory is the Solow Growth Model, also known as the Solow-Swan Growth Model (Solow, 1956), which is an influential economic model developed by Robert M. Solow and Trevor W. Swan in the 1950s. This Solow Growth Model has been influential in economics and used to study economic growth and development in various countries. It highlights the importance factors such as technological progress, capital, and the convergence of economies. However, it is a simplified model and does not consider all the complexities of real-world economic growth, such as human capital, institutional factors, and policy effects. Economists have expanded upon the Solow model to incorporate these additional factors and

create more comprehensive growth models. Solow Growth model can be written as Y = F(K, L, A), in which K represents Capital, L is Labour, and A is Total Productivity or Technology.

Another modern growth theory is Endogenous Growth (Romer, 1990). The theory suggests that economic growth is contributed by internal factors, particularly factors within the economic system, as opposed to being solely influenced by external factors like technological progress. In endogenous growth theory, human capital, research and development (R&D), and innovation are integral to sustained economic growth. The formula of endogenous growth written by Y = A * F(K, L, H, N) where Y represents the output or real GDP, A represents total factor productivity (TFP) or Technology, which represents the level of technology and knowledge, K stands for capital, L stands for labour, H represents human capital (knowledge and skills of the workforce), N represents the level of knowledge and innovation (research and development).

Unified Growth Theory offers a unified model explaining how economies evolve from stagnation to growth, addressing global income disparities. It merges insights from various growth models to trace economic development across history, focusing on the roles of technological progress, demographic shifts, and human capital. The theory highlights the transition from Malthusian stagnation, where population growth neutralizes output gains, to periods of sustained income growth. It also considers the impact of historical and social factors on economic trajectories. Oded Galor has significantly contributed to this field, particularly through his work "Unified Growth Theory" (Princeton University Press, 2011),which delves into the theory's principles and their relevance to understanding long-term economic changes.

Table 3: Different Growth Theories

Aspect	Classical Growth Theory	Solow Growth Model	Endogenous Growth Theory
Technological Progress	Exogenous, limited innovation	Exogenous, limited innovation	Endogenous, driven by investments
Formula for Output (Y)	Y = F(K, L)	Y = F(A,K, L)	$Y=A \cdot K^{\alpha} \cdot (HL)^{1-\alpha}$
Capital Accumulation	Key driver of growth	Key driver of growth	Key driver of growth
Labour and Population	Emphasises population growth and resource constraints	Considers labour supply and diminishing returns to labour	Incorporates human capital, education, and innovation
Technological Change	Limited emphasis on innovation	Assumes exogenous technological	Emphasises endogenous technological

Long-Run Equilibrium	Potential resource constraints and stagnation	Predicts steady-state equilibrium with constant growth rates	Examines long-run equilibrium and policies promoting innovation
Policy Implications	Limited focus on policy implications	Policy implications related to savings, investments, and population control	Acknowledges the role of government and policies in fostering R&D, education, and innovation
Long-Run Equilibrium	May suggest resource constraints and potential stagnation	Predicts the existence of a steady state equilibrium with constant growth rates	Examines long-run equilibrium and how policies and investments can influence technology and growth
Policy Implications	Limited emphasis on policy recommendations	Policy implications often relate to savings, investments, and population control	Recognises the role of government and policies in promoting R&D, education, and innovation

In Table 3, there are differences in background theories of growth, which were studied to define the relationship between digitalisation and growth.

3.1.2. Recent Research

Digitalization has been a key objective that is used as a production function in economic formulation. Recently, research efforts have been directed towards measuring the contribution of digitalization to the economy. However, integrating digitalization into economic formulas can be challenging due to its abstract nature. Notably, one interesting article has defined ICT as a persistent key driver of the economic growth, with evidence drawn from the South Asian economies (Hussain et al., 2021) by combining the three main areas such as **fixed-telephone subscribers**, **mobile-cellular subscribers**, and **internet users**, as the ICT penetration indicators. The result from the study suggests that ICT penetration has provided positive impact on the economic growth of South Asian countries even in the short and long run.

Further discussion on the relationship between digitalisation, education, and economic growth, which concentrated on the Middle East and OECD countries, shows that digitalisation and education have impacted economic growth (Habibi and Zabardast, 2020). They used Digital technology measurement by Mobile cellular subscriptions (per 100 people), Individual Internet users (percentage of the population) and broadband subscriptions (per 100 people). Using the OLS and fixed-effects estimator, the results indicated that countries with better access to education and ICT are more favourable to economic growth.

Another article published on behalf of the Economic Society of Australia titled “How Do Digital Technologies Drive EconomicGrowth?” (Qu, Simes and O’Mahony, 2017), uses

the economic formula $\mathbf{Y(t)= K(t)^{\alpha} H(t)^{\beta} (A(t) L(t))^{1-\alpha -\beta}}$. K is physical capital, H refer to human capital and and L is labour, where alpha and belta are the partial coefficient elasticity of output with respect to K and H, and A(t) is measure of technical progress and economic efficiency. Economic efficiency in this regard can include a various of 'enabling' factors, such as digital technologies, international trade, professional and support services, transport and logistics, and innovation. The regression with panel data has been applied. The empirical analysis used the sample data from 37 countries over 15 years from 2000 to 2014, including 34 OECD countries (excluding Latvia), with China, Russia and South Africa. The main point of the study is that the diffusion of digital technologies, such as internet usage and mobile phone penetration, has played a significant role in driving long-term economic growth across countries. These technologies have contributed to a rapid convergence toward steady-state growth paths and notably improved living standards, contributing over 3 per cent to living standards in a decade. The study highlights the positive impacts of digital technology amidst various global economic challenges and cautions against prematurely judging the potential of emerging technologies such as artificial intelligence and the Internet of Things. It acknowledges the limitations of growth regression analysis and the difficulty of quantifying digital technologies' broader economic and social benefits, which extend beyond GDP per capita measures.

3.2. Overview of the Digital Economy

The term "digital economy" refers to an economic system primarily focusing on Digital Technology to boost productivity. Based on OECD (2012), the digital economy encompasses of the markets that depend on digital technologies to accelerate the exchange operation of goods and services within electronic commerce. In the digital economy, traditional processes are often transformed or replaced by digital methods, leading to increased efficiency, innovation, and interconnectedness. Key components of the digital economy include

- e-commerce,
- online advertising,
- digital payments,
- cloud computing, and
- various other technology-driven activities.

They drive economic growth and productivity in the modern world. This foundation of the digital economy is characterized by its emphasis on data, information technology, and digital infrastructure as fundamental drivers of economic activity.

The World Economic Forum through the Global Information Technology Report 2016 (Baller, Dutta and Lanvin, 2016) shows that the world starting at the beginning of the Fourth Industrial Revolution, that signifies a shift towards novel systems that merge digital, biological, and physical technologies in innovative and potent ways. ust as the digital revolution built upon the foundational components of the second industrial revolution, including electricity, mass communication, and advanced manufacturing, the technologies defining the Fourth Industrial Revolution are being developed on the groundwork laid by the third revolution, which is digital in nature. This foundation includes global digital communication accessibility, cost-effective processing with high-capacity data storage, and a progressively interconnected community of active digital technology users.

Based on ADB (Asian Development Bank, 2018), the digital economy is the variety of economic activities that manipulate by digital technology as factors of production. The digital economy has led to advantages and improvements as digital technologies have fueled innovation, increased job opportunities, and spurred economic expansion. These technologies, such as the internet, big data, cloud computing, and fintech, are employed in gathering, storing, analyzing, and distributing information digitally.

Based on the United Nations Economist Network, the digital economy is an era where almost all social and economic activities are either reliant on or significantly enhanced by digital inputs, including digital infrastructure, services, and data which using digital technology (United Nations, 2019). This definition underscores the pervasive impact of digitalization across various sectors of the economy, transforming how people study, work, and live. The digital economy is characterized by the use of digital technologies in every aspect of life, fundamentally changing the ways in which economic value is created, distributed, and consumed. United Nations Economist Network focuses on the critical role of digital economic transformation in achieving sustainable growth and development. It emphasizes the importance of transitioning from traditional, less productive sectors to modern, technology-driven industries to enhance productivity and foster economic progress. The document highlights technological change, particularly digital technologies in the modern era such as artificial intelligence, blockchain, and big data analytics, as key drivers of this transformation, especially developing countries, to adopt these technologies to stimulate economic transformation, suggesting that digitalization, supported by appropriate policies,

can lead to inclusive growth, job creation, and improved living standards. It calls for investment in digital infrastructure, skills, and connectivity to leverage digitalization for broad-based economic benefits.

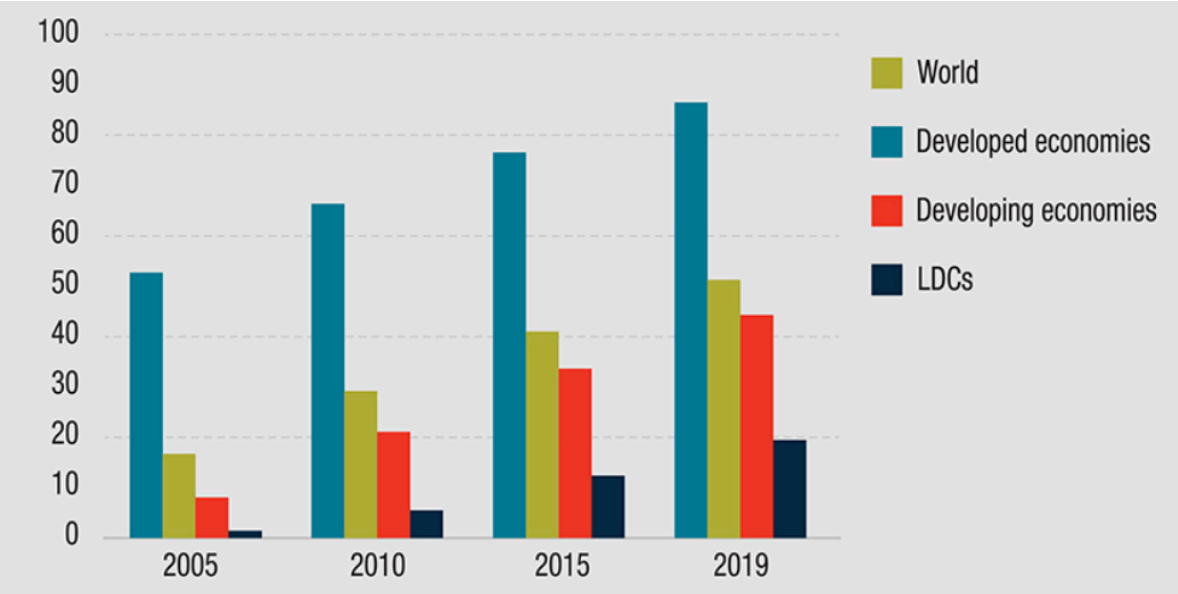
Digital platforms have become necessary in the new economic era. In 2017, the combined value of the digital platform companies with the market capitalization (bigger than $100 million) was estimated over than $7 trillion, it was around 67 per cent increase from 2015. Some global digital platforms have secured their position in the market sectors such as Google holds a 90 per cent share of the search engine across the internet market. It means that the Facebook controls around two of thirds of the social media in the globe and has become the top one social media platform. Amazon holds 40 per cent share of the global online retail market, WeChat has over one billion active users and, Alibaba is estimated to top e-commerce market about 60 per cent of the Chinese (UNCTAD, 2019).

Based on the IMF report (International Monetary Fund Middle East and Central Asia, 2023), The United Arab Emirates government is making significant efforts to build a robust digital economy as they embraced digitalisation as a crucial growth driver across public and private sectors, intending to lead the region and world. The UAE's digital economy strategy aims to increase the contribution of digitalisation into the economy (non-oil) to 20 per cent by 2031. They are focused on the Digital Economy pillars, namely

- Digital Infrastructure,
- Digital Capacity Development,
- Digital Regulation
- Digital Innovation and
- Local Production.

Technology usage has become essential and affects economies in different ways. At the same time, business operations and value chains, processes of production, shipping, transportation networks, retail distribution, investments and financing are digitalised (The United Nations Conference on Trade and Development, 2023). As the internet is a major digital economy, Figure 1 shows the growth of internet usage worldwide.

Figure 1: Growing Global Internet Usage (Percentage)



Source: The United Nations Conference on Trade and Development, 2021

3.3. Overview of Development

The term development has broad meaning. People may intend to discuss economic development in a country when discussing development. However, the definition of development has been extended to more indicators, which are not only income but also the well-being of people. Based on the World Bank Development indicators, each country has more than one thousand indicators used to measure development (World Bank, 2024). One of the popular articles found on the Wold Bank document website (Hicks and Streeten, 1979), which have discussed development must involve various indicators from Economic Development and Social Development. Last but not least, the United Nations has also introduced the Human Development Index (HDI) (UNDP, 1990). This composite measure considers life expectancy, education, and per capita income indicators to provide a broader understanding of well-being and human progress rather than only GDP.

