



CAMBODIA 2040

ECONOMIC DEVELOPMENT

Edited by
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The Organizations

Future Forum

Founded by Ou Virak in late 2015, Future Forum is an independent think tank that focuses on research, analysis, and public policy, representing a dynamic response to an identified “policy gap” in Cambodia.

While there are various civil society actors in Cambodia engaged with a wide variety of issues, Future Forum takes a broader view and adopts a more measured, analytical and considered approach that identifies underlying trends and employs rigorous research, and creative and principled policy recommendations to help shape Cambodia’s policy discourse.

Rather than simply identifying problems, Future Forum adopts a solution-oriented approach, and uses its research to equip key decision-makers with detailed, specific, constructive policy solutions to Cambodia’s issues. Future Forum remains closely connected to youth and grassroots civil society networks such that it can provide local communities with the benefit of policy, analysis and technical assistance.

Konrad Adenauer Stiftung

Freedom, justice and solidarity are the basic principles underlying the work of the Konrad Adenauer Stiftung (KAS). The KAS is a political foundation, closely associated with the Christian Democratic Union of Germany (CDU). As co-founder of the CDU and the first Chancellor of the Federal Republic of Germany, Konrad Adenauer (1876-1967) united Christian-social, conservative and liberal traditions. His name is synonymous with the democratic reconstruction of Germany, the firm alignment of foreign policy with the trans-Atlantic community of values, the vision of a unified Europe and an orientation towards the social market economy. His intellectual heritage continues to serve both as our aim as well as our obligation today. In our European and international cooperation efforts we work for people to be able to live self-determined lives in freedom

and dignity. We make a contribution underpinned by values to helping Germany meet its growing responsibilities throughout the world.

KAS has been working in Cambodia since 1994, striving to support the Cambodian people in fostering dialogue, building networks and enhancing scientific projects. Thereby, the foundation works towards creating an environment conducive to economic and social development. All programs are conceived and implemented in close cooperation with the Cambodian partners on central and sub-national levels.

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Chapter 1 | Introduction

DETH Sok Udom, Bradley J. Murg,
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Cambodia has experienced drastic changes since the signing of the Paris Peace Accords in 1991. Twenty-five years later, Cambodia is a lower middle-income country with consistently high GDP growth rates and concomitant improvements in human security as measured by the Human Development Index (HDI). The question that Cambodia confronts today is a seemingly simple one, but which is in fact remarkably complex: Whither Cambodia? From energy to industrialization to agriculture, how are the diverse sectors of Cambodian society and the Cambodian economy likely to develop over the next two decades?

As a relatively small country in a region of growing geopolitical and economic importance, how is the kingdom to respond to an assortment of global trends? From the continued rise of China to the effects of climate change to the transition towards a digitalized global economy, Cambodia is set to develop within a rapidly changing global landscape that offers both new challenges and new opportunities.

Set at the intersection between domestic development and global change, will Cambodia in 2040 be a middle-income state with growing prosperity or will it have stagnated at its current, lower middle-income level, or indeed have dropped back to the status of a low-income state? Will the kingdom have adapted to climate change or will it be a victim of its topography? Will a social

welfare system be developed to ensure the dignity and security of all of within the kingdom?

In order to address these and other important questions, Future Forum has partnered with the Konrad Adenauer Stiftung to produce a series of edited volumes examining a number of different areas of socio-economic development, ranging from fiscal policy to the fourth industrial revolution to healthcare. There are three thematic scopes that the series covers: (i) economic development; (ii) culture and society; and (iii) foreign policy and governance.

This is the first book that brings together a collection of experts, utilizing a single methodological framework, in order to set out the potential scenarios that Cambodia is likely to confront two decades from now. Broadly employing a shared foresighting approach each author examines their particular area of expertise in order to illustrate the potential paths that Cambodia could follow. Additionally, as befits a book about the future of Cambodia, each of the substantive chapters has been developed and written by a Cambodian analyst.

Methodology and Structure

Foresighting is grounded in the view that society is neither predictable nor evolutive. According to this perspective, future developments cannot simply be calculated, totting up sums to yield precise predictions as to outcomes in the long term. However, at the same time, foresighting recognizes that the world is not a chaotic place wherein the analysis of potential future trajectories is ultimately impossible. Rather, in this methodology, the future is best understood as “malleable.” Agency exists but diverse macrosocial variables, institutions, and trends ultimately structure the decisions taken by actors. In this middle ground between perfect prediction and pure chaos, it is possible to capture and analyze processes of change.

Based on a focused and systematic analysis of contemporary trends, across a diverse set of societal and technological sectors, these trends can be extrapolated into the future. Hence, by following their respective trajectories it is possible to develop probabilistic scenarios as to the paths that societal change can take. A “scenario” is understood in this context as a description of a possible

future situation inclusive of the path that leads to that situation. At the same time, scenarios are not developed in a way that presents a full and precise picture of the future; rather these are hypothetical constructs built to highlight certain key factors that will drive future developments. These scenarios can then be used to drive discussions concerning contemporary politics and policies such that actors are able to “clear away the brush” and grapple with the key factors that will most significantly impact the development of a particular topic.

Owing to constraints of space, rather than projecting a series of potential scenarios – each author sets out an ideal and a baseline scenario. Defining a particular set of key factors and then utilizing a funneling method, each chapter analyses its area’s salient factors in order to generate the respective ideal and baseline scenarios.

As a methodology, foresighting has historically had diverse applicability across different fields of research – with some being more amenable to such an approach than others. Rather than “boxing in” analysts, this volume recognizes that diversity and approaches foresighting as a methodological toolbox from which analysts can draw in order to best explore the future development of their particular areas of research. Following the foresighting analysis presented, outputs are specified in the form of a set of policy recommendations. Each chapter follows the same narrative, four-part structure:

- 1) ***The Ideal Scenario***, describing the plausible ‘best-case’ outcome for the topic at hand, given that the prescribed policy recommendations are undertaken.
- 2) ***Scenario Space and Key Factors***, containing an analysis of the topic space as defined by the author.
- 3) ***Policy Initiatives to Achieve the Ideal Scenario***. Having defined the topic space and considered the interplay of global trends and local development needs, the author outlines their policy roadmap.
- 4) ***Baseline Scenario: Business as Usual in 2040***. The final section presents the hypothetical outcome for the topic if current practice is to remain in motion.

In addition to these four sections, in order to bring these analyses “to life,” each chapter begins with a brief narrative setting out what one day in 2040 for a random Cambodian citizen might look like under the ideal scenario developed.

Beyond its contribution in the policy arena, we visualize this book as having a second and equally important benefit: supporting the training and development of Cambodian scholars. To this end we utilize foresighting as a guide and structure for a diverse set of local, Cambodian experts to examine key policy questions over the long term. It is not intended to be read as a definitive construction of the Cambodian development pathway. Rather, Cambodia 2040 represents a promotion of analytical hypotheses and outcomes, intended to encourage discourse and debate amongst stakeholders from government to aid partners to citizens.

The Kingdom in Retrospect: Cambodia in 2000

The new millennium ushered in a period of relative stability in war-torn Cambodia. Less than a year earlier, in March 1999, the last Khmer Rouge commander, Ta Mok, was arrested, thereby effectively ending the guerrilla movement that had posed security threats to Cambodia throughout the 1990s. In April 1999, Cambodia was also admitted as the tenth member of the Association of Southeast Asian Nations (ASEAN) after decades-long delay caused by Cambodia’s civil wars, bloody regime changes, and domestic instability.

Thanks to the fragile peace achieved by 2000, the country began to witness signs of modest socio-economic growth. This was evident, for instance, in the rise of official tourist arrival to the kingdom. While 118,183 tourists officially visited Cambodia in 1993, the number rose to 466,365 by the end of 2000. In 2000, there were already 240 hotels and 292 guest houses operating in Cambodia catering to the rising tourist demands (Sharpley & McGrath, 2017, pp. 90–91). Likewise, urbanization and the expansion of Phnom Penh as the capital city began to accelerate: “The real estate market took off significantly after 1998 and grew at a rapid rate between 2004 and 2008. The price of land in central Phnom Penh increased great between 2004 and 2007, from around US\$250 to over US\$2000 per square meter in some key locations” (Percival, 2017, p. 182). At the

time, however, traffic congestion and waste management were presumably not the pressing issues as they are today.

While provision of public general education began almost immediately following the collapse of the Khmer Rouge regime, the establishment of private secondary and higher education institutions only began to mushroom during the early 2000s (the first private university was officially established in 1997), though at the time, quality control and accreditation regulations were scant.

In 2000, only 80,000 persons were estimated to own a mobile phone (CIA World Factbook 2001: Cambodia, 2001); by 2019, mobile subscription has jumped to more than 18.5 million users (when the total population is only approximately 16.5 million). Cambodia also began its e-government initiatives by establishing the National Information Communications Technology Development Authority (NiDA) in 2000, but poor technology infrastructure, low literacy rates, and a high turnover of government IT staff members were the main challenges of such efforts (Richardson, 2017).

According to official statistics, Cambodia's GDP per capita had increased from \$288 in 2000 to over \$1500 in 2018, making Cambodia one of the best performers in poverty reduction (Ministry of Economy and Finance, 2016) – even if, as Young Sokphea pointed out, “[...] the poverty measurement and calculation remain contested” (Young, 2017).

As the Khmer Rouge threat diminished by the late 1990s, “land disputes became the most high profile source of potential threat to peace and stability. Regular disputes occurred, typically between groups of villagers and well-connected companies or individuals whose identity was difficult to pin down” (Biddulph & Williams, 2017). Similarly, thanks to weak governance, the country's natural resources have also become collateral damage of Cambodia's embrace of a market economy. Since the early 2000s, the country has continued to witness rapid deforestation, high profile cases of land evictions, mineral extraction, and environmental degradation. Political tension has also continued to simmer throughout the 2000s, culminating in the dissolution of the main opposition party – the Cambodian National Rescue Party (CNRP) in 2017.

Noting these vast changes – both positive and negative, anticipated and unanticipated – experienced in the kingdom over the course of the last twenty years, the future development of Cambodia will be anything but dull.

The Kingdom at Present: Cambodia in 2020

The utility in this project is derived from the observation that a great deal of growth and development has been achieved in the previous twenty years of Cambodian history. The recommendations made within this series are set against the circumstances of Cambodia as it enters 2020; with a view to the exceptional development it may undertake by 2040. Accordingly, it is necessary to provide an overview of Cambodia at this moment in time.