3.3.1. Economic Development

Economic development can be described as a situation where a country's ability to produce goods and services grows faster than its population. While this concept is often discussed with a focus on poorer countries, the fundamental processes driving economic growth are similar across nations with varying income levels (International Monetary Fund, 1953). In addition, development refers to enhancing a country's productive capacity and output at a rate surpassing its population growth. It is a broad concept encompassing

economic growth across low-income and high-income nations without strict demarcation, aiming for sustainable progress that includes technological advances and better use of resources. This growth is not just about temporary gains from trade improvements or underused equipment but involves a comprehensive increase in export and domestic production capacities.

However, many indicators have been used to define the term development. GDP, which is well known for measuring the total economic output of goods and services produced in an economy, has flaws when used to identify the well-being of people living (International Monetary Fund, 2021). In GDP calculations, prices help decide how much each product or service counts, but GDP only looks at what is bought and sold in markets. Hence, it misses critical parts of life like leisure time, relationships with family and friends, and emotions such as worry or other sense of purpose. Also, even though prices can show what is valuable in the market, we can not consider that having much money might mean more happiness than less because GDP is based on data from market transactions; it overlooks aspects that are important to humans but do not pass through the market.

Based on the United Nations (United Nations, 1997), "Development is a multidimensional undertaking to achieve a higher quality of life for all people. Economic development, social development, and environmental protection are interdependent and mutually reinforcing components of sustainable development".

Table 4 measures the level of development by the IMF, which uses various indicators not only to measure economic growth but also to measure another aspect that was causing to well-living conditions for people. The researchers calibrated the importance, setting the highest priority aspect of freedom from corruption, injustice, and abuse of power to a standard value of 1.00.

The study presents findings based on 18 chosen criteria out of a pool of 136 aspects concerning well-being. This selection encompasses the three aspects deemed most significant, noteworthy elements within the top 10, all aspects that have a strong correlation with the components of the Human Development Index (HDI), as well as other aspects that are extensively documented, plus an aspect of the natural environment (International Monetary Fund, 2021).

Table 4: Measure of Quantifying Well-being by IMF

A personal well-being index is based on aspects of an individual's welfare, each of which is assigned a weight based on surveys that determine people's values and priorities.

Aspect	Weight
Freedom from corruption, injustice, and abuse of power in your nation (normalized to 1.00)	1.00
People having many options and possibilities in their lives and the freedom to choose among them	0.90
People being good, moral people and living according to their personal values	0.90
People's sense that they are making a difference, actively contributing to the well-being of other people, and making the world a better place	0.82
People's freedom from being lied to, deceived, or betrayed	0.77
Society helping the poor and others who struggle	0.77
People's health	0.74
Freedom of speech and people's ability to take part in the political process and community life	0.74
People's financial security	0.72
The extent to which people feel the things they do in their lives are worthwhile	0.62
How happy people feel	0.59
The condition of animals, nature, and the environment in the world	0.56
People's knowledge, skills, and access to information	0.54
People's chances to live long lives	0.49
How satisfied people are with their lives	0.46
The average income of people in your nation	0.44
People feeling that they understand the world and the things going on around them	0.38
People not feeling anxious	0.23

Source: Benjamin, Heffetz, Kimball, and Szembrot (2014).
Note: The weights are derived from surveys of stated preference on 131 aspects of public policy. The weight on the top aspect is normalized to 1.00.

Source: (International Monetary Fund, 2021)

3.3.2. Social Development

Social development focuses on prioritizing individuals, highlighting that overcoming poverty requires not only sound economic policies but also fostering inclusive, cohesive, and accountable societies to empower people, a strategy essential for addressing challenges like post-conflict reconstruction, climate adaptation, good governance, and aiding the poorest countries as emphasized by the International Development Association (World Bank, 2010). There are several indicators of social development mentioned by the World Bank in Table 5.

Table 5: World Bank Social Development Indicators

Social Development	
Adolescent fertility rate (births per 1,000 women ages 15-19)	Children in employment, female (% of female children ages 7-14)
Children in employment, male (% of male children ages 7-14)	Children in employment, total (% of children ages 7-14)
Labor force participation rate, female (% of female population ages 15+) (modeled ILO estimate)	Labor force participation rate, male (% of male population ages 15+) (modeled ILO estimate)
Life expectancy at birth, female (years)	Life expectancy at birth, male (years)
Prevalence of HIV, female (% ages 15-24)	Prevalence of HIV, male (% ages 15-24)
Proportion of seats held by women in national parliaments (%)	Refugee population by country or territory of asylum
Refugee population by country or territory of origin	School enrollment, primary (gross), gender parity index (GPI)
School enrollment, primary and secondary (gross), gender parity index (GPI)	Unemployment, female (% of female labor force) (modeled ILO estimate)
Unemployment, male (% of male labor force) (modeled ILO estimate)	Vulnerable employment, female (% of female employment) (modeled ILO estimate)
Vulnerable employment, male (% of male employment) (modeled ILO estimate)	

Source: (*World Bank Open Data*, 2024)

However, there are differences between specific indicators from different organisations's research. As shown in Table 6, the OECD has divided social development indicators into five contexts: general context, self-sufficiency, equity indicators, health, and social cohesion.

Table 6: OECD Social Development Indicators

Social status	Societal responses
List of general context indicators	
Household income	
Fertility	
Migration	
Family	
Demographic trends	
List of self-sufficiency indicators	
Employment	
Unemployment	Education spending
Skills Labour market entry	
List of equity indicators	
Income inequality	Social spending
Poverty	
Living on benefits Recipients of out-of-work benefits	
List of health indicators	
Life expectancy	Health spending
Perceived health status	
Suicide Tobacco and alcohol consumption	
List of social cohesion indicators	
Life satisfaction	
Trust	
Voting	
Crime and prisoners	
Social networks	

Source: (OECD, 2019)

3.3.3. Human Development Index

As mentioned, beyond the measure of Economic and Social Development, the Human Development Index has become a widely accepted method. The Human Development Report 1990 set the stage for further discussions about development priorities and the importance of focusing on human outcomes. It has impacted how governments, international organizations, and researchers think about and measure progress.

Key highlights of the 1990 report include:

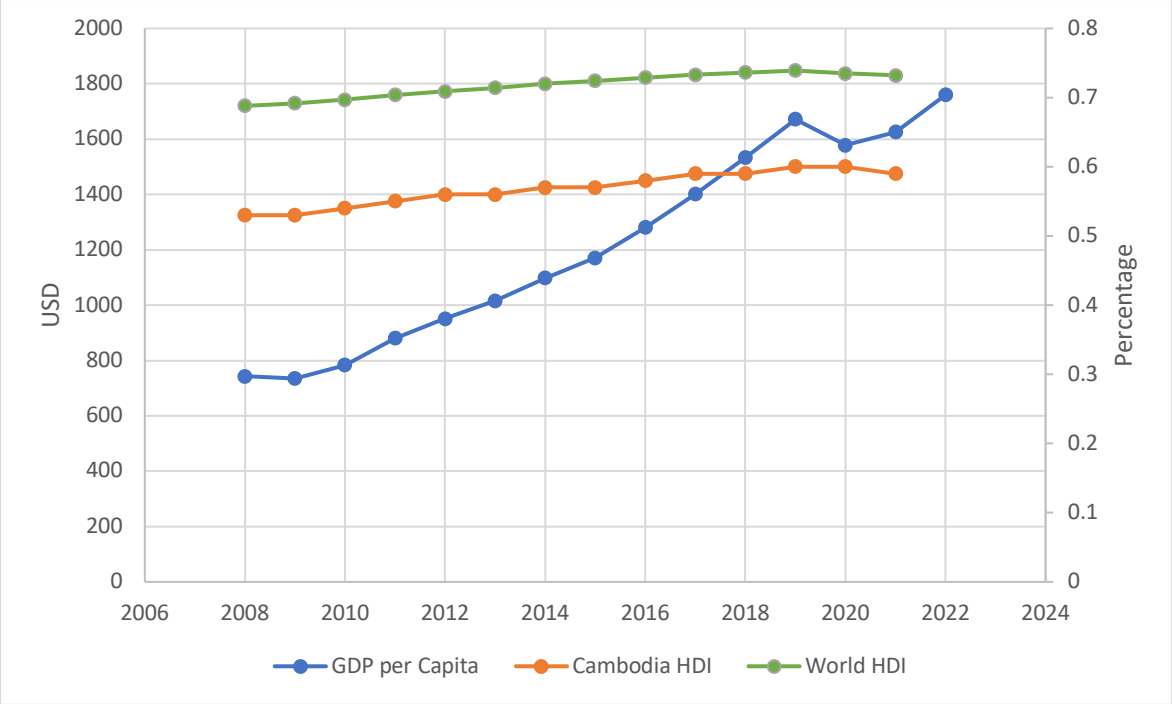
- Redefining Development: The report challenged the conventional wisdom of measuring a country's progress only through economic growth. It argued that the accurate measure of development should focus on improving human lives and expanding choices and opportunities for people.
- Introduction of HDI: The HDI was presented as an alternative to GDP, highlighting that the development of a country should ultimately be measured by the abilities and well-being of its people. The HDI combines health, education, and income indicators to provide a more comprehensive view of whether people are leading long, healthy, and prosperous lives.
- Global and Regional Analysis: The 1990 Human Development Report provided a global overview of human development trends and also offered detailed analyses of different regions. It highlighted vast disparities in well-being and opportunities between and within countries.
- Focus on Policy: The report presented data and offered insights into policies and strategies that could promote human development. It highlighted the significance of fostering an environment that enables individuals to realize their maximum potential, lead productive lives aligned with their desires and interests, and gain access to the resources necessary for maintaining a respectable standard of living.
- Call for International Cooperation: Recognizing that challenges to human development are often global in nature, the report called for increased international cooperation to address issues such as poverty, illiteracy, and environmental degradation.

In short, The Human Development Index (HDI) was created to challenge the notion that a country development could be determined its economic expansion, often represented by Gross Domestic Product (GDP). This is not the moment to delve into GDP's limitations in measuring human happiness, but it's worth noting that Simon Kuznets, the Nobel Prize-winning economist who played a significant role in developing GDP in the 1930s, specifically advised the government against using it as a gauge of well-being. Despite his warnings, it became a common practice globally (Measuring development progress beyond income, 2020).

3.3.4. Cambodia Development

Cambodia's development presents various scenarios, and the country has made progress in recent years to reduce poverty and increase economic growth. At the same time, the lowing of civil liberties, natural resource depletion, and low-performing public health and education services challenge the country's development progress. Cambodia has seen notable improvements in health, early childhood development, and education in rural areas, with significant advancements in life expectancy and reductions in mortality rates from 2000 to 2021. However, Cambodia still falls behind in human capital indicators compared to other lower-middle-income countries. A child born in Cambodia in 2020 is estimated to achieve only 49 per cent of their potential productivity due to gaps in education, health, and nutrition. Enrollment rates in the 2021-2022 school year for primary, lower secondary, and upper secondary education reached 93 per cent, 46.7 per cent, and 28.6 per cent respectively, indicating progress yet also highlighting areas for further improvement (World Bank, 2023).

Figure 2: GDP per capita and Human Development Index



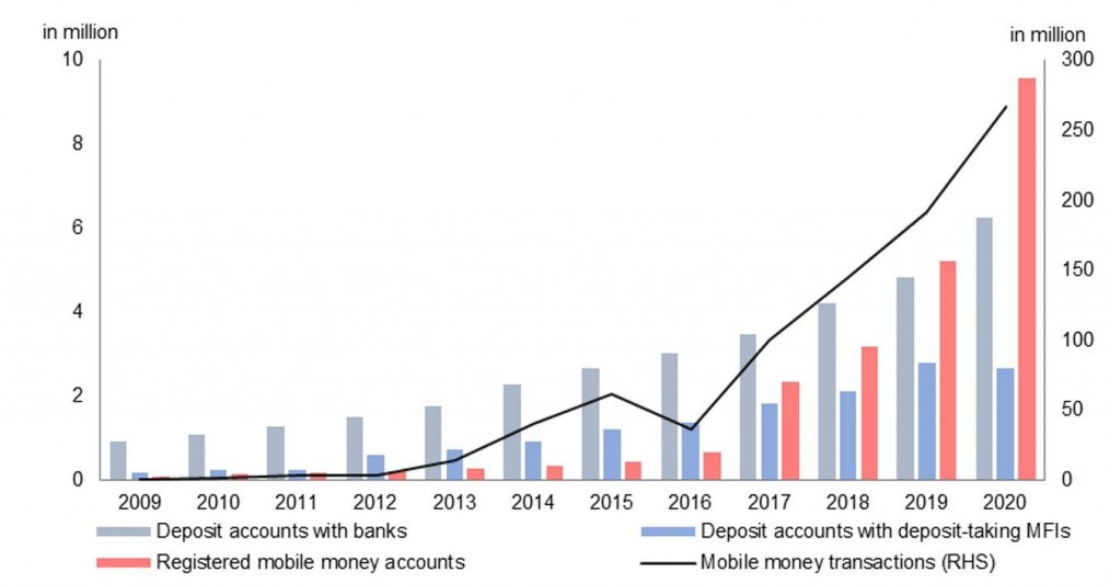
Source: (United Nations, 2024)

Figure 2 shows Cambodia's GDP per capita and HDI with World HDI numbers from 2008 to 2022. Due to the rapid economic growth, GDP per capita increased from 742 USD in 2008 to 1760 USD in 2022. HDI has significantly increased from 0.53 in 2008 to 0.60 in

2019 and down to 0.59 in 2021. This index has put Cambodian people at a medium level of Human Development compared to the rest of the world (United Nations, 2024).

Another important indicator is financial sector development, which is crucial for economic growth and development, serving as both a driver and an indicator of economic progress. It enhances economic development by facilitating capital accumulation and technological advancement by increasing savings rates, mobilizing savings, generating investment information, attracting foreign capital, and ensuring efficient capital allocation.

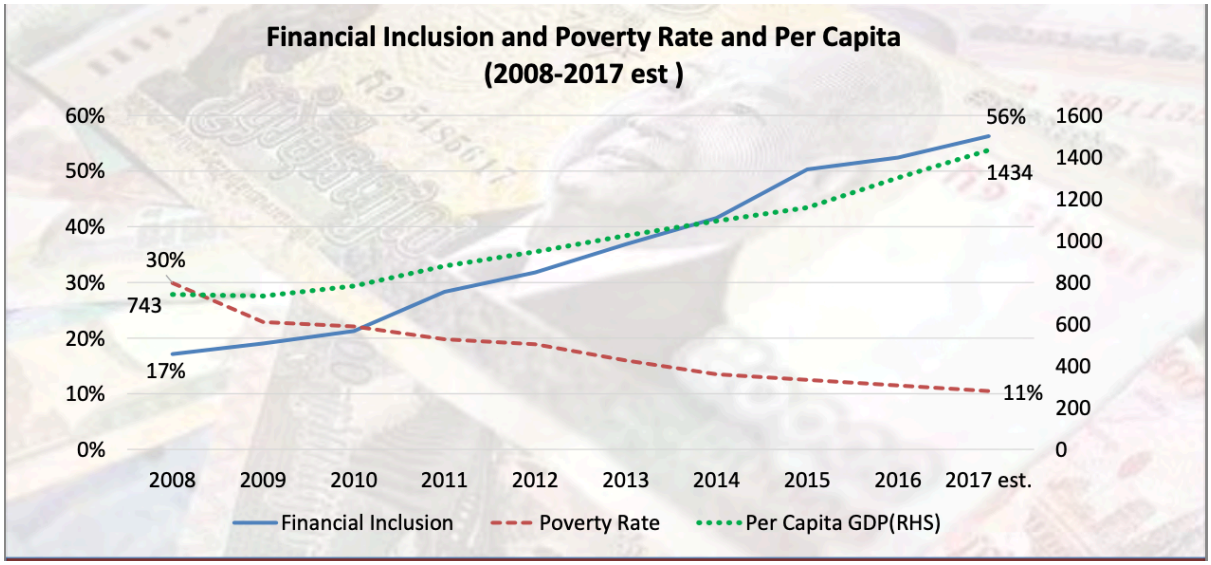
Figure 3: Number of Deposit and Mobile Money Accounts and Transactions



Source: (ASEAN+3 Macroeconomic Research Office, 2021)

In Cambodia, mobile money services have quickly expanded, with the number of agents per 100,000 adults rising from 34 in 2015 to 400 in 2020. The registered mobile money accounts surged by over 9.6 million in 2020, covering over 80 per cent of the adult population, which is higher than the number of people with bank or microfinance deposit accounts. Furthermore, in Figure 3, the volume and value of mobile money transactions grew significantly, reaching 266.5 million transactions in 2020, and the total transaction value was 168.6 per cent of the GDP (ASEAN+3 Macroeconomic Research Office, 2021).

Figure 4: Financial Inclusion, Poverty Rate, and GDP Per capita



Source: National Bank of Cambodia

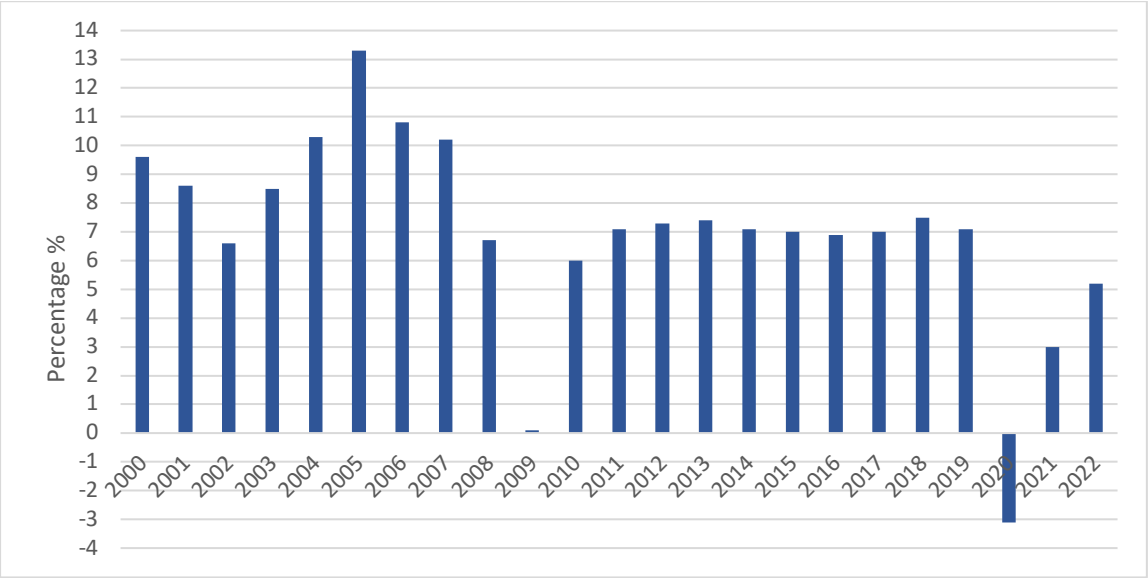
Financial inclusion has been noticed as an important key for development, which means people can access financial such as banks, microfinance institutions, and other financial institutions. Based on Figure 4, while financial inclusion and GDP per capita increased, the poverty rate decreased consequently. This shows the positive development in the country during that period.

3.4. Cambodia Economy Background

Cambodia is a small Southeast Asian country with a population of 16 million people. After the Khmer Rouge finished in 1975, Cambodia continued falling into the civil war until 2000, even though there was an election in 1993 (Moody's Analytics, 2023).

Cambodia experienced substantial economic growth in the last two decades before COVID-19. From 2000 to 2019, Cambodia's economy maintained an average annual growth rate of 7.7 per cent, while the 2020 GDP growth rate downturn to -3 per cent because of COVID-19 and recovered to 3 per cent and 5.2 per cent in 2021 and 2022, respectively (World Bank, 2023) as shown in Figure 5.

Figure 5: Cambodia's GDP Growth

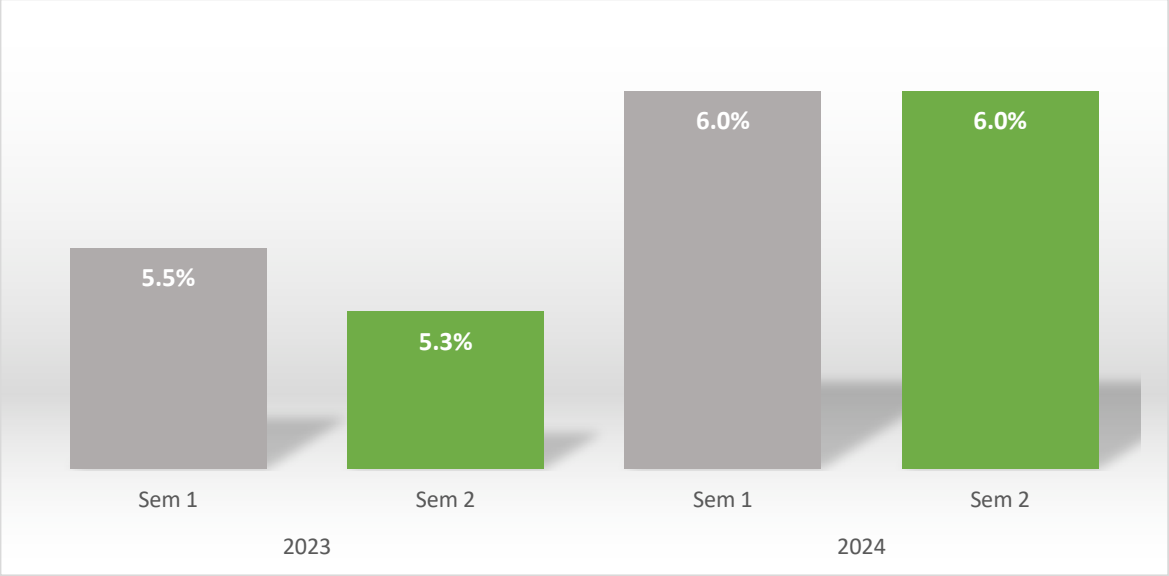


Source: World Bank

The economy's main drivers are agriculture, manufacturing, tourism, real estate, and construction. According to the World Bank (2023), from 2009 to 2019, the poverty rate declined by 1.6 percentage points each year, and Cambodia is setting its sights on achieving upper middle-income status by 2030.

In the Asian Development Bank report (Asian Development Bank, 2023), Cambodia's economic growth projection has been adjusted to 5.3 per cent, revised from 5.5 per cent. This revision is primarily attributed to a slower-than-anticipated growth in the industrial sector during the first half of 2023. However, it maintains the country's growth forecast for 2024 at 6.0 per cent, as shown in Figure 6.

Figure 6: ADB Adjusts 2023 Growth Forecast for Cambodia, Maintains 2024 Outlook



Source: Asian Development Bank

3.5. Cambodia Digitalization

Digital Technology become a critical key to boost productivity in Cambodia. The integration and utilisation of digital technology can be seen in homes, companies, and governmental organisations. According to Cambodia's telecommunications regulator, in 2020, the country had a significant increase in Internet users to 16.3 million devices registered (compared to 5.0 million in 2004), as well as a substantial rise in mobile phone subscribers, reaching 20.8 million, compared to 2.5 million in 2004. Moreover, there were approximately 12 million social media users. The interest in digital technology, digital transformation, and the digital economy gained momentum during the COVID-19 pandemic. However, despite these developments, Cambodia still faces challenges in fully harnessing the advantages of digital technology and digital transformation (Savuth and Sothea, 2023).

3.5.1. ICT Development Index 2023

Information and Communication Technology Development Index has been developed to measure the level of using Information and Communication Technology in each country. It is a composite indicator published by The International Telecommunication Union is a specialized agency of the United Nations. In 2023, ITU was using a new method called Universal and Meaningful Connectivity, which is the opportunity for all to have an enjoyable, secure, enriching, and productive experience on the internet at a reasonable cost (International Telecommunication Union, 2023).