As noted above, the last twenty years of change in the kingdom have seen Cambodia undergo a considerable economic transition towards the lower middle-income status reached in 2015 (WorldBank, 2019). This growth has been primarily driven by large demands in the garments and tourism industries (ODC, 2019). With an average growth rate of 8% between 1998 and 2018, Cambodia is one of the fastest-growing economies in the world (WorldBank, 2019). The latest figures at the time of writing show that Cambodia's international trade reached \$24.9 billion (MEF, 2019). The kingdom's three biggest export markets are the United States, the United Kingdom, and Germany; while its largest import partners are China, Thailand, and Vietnam (WITS, 2019). With ambitions to break into the upper middle-income bracket by 2030, the policy recommendations made in this book seek to support the continued achievement of this goal.

The poverty rate in Cambodia has continued to fall as economic growth continues to provide an engine for development. With a population sitting just over 16 million, and according to official estimates by the World Bank, the poverty rate has fallen from 47.8% in 2007, to 13.5%. Of this group, over 90% are based in the countryside. The kingdom met its obligation to the Millennium Development Goal of halving poverty. Currently, 76% of the population remain rural.

Cambodia has made substantial improvements in health since its continued policy efforts that began in the 1990s (WorldBank, 2019). The infant mortality

rate has dropped to 46 deaths per 1000 live birth, while the life expectancy has increased to 65 years (63 years for males and 68 years for females). The fertility rate is currently at roughly 2.5 children born per woman, while the maternal mortality rate has fallen to 160 deaths per 1000 live births. Regarding developments in education, net enrolment in primary education has increased from 82% in 1997 to 97% in 2016 (WorldBank, 2019). On average, children complete 11 years of formal education and 80 percent of the population are literate (CIA, 2019). As of 2019, the average age in Cambodia remains young at 24 years old. Prospects for employment remain rooted in garments, tourism, construction, and agriculture.

Beyond Cambodia's internal status at this time, several prevalent mega-trends will determine the future of growth and development within the kingdom. Whereas a trend captures a general direction of change over time, a megatrend captures the major forces in societal development that are predicted to affect all areas over a ten-year timeframe (EFP, 2019). At this time, five megatrends have been identified that will shape the development of global society and economy (PWC, 2019): rapid urbanization; climate change and resource scarcity; a multipolar structure of global power; population growth and demographic change; and technological breakthroughs. Each of these megatrends will have a direct impact on the form and function of Cambodian growth and development.

The Kingdom in Future: Cambodia in 2040

The first volume in this series begins with a wide-ranging analysis as to the economic development of the kingdom. Cambodia is undergoing a rapid economic transformation supported by two decades of strong growth performance. In chapter one, author KRUY Narin provides a comprehensive review of the kingdom's economic development in line with the strategic plans in place to support its continued proliferation. Leaning into the established 'Rectangular Strategy' frameworks, the chapter explores the roles of small and medium enterprises, foreign investment, and trade-related governance, in delivering Cambodia into the upper-middle-income bracket. The chapter well depicts the enormous challenges that confront the kingdom across myriad sectors if upper middle-income status and eventually high income status are to

be attained while also providing a comprehensive perspective highlighting various key factors that are subsequently developed in the following chapters.

In its development towards upper-middle-income status, Cambodia will necessarily reduce its foreign aid dependence and seek to enhance its sovereign fiscal system. In chapter three, CHEAN Sithykun provides an across-the-board overview of the fiscal policy priorities that will support the development of this system. Acknowledging the opportunities presented by new technology, this chapter champions the implementation of a SMART taxation system that will manage efficient revenue capture and encourage a flourishing business and investment environment. With an eye firmly on resilience to economic shocks and the changing Cambodian employment landscape, fiscal policy recommendations are considered through a decidedly Cambodian lens.

In its pursuit of upper middle-income status Cambodia cannot afford to ignore the rapid, global economic transition triggered by the emergence of new technologies in communication, production, and energy. In chapter four, PHU Leewood provides a compelling discussion of the opportunities available to the kingdom for its future industrialization, set within this transition. Topics covered include opportunities for improving the productive means of agriculture, the role of new communications in delivering a more efficient labor matching market, and how industry 4.0 provides new vehicles of energy for enhanced production. Both economic and social implications are examined and make for necessary reading in the kingdom.

Author SOK Kha explores the future of regional economic integration in chapter five and the potential in Cambodia's increased integration within the global value chain as the kingdom continues its economic growth and development. Rooted in the strategic advantage of its Southeast Asian location, the chapter covers the importance of liberalizing trade and market access, and the subsequent role of investment in securing a more dynamic and capable nation. In addition, the role of human capital improvement is discussed as a means of ensuring a sustainable, adaptive, and innovative economy.

Reconceptualizing the topic of economic diplomacy to incorporate changing global economic realities, in chapter six DARAVUTH Sithy Rath and VRAK Thanit

explore the kingdom's options for economic diversification under industrialization 4.0 and set it within the potential for utilizing the machinery of city diplomacy. They explore the role of economic adaptation under new technologies to empower Cambodian development and to deliver a smart, innovative, and digital transformation to Cambodia's urban centers. Subsequent empowerment of the kingdom's diplomatic and economic functions, ushered in under digital-city revolutions, is subsequently highlighted as a means of further economic development opportunity. Through strategic investment and governance in strengthening Cambodia's cities (beginning with Phnom Penh), the authors identify opportunities for an economic and technological "center of gravity" to instigate a reinforcing cycle of entrepreneurialism, foreign investment, national development, and global smart-city collaboration. Drawing on examples from Bristol to Nanjing, this chapter provides important insight as to the powerful nexus between city infrastructure, digitalization, diplomacy, and economic empowerment.

Industrialization and climate change are two decidedly crucial factors determining Cambodia's potential economic growth and development. Emerging at the intersection of the two, and of crucial importance, is energy. In chapter seven, HENG Pheakdey and Maureen Boyle explore the required changes to the Cambodian energy space in pursuit of equitable and sustainable coverage. Of primary interest within the chapter is the need to ensure an affordable, efficient, and accessible electricity supply within the kingdom, underpinned by a complimentary mixture of renewable and traditional sources. Beyond coverage, a comparative reduction in energy demand is considered in line with developing and governing for energy efficient practices within energy intensive sectors.

Cambodia is one of the most vulnerable countries to be affected by climate change; despite its position as one of the lowest contributors thereto. In the kingdom's pursuit of economic growth and development it must find ways to both adapt to and mitigate the challenges both at present and in the future. In chapter eight, OUNG Ty Keithya sets about identifying these opportunities and how they can be implemented. Due to its global implications, Keithya sets his vision for the future within a framework that considers Cambodia's ability to

respond, and the global collectives responsibility to address. He outlines his vision for a prosperous nation against the needs to ensure suitably designed domestic policies for 'green industry', as well as the importance of effective land management governance between agriculture, industry, forestry and residence. With roles identified for the public, the government, and business this chapter provides a comprehensive review of the opportunities available and the policy responses required to take advantage of them.

As Cambodia continues its trajectory towards upper-middle-income, there are a number of changing socio-economic features that raise difficult questions for policymakers. How does Cambodia support an ageing population? How can an economy protect its population in a recession? What are the necessary safety mechanisms to manage external shocks and domestic stresses? In the final chapter, YOU Sotheary sets out to answer these questions. Drawing on examples from Thailand to Kuwait to Brazil, she outlines the future of social welfare protection set amid a growing economy and rapidly changing world. In particular, questions and answers are provided as to the benefit of pension schemes, universal health converge, paternal work leave, and income security for the working age population. Taking into account the competing economic and social arguments, this chapter offers an intriguing overview of the needs for Cambodia as a developing economy.

We expect that this series will be of considerable interest across a range of constituencies, from government ministries to NGOs to bilateral and multilateral aid agencies and could ultimately help to facilitate greater cooperation among these diverse actors while contributing to resolving the perpetual challenge of aid fragmentation and the absence of coordination among the various stakeholders in Cambodia's development.

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Chapter 2 | Economic Development Outlook

Mrs. KRUY Narin

I. Economic Outlook: The Ideal Scenario

From being largely reliant on agriculture, in 2040 the Cambodian economy has developed into one that is industry-based; from being labor intensive and narrow, its economy is now skills-based and diversified. The population enjoys higher standards of living and better conditions in smart and green cities, with access to quality healthcare and education systems, inclusive social security, and efficient public services. Strong political will and bold reform efforts have been key in effectively addressing structural weaknesses to improve the investment climate, reduce business costs, enhance trade facilitation, and address skills shortages. This has provided a conducive environment for Cambodia to strengthen its competitiveness and attract more quality foreign direct investment for economic diversification, with a focus on higher value-added goods and services. Complications and costs regarding doing business in Cambodia have been reduced drastically, with investors well informed of the registration processes that turn over in a matter of a few business days. The removal of unnecessary formal and informal fees has substantially reduced the cost burden for investors, and in turn boosted the competitiveness of local firms so they can provide cheaper products to better compete in both domestic and foreign markets.

Given strong growth performance, the Royal Government of Cambodia (RGC) has been able to mobilize greater resources from tax collection. Public-Private

Partnership (PPP) infrastructure projects have been further expanded, with a robust regulatory framework and the necessary management capacity in place. The government's bond market stands firm and has grown rapidly due to higher domestic savings and substantial inflows of Foreign Direct Investment (FDI), which will have been used as a complementary financing source for public investments in the long term. Infrastructure projects are completed with greater efficiency and under stricter supervision and closer monitoring by a highly capable public investment management unit.

A streamlined and modernized customs administration supports investment and trade growth, with officials providing clearance times and fees on par with international best practice. Port facilities have been upgraded to allow large ships to dock without having to reload to smaller vessels. Systematic port management facilities have greatly improved loading and unloading times, with lower inventory and storage fees. With a well-managed system and capable officers in place, unnecessary customs and port fees are minimal, with the time to clear goods greatly reduced.

As part of the economic diversification process, a long-term agricultural sector development plan has been drafted to accelerate the growth of productivity (both labor and land); diversify other sub-sectors including livestock, poultry, and aquaculture; commercialize agro-processes to increase value in the sector and boost the impact of the investment in their development. Given this comprehensive plan, and improved institutional capacity and greater investment efficiency in the sector, agriculture has returned to strong growth, and now contributes substantially to the kingdom's economic development. In line with increasing living standards, the quality of education and public health services has improved considerably. The RGC has focused on the development of the digital economy by investing in technology and infrastructure to grasp the opportunities brought by the Fourth Industrial Revolution and to reduce the impacts of disruptive technologies, while minimizing cybersecurity risks by assessing the current state of Cambodia's digital economy to identify policies to develop it further. The private sector and large tech firms have been consulted to gather input as the government develops its digital strategy and prepares legal and institutional frameworks.

II. Scenario Space and Key Factors for Cambodia's Economic Development

Cambodia has demonstrated remarkable economic performance over the past two decades, with an average annual growth rate of 7.7%. The kingdom's GDP per capita growth has outpaced the ASEAN average, with absolute poverty down to 2%. This extraordinary growth saw Cambodia achieve lower-middle-income status in 2015. Building on this solid performance with the aim of reaching the next level of development, the RGC has set a target of becoming an upper-middle-income country by 2030, achieving high-income status by 2050, with per capita gross national income of \$3,896 and \$12,056, respectively, based on the World Bank's new classification thresholds. People will enjoy enhanced infrastructure with a better education system and improved healthcare services. Social security will be provided for all, with better integrated and more effective social protection systems in place. Digital adoption will be high in most areas, with people living in smart and green cities.

Realizing such an ambitious plan will demand stronger and bolder reform efforts to address structural issues, such as limited economic diversification, low competitiveness, weak trade facilitation, poor infrastructure, and a lack of skilled workers. The concrete reform measures announced by Prime Minister Hun Sen in 2019 can be seen as the starting point for the government's long-term reform agenda to reduce investors' cost burden and improve trade facilitation, as well as provide an environment conducive for small to medium size enterprises (SMEs) to thrive.

Five sets of key factors underpin the successful transition towards upper-middle income: (i) political, security, and defense objectives to provide an enabling environment for sustainable economic development; (ii) socio-economic objectives in enhancing competitiveness, speeding up diversification process and emboldening reform efforts in all prioritized areas; (iii) socio-cultural objectives in having a national view on national and state development for inclusive growth; (iv) science and technological objectives in reaping the benefits of Industry 4.0 in promoting sustainable growth in the long term; and (v)

environmental objectives in ensuring sustainable development with the conservation of the environment and adaptability to climate change.

As stipulated in the Rectangular Strategy Phase IV, Industrial Development Policy (2015-2025), and SME Policy, the promotion of SMEs and entrepreneurship is viewed as indispensable for economic diversification and sustainable growth in the long term. This is due to their crucial role in driving growth and generating employment, with these entities providing employment to 70% of Cambodians, contributing 58% of national production, and accounting for 99.8% of all firms in the kingdom.

Several policy and regulatory support initiatives have been introduced recently to facilitate the creation of SMEs and enhance their competitiveness and production capacity to ensure they reach their full potential in the long term and further support economic growth. The Ministry of Economy and Finance (MEF) has provided various forms of support to the SME sector including: (i) domestic tax incentives (Sub-Decree No.124) and customs tax incentives (Sub-Decree No.50); (ii) building entrepreneurship ecosystems for potential SMEs and innovative start-up business incubators, and promoting an entrepreneurial culture through the Entrepreneurship Development Fund (\$5 million per year from the RGC); (iii) sourcing finance for SMEs from the SME bank (capital of \$100 million from the RGC); and (iv) co-financing grants for skilled labor training through the Skills Development Fund (\$5 million per year from the RGC in addition to \$9.6 million from the Asian Development Bank).

Further SME support from other government institutions has been complemented by the provision of capacity building and research and development in the ICT sector through the Capacity Building Research and Development fund (CBRD) (\$12 million from the Ministry of Posts and Telecommunications); providing startup development mentorship, technical assistance, and talent accelerators linked to investment by the Techo Startup Center; providing a platform for SMEs to be listed on the Cambodia Securities Exchange's (CSX) growth board to raise funds from capital markets; and promoting inclusive business through strategic mechanisms including coordination, awareness, accreditation, incentives, public procurement,

technical assistance, finance, monitoring, and reporting through the Inclusive Business Enabling Environment for Cambodia (IBeeC) strategy (under the Ministry of Industry and Handicrafts). Providing tax incentives to SMEs for the utilization of technology will be key to ensuring SMEs remain competitive and support growth through the adoption of digital technology to improve productivity and gain access to new markets through e-commerce and digital financial services.

Other regulatory frameworks have been adopted and drafted to provide protection and ensure competition, union rights, and the clustering of SMEs, including the Consumer Protection Law, E-Commerce Law, and Competition Law, as well as the Sub-Decree on Union of SME Association of Cambodia (drafted and in the process of incorporating inter-institutional inputs and finalization under the Ministry of Industry and Handicraft), and the *prakas* on SME Clusters and SME Policy (drafted under the Ministry of Industry and Handicrafts).

SMEs in prioritized sectors will have been incentivized via tax policy to promote development, backward linkages for FDI and exports, innovative startups in the digital and tech sectors, research and development, technology production, SME cluster development, and increased domestic production capacity, as well as to create jobs in agriculture and agro-industry, food processing, manufacturing for local consumption, recycling, and tourism.

Benefits will have included: (i) income tax exemption from three to five years; (ii) minimum tax and prepayment tax exemptions; (iii) deductible expenses allowed up to 150%-200%; (iv) tariff exemptions on imports of production and construction equipment, and raw materials for SMEs producing clean water and exporting raw materials and goods for domestic consumption; (v) tariff exemptions for equipment used for research and development, and innovative ICT development; (vi) tariff reductions for the export of agricultural products; (vii) the launch of the SME bank in 2019 with a start-up fund of \$100 million from the RGC to support potential SMEs for business expansion and employment generation, increased financial inclusion, and the formalization of the SME sector through increased registration; (viii) the launch of the entrepreneurship

development fund in 2019 with available funds of \$5 million per annum to provide financial support, technical support, and training and consulting services for new start-ups; and (ix) further incentive packages and the introduction of additional SME laws after studies by the Ministry of Industry and Handicrafts.

The Ministry of Education, Youth and Sports' (MoEYS) Higher Education Vision 2030 policy was developed and implemented to build a quality higher education system that develops human resources and provides the level of knowledge, skills, and moral values necessary to work and live in an era of globalization and a knowledge-based society resulting from higher standards of education. The policy calls for an updated curriculum that includes the provision of science and IT skills, improved teaching standards, and upgraded materials and facilities.

For skills development, the National Policy on TVET 2017-2025 and the Skills Development Fund were piloted to deal with limited labor market information, as well as supply-driven quality, planning and capacity challenges to bridge the current skills gap by putting in place the necessary action plans and M&E mechanisms.

III. Policy Initiatives to Achieve the Ideal Scenario

In an ideal scenario, Cambodia in 2040 will be in the latter stages of transitioning from upper middle income status in 2030 to achieving high income status by 2050, with a great deal of attention paid to investment attraction and SME development. Other sectors will have provided an enabling environment for investment to grow, competitiveness to be strengthened, and diversification to be sped up.

There are several overarching features that need to be addressed in the short-term to attract greater quality investment and create more SMEs to facilitate long term growth and achieve the ideal scenario in 2040. They include: (i) removing Kampuchea Shipping Agency and Brokers (KAMSAB) and terminating permanent role of CAMCONTROL checks from borders, airports, and ports; (ii) reducing logistics costs, and handling and port service fees and charges; (iii) reducing energy costs by two cents per kilowatt hour for industrial use, with

further reductions in the near future; (iv) improving trade facilitation by issuing computerized invoices for service charges by customs officers that can later be used as deductible expenses and to remove broker overcharge by being counted as an official fee, removing 50% of container scanning fees, allowing certain scanning exemptions for best traders and scanning done at dry ports, and reducing the number of restricted goods, while launching a national single window service and improving trade efficiency by using information and communications technology (ICT); (v) reducing repetitive auditing functions; (vi) providing tax incentives to boost agriculture development; (vii) finalizing amendments to the investment law and the law on special economic zones (SEZs); (viii) simplifying business registration processes by using IT platforms to consolidate procedures; and (ix) diversifying export markets in order to reduce vulnerability to external shocks. In addition to these features of change, each previously outlined key factor has a range of interventions that require discussion.

Politics, Security and National Defense

Cambodia aims to have in place a democratic political system based on the rule of law and strengthened political institutions by 2030, with further democratic consolidation through 2040.

Necessary policy steps to ensure attainment of upper-middle income in 2040 require Cambodia to: (i) continue building a culture of democracy, underpinned by the necessary institutions and governance mechanisms; (ii) ensure a free, fair, and multi-party election system with international oversight; (iii) promote political equity through a culture of dialogue; (iv) continue ensuring freedom of the press and freedom of speech in accordance with the legal frameworks; (v) strengthen the capacity of political institutions, with the clear delegation of tasks within a system of checks and balances; (vi) strengthen the capacity of officials in each institution and the quality of policy discussion; and (vii) regularly improve the functional roles of the public institutions of government, at both the national and sub-national levels.

The RGC aims to have developed effective and transparent political institutions by 2030, and have in place robust, transparent, and accountable public

institutions. The government needs to ensure that it will: (i) establish suitable incentive mechanisms for public institutions; (ii) continue a campaign against corruption by promoting a culture of intolerance to all forms of fraudulent conduct; (iii) continue promoting public administration reforms toward the establishment of a performance-based system; (iv) enhance professionalism in the provision of public services; and (v) continue democratic reforms at the sub-national level through promoting accessible public services close to communities.

Fostering a climate of rule of law, especially regarding public order and criminal, civil, and business law based on regional standards, needs to be strengthened by 2030, with judicial system standards in line with international practices covering the entire legal framework developed by 2040. To this end the RGC can: (i) continue formulating laws and regulations with suitability, consistency and enforceability; (ii) strengthen the capacity of law enforcement officers through promoting skills and integrity; (iii) strictly implement professionalism in the legal system; (iv) improve accessibility to legal services, especially for the poor; and (v) promote specialization in the provision of legal services, with a focus on quality and the eradication of corruption in the judicial system.

National defense institutions including the military will be reformed, with the strengthening of foreign affairs and international cooperation continuing until 2030, as the government aims to have national defense and foreign affairs institutions in place by 2040 that meet the requirements of the 21st century.