Table 7: ICT Development Index Aggregate 2023

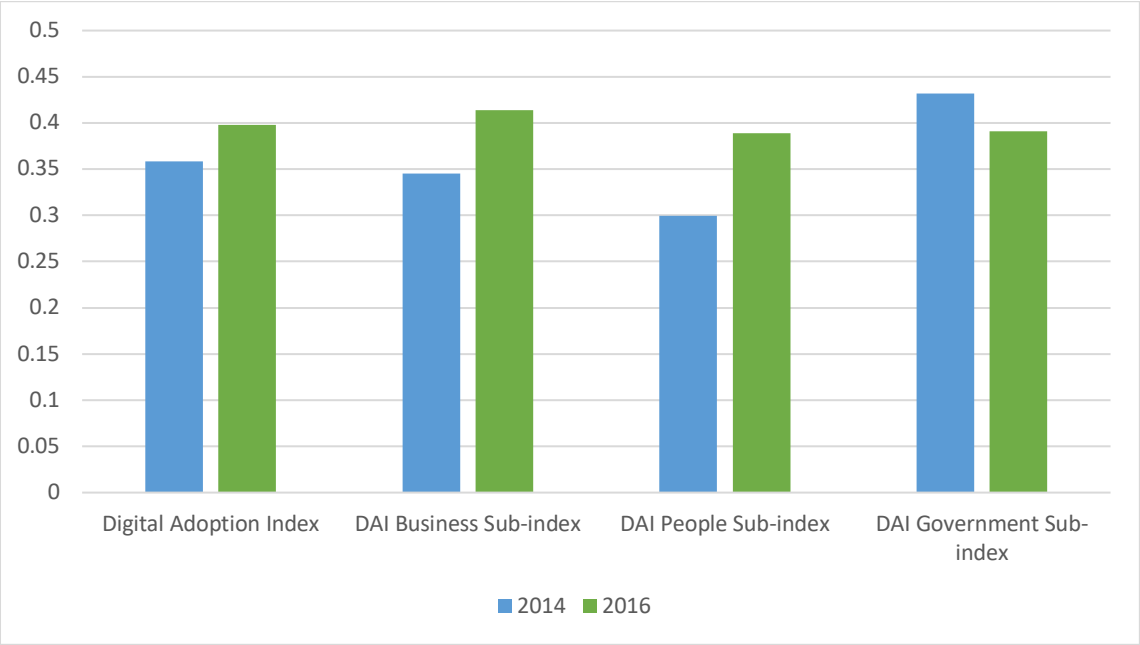
Country	Universal Connectivity Pillar	Meaningful Connectivity Pillar	ICT Development Index (IDI)
Brunei Darussalam	95.7	94.0	94.8
Cambodia	62.5	74.4	68.5
Indonesia	76.1	84.2	80.1
Lao P.D.R.	59.6	69.6	64.6
Malaysia	94.5	94.5	94.5
Myanmar	67.1	64.2	65.7
Philippines	49.4	80.5	65.0
Singapore	99.4	95.4	97.4
Thailand	85.9	91.6	88.7
Viet Nam	74.0	87.3	80.6

Source: ITU

Based on Table 7, among the ASEAN countries, Cambodia's IDI is 68.5, which ranks 6th among ten countries.

In 2016, the World Bank also measured the level of digital by releasing the Digital Adoption Index report (World Bank, 2016), which evaluates the ranking of the digital index by country. This index encompasses 180 countries and employs a scale from 0 to 1. It primarily emphasises the supply side of digital adoption to achieve comprehensive coverage and simplify theoretical connections. In Figure 7, the Digital Adoption Index value increased from 0.36 to 0.40 in 2014 to 2016. However, this value was slightly below the world average of 0.49 in 2016. DAI is unavailable for the current year, whereas digital adoption trends in all three sectors improved, especially during the COVID-19 pandemic. The increasing trends include growing smartphone users, Internet users, online businesses, and banking platforms.

Figure 7: Cambodia Digital Adoption Index 2014 - 2016

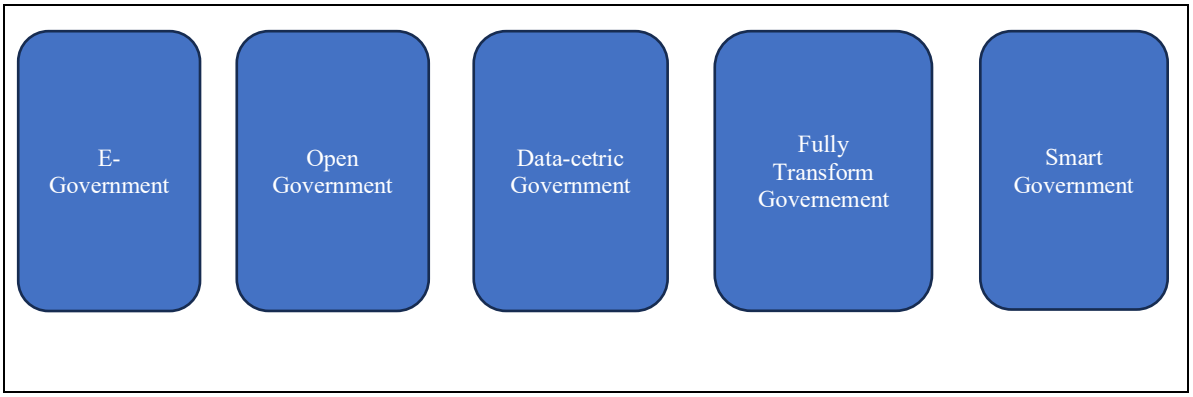


Source: World Bank

3.5.2. Digital Government

In the digital era, the relentless progress of digital technologies has not only reshaped daily life. However, it has also driven governments to transition from traditional methods to modern digital approaches in service provision and communication, known as digital government, primarily focusing on modernising systems and services to enhance governance and deliver equitable, transparent, effective, and accountable public services. Cambodia has been developing e-government initiatives to enhance public services and transparency. Digital platforms are being used to streamline administrative processes, such as online registration for businesses and citizens' access to government services. Based on the Digital Government policy paper (Ministry of Post and Telecommunications, 2022), developing digital government must focus on the entire government procedure, it mean that all ministries and institutions which are elemental parts interacting inside a system. Ministries and institutions are allow to develop their internal systems for delivery of their public services through interconnecting, sharing data and functioning of a main government system.

Figure 8: Levels of Digital Government Development in Cambodia



Source: Cambodia's Ministry of Post and Telecommunications

As shown in Figure 8, the development of a digital government can be categorised into five levels of progression:

- Level 1: E-government is a first digital government that sharing the information and services through online using digital information system, but those systems, infrastructure, and data still need to be integrated as currently are seperated.
- Level 2: The open government refer to the stage of develop a system to get feedback from users (citizens) and do interaction with service recipients. Hence, the information from government will be publish in thte system to ensure transparency and accountability.
- Level 3: In data-centric government, the focus shifts to considering data as a critical asset, prioritising its collection, utilisation, and analysis over application development. This level involves gradually harmonising digital systems and data across government entities through an integrated digital platform.
- Level 4: The fully transformed government stage refer to all ministries and institutions are transformed to digital, which mean all public service providers and government are digitalised with data intergration and security and privacy are protected.
- Level 5: The smart government is a stage when data collection, and analysis are automated for decision-making and problem-solving, enabling full-scale innovation in digital government services with technologies like AI, IoT, Big Data, blockchain, and cloud technology.

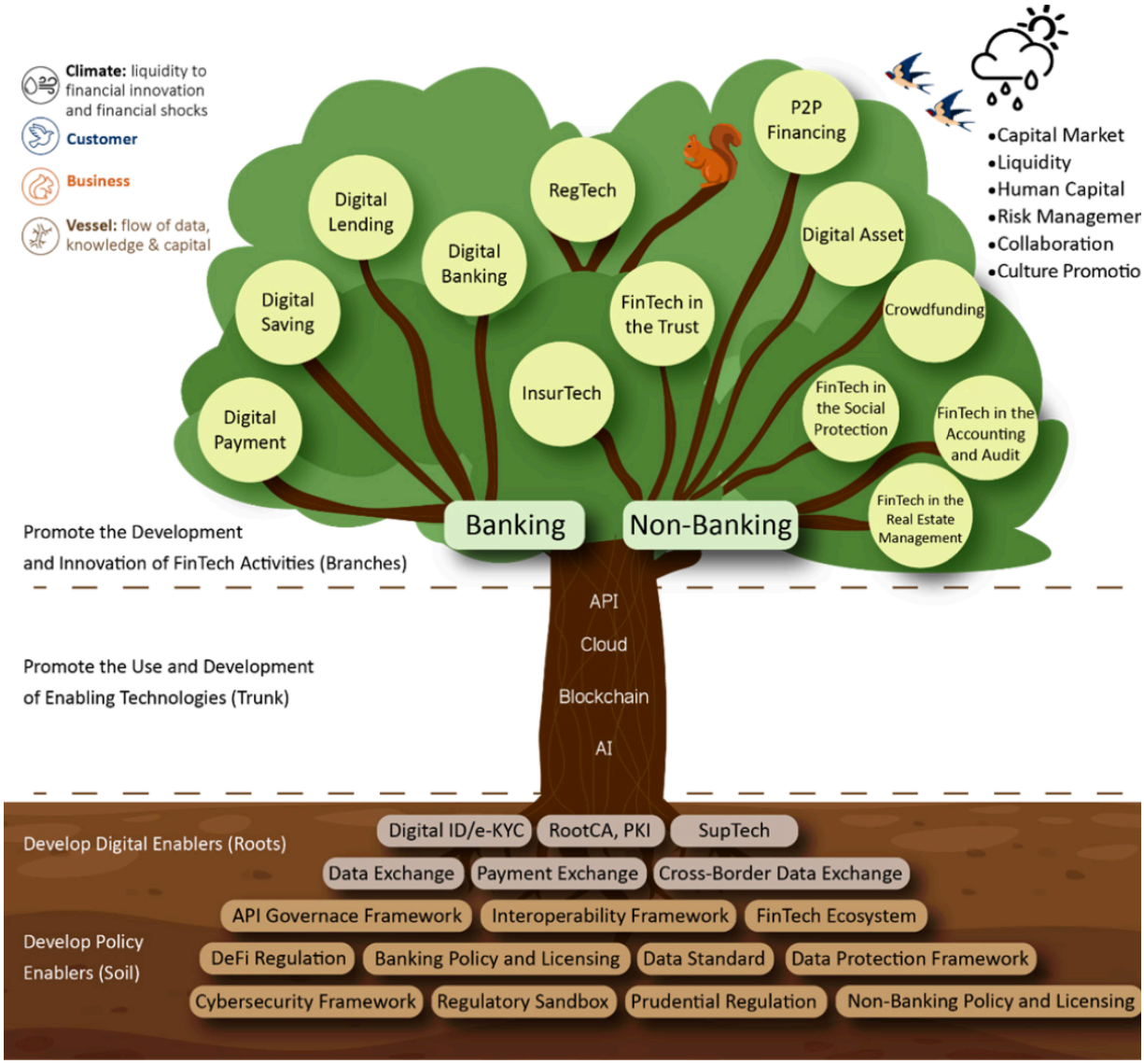
3.5.3. FinTech and Digital Payment

Financial Technology (Fintech) has been growing quickly to modernise the financial sector in the digitalisation era. Recently, the royal government of Cambodia published the Fintech policy framework to support development in Cambodia. Based on the Ministry of Economy and Finance (Digital Economy and Business Committee, 2023), the Cambodian government developed a forward-looking strategy for fostering FinTech growth in Cambodia, focusing on improving financial inclusion, upholding the financial sector's stability, and fostering financial innovation. This approach leverages the financial industry's digital transformation to create opportunities for all stakeholders, ultimately propelling the development of Cambodia's thriving digital economy and society.

In Figure 9, the policy framework sets out the main goals that correspond to the four parts of the FinTech Tree:

- **Development of Policy Enablers represented by "Soil"** The Royal Government is committed to fostering a supportive environment for FinTech growth through policy and legal frameworks, trust-building, stakeholder collaboration, and innovative initiatives.
- **Development of Digital Enablers represented by "Roots"** focuses on utilising and creating digital enablers to support both FinTech and broader digital development, drawing an analogy to strong tree roots efficiently absorbing nutrients from the soil, underscoring the critical role of digital enablers in advancing FinTech.
- **Promotion of the Use and Development of Enabling Technologies represented by "Trunk"** focus is on advancing technology adoption and development in the public and private sectors through research, literacy promotion, and skill training, essential for supporting FinTech innovation and progress, much like a strong trunk enables healthy growth and branching in a tree.
- **Promotion of the Development and Innovation of FinTech Activities represented by "Branches"** focuses on innovatively diversifying FinTech activities in the banking and non-bank financial sectors to meet market demands, similar to diverse branches bearing fruits that improve access to financial services and enhance consumer trust and well-being.

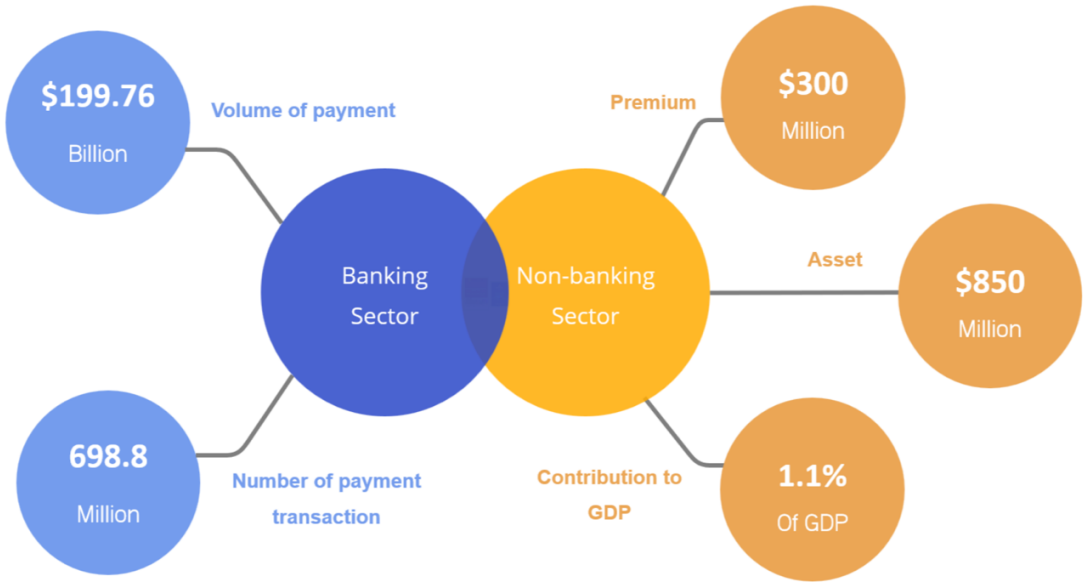
Figure 9: Cambodia's FinTech Tree



Source: Cambodia Financial Technology Development Policy 2023-2028

The Financial sector has significantly contributed to GDP. The banking sector's payment volume was 199.76 billion US dollars, and payment transactions were 698.8 million dollars, while the non-banking sector contributed 1.1 per cent to GDP, as shown in Figure 10.