The RGC can: (i) implement policies to build the next generation of its armed forces; (ii) review national defense strategies, especially in the context of modern warfare; (iii) promote foreign affairs and international cooperation with regard to political and economic security between the kingdom and other countries in the region and the world; (iv) strengthen bilateral, multilateral, and international relations to protect Cambodia's interests; (v) improve information collection and analysis along with other mechanisms to be able to respond to an evolving international context; (vi) establish systems to share information and perspectives on foreign affairs; (vii) and promote bilateral collaboration by signing memorandums of understanding (MoU) on the sharing of information

on trade, human and drug trafficking, money laundering, double tax agreements, and terrorism.

Socio-Economic Sector

To become an upper-middle income country by 2030 and achieve high-income status by 2050, the RGC will need to have pushed forward the necessary structural and governance reforms to maintain robust sustainable growth in the long term, with economic resilience against domestic and external risks and uncertainties. Key policy focuses can be prioritised to: (i) maintain political, macroeconomic and financial stability; (ii) increase competitiveness and encourage diversification through boosting the productivity and value of existing industries, as well as easing the setting up of new enterprises by lowering energy costs and removing unnecessary fees, improving the business climate and trade facilitation, strengthening economic and social infrastructure, addressing the skills gaps by improving the quality of education and promoting technical vocational training, and implementing growth-supporting tax policies; (iii) fully commit to managing macro-financial risks, safeguarding fiscal sustainability, supporting inclusive growth, and addressing governance vulnerabilities; (iv) strengthening the rule of law and regulatory frameworks to encourage greater investment in the industrial sector; (v) enhance the capacity of the state in efficiently providing public goods and services, and to improve governance; (vi) strengthen public financial policies that focus on the equity of tax collection and revenue redistribution; (vii) maintain price stability and restore monetary policy independence through gradual de-dollarization; (viii) enhance domestic saving mechanisms to reduce the dependency on capital inflows for investment; (ix) continue strengthening the securities market to promote corporate governance, encourage domestic investment, and ensure business sustainability and (x) increase the use of Public Private Partnerships (PPP) for infrastructure and energy development to support sustainable growth.

In the ideal scenario, the Cambodian economy will be fundamentally competitive by 2030, and competitive at the regional and global levels by 2040. Key policy items to consider include: (i) the promotion of entrepreneurship and local business creation through human resource development and improved

knowledge and skills, as well as engendering a culture of entrepreneurship; (ii) the continued establishment and development of SMEs by creating joint public services to enable their swift creation; (iii) the improvement of product standards, with a focus on safety, quality, and the environment; (iv) the continued strengthening of competition based on regulatory and institutional frameworks, the protection of the rights of investors, and the implementation of competition and antitrust laws, supplying reliable consumer protection, the protection of intellectual property rights, and social and cultural protection, as well as environmental protection, among others; (v) the continued maintaining of job market stability; (vi) the further building of necessary infrastructure to reduce the cost of Cambodian products, and the development of new industries with high value and innovation; (vii) the strengthening of public institutional capability in market information collection, impact analysis, and assessment, the implementation of business-related laws, and involving the government in creating value and pushing market competition capability; and (viii) the encouraging of private businesses to invest in skills and innovation.

Cambodia will have continued to improve the quality of its education and public healthcare sectors to near that of the regional standard by 2030, supplying quality, trusted and professional services, while it will have matched or surpassed the regional standard by 2040 in an ideal scenario. The RGC will have continued to: (i) ensure access to basic education for all and improve learning at all levels; (ii) frequently update a curriculum that includes the acquisition of the skills, as well as the science and ICT learning, needed by the labor market; (iii) pay greater attention to teacher welfare and boost the performance of those in education; (iv) provide high-standard learning and teaching materials; (v) promote the role of higher education as a center of knowledge and research, leading new research aligned with Cambodia's economic development; (vi) maintain the achievements in the health sector, particularly in providing basic health care services; (vii) cut down on out-of-pocket healthcare expenses by strengthening the equity fund and increasing health insurance coverage; (viii) improve the quality of treatment and nursing available at public hospitals; (ix) promote medical research in the context of technological advances, and encourage the domestic production of drugs and medical equipment; and (x)

strengthen the overall management of the health sector in order to increase public trust and transform Cambodia into a medical tourism destination.

The RGC will have aimed to see poverty eradicated and social security for all in place by 2030, with social protection policies fully implemented, including social assistance and social security, by 2040. The RGC will (i) implement the National Social Protection Policy 2017-2025 step by step, focusing on universal pensions and health insurance, as well as the provision of workplace social assistance; (ii) ensure operational efficiency in the institutional mechanisms of social protection; and (iii) promote sustainable financing that supports social protection policies.

Social-Cultural Sector

The RGC will want the Cambodian people by 2030 to have a unified view of national and state development, with a national perspective on the kingdom's position externally by 2040 as it participates regionally and internationally. The RGC will therefore need to: (i) prepare dissemination and communication frameworks for directing people's behavior in daily life, with business and governance rationalizing decision-making and the direction of future development; (ii) research, discuss, and build consensus on the "Cambodian dream" for the 21st century, especially among the young; (iii) research and discuss capacity building to improve the social progress open to different nationalities and cultures in the context of globalization and regionalization; (iv) manage the expectations of the Cambodian people so they understand their individual role in contributing to the national development process; (v) promote participation in building the nation through respecting laws, protecting national interests, building national institutions, and protecting the environment; (vi) assist those seeking further knowledge and skills to increase community and country development; (vii) champion the "role model" at all levels with the aim of creating upstanding citizens, businesspeople, police officers, and civil servants etc.

National identity and cultural heritage will be well preserved and developed by 2030, with Cambodian culture further developed through wider recognition at the international level by 2040. The RGC will: (i) promote the preservation and

development of national identity and culture; (ii) prepare legal frameworks, policies, and institutional mechanisms to embed all forms of culture into education, daily life, social institutions, new buildings, and other physical infrastructures; (iii) prepare national policy for the incorporation of positive elements of foreign culture into Cambodia's; (iv) prepare national policy as to the development and preservation of culture and art in line with societal evolution; (v) prepare mechanisms and policies aimed at enhancing ancient Khmer artforms and crafts; (vi) continue to invest in the preservation of Khmer culture to ensure its continuation; (vii) push for international cultural exchanges, and invest in artists and those skilled in cultural craftsmanship; (viii) strengthen activities promoting national identity and local culture; (ix) prepare a system for the management of national identity and culture, with the compiling and publishing of research, as well as launch further studies into cultural inheritance and national identity; and (x) reinforce the use and teaching of the Khmer language internationally, and strengthen human resources in promoting national identity and culture to be passed on to future generations.

In an ideal scenario, social infrastructure in both urban and rural areas will be comprehensive, better executed, and more efficient by 2030, and highly efficient and cutting edge in line with technological advances by 2040. The RGC will: (i) pay greater attention to urban infrastructure, particularly sewage, flood and waste management; (ii) implement an integrated urbanization master plan for smart cities to address urban challenges in the context of economic, social, and technological advancements, as well as climate change, with greater management of urban transportation and traffic measures; (iii) push for the creation of national programs to provide affordable housing in major urban areas; (iv) promote pleasant urban surroundings; and (v) protect the environment.

The RGC will have built the foundations for an inclusive society by 2030, with Cambodia a fully inclusive society by 2040. Priority areas should be: (i) to prepare specific frameworks and mechanisms to provide opportunities to engender dignity among the whole population, especially regarding women's participation in the economic, social, political, and cultural sectors; (ii) to prepare mechanisms for Cambodians abroad to contact and gather competent compatriots to take

part in the kingdom's development; (iii) to create programs to reintegrate Cambodians who have worked abroad for long periods; (iv) to continue paying attention to the welfare of the disabled; (v) to promote the rights of indigenous people; and (vi) to progressively support the welfare of prisoners.

Science and Technology

The RGC aims to have built sufficient fundamental infrastructure for the development of the science and technology sector by 2030, and have developed a society based on science and technology to reap the benefits of Industry 4.0 by 2040. Policy priorities will be: (i) to reduce the gap in digital connectivity as much as possible by improving the availability of fast, low-cost internet connection; (ii) to continue expanding the energy network and move toward renewables for sustainable energy development; (iii) to enhance digital infrastructure management systems; and (iv) to increase investment to expand the establishment of public and private educational institutions providing training in science and technology.

The RGC will have to set up frameworks for science and technology and related research institutions by 2030, and will have increased the number of those involved in science and technology by 2040. Key policy items include: (i) to increase human resources in the science and technology sector; (ii) to enhance interdisciplinary research capacity at universities; (iii) to encourage and promote doctoral training programs at all public universities by focusing on priority majors; and (iv) to continue to increase training in science and technology in line with global trends.

Cambodia will need to have formulated policies and regulatory frameworks to develop technology and related industries by 2030, and will have put in place the necessary frameworks to support science and technology by 2040. The RGC will: (i) establish regulatory procedures for the management, support, and adoption of science and technology; (ii) create mechanisms for financing entrepreneurship and business innovation, and encourage public interdisciplinary research; (iii) direct employment policy to align with the changing global context, such as jobs being replaced by automation; and (iv) improve the governance of science and technology sector policy by creating

regulations and institutions that strengthen the management of data flows, data protection, digital security and privacy, licensing, and intellectual property rights, as well as boost research into artificial intelligence and financial technologies (Fintech), etc.

Natural Environment

The RGC aims to see an end to water-resource disputes by 2030, and have effective management systems in place by 2040. In order to meet these targets it will be necessary to: (i) formulate effective policy frameworks for the entire water resources management system, for agricultural irrigation and climate change adaptation; (ii) implement long-term agricultural development plans using the latest technology to increase yields in line with developments in global production; and (iii) establish responsive crisis assistance mechanisms.

The kingdom's environment and ecological systems are to be stable and thriving by 2030, with their sustainability ensured by 2040. For this to be achieved, the RGC will need to: (i) accelerate the conservation of the environment and ecological systems; (ii) conserve ecosystems while utilizing natural resources sustainably and maintaining environmental systems; (iii) promote the management and use of low-carbon technologies to support sustainable development; (iv) reduce vulnerability and increase the resilience of communities impacted by climate change; and (v) improve knowledge and understanding on the responses to climate change.

If Cambodia is to be well prepared for climate change by 2030 and able to implement adaptability measures by 2040, further reforms are required. The key policy priorities are to: (i) manage social and economic infrastructures to mitigate the effects of climate change; (ii) build infrastructure, roads, transportation systems, and distribution channels that align with climatic conditions, and ensure sustainable economic trading processes; (iii) promote resilience to climate change through improving food, water, and energy security, and increase the resilience of infrastructure systems, as well as ensuring strategic production to meet the impacts of climate change; (iv) promote adaptations in social protection and participatory methods in reducing losses due to climate change; (v) build institutions and coordinating frameworks to

respond to climate change at the national level; and (vi) actively participate in regional and international efforts to tackle the effects of climate change.

IV. Economic Development Under the Baseline Scenario: Business as Usual in 2040

The business-as-usual scenario indicates that the kingdom will miss both the upper-middle-income and high-income status targets. By 2040, the country's economic outlook could be significantly worse off without the implementation of major reforms. Cambodia could remain a lower-middle-income country or even return to low-income status if the economic base has not been substantially broadened and diversified. Industry level competitiveness remains minimal partly due to inadequate physical infrastructure and trade facilitation. In this scenario, the kingdom has not brought about the requisite improvements in standards across public education, healthcare, and security.

With poor levels of technology adoption and a low-skilled labor force present in 2020, Cambodia needed to grow at the rate of China to meet the medium-term target of attaining upper-middle-income country status by 2030 (Spiess, 2018). Cambodian investment needed to increase to 33% of GDP, from the current level of 22% of GDP as in 2017, and savings needed to reach 28% of GDP from 13% for the kingdom to reach high-income status by 2050.

Achieving these ambitious long-term goals by sustaining strong growth has proven beyond the kingdom's capacity as a result of ongoing structural issues, limited fiscal space, and institutional capacity problems. In addition, Cambodia has undergone a number of undesirable transitions including: (i) the uncertainty of trade preferential treatment ; (ii) an escalation of U.S.-China trade tensions leading to prolonged global protectionism; (iii) slowed growth in China that disrupted investment; (iv) elevated financial sector vulnerabilities stemming from strong credit growth in the real estate sector, and (v) worsening extreme weather conditions that disrupted agricultural output.

Diversifying the economy while at the same time upgrading its value add is not an easy task, with public sector capacity realistically not able to match the stated ambitions and weakening investment sentiment in this scenario. The 2015-2025

industrial development plan has not yielded much progress due to limited institutional capacity in its implementation, as well as weak institutional coordination across the relevant agencies.

Attracting new quality investments and expanding existing ones has decelerated due to bureaucratic practices, less efficiently used fiscal incentives, the absence of amended investment laws, a low-skilled labor force, and weakening investment sentiment brought about by intensified trade tensions between the US and China. Meanwhile, integrated multi-year development plans in existing sectors (tourism, logistics, transportation, telecommunications, agriculture, urban development, and energy) have not been well developed, while implementation capacity remains questionable in stimulating better contributions to the economy.

Drastically improving infrastructure to better support growth in the long term would demand a huge amount of financing. This would most likely be viewed as impossible given Cambodia's limited fiscal space, declining concessional loans and grants, and limited financing sources from the private sector. Government revenue has very limited room for growth amidst a weakening investment position, while demand for spending will keep growing over time to meet the implementation of social protection systems, infrastructure needs, and improvements to public services. Going forward, Cambodia will depend more on external financing with higher costs of borrowing to respond to infrastructure development needs, while PPP schemes have only begun, regulatory frameworks and managing capacities newly developed, and government bonds still in their infancy. Consequently, the existing mechanisms introduced in 2019, in the absence of the substantial reforms, are unlikely to deliver the desired level of economic growth and development as stipulated in Cambodia's long-term visions.

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Chapter 3 | Fiscal Policy

Mr. CHEAN Sithykun

Dara has recently relocated the headquarters of his digital marketing company to Phnom Penh. Encouraged by the growth of industry in the kingdom, the move was largely motivated by the low level of corporate taxation when compared to his previous base in the region. This additional revenue for the company has been instrumental in the firms' recent success. The ability to invest in the latest software and training has led to a reputation for quality that is now in high demand: so high that the team has doubled in personnel. Thankfully the national e-payroll system is streamlined to reduce the burden on companies. One code per company, one code per resident, easy to track for Dara, and easier to collect for the administrative system.

I. Fiscal Policy: The Ideal Scenario

As a result of extensive and progressive reforms by the Royal Government of Cambodia (RGC) to enhance tax administration procedures and the fiscal system, fiscal policy in the kingdom has seen a remarkable transformation in operating efficiency and institutional systemization.

Of particular note is the impressive addressing of tax revenue collection. Collected tax revenue now averages 86% of total national revenue, with more traditional means of income, such as foreign aid, now contributing only a small proportion of total government revenue streams.

As well as having significantly developed its tax revenue mechanisms, Cambodia has created a smart tax system designed to insulate against shocks and work

toward the equitable redistribution of national income to meet development goals and provide public sector security.

A resilient tax system is one designed in such a way that it can rebound from benign influences and/or external shocks to recover tax revenues quickly (Miranda 2015). Such a system also ensures adaptive capabilities in response to unexpected changes in circumstance and the consistent evolution of societal patterns across areas including advances in investment portfolios, saving patterns, and technology (ibid).

Revolution 4.0 will create further opportunities for Cambodia to generate greater tax revenues. The digital economy will create further business interaction, thereby increasing productivity and competitiveness. Changes in the way people do business, think, and behave will positively impact revenue collection as awareness of the benefits of tax compliance increases.

Yet with thousands of traditional jobs likely lost due to the Fourth Industrial Revolution and new high-skilled roles in strong demand, it will be necessary to have measures in place to mitigate the impact thereof, such as the provision of training for low-skilled workers and the creation of other opportunities for those individuals.

With targeted fiscal procedures and system development, domestic tax revenues will have grown to become the primary source of government funding in Cambodia by 2040. This will have been enhanced by the declining costs of tax collection, becoming on par with global standards. A more efficient taxation system has worked to address previous asymmetries and to command a stable, predictable revenue stream.

The main objectives of Cambodian fiscal policy in 2040 will be to keep the rate of inflation at between 2% and 3%, and to stabilize the kingdom's macroeconomic environment. Predictability is paramount to maintaining productivity and progress under the institutionalized approach. Taxation is utilized as the main tool of fiscal funding and contributes an average of 86% to the total national budget. Government spending is focused on meeting national development objectives and the pursuit of equitable redistribution.

Accordingly, it has seen year-on-year increases as the system ensures a more consistent stream of domestic income. Foreign debt still remains a feature underpinning national spending, but this has levelled out at around \$ 5 billion. The primary shareholder of this debt is China, with around 40% attributed to targeted infrastructure investment programs in the kingdom.

Five key factors will ultimately determine the path of development as regards fiscal reform:

1. The RGC will have increasingly pursued a systematic process for ensuring tax collection. Individuals and organizations that have remained noncompliant are subject to tax levies on personal income, luxury products, and corporate tax.
2. A reduction in the corporate tax rate of around 15% will have been utilized to lure more Foreign Direct Investment for the country.
3. National treasury bonds will be issued to raise public finance internally. This is enhanced, when necessary, by holding foreign assets, and finance procured from international financial institutions such as the World Bank, the Asian Development Bank, or the Asian Infrastructure Investment Bank.
4. The implementation of a comprehensive tax reform package to increase government spending and stabilize the macroeconomy.
5. Taxes and government expenditure will be seen as key strategic fiscal tools for pursuing government objectives.

Through these five key factors, the future of Cambodian fiscal funding will have been strongly reformed to target taxation and foreign borrowing to offset government spending and deficit funding. Taxation remains a key instrument of fiscal funding and the capability of the government in responding to rapid global economic, societal geopolitical changes, resilience to the shock is questionable for the next 20 years.

The world economy in 2040 has changed as well as the regional and national level. In the context of Cambodia, government spending remains continuous to meet spending demands on public goods desired by its citizens – noting here the increased percentage of elderly Cambodians not in the active labor force.

As evidence, government spending in 2018 was 24.2% of GDP, while revenue was 22.3% of GDP (World Bank 2019). This makes fiscal funding more challenging and policy objectives toward an inclusive economic growth will not be easy to achieve. There might also be questions as to how to structure taxation and whether central or local government mobilizes revenues.

Tax revenue is one of the main revenue sources available to the government to fund its expenditure, accumulated year on year. The stimulation of economic growth with macroeconomic stability, full employment, and low inflation is the main objective for economic policymakers.

Taxation has been used as one of the key instruments for the government to mobilize funds. The simplification of the tax system, reducing tax erosion and tax evasion are challenges for every country. Some countries have done far better than others in modernizing and comprehensively reforming their tax system to lure foreign investors.

However, many have lost significant revenue from tax erosion and evasion because of weaknesses in the tax system and its administration. To overcome these challenges, having clear tax policy objectives, good governance in revenue administration, and global tax system integration are crucial for all countries.

The globalization of the tax system remains a subject of debate among states. Both developed and developing countries continue to face violations of their laws. A unified and globalized tax system could help countries eliminate tax evasion and Base Erosion and Profit Shifting (BEPS).

Carnahan (2015) states that the nature of economics has changed due to globalization, with tax authorities facing challenges in raising income as individuals and multi-cooperative companies allocate profits and arrange their affairs so revenues can be hidden. The Automatic Exchange of Information (AEOI) seeks to address these issues; however, the extent of members'

awareness is still insufficient to act on this initiative (ibid). This means developing countries need to invest more in human and physical capital to meet the standards required by developed countries, investing in technology, standardized regulations, and cybersecurity platforms, which represents an expenditure burden for such countries.

II. Scenario Space and Key Factors for Fiscal Policy

Cambodia's economic development post-conflict has seen progressive and measured change since 1993. Not only has the form of the structural economy changed, the political system also shifted from communist to democratic principles. From step to step, there have many mechanisms and stakeholders involved underpinning the government's economic development policies. Some argue that Cambodia's rapid growth has been both unusual and volatile (Hal & Jayant, 2014). This could point to implications in development, including landscaping, people replacement, and natural resource distortion.

The stages of Cambodia's development can be summarized in the form contained in Table 1 Below.