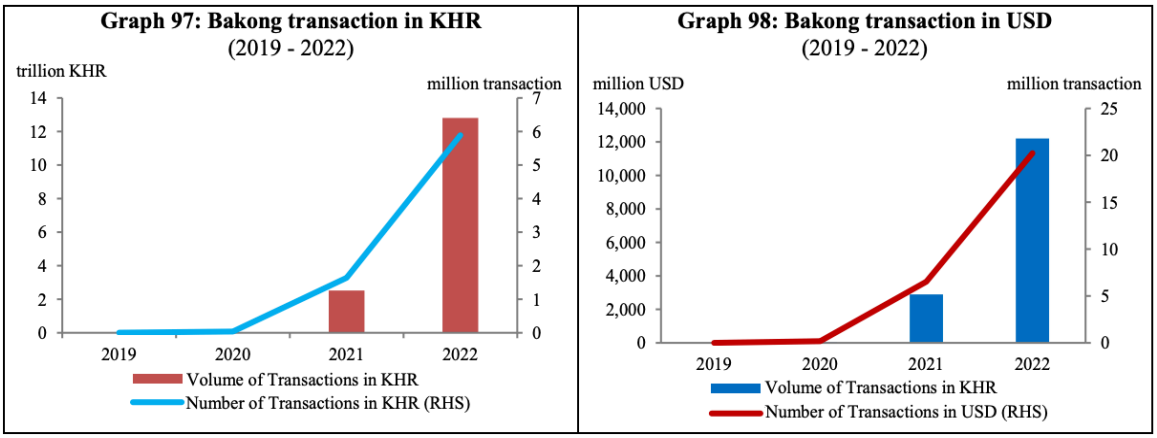
Figure 10: Financial Technology in Cambodia 2021



Source: National Bank of Cambodia and Insurance Regulator of Cambodia

To fulfil the needs of payment volumes and increase payment efficiency, Cambodia has been developing digital payment, both retail and business, which enables users and business owners to do transactions faster and more reliably. According to the National Bank of Cambodia annual report, in 2022, the number of online payment service transactions increased to 1 billion, whereas the volume of the transactions also increased to USD 272.5 billion, equivalent to 10 times the GDP. Moreover, the National Bank of Cambodia has developed a Blockchain backbone system called Bakong that allows all banks and microfinance institutions to connect and transfer money faster and more reliably (National Bank of Cambodia, 2022).

Figure 11: Online transactions via the Bakong system in 2022



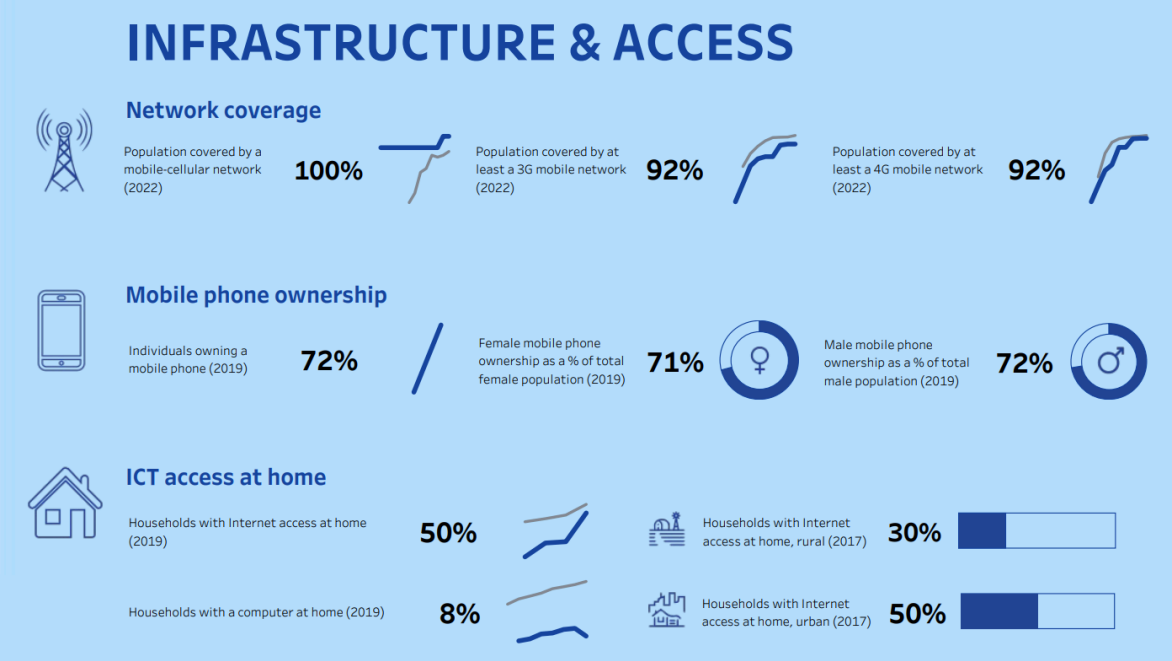
Source: National Bank of Cambodia

In 2022, the Bakong payment system had 69 members, 46 of whom were in the production phase. In Figure 11, a total of 0.52 million customers registered through the Bakong application. There were 26.1 million transactions with a total volume of KHR 12.8 trillion and a total volume of USD 12.2 billion.

3.5.4. Digital Infrastructure

Cambodia has experienced a substantial increase in internet and mobile phone penetration. This increase has improved access to information and opened up e-commerce and digital communication opportunities.

Figure 12: Cambodia ICT Usage

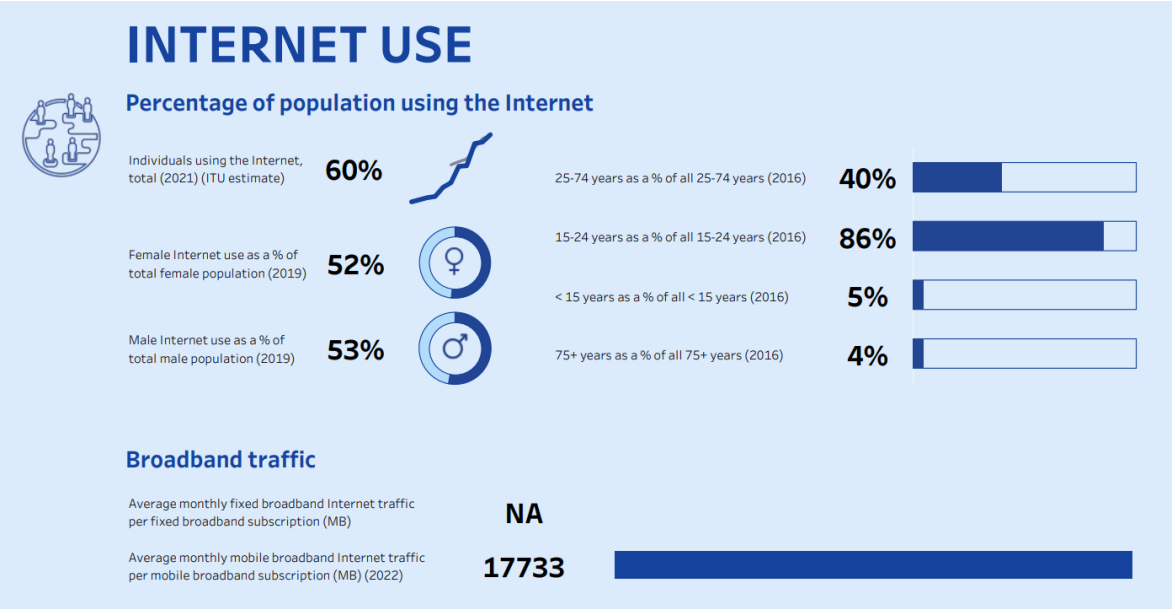


Source: International Telecommunication Union

As shown in Figure 12, the network coverage was 100 per cent in 2022, the population covered by the 3G mobile network was 92 per cent, and the 4G mobile network was 92 per cent. The average number of people owning a phone is 72 per cent, while internet connection from home was 50 per cent. Internet access from households was 50 per cent, while rural access was 30 per cent and urban access 50 per cent. The number of households using computers was only 8 per cent.

In 2021, the number of individuals using the Internet was 60 per cent of the total population, while the average number of male and female users was 52 per cent and 53 per cent respectively. The average monthly mobile broadband subscription was 17733 megabytes, as shown in Figure 13.

Figure 13: Cambodia's Internet Usage



Source: International Telecommunication Union

3.5.5. Startups and Innovation

Cambodia has seen a growing number of tech startups, incubators, and innovation hubs. These initiatives aim to foster entrepreneurship and technological innovation in the country.

The number of tech startups in Cambodia has grown substantially, from less than 50 in 2013 to approximately 300 in 2018 (Asian Development Bank, 2022). Most of these startups focus on fintech, with other significant sectors including media and advertising, e-commerce, development services, and digital marketplaces. As of late 2021, approximately 90 active startups were registered on the Startup Cambodia platform, and Impact Hub, since its inception in Cambodia, has supported about 370 startups, with 40 per cent of them being active as of the third quarter of 2021.

Table 8: Cambodia Government Activities in Supporting Tech Startups

Programs/ Centres	Activities	Implementing Agency	Implemented Year	Priority Sector/s
Skills Development Fund	• Skills upgrading (training) for growth-stage startups	MEF	2018	• Manufacturing • ICT • Construction • Electronics • Tourism • Other high-demand skills

Khmer Enterprise	• Capacity upgrading • Entrepreneurial culture promotion • Networking • Seed funding	MEF	2019	• Services • ICT • Agriculture • Manufacturing
Techo Startup Center	• Pre-incubation • Incubation	MEF	2019	• Agriculture • Finance • Technology
Startup Cambodia	• Startup nurturing programs • Community programs • Digital platform programs • Research and policy programs	MEF	2021	• Startups in all sectors
CamDX	• Online business registration	MEF	2021	• SMEs and startups in all sectors
SME Bank	• Loan	MEF	2020	• New innovative industry or manufacturing, high value-added and high-tech content and others along with priority sectors of IDP
Credit Guarantee Corporation of Cambodia	• Business recovery guarantee scheme • Cofinancing guarantee scheme	MEF	2020	• Agriculture, industry, and service
Digital Innovation Center	• Incubation/acceleration • Makerspace • Co-innovation space • Event space	MPTC	2020	• Technology
Digital Technology R&D Center	• R&D on digital innovation	MPTC	2021	• Technology
Technology Business Incubation	• Training • Pitching	MISTI	2019	• Food processing
Incubation	• Training	MISTI	2020	• Agro-processing
Go4eCam	• E-commerce marketplace • Training and incubation program • SME formalisation for e-commerce • Small grant • Pitching events with investors (for growth-stage startups and SMEs)	MoC	2021	• Manufacturing • Agro-processing • Green/environmentally friendly products

Source: Asian Development Bank

Table 8 shows the Cambodian government's activities and supports for small and medium enterprises and start-up development. The Ministry of Economy and Finance (MEF)

actively supports tech startups. Furthermore, alongside the establishment of the Skills Development Fund aimed at enhancing the abilities of SMEs and startups in their growth phase, initiatives such as Khmer Enterprise (KE), Techo Startup Center (TSC), the Startup Cambodia National Program, SME Bank, the Credit Guarantee Corporation of Cambodia (CGCC), and the facility for online business registration have been developed.

Digital Education and Skills Development

The objective of digital education is to increase the overall skill and employment of Cambodian youth through two specific objectives:

- Evaluate digital literacy and related skills in Cambodian youths aged 15 to 30 to provide essential insights for informed development initiatives to promote the digital economy, addressing the current lack of data on their digital capabilities.
- Create a digital skill framework and policy brief informed by the assessment findings from the first objective, which will guide future digital development initiatives by offering necessary input and direction. Efforts are being made to enhance digital literacy and technology-related education (United Nations Development Programme, 2020). This is crucial for preparing the workforce to participate in the digital economy.