Table 1. Stages of Cambodian Development

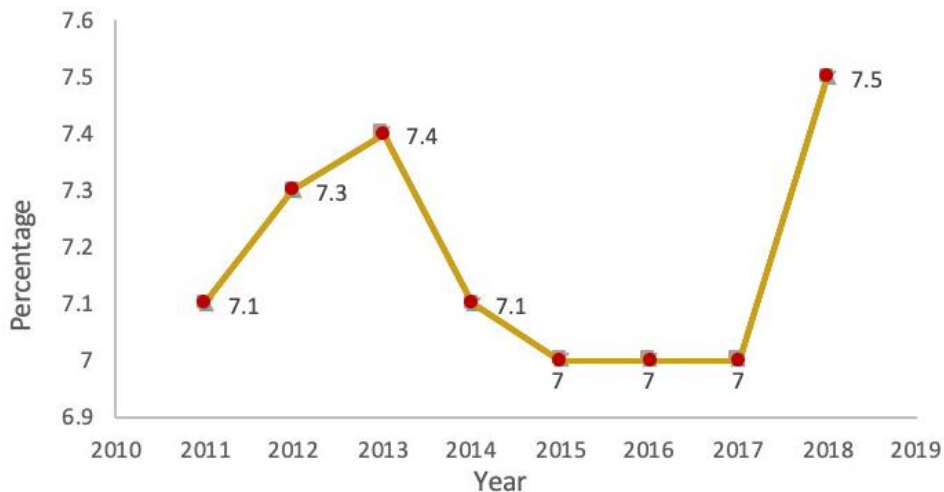
Year	Structural Economy	Fiscal Policy Implementation
1993-2013	Agricultural-based economy	Expansionary
2013-2018	Agricultural & labor-intensive industry	Expansionary
2018-2030	High value-added industry	Expansionary
2030-2050	Knowledge-based economy	?

Shifting from a labor-intensive to a high value-added or knowledge-based economy can be challenging and an unrealistic goal if clear directions are not outlined and policy objectives not critically defined. It requires the government to invest greater capital to modernize and improve physical infrastructure and human resource development through skills training and job creation.

Cambodia's unprecedented growth has relied on conventional economic drivers, i.e., construction, agriculture, garment manufacturing, and tourism, with a small threshold from service industries. While the global economy becomes more competitive with a race for technology, it is not realistic for these to continue contributing such a large proportion to national income in the future. However, shifting the structural economy from agrarian to high value-added is not simple.

Reviewing key indicators of economic achievement, Cambodia has achieved economic growth of around 7% annually since 2011. In a preliminary estimate by the World Bank Group (2019), real growth reached 7.5 per cent in 2018, an increase on previous years (see in figure 1).¹ Crucially, individual household income per capita has gradually increased to \$1,230 in 2017 from \$750 in 2010 (see figure 2).²

Figure 1. Annual GDP Growth (2010 – 2019).

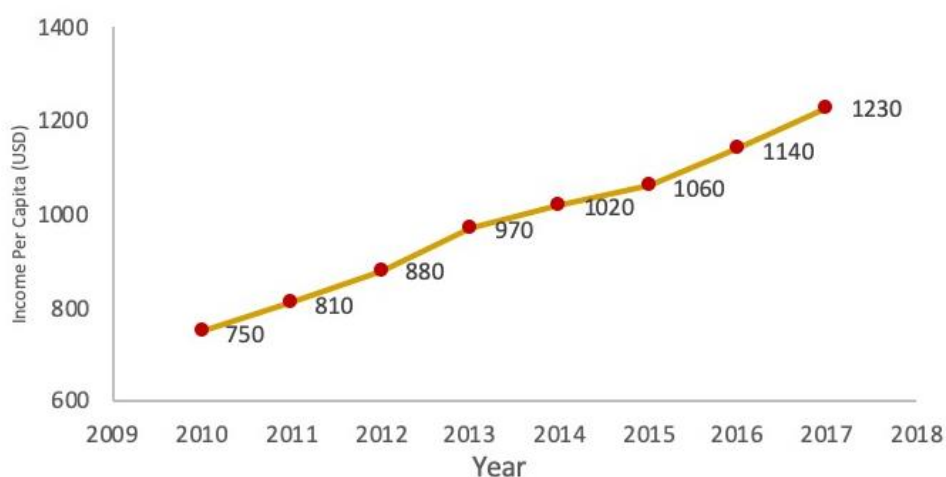


¹ Recent Economic Development and Outlook, Cambodia Economic Update, World Bank Group May 2019

² GNI per capita, Atlas method (current US\$), retrieved from <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?end=2017&locations=KH&start=2010>

Even with an annual average growth rate of seven percent, income per capita has been lower than that in other countries in the region. According to the country's strategic plan, the current government aims for Cambodia to reach upper-middle income (\$3,956 to \$12,235)³ status by 2030, before becoming a high-income country by 2050 (>\$12,235). Driving the economy to meet the 2030 and 2050 objectives requires credible and strategic economic policies and comprehensive public service administrative reforms.

Figure 2. Household Income Per Capita (2009 – 2018).



From 2010, it took Cambodia only seven years to move from low to lower-middle income country status. However, it is questionable whether there will be sufficient time for the kingdom to meet the ambitious 2030 and 2050 goals. Income per capita would have to increase three-fold in the thirteen years from 2017 to 2030 and nine times in the next thirty-three years.

Tax revenues have gradually increased over the past decade. This has been driven by reforms in tax administration and registration procedures and improving the ability of individual tax officials to mobilize tax revenues. In percent of GDP, the share of tax revenue has increased from 12% in 2013 to

³ World Bank Data Team, July 2017, Retrieved from <https://blogs.worldbank.org/opendata/new-country-classifications-income-level-2017-2018>

16.9% in 2017, with 17.2 per cent projected for 2019 (IMF Report 2018). Despite significant progress, achieving fiscal sustainability requires modernizing revenue administration and strategic policies to underpin the economy and improve equity and efficiency (ibid).

Efficiency in tax collection is one of the key performance indicators for tax administration, and a major factor in determining the realities of Cambodian fiscal policy in 2040. In this context, efficiency means maximum tax revenues with minimum tax expenditure. Miranda (2014) states that under the global standard, efficiency in tax collection means that only one US dollar is spent to collect one hundred dollars of tax revenue.

In theory, tax revenue and GDP growth are both positive correlations. However, these are decoupling in some countries, mainly due to a rise in tax expenditure (OECD, 2016). In this respect, transparency in tax revenue and expenditure is crucial to improving efficiency in tax collection. Tax collection targets in Cambodia can be overestimated or underestimated, while tax expenditure has never been publicly disclosed.

Despite increasing tax revenues, government expenditure has also increased annually. In the IMF report, public sector expenses are accumulating, with a large proportion of government spending going on the compensation of employees (IMF 2018). This continues to grow year-on-year in tandem with projected GDP growth.

This means government operations are less efficient, which needs to be tackled by focusing on cost control rather than cost-cutting. The government budget should be spent on priority sectors that align with the strategic development policies of the country-budget policy linkage. Therefore, all stakeholders need to be more engaged to prepare for what lies ahead and to overcome difficulties, especially as global economic competition intensifies.

An imbalance between government revenues and expenses creates challenges for policymakers in making decisions regarding the design of asymmetric policies between the budget and sectoral priorities of the government.

In 2018, public external debt was around 31% of GDP, close to the borrowing ceiling as stated in the budget law. This debt has increased unprecedentedly recently, and it is likely to further climb with the government needing additional funds to cover expenditures.

Grants also contribute to government revenues -- around 1.5% of GDP. These are predicted to gradually decline to less than 1% of GDP from 2020 onward (IMF, 2018). Grants and public debt moving in the opposite direction creates concern regarding the future of the kingdom's fiscal funding.

In addition, the equilibrium of the global economy has been threatened by the world's two principal powers competing in a trade war; a fragile liberal trading system; democratic recession; the rise of populism in developed countries; fast-growing information and communications technology (ICT); changing demographics; and climate change.

As described by Karl Marx, global or domestic political struggles result from a conflict of economic interests as each economy competes to gain more and more economic benefits (Francis, 2018). These demands force the development of economic policies that not only focus on macroeconomic stabilization but also on resilience to shocks. With future uncertainties, economic policies should focus on balancing growth and sustainability objectives (IMF, 2019).

There are additional key factors that result in uncertainty as regards the 2040 scenario outlined above. Slowing growth in developed countries is likely to have an impact on emerging economies -- most of them export-oriented countries. Moreover, rapid urbanization and changes in the structural economic sector in low and middle-income countries has depleted natural resources and resulted in the dislocation of the free flow of labor and goods that are the main inputs of the industrial sector. All of these factors make it harder for developing countries to achieve inclusive growth.

Burkhardt & Bradford (2017) comment that governments are too slow in responding to economic and societal changes, with most decisions being made without consulting other stakeholders. Governmental responses are often made by individual departments and fragmented by the levels of government and different departments (ibid).

Whether the current government's ambitions of Cambodia become an upper-middle income country by 2030 and reaching high-income status by 2050 are realistic or not depends on successful governance and economic reforms by the state.

III. Policy Initiatives to Achieve the Ideal Scenario

The key factors in the pursuit of Cambodian fiscal policy reforms are: (i) maintaining a sustainable fiscal balance; (ii) increasing budget allocation for the social and economic sectors; (iii) limiting rationalized public expenditure; (iv) preventing revenue leakage; (v) maintaining price stability in the dollarized economy; and (v) ensuring a level of government spending in line with macroeconomic stability (CDC 2019).