Digital literature is vital for the capacity development of digital skills in the labour market. However, to implement digital literature more effectively, it needs to make an effort to create a digital foundation and digital infrastructure, which have noticed significant growth in recent years.

Table 9: Summary of Digital Landscape in Cambodia

Indicator/Challenge	Score	Comparison
Global Digital Readiness Index	8.6/25	11.93 (global average)
Company with website	24.2%	52.4% (PH), 48.6% (VN) 45.5% (TH)
Secure server per 1 million people	81.1	393.8 (mid-income), 1769.5 (VN), 953.9 (TH)
Home with PC	12.5%	38.9% (Asia/Pacific) 47.1% (world)
Home with Internet	21.0%	49.0% (Asia/Pacific) 54.7% (world)
Bank account (aged 15+)	22%	
Bank account (working age)	15%	
Individuals conducting digital payment	16%	
E-Government Development Index	145th	
E-Participation Index	171th	
Lack of competent IT professionals		

Source: UNDP

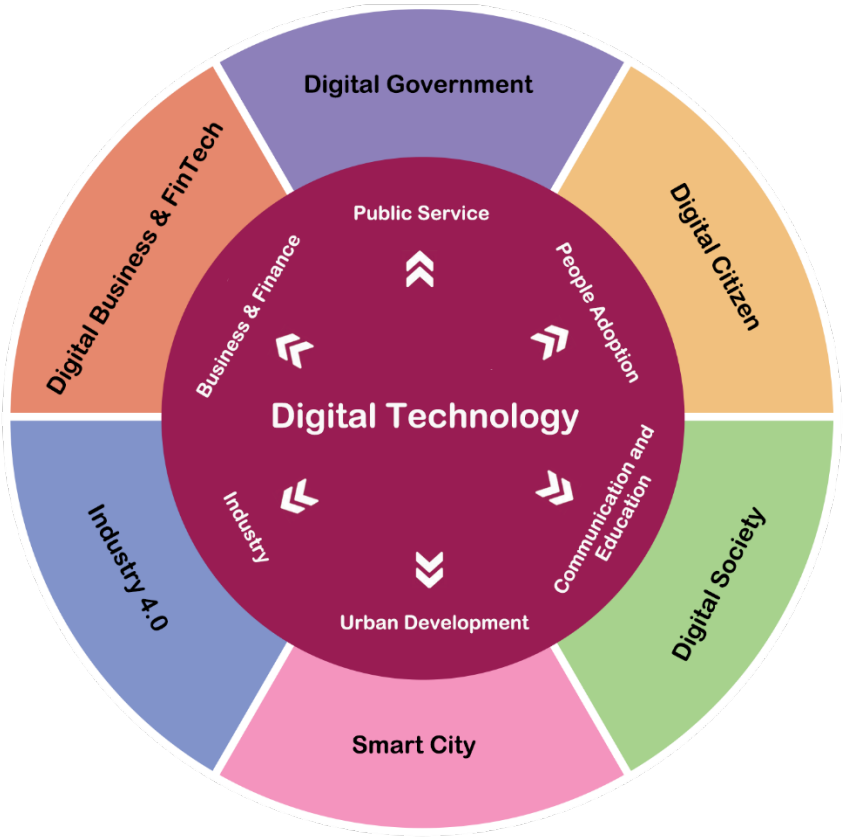
Based on Table 9, The digital landscape in Cambodia is characterized by its below-average performance in several key indicators compared to regional and global standards. With a Global Digital Readiness Index score of 8.6 out of 25, Cambodia falls behind the global average of 11.93. Only 24.2 per cent of companies in Cambodia have a website, significantly lower than in the Philippines 52.4 per cent, Vietnam 48.6 per cent, and Thailand 45.5 per cent. Secure servers per 1 million people amount to 81.1 in Cambodia, compared to 393.8 in mid-income countries, 1769.5 in Vietnam, and 953.9 in Thailand. Home digital access is limited, with only 12.5 per cent of homes having a PC and 21.0 per cent having internet access, both below the Asia/Pacific and world averages. Financial inclusion is also low, with only 22 per cent of individuals aged above 15 having a bank account and 16 per cent conducting digital payments. Cambodia ranks 145th in the E-Government Development Index and 171st in the E-Participation Index, highlighting challenges in digital governance and citizen engagement. The noted lack of competent IT professionals further underscores the need for enhanced educational and training programs in the ICT sector.

3.6. Digital Economy in Cambodia

Over the past twenty years, supported by preferential trade and strong foreign direct investment inflows, Cambodia has improved economic growth and job creation with limited value-added, such as garment manufacturing, agriculture, and construction. Recently, Cambodia has become a lower-middle-income economy, with rapidly increasing wages against inactive productivity and rising regional competition; Cambodia will be required to develop new sources of growth. In this regard, technological adoption will become essential to boosting productivity and opportunities in the economy (World Bank, 2018).

According to the Senior Government, Cambodia has recently released the Cambodia Digital Economy and Society Policy Framework 2021-2035 to use digitalisation to boost the economy and meet sustainable economic growth. (Supreme National Economic Council, 2021). The framework will focus on building the foundation of digital technology and implementing it in each sector. The transformation of digitalisation will become an important factor in pushing the products and services in Cambodia’s economy.

Figure 14: Digital Transformation in All Aspects of the Economy and Society



Source: Cambodia Digital Economy and Society Policy Framework 2021 - 2035

In recent years, Cambodia has had a remarkably growing information and communication technology (ICT) system. Nevertheless, the digital sector remains challenging, including basic foundations such as the limited digital infrastructures, knowledge, skills, and digital leadership. In Figure 14, digital technology has become the main factor supporting digitalisation through various sectors in Cambodia's economy, including Digital Government, Digital Citizen, Digital Society, Smart City, Industry 4.0, Digital Business, and Fintech. However, in a new digital era, the digital business and digital ecosystem in Cambodia is still weak and has a small contribution to regional and global value chain. At the same time, a central role in the digital transformation process known as digital government has not been fully prepared, which demands determining and setting priorities to catch the opportunities in the digital sector.

Table 10: Summary of Strategic Priorities under the Foundations and Pillars of Building a Digital Economy and Society

Strategies	Description	Strategic Priority
Foundations	Infrastructures	• Digital Connectivity • FinTech Infrastructureand Digital Payment Systems • Logistics and Final Destination/Last-mileDelivery
	Digital Reliability and Confidence	• Legal Framework • Cybersecurity Management
Pillars	Digital Citizens	• Digital Leadership • Pool of Digital Talent Human Resources • Digital Citizens
	Digital Government	• Digital Government and Public Services • Keys to Boosting Digital Performance • Data-based Governance
	Digital Businesses	• Enterprise Digital Transformation • Entrepreneurship and Startup Ecosystems • Digital Value Chains
Impacts of digital transformation on the economy and society		

Source: Cambodia Digital Economy and Society Policy Framework 2021 – 2035

In this regard, the Cambodian government has been designed from step to step to enable digital transformation. So, the framework will focus on developing the foundation of the digital economy and pillars such as digital citizens development, digital government development, and enabling digital businesses (see Table 10). Cambodia's Digital Economy and Society Policy Framework (Supreme National Economic Council, 2021) designed for a long term to successfully promote and lead Cambodia digital transformation by identify and impment the policy to measures that reflect, respond, and align with regional and global trends.

4. Analytical Part

4.1. Overview and Econometric Model Specification

This section analyses the significance of digital and economic indicators contributing to GDP per capita output. We discuss our data, model, method, and result in detail, along with a description of basic statistics. As discussed in the methodology section, we have introduced our model from the theoretical to the final assumption in the econometric model. We construct that model to define the economic output. So, to be more understandable, we have briefly recapped our model below.

4.1.1. Model Selection

As shown in the methodology section, the Solow-Swan economic model: $\mathbf{Y=F(A\ K^{\alpha}\ L^{1-\alpha}\ )}$ has been used. However, our econometric model has applied natural logarithms to transform data to simplify complex relationships between output and inputs. The coefficients in the log-transformed model directly represent elasticity (percentage change) in output resulting from a one per cent change in input levels. This transformation also helps to deal with data that vary widely in range, as it normalizes large values and reduces the impact of extreme outliers.

The analysis employs an Ordinary Least Squares (OLS) regression model chosen for its robustness in estimating linear relationships between a dependent variable with independent variables. OLS is the most common estimation method in econometrics due to its desirable properties, provided that the Gauss-Markov assumptions hold true.

The model is specified as follows: the logarithm of GDP per capita (l_Y) as the dependent variable, reflecting the economic output. Finally, we got a model:

$$\mathbf{\ln(Y) = \beta 0 + \beta 1 \cdot \ln(MCS) + \beta 2 \cdot \ln(MNC) + \beta 3 \cdot \ln(FBS) + \beta 4 \cdot \ln(K) + \beta 5 \cdot \ln(L) + \varepsilon.}$$

- β_0 is the intercept term.
- β_1 through β_5 are the coefficients for each independent variable.
- l_MCS represents the logarithm of Mobile Cellular Subscriptions, indicating the prevalence of mobile telephony.
- l_FBS is the logarithm of Fixed Broadband Subscriptions, representing internet connectivity.
- l_MNC represents the logarithm of Mobile Network Coverage, reflecting mobile network accessibility.

- l_K is the logarithm of capital, proxied by Foreign Direct Investment inflow as a percentage of GDP.
- l_L denotes the logarithm of the Labour force participation rate.
- ε is the error term capturing all other factors not included in the model.

4.1.2. Data Collection

In this analysis, data is the most challenging part to handle because of the limited availability of data. Cambodia is a developing country, and most digital infrastructure data is captured in only a short period. The model uses an annual time series dataset from 2008 to 2022, providing 15 observations (T = 15) for each variable. This period allows for an analysis of the effects of the post-global financial crisis and the recent growth trends in Cambodia. The data was collected from reliable sources mentioned in the methodology section to ensure the result was accurate.

4.1.3. Estimation Technique

We use Python and Gretl in analysis while using the OLS method to estimate the relationship between our independent and dependent variables. OLS estimation technique minimises the sum of the squared residuals, ensuring the best linear unbiased estimators (BLUE) under the classical linear regression model assumptions. The estimation process involves calculating the coefficients (β_1-β_5) that best fit the model to the data.

The statistical significance of each coefficient is evaluated based on the t-ratio and corresponding p-value. Coefficients with p-values below standard significance levels (0.1, 0.05, and 0.01) are considered statistically significant, indicating a less likely chance that the observed relationship is due to randomness.

We also conduct diagnostic tests will be conducted to validate the OLS assumptions, including:

- Checking for autocorrelation with the Durbin-Watson statistic.
- Testing for Heterokedasticsity
- T-test
- F-test

4.2. Descriptive Statistics

4.2.1. Summary Statistics

In this section, we described the summary statistics which selected only the main components in descriptive statistics, such as count (observation number), mean or average, median, standard deviation, and minimum and maximum values. The observation was 15, from 2008 to 2022.

Table 11: Summary Statistics, using the observations 2008 – 2022

	Y	MCS	FBS	MNC	K	L
count	15	15	15	15	15	15
mean	7.059074	4.604026	-0.656017	4.587311	2.477015	4.316381
std	0.309111	0.467525	1.003419	0.033652	0.168673	0.043083
min	6.599598	3.413984	-2.128581	4.465908	2.063653	4.25206
25%	6.818625	4.65194	-1.538169	4.59512	2.445571	4.282761
50%	7.065357	4.797161	-0.613196	4.59512	2.525039	4.306346
75%	7.349546	4.872673	0.082679	4.59512	2.587492	4.358764
max	7.472842	4.907045	1.112029	4.601162	2.649412	4.377245

In Table 11 is the summary statistic of observation from 2008 to 2022 after we have used logarithm with the original data. Based on these numbers, we describe the variable below.

l_Y (Logged Y)

Mean 7.06, suggesting that on above average, the logarithm of income is around 7.06. Median 7.07, indicating that income is slightly higher than the mean, suggesting a slightly left-skewed distribution. Standard Deviation (S.D.) 0.309, showing moderate variability in income. Minimum 6.60 and Maximum 7.47, indicating the range of income values.

l_MCS (Logged MCS)

Mean 4.60, with a slightly lower average value than the median, indicating a right-skewed distribution. Median 4.80, suggesting the middle value is relatively high. Standard Deviation 0.468, indicating a broader variability compared to l_Y—minimum 3.41 and maximum 4.91, showing a wide range of values.

l_MNC (Logged MNC)

Mean 4.59 and Median 4.60 are very close to the mid-point of the four scale, indicating a symmetric distribution. The Standard Deviation of 0.0337 is very small, which means l_MNC values are very consistent. Minimum 4.47 is close to the mean and median, suggesting that there are not many outliers on the lower end, while the Maximum 4.60 is equal to the median, indicating that most of the data is clustered around a central value with very little variation.

l_ FBS (Logged FBS)

Mean -0.656, showing that on average, the value is negative. Median -0.613, close to the mean, suggesting a somewhat symmetric distribution. Standard Deviation 1.00, indicating a high level of variability. Minimum -2.13 and Maximum 1.11, showing a wide range and the presence of both negative

l_K (Logged K)

The mean (2.48) and median (2.53) are close, hinting at a roughly symmetric distribution. A low standard deviation (0.169) denotes a low level of variability in the capital variable K, and the range from minimum (2.06) to maximum (2.65) is narrow, indicating that the values of K are quite consistent over the period.

l_L (Logged L)

The mean (4.32) and median (4.31) are similar, typically pointing to a symmetric distribution. The very low standard deviation (0.0431) reflects minimal fluctuation in L. The range from minimum (4.25) to maximum (4.38) is the narrowest among all variables, showing stable values for L over the years.