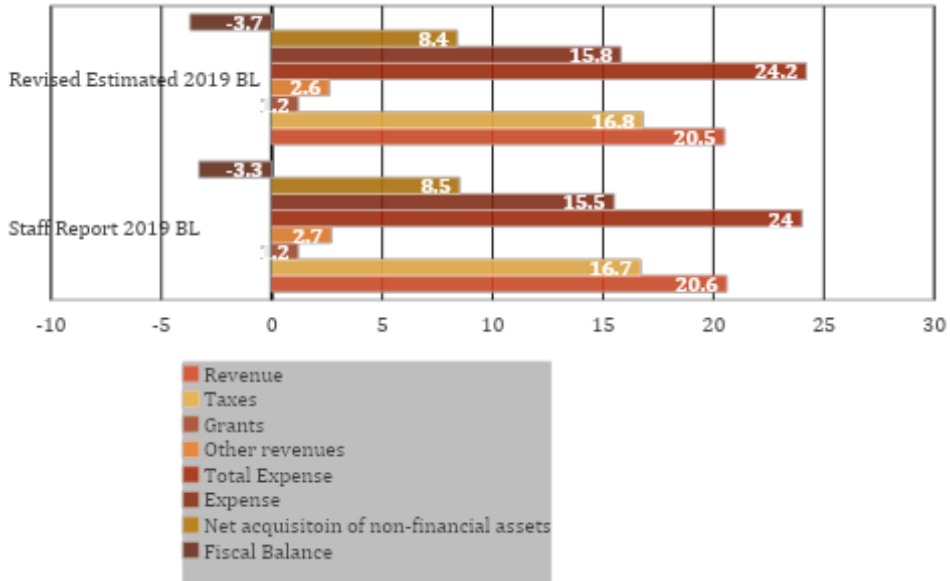
To further support economic growth, an expansionary fiscal policy remains important to ensure the success of reforms. In the 2019 budget, expenditure is still spent on the increasing public wage bill, improving human capital, and infrastructure (IMF 2018). With tax administration reforms in progress, the authorities remain optimistic that the budget deficit will be neutralized thanks to strong revenue collection.

However, public debt remains around 30% of GDP, alerting fiscal risk and drawing greater attention from the public and civil society. Even though that threshold is lower than that of other developing and developed countries, the contingency of liability should be monitored and well managed to avoid any potential debt trap. To mitigate this and going forward, strengthening fiscal governance and modernizing the tax collection system and the customs and excise administration with fiscal transparency are pragmatic measures for the government to adopt.

Through recent tax administration reforms, revenue has been accumulating progressively. The Ministry of Economy and Finance (MEF) has been implementing the Revenue Mobilization Strategy (RMS) for 2018-2023, with the General Department of Taxation (GDT) a key stakeholder to ensure its responsible execution (IMF 2018).

In 2017, Cambodia’s tax revenue to GDP was 17.2%, which is comparable with other countries in the region. Since 2012, the GDT has met 71 of 86 RMS measurements, while the remaining 15 are in active progress (ibid). Authorities expect revenue collection fiscal to remain strong in 2019, mostly from indirect taxes and property tax. This will help to narrow the government’s fiscal deficit.

Figure 3. Cambodia 2019 Budget Law (% of GDP)



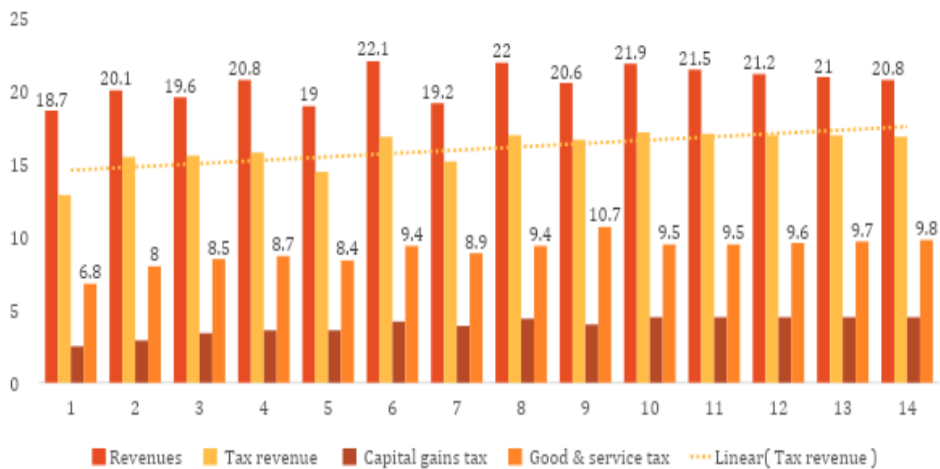
The figures show that tax revenues contribute a major share of total government revenues. The budget deficit also looks relatively positive, remaining under 5% annually. However, the reduction in grants from development partners may have unintended consequences that hurt taxpayers. To overcome this, the tax structure needs to be simplified and clearly defined, and have clear objectives.

For instance, notions of taxing more or taxing better will be the most important considerations going forward. Moreover, broad-base taxes with lower rates are clearly preferable to narrow-base taxes with high rates, and the tax structure should not support “pro-rich” policies through the provision of special treatment such as unfair tax incentives.

Cambodia has made significant achievements in improving tax revenues in recent decades thanks to progressive reforms of the tax administration and the diversification of revenue sources, which will support reaching the ideal outcome. Total revenue had increased to 22% of GDP in 2018 from 15.1% of GDP in 2014, with average growth of 1.4% of GDP.

In May 2019, the RGC launched a new revenue mobilization strategy for the period from 2019 to 2023. This will act as the roadmap for inter-related ministries to follow in order to strengthen revenue collection efficiently and effectively, with integrity and credibility. The strategy aims for sustainable economic growth and optimum revenue levels, ensuring justice for taxpayers. It also aims to ensure social justice by easing the tax burden for the poor and a commitment to provide welfare and to ensure environmental protection (RGC, 2019).

Figure 4. Key Sources of Government Revenue (2013 – 2023)



With historic achievements in tax mobilization over the past five years, in the next twenty, three different trajectories are likely for raising greater revenues to fund government expenditure, which has grown annually, in order to achieve the ideal 2040 scenario.

Trajectory 1: Levying personal income tax, taxing luxury products, and a corporate income tax

The purposes of taxation are efficiency, effectiveness, equity, and simplicity. This means tax is for economic growth, social justice, and minimizing inequality. Thomas (2015) states that households have different sources of income: wages, self-employed, pension funds, income transfer, and capital income. The tax system should address the income gap between rich and poor.

However, it is difficult to tax more while people might shift their income to other jurisdictions that have a lower rate or tax havens. Thus, in this scenario, a levy on income tax and corporate income tax might not be practical in the next 20 years. However, levying more taxes on luxury products might help reduce inequality in society.

Trajectory 2: Reducing corporate income tax (CIT)

In the digital economy, a country with less attractive corporate income tax rates might find it hard to lure foreign investors and lose revenue due to capital outflows from the economy. Many countries have decreased the CIT rate to attract further FDI and offered other form of tax incentives (GGGI 2018). Some incentives are provided for a one-off period, and some are temporary (ibid). As a consequence, tax competition might hurt countries that have poor tax administration and unattractive tax rates. This could undermine the common interests of people and the liberal trading system. However, this form of tax is commonly used in many countries, both developed and developing. Other ASEAN countries as well as Cambodia are to reduce the rate of CIT to below 20% in the near future.

Trajectory 3: Diversified sources of government revenues, tax and non-tax revenues, and shifting tax collection from narrow-base to broad-base collection

The diversification of revenue sources is key to preparing for the next possible economic downturn. In terms of private sector practice, it is not a good risk management framework for an entity/corporation to heavily rely on a single source of revenue or financial supporter. While this can apply to countries, generally tax revenues contribute a large proportion of a nation's total revenue.

For Cambodia, grants are at present still crucial for social and infrastructure development. In 2016, grants contributed to 2.5% of GDP. However, this has gradually decreased to below 1% as per IMF estimates (IMF, 2019). In 2023, it is estimated that grants will be reduced to 0.5% of GDP, while non-grant remains residual at around 17% of GDP. Therefore, the diversification of revenue sources is a crucial ingredient in preparing to react swiftly to local, regional, and global trends.

The final trajectory is the most likely over the next 20 years in Cambodia. To mobilize more funds for government expenditure, broad base tax collection is the most useful tool with which to reach at least 90% of taxpayers.

James, Michael, and John (2006) are of the view that with a country needing more revenue in the future, it is necessary for it to have a tax system that can supply it. Broadening taxes with lower rates could involve reducing revenues from a specific form of tax revenue, income tax, for instance, but other forms of tax might offset the loss (*ibid*). The authors add that the first policy approach in preserving some sense of fairness in tax collection is to reform income tax by lowering the rate, removing distortions as broadly as possible, and broadening the tax base.

To reach the ideal scenario for 2040, there are two possible factors, internal and external, that need to be taken into account. Internal factors include reforms to the tax system and a commitment by inter-related ministries to promote a tax-compliant culture, ensuring accountability and integrity among officials, and strengthen governance between institutions and taxpayer. As the world changes, a tax system needs to be adaptable to changes in investment, employment and saving patterns and the way people do things, and advancements in technology (Miranda, Andre, Peter, and Quentin 2015).

First, broadening the tax base will help the country mobilize more revenues, but it needs sophisticated tax registration procedures and simplicity in its tax system to achieve revenue maximization. Generally, the tax base normally takes from the principal production factors in the economy, such as labor, capital, and land. From these economic factors, the country can charge three tax bases: income,

consumption, and wealth. Income and wealth taxes are the main targets over the next 20 years as the economy becomes more advanced.

Income and wealth taxes not only help a country to mobilize more revenue, but it also minimizes inequality, helping prevent the rise of populism and disorder when the gap between rich and poor grows. Miranda, Andre, Peter, and Quentin (2015) opine that the fair distribution of economic reward is essential for a country to maintain social wellbeing and cohesion, and be accepting of the political and social institutions. Income tax is the single largest source of government revenue in Australia, contributed more than 10% to the GDP (ibid). Drawing from this, it is crucial for Cambodia to restructure its current form of personal income tax to minimize tax evasion and erosion by those in the top 10% income bracket.

Property tax may be the second target for the 2040 vision. The objectives are to turn vacant land into productive land and cool unprecedentedly rising prices resulting from speculation by local and foreign property developers. While activity in the property market brings in short-term revenue for the government, high property prices will not help the economy in the long term. The government should introduce a flat rate for commercial and rental properties, and make this rate progressive over the next 20 years. Doing so would see property prices come down and ensure rational behaviour.

Company income tax (CIT) contributes the largest proportion of tax revenue, as a single source, in Cambodia. The current CIT rate is 20% which sits at the average rate across Asia, and below the OECD average of 24% (Tax Foundation, 2018). Despite its seemingly reasonable level, the rate has been identified as a hindrance to optimal investment wherein it serves to reduce the attractiveness of Cambodia among investors and large multinational corporations (PWC 2018). Using a reduced CIT rate, the government seeks to induce a greater level of investment and subsequently add value to the economy through technology, the creation of jobs, and the transfer of skills.