4.2.2. Correlation Matrix

This section presents the correlation matrice of the variables that we used in the regression model. The data covered 2008 to 2022. The 5 per cent critical value for a two-tailed test with n = 15 observations is 0.5140.

The correlation coefficient value in Table 12 ranges between -1 and +1. The +1 value mean that there is a positive linear relationship perfectly while -1 indicates that, there is a negative linear relationship perfectly, and 0 indicates that, there is no linear relationship. A positive value suggests that if one variable increases, associated with other variables tends to

increase, whereas a negative value indicates that, if one variable increases, lead to other variables tends to decrease.

Table 12: Correlation coefficients, using the observations 2008 - 2022

5 per cent critical value (two-tailed) = 0.5140 for n = 15

l_Y	l_MCS	l_MNC	l_FBS	l_K	l_L	
1	0.7163	0.4296	0.9462	0.5721	0.8737	**l_Y**
	1	0.7073	0.5592	0.7634	0.2971	**l_MCS**
		1	0.4425	0.6798	0.1355	**l_MNC**
			1	0.446	0.9166	**l_FBS**
				1	0.2332	**l_K**
					1	**l_L**

Strong positive correlations

GDP per capita (Y) and **Mobile Cellular Subscriptions (MCS)** have a strong correlation (0.7163). It suggests that as the GDP per capita in Cambodia increases, the number of mobile cellular subscriptions also increases significantly. Economic growth seems to be closely related to mobile connectivity.

GDP per capita (Y) and **Fixed Broadband Subscriptions (FBS)** have an extremely strong correlation (0.9462), indicating that economic growth (as measured by GDP per capita) is closely tied to the penetration of fixed broadband services. This suggests that as the economy grows, access to high-speed internet becomes more widespread.

GDP per capita (Y) and **Foreign Direct Investment (K)** is 0.5721, a strong correlation here implies that as Cambodia's GDP per capita grows, there is a significant increase in foreign direct investment as a percentage of GDP. Economic prosperity seems to attract more foreign capital.

GDP per capita (Y) and **Labour force participation (L)** have a very strong correlation (0.8737), which suggests that economic growth in Cambodia is strongly linked to the labour force participation rate. As people's income increases, a larger percentage of the working-age population is employed or looking for work.

Mobile Cellular Subscriptions (MCS) and **Mobile Network Coverage (MNC)** also have a strong correlation (0.7073), indicating that the number of mobile subscriptions is

significantly related to the coverage of the mobile network. More subscriptions may drive network expansion, or conversely, wider coverage could lead to more subscriptions.

Mobile Cellular Subscriptions (MCS) and **Fixed Broadband Subscriptions (FBS)** have above the average correlation (0.5592). This strong correlation suggests that as more people subscribe to mobile telephone services, there is also a significant increase in fixed broadband subscriptions, indicating a general growth in telecommunication services.

Mobile Cellular Subscriptions (MCS) and **Foreign Direct Investment (K)** have a high correlation value (0.7634), which indicates that the increase in mobile cellular subscriptions is strongly related to an increase in foreign direct investment. As the telecommunication sector grows, it might be attracting more foreign capital.

Mobile Network Coverage (MNC) and **Foreign Direct Investment (K)** have **a** higher correlation than average **(**0.6798). This high correlation here suggests that as mobile network coverage expands, foreign direct investment also increases, indicating that expanding mobile infrastructure may be a key area of interest for foreign investors.

Fixed Broadband Subscriptions (FBS) and **Labour force participation (L)** have a very strong correlation (0.9166). It implies that the number of fixed broadband subscriptions increases as the labour force participation rate increases. A more active workforce might demand more internet connectivity, or increased connectivity could foster a more engaged workforce.

Moderate positive correlations

GDP per capita (Y) and **Mobile Network Coverage (MNC)** have a moderate correlation (0.4296), which suggests that while economic growth is somewhat related to mobile network coverage, the relationship is not as strong as others, implying that other factors might be influencing network expansion.

Mobile Network Coverage (MNC) and **Fixed Broadband Subscriptions (FBS)** have a moderate correlation (0.4425), indicating that there is some relationship between the extent of mobile network coverage and the number of fixed broadband subscriptions. As network coverage increases, there might be a moderate increase in broadband connectivity.

Fixed Broadband Subscriptions (FBS) and **Foreign Direct Investment (K)** have a slightly below-average correlation (0.446), suggesting a relationship where increasing foreign direct investment could be associated with increases in broadband subscriptions, although this relationship is not as strong.

Weaker correlations

Mobile Cellular Subscriptions (MCS) and **Labour force participation (L)** have a low correlation value (0.297). This weak correlation suggests there is little to no linear relationship between the number of mobile subscriptions and labour force participation. These aspects seem to operate independently of each other.

Mobile Network Coverage (MNC) and **Labour force participation (L)** have a weak correlation (0.1355), which indicates almost no linear relationship between mobile network coverage and labour force participation, suggesting that other factors are at play.

Foreign Direct Investment (K) and **Labour force participation (L)** showed a weak correlation (0.2332). It suggests that foreign direct investment and labour force participation are not closely linked. Increases in one do not reliably predict changes in the other.

4.3. Analysis Results

4.3.1. OLS Estimation Results

In this section, we focus on the main result output of our regression using OLS. The dependent variable l_Y is the natural logarithm of GDP per capita, a common transformation in economic analysis that helps linearize exponential growth trends and stabilize the variance.

Table 13: Regression Result using OLS model

using observations 2008-2022 (T = 15), *Dependent variable: l_Y*

	Coefficient	Std. Error	t-ratio	p-value	
const	−7.81891	3.62612	−2.156	0.0594	*
l_MCS	0.306543	0.0248589	12.33	<0.0001	***
l_FBS	0.0541120	0.0283908	1.906	0.0890	*
l_MNC	−0.989992	0.332925	−2.974	0.0156	**
l_K	0.146507	0.0587737	2.493	0.0343	**
l_L	4.09618	0.576376	7.107	<0.0001	***

Mean dependent var	7.059074	S.D. dependent var	0.309111

Sum squared resid	0.004593	S.E. of regression	0.022590
R-squared	0.996567	Adjusted R-squared	0.994659
F(5, 9)	522.4513	P-value(F)	8.39e-11
Log-likelihood	39.40056	Akaike criterion	−66.80112
Schwarz criterion	−62.55282	Hannan-Quinn	−66.84637
rho	0.039823	Durbin-Watson	1.701158

Based on the result in Table 13, we are making a detailed interpretation of each variable of regression output below:

Constant (Intercept)

The model intercept is -7.81891, with a standard error of 3.62612. This coefficient has significant at the 7.8 per cent level (p-value = 0.0594), suggests the expected value of l_Y when all independent variables are zero. The negative sign could imply that without the technological and economic factors included in the model, the baseline level of GDP per capita, as captured by the model can be interpret that, if all the explanatory (independent) variables were to be 1, and hence their log values 0, implying no multiplicative effect, the baseline level of , on a logarithmic scale is −7.8.

Mobile Cellular Subscriptions (l_MCS)

The coefficient of 0.306543 is highly significant (p-value < 0.0001), indicating a robust positive relationship between mobile cellular subscriptions and GDP per capita. The elasticity interpretation suggests that a 1 per cent increase in mobile cellular subscriptions is associated with an average 0.306543 per cent increase in GDP per capita. This result underscores the importance of mobile technology in enhancing economic productivity and growth.

Fixed Broadband Subscriptions (l_FBS)

With a coefficient of 0.05411, this variable shows a positive but less association with GDP per capita compared to l_MCS, significant at the 8.9 per cent level (p-value = 0.0890). It could suggest that while broadband infrastructure contributes to GDP per capita output, its effect is less pronounced than mobile technology, possibly due to higher costs or lower penetration rates. It can be interpret that, 1 per cent increase of fix broadband subsriptions, associated with the 0.0541120 per cent increase of GDP per capita (l_Y), holding other variables constant.

Mobile Network Coverage (l_MNC)

The coefficient for l_MNC is -0.989992, which is statistically significant at the 5 per cent level (p-value = 0.0156). The negative sign is intriguing, as it suggests that an increase in mobile network coverage is associated with decrease in GDP per capita. This result can be explained by understanding the existing mobile network coverage has reached its maximum level. From 2009 to 2020, 99 per cent of the population could access the mobile network; in 2021 and 2022, it increased to 99.6 per cent. So, it can be concluded that, once a certain level of coverage is reached, the benefits of additional coverage could diminish and may not significantly contribute to GDP growth and it may wasted of money to make this technology redundancy. However, this result may require further investigation, so the potential explanations could include redundancy in coverage, diminishing returns to scale, or data issues such as multicollinearity.

Foreign Direct Investment (l_K)

FDI has a positive coefficient of 0.146507, which is significant at the 5 per cent level (p-value = 0.0343). It implies that foreign direct investment is a positive driver of economic growth in Cambodia, likely through capital accumulation, technology transfer, and job creation. The elasticity suggests that a 1 per cent increase in FDI is associated with a 0.146507 per cent increase in GDP per capita.

Labour Force Participation (l_L)

Labour has the largest coefficient of 4.09618, with a very small p-value (< 0.0001), indicating a highly significant and strong positive impact on GDP per capita. This finding aligns with economic theories that stress the importance of labour in production and suggests that the engagement of the working-age population in the labour market is a critical factor for economic prosperity. Based on the coefficient, we can interpret that, 1 per cent increased in labour associated with increase of 4.09618 of GDP per capita, holding other variables constant.

4.3.2. Model Fit and Goodness-of-Fit Measures

The R-squared of 0.996567 suggests that 99.66 per cent of the variance in the logarithm of GDP per capita is explained by the model, which is exceptionally high and may raise concerns about overfitting, although, in a time series context, this could also result from a strong underlying growth trend.

The Adjusted R-squared result is 0.994659, the number of predictors and the sample size, offering a more penalized fit measure, which is still remarkably high, supporting the model's explanatory power.

The F-statistic of 522.4513 is quite large. In general, a large F-statistic is an indicator that at least one of predictor variables in the model is significantly related to the dependent variable.

The p-value associated with this F-statistic is extremely low (8.39e-11, which is practically zero). This means that the observed F-statistic (or one more extreme) is highly unlikely to have occurred if the null hypothesis had been true (for example, if the independent variables had no explanatory power). Given this high F-statistic and the corresponding low p-value, we reject the null hypothesis. This suggests that the overall regression model is statistically significant, meaning that the all independent variables in the model explains variations in the dependent variable.

4.3.3. Diagnostic Checks and Model Assumptions

Test Autocorrelation

The Durbin-Watson result is 1.701158, closing to 2, suggesting no serious autocorrelation concern exists. However, given the time series nature of the data, additional tests, such as the Breusch-Godfrey test for serial correlation, could be conducted for more robust inference.

White test

In this section, we take the White-test to detect the heteroscedasticity in our regression model. The heteroscedasticity happend when the variance of the errors in a regression model is not constant across levels of the explainatory variables. It can lead to inefficiency in the estimates and make the standard errors of the coefficients unreliable, affecting the results of hypothesis tests.

In Table 14, the white-test is related to regressing the squared residuals from the original OLS regression on the original predictors, their squares, and potentially their interactions. The coefficients, standard errors, and t-ratios for each term in this regression are provided, but the primary interest is in the overall significance of this regression, not in individual coefficients. In this case, the degrees of freedom for the Chi-square is 10, corresponding to the number of predictors in the regression (5 original variables and their five squared

counterparts). The test statistic for White's test is TR^2, which in this case is 14.113535. This statistic is distributed according to a Chi-square distribution, where the degrees of freedom correspond to the count of independent variables in the regression analysis used for testing (including the squared and interaction terms).

Table 14: White's test for heteroskedasticity OLS

Using observations 2008-2022 (T = 15). Dependent variable: uhat^2 ($\hat{U}^2$)

Variable	Coefficient	Std. Error	t-ratio	p-value
const	-40.5836	8.87058	-4.575	0.0102
l_MCS	0.015883	0.0114324	1.389	0.2371
l_FBS	0.0020999	0.000360556	5.824	0.0043
l_MNC	16.6783	3.84808	4.334	0.0123
l_K	-0.0251708	0.0273194	-0.9214	0.409
l_L	1.32464	0.775513	1.708	0.1628
sq_l_MCS	-0.00182765	0.00129248	-1.414	0.2302
sq_l_FBS	0.000685966	0.000166908	4.11	0.0147
sq_l_MNC	-1.84109	0.424542	-4.337	0.0123
sq_l_K	0.00520232	0.00556183	0.9354	0.4026
sq_l_L	-0.155682	0.0898662	-1.732	0.1582

Unadjusted R-squared = 0.940902
Test statistic: TR^2 = 14.113535,
with p-value = P(Chi-square(10) > 14.113535) = 0.167876

Given that the p-value is recorded at 0.167876, which surpasses conventional levels of significance (for instance, 0.05), the null hypothesis asserting homoskedasticity is not to be rejected. This outcome implies an absence of statistical evidence against the assumption of constant variance in the error terms as per White's test on the Ordinary Least Squares (OLS) model. Consequently, it is inferred that the presumption of constant variance within the residual terms is maintained for the model, indicating the reliability of the OLS standard errors and test statistics in this context.

The non-detection of heteroskedasticity is interpreted as enhancing the credibility of the model's inferential statistics, such as the t-tests applied to the coefficients. Nonetheless, it is imperative to acknowledge that this examination constitutes merely one dimension of diagnostic evaluation. To ascertain the comprehensive robustness of findings, it is essential that other assumptions underlying the model are similarly examined and confirmed.

The observation of a high unadjusted R-squared value, standing at 0.940902, within the regression of squared residuals suggests a commendable fit of the model to the data. However, the insubstantial statistical significance, as indicated by the p-value of the overall test, denotes that this fitting does not challenge the assumption of constant variance among the error terms.

5. Result and Discussion

This study has utilized an OLS regression model to determine the GDP per capita in Cambodia over the period 2008-2022. The findings reveal significant relationships between the output (GDP per capita) and several key variables such as Technology(mobile cellular subscriptions, fixed broadband subscriptions, mobile network coverage), foreign direct investment, and labour force participation.

5.1. Variable Contribution

Mobile Cellular Subscriptions (l_MCS):

The strong positive relationship between mobile cellular subscriptions and GDP per capita underscores the critical role of mobile technology in economic development. This aligns with the broader literature suggesting that mobile technology enhances economic efficiency, supports small business growth, and facilitates access to markets and financial services (Aker and Mbiti, 2010). The elasticity of GDP per capita to mobile cellular subscriptions suggests that policies aimed at expanding mobile access could have substantial economic dividends.

Fixed Broadband Subscriptions (l_FBS):

Although the relationship between fixed broadband subscriptions and GDP per capita is positive, its statistical significance is weaker. This might reflect the nascent stage of broadband infrastructure development in Cambodia compared to mobile technology. However, the positive coefficient aligns with global findings that broadband penetration is associated with economic growth, primarily through improved business processes, innovation, and access to information (Koutroumpis, 2009).

Mobile Network Coverage (l_MNC):

The negative impact of mobile network coverage on GDP per capita is intriguing. Contrary to expectations, it suggests potential inefficiencies or diminishing returns in network expansion. This may indicate that investment in further coverage does not translate into proportional economic benefits beyond a certain point, possibly due to factors like market saturation or misallocation of resources. This result warrants further investigation and highlights the importance of strategic planning in network infrastructure development.

Foreign Direct Investment (l_K):

The positive association between foreign direct investment and GDP per capita highlights FDI's role in transferring capital, technology, and managerial know-how to Cambodia. This is consistent with the theory that FDI supplements domestic investment and enhances economic growth through technology diffusion and skill development (Borensztein, De Gregorio and Lee, 1998).

Labour Force Participation (l_L):

The significant positive relationship between labour force participation and GDP per capita emphasizes the importance of human capital in economic growth. This finding suggests that policies aimed at increasing labour force participation through education, skills training, and gender inclusion, could have significant economic benefits. It supports the theory that a more engaged and skilled in labour force contributes to higher productivity and economic output (GARY S. BECKER, 1964).

5.2. Theoretical and Practical Implications

The empirical investigation delineated within this thesis, underpinned by an Ordinary Least Squares (OLS) regression analysis spanning the years 2008 to 2022, has furnished critical insights that illuminate theoretical nuances and practical exigencies in economic growth and productivity. These findings, affirming the significant roles of technological progress, capital stock, and labour in influencing the level of output, serve as a cornerstone for advancing economic discourse and shaping efficacious policy formulations.

5.2.1. Theoretical Implications

Endogenous Growth Theoretical Perspectives

This study supports the theory that technology is a crucial driver for economic growth, aligning with the principles of endogenous growth theories (Romer, 1990). The observed positive relationship between technological progress and output illustrates technology's dual role in directly boosting production and enhancing the efficiency of other inputs, challenging the conventional models based on the premise of diminishing returns. Such findings call for a broader integration of technological factors in growth theories to better reflect their comprehensive impact.

Revisiting Production Functions

The significant effects of capital and labour on output reaffirm the core assumptions of economic production function theories (Solow, 1956). The results advocate for a nuanced understanding that transcends mere quantity, highlighting the importance of the quality of capital and labour. Specifically, the empirical significance of labour suggests a theoretical expansion to incorporate human capital dimensions, thereby enriching the analytical models with considerations of education, skill development, and labour quality. However, the data also highlight the need to consider the quality of these inputs, suggesting a shift towards models that account for human capital's role in enhancing productivity, as GARY S. BECKER (1964) advocates.

Human Capital and Productivity

Consistent with human capital theory (Schultz, 1961), the notable impact of labour quality on output emphasizes the importance of investing in education and skill development. This suggests a move towards theories that more closely consider the qualitative attributes of labour and their significant contributions to economic growth. This underscores the imperative for economic theories to evolve, integrating a more granular perspective on labour that encompasses its qualitative attributes and their consequential role in driving productivity and growth.

5.2.2. Practical Implications

Policy Innovation for Technological Advancement

The findings highlight technological progress as essential for economic growth, suggesting that governments should develop policies that encourage innovation and the adoption of advanced technologies (UNCTAD, 2019). Such policies might include financial incentives for R&D, support for startups, and substantial investments in digital infrastructure to foster a technologically innovative environment conducive to economic diversification and resilience. To harness the full potential of technological progress, governments must prioritize the establishment of comprehensive innovation policies. These policies should encompass financial incentives for research and development, robust support systems for startups and technology firms, and significant investments in digital infrastructure. The aim is to cultivate a fertile ground for technological innovation, facilitating seamless integration across sectors and thereby driving economic diversification and resilience.

Strategic Capital Investment

The strategic significance of FDI, as revealed in the findings, points to its role as a source of capital and a mechanism for technology transfer, skill development, and infrastructure improvement (World Bank, 2020). Policymakers are advised to create a welcoming climate for FDI, emphasizing investments in sectors with growth and innovation potential to ensure that FDI acts as a catalyst for economic transformation and enhancement of competitiveness.

Comprehensive Human Capital Development

The importance of labour quality to output underlines the necessity for policies promoting comprehensive human capital development (ILO, 2017). Policies must extend beyond primary education and training, encompassing comprehensive skill development initiatives tailored to evolving market demands. This involves fostering strong linkages between educational institutions and the private sector, ensuring that the curriculum is aligned with industry needs and future technological trends. Investment in continuous learning and professional development programs is crucial to upgrading the workforce's skillset, enhancing productivity, and propelling economic growth. Health and well-being programs should also be integrated into the national workforce strategy, recognizing that a healthy workforce is fundamental to sustaining productivity and innovation.

Implications for Business Strategy

For businesses, the imperative to incorporate advanced technologies, strategically manage FDI, and invest in human capital development emerges as a tripartite strategy for securing competitive advantage and driving productivity (Porter, 1990). Enterprises should leverage FDI for financial capital and as a gateway to technological innovation, managerial expertise, and global market access. This entails creating strategic partnerships with foreign investors, adopting the best technology and operations management practices, and fostering a culture of continuous learning and innovation. Businesses must prioritize workforce development, embracing skill enhancement and professional development as critical components of their growth strategy.

5.3. Limitations and Further Research

5.3.1. Limitations

This study's endeavour to elucidate the impact of the digital economy on Cambodia's development while employing an Ordinary Least Squares (OLS) regression model with GDP per capita as the dependent variable has provided insightful findings. However, it acknowledges several limitations that merit consideration.

First, the model's exclusive reliance on GDP per capita to gauge development presents a constrained view, potentially overlooking broader developmental dimensions such as social equity, environmental sustainability, and quality of life. While GDP per capita is a widely used metric, its ability to fully capture the multifaceted nature of development is limited.

Second, the selection of independent variables, including Mobile Cellular Subscriptions, Fixed Broadband Services, and Mobile Network Coverage, alongside Capital and Labour, although grounded in empirical rationale, might not encapsulate the entire spectrum of factors influencing development. This limitation raises the concern of omitted variable bias, where the exclusion of pertinent variables—such as education quality, health outcomes, or governance quality—could lead to biased coefficient estimates for the included variables.

Furthermore, the dataset, spanning from 2008 to 2022, while offering a temporal depth, may not fully reflect the rapidly evolving nature of the digital economy and its impact on development. The dynamic and fast-paced advancements in technology and digital infrastructure post-2022 are not captured, potentially limiting the findings' applicability to future scenarios.

Lastly, the study's geographical focus on Cambodia, though providing detailed insights into the country's context, limits the generalizability of the findings to other nations with different socio-economic landscapes and digital economy maturity levels.

5.3.2. Further Research

Concerning the limitations identified, several avenues for further research are proposed to deepen and broaden the understanding of the digital economy impact on development. Future studies could benefit from incorporating more development indicators beyond GDP per capita, such as the Human Development Index (HDI) and social development, to provide a more nuanced understanding of how the digital economy influences various aspects of development.

Extending the temporal scope of the analysis beyond 2022 would capture more recent developments in the digital economy, allowing for an examination of the post-pandemic recovery period and the acceleration of digital transformation initiatives worldwide. This extension could yield insights into the evolving impact of the digital economy on development. Moreover, comparative studies examining multiple countries or regions could enhance the understanding of contextual factors influencing the digital economy's impact on development. This analysis would enable the identification of patterns and divergences across different settings, enriching the global discourse on digital economy and development.

Finally, employing advanced econometric techniques and methodologies, such as panel data analysis, instrumental variable approaches, or machine learning algorithms, could offer more sophisticated insights into the causal relationships between the digital economy and development. These methodological advancements would help address endogeneity issues and provide a more robust foundation for policy recommendations.

6. Conclusion

In this diploma thesis, we explored how the digital economy impacts development in Cambodia, focusing on GDP per capita among other independent variables, including technology progress, capital, and labour force contributions.

Our findings present a compelling narrative of the digital economy's transformative power in Cambodia. The significant positive coefficients for Mobile Cellular Subscriptions (MCS) and Fixed Broadband Subscription (FBS) underscore the vital role of digital connectivity and access in stimulating economic growth. The data strongly support the alternative hypothesis that technological progress is positively related to the output level, challenging the null hypothesis of no significant relationship. This emphasizes the critical importance of digital infrastructure in fostering economic development, aligning with global observations on the digital economy's potential.

Conversely, the fact that Mobile Network Coverage (MNC) had a negative effect is interesting and suggests more to the story. As I have once explained, based on data, since 2008, mobile networks have covered 99 per cent, which means almost everyone can use this network. Hence, wasting money to increase this service may not help the economy, and those investments should be made to develop other sectors or new technology will be improved. Even though having widespread network coverage is crucial, how much it helps the economy could depend on other things like how good the service is, how much it costs, and whether people know how to use it effectively. This result makes us think more about how digital services are provided and used by different groups of people in Cambodia.

The analysis further validated the significant positive impacts of capital stock (K) and labour (L) on GDP per capita output, affirming the indispensable role of investment in physical assets and human capital in driving development.

Cambodia's policymakers, stakeholders, and businesses must prioritize strategic investments in digital infrastructure, enhance access to quality digital services, and foster an environment that nurtures technological innovation. Equally important is the need to invest in human capital development, ensuring that the workforce possesses the necessary skills to thrive in a digital economy and to facilitate capital investment that complements technological progress.

In conclusion, this thesis shows the complex ways the digital economy has a positive impact on the development in Cambodia, moving beyond simple stories to a deeper understanding. As Cambodia is working on digitalisation to support sustainable development,

this study's insights show how to smartly combine digital technology with capital investment and labour to produce sustainable economic growth. This research highlights the need to carefully and reasonably use the digital economy's power, ensuring everyone in Cambodia benefits from this growth.

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