However, this requires strong tax administration and regulations, with officials able to ensure efficiency by collecting more revenue with less expenditure. Another mechanism is raising awareness among taxpayers of the advantages of

paying tax to the government. This needs a simple payment procedure, with taxpayers willing to pay their obligation to the government, and investment in technology and an ICT platform for the tax administration.

Second, external factors including uncertainty surrounding the global balance of power, fragile trading systems, and an unpredictable international political economy. These factors may have an indirect impact on Cambodia's economy as a whole and could distort the ideal fiscal policy scenario in 2040.

Global politics remains uncertain with competition between the two major powers, the United States and China. Cambodia has been labelled a Chinese client state. This could make Western investors less willing to do business in the kingdom.

Moreover, economists have predicted that the Chinese economy will slow over the next five years. This slowdown could have negative impacts on Cambodia's economy as China is one of its biggest investors, particularly in the real estate sector. The drying up of capital inflows from China into the kingdom would have seriously hurt the Cambodian economy.

The trading system is under attack from rising protection and international political economy is unpredictable. The liberal trading system, in the form of WTO, remains fragile, while most industrialized nations have turned from multilateral strategic trading approaches to bilateral agreements, ignoring the post-World War II consensus. Moreover, international political economy has seen challenges from rising populism across Europe, "Brexit" – the United Kingdom leaving the European Union – the escalation of disputes over the South China Sea, and the rise of protectionism. Whether positive or negative, these developments will definitely have a major impact on the mobilization of revenues.

IV. Fiscal Policy Under the Baseline Scenario: Business as Usual in 2040

Consistent with current practice, revenue compared to GDP will remain residual between 2019 and 2020 as per forecasts. On average, revenue is increasing 0.01% annually, which remains low. Without further intervention, revenue is

expected to increase around 0.03% annually in 2040. If we look at expenditure, current figures show a slight increase due to greater administrative reforms and budget expenditure on priority areas aligned with the development policies of the Cambodia-budget policy linkage. If current practice and trends remain consistent, government spending in 2040 may not see big changes; perhaps an average 2% increase by 2040.

Table 2. Cambodian Fiscal Projections (2016 – 2021).

Fiscal	2016	2017e	2018e	2019f	2020f	2021f
Revenue (% of GDP)	20.7	21.4	22.3	21.2	21.6	22.0
Expenditure (% of GDP)	22.1	23.1	24.2	23.9	23.6	23.6
Overall Fiscal Balance (% of GDP)	-1.4	-1.6	-1.9	-2.6	-2.0	-1.6
Primary Fiscal Balance (% of GDP)	-1.0	-1.2	-1.5	-2.1	-1.5	-1.1
General Government Debt (% of GDP)	29.1	30.3	30.6	30	30.1	31.1

Source: (World Bank 2019, Recent Economic Developments and Outlook Selected Issue: Investing in Cambodia's Future, page 53)

Serious attention should be paid to the level of general government debt to GDP. The proportion is considered as residual from 2019 until 2021 as forecast. However, the baseline scenario is that government debt will reach 40% of GDP in 2040 without targeted fiscal intervention.

This will be compounded by the emergence of industry 4.0 practices which will necessarily influence the economy of Cambodia and the region, in addition to incurring costs of transition. This will require a huge level of capital and physical investment, an investment that the government will not be able to carry out alone. Therefore, either borrowing or grants will be useful tools for Cambodia to be ready for the Fourth Industrial Revolution.

Maintaining a sustainable fiscal balance is another challenge for Cambodia to overcome by 2040. There may be many changes, including to the societal and demographic structures, political institutions, and the structural economy. With

government spending rising continuously, economists, policymakers, and international development partners for years worked on a resilient fiscal policy for sustainable growth.

However, unexpected future changes may prove to be the hardest work yet in designing a practical and resilient fiscal policy. Lee, Kim and Park (2017) state that emerging economies in ASEAN have been improving their social fund transfers – mainly for the growing elderly population – and their generous fund transfer policy is proof of an unsustainable fiscal balance.

In 2040, Cambodia's population structure may have seen huge changes, with resultant effects on government revenues and expenditures. The level of spending in the public sector may be higher than the current baseline year 2019 and be one of the bottlenecks in achieving a sustainable fiscal balance. Lee, Kim and Park (2017) estimate that government expenditure will reach 21.4% of GDP in 2040 and tax revenues making up around 15% of GDP. This prediction appears more conservative than the World Bank forecast that government expenditure will be around 23.6% in 2021.

When a country reaches middle to high income status, public spending increases and puts a burden on government revenue shared with other key economic sectors. In theory, government spending on social fund transfers has a slight effect on economic multipliers (Peter 2010). From this perspective, fiscal policymakers need to think strategically in designing a plausible policy that works for everyone and balances social and economic benefits.

In 2040, limiting rational public expenditure and preventing revenue leakage will be the priority for the relevant ministries as they monitor and control government expenses. This means that a prioritized public sector might absorb more of the budget than non-prioritized sectors in any particular year.

The budget will be allocated by alignment with the prioritized sectors as set by the government in every mandate. To do so, budget allocation will target sectors set by the national grant strategic policy known as "Budget Policy Linkage". It is envisioned that alignment between policy and government spending is a key measure in helping the government balance revenues and expenditures. One area in particular that will remain problematic is the level of CIT. In the absence

of the targeted intervention to encourage business investment, CIT is likely to see a moderate decrease but will fall short of encouraging significant investment.

Ensuring macroeconomic stability, with internal and external balance, is an economic policy objective for every country. In Cambodia, the government is undertaking deep reforms in all sectors to ensure the economy remains strong and resilient to unpredictable shocks and the continued strong functioning of the economic sector.

Two significant sectoral reforms have been seen recently: tax administration reform and trade facilitation. These two reforms have tremendously aided foreign investors doing business in Cambodia. However, the kingdom will be unable to end the dollarization of its economy in the next 20 years, with the dollarization circular in the economy reported at around 86% in 2013 (Kubo 2017). The trend of de facto dollarization is in sharp contrast with other ASEAN member countries, where dollarization has been declining in a stable trend (ibid).

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Chapter 4 | Industrialization

H.E. Dr. PHU Leewood

The date is July 30, 2040 and Mr Khemara, a farmer from Takeo province, has just finished planting his rice crop. Leaving his family to tend to the crop before the harvest period, he departs for seasonal work across the border in Thailand. As he waits in the airport for his flight to depart he thinks back to his first cross-border excursion as a young man of 16. At that time, he would cram himself into the back of an unsafe minivan heading across the border with the hope of being picked up by a generous employer. Thankfully those days are well behind him, and indeed the population in general. Migratory work patterns are now supported by an e-allocation platform "JobHelp." He has registered his intention to work outside the country through the government endorsed app and it has matched him with suitable employment. By creating a profile of his qualities and qualifications Mr Khemara is matched by a mentor to the type of employment that he is seeking.

Prior to boarding the flight Khemara consults his "FarmHelp" mobile application to ensure that the rice crop he has recently planted has enough water and the soil content is appropriate for the young seedlings. In the event of detection of an unsuitable environment, the application sends a notification to alert the farmer suggesting corrective actions. Since its launch in 2035 the application has helped Khemara secure several quality harvests. It also has the additional benefit of ensuring that his brother is undertaking the promised work while Khemara is away.

Sitting in the plane prior to take off, he realizes that the jacket he had purchased for taking the chill out of the cabin is rather tight and

uncomfortable. Fortunately, under the 'custom fit policy' of his garment manufacturer, he can request another one be made to accommodate any unexpected size fluctuation. With the "GarmentsHelp" app he scans the barcode on the jacket to bring up his profile. He can then send the correct size information to the factory and request that the new one be delivered to him in Thailand.

I. Industrialization: The Ideal Scenario

In 2040, Cambodia's adoption of Industry 4.0 technology has yielded tremendous gains for the kingdom's production, GDP, and development. The timely adoption, utilization, and development of technological industrialization methods has resulted in Cambodia comfortably achieving its goal of reaching high-middle-income status.

Application of such technology in the agricultural sector has had a particularly positive effect. By connecting the farm to the farmer through technological innovation, farmers are able to access up-to-date, real-time information on land features, including soil & moisture content, crop planting recommendations relative to the soil conditions, and appropriate fertilizers for germination. Access to this information provided the base for an increase in crop production yields that positively impacted the life of Cambodians and provided a strong footing for trade with neighboring countries.

In addition, Industry 4.0 has supported the development of platforms to connect the country's large youth population with existing workers abroad and the relevant authorities, in order to avoid rampant human trafficking problems, and help to contribute to a vibrant productive workforce in the society. In this way, Cambodian young people are able to know about employment opportunities through Cambodian workers abroad and the proper authorities to contact to legally secure such employment. The system can intelligently report suspicious activities or potential human trafficking activities to the responsible authorities for immediate action.

Cambodia has benefitted from the repatriation of migrant labor workers who bring back experience and skills from their time away from Cambodia. The

knowledge exchange facilitated by migration has supported the development of integrated connectivity platforms for domestic and international citizen support.

In addition, the development of quality Industry 4.0 degrees in the Cambodian university system has begun to consistently provide workers who are trained in the requirements of an Industry 4.0 economy. Coding, engineering, and communications comprise the three bachelor's degree programs that have most benefited the Cambodian economy in its industrialization.

Combined with the expertise garnered from Industry 3.0, in 2040 the skilled Cambodian workforce develops an exchange of training and experiences in connectivity, intelligence, and automation. In particular, training has focused on the skills required for the implementation and suitability of Industry 4.0., specifically: the internet of things, mobile computing, big data analytics and advanced algorithms, authentication and fraud detection, pattern recognition, artificial intelligence, cloud computing, and cybersecurity.

These successful developments have been driven in part by the willingness of the private sector to adopt Industry 4.0 technology to stay ahead in their own industry. Firms engaged in assembly work now take advantage of lower labor cost requirements as well as automated and integrated technologies in order to maximize their output and economic success.

Regionally, Cambodia has utilized the further integration of the ASEAN economic community in order to expand its market growth and diversification during its domestic transition to a knowledge economy. Regional university exchanges have supported the training of young ASEAN academics within specialty fields contingent on national locational advantage. With Cambodia's unique ecological blueprint, it has become the regional environmental specialist for Industry 4.0 adaptation and mitigation technologies.

II. Scenario Space and Key Factors for Industrialization

This chapter concerns the Cambodian potential for industrialization and economic growth set within the contexts of Industrial Revolution 4.0

A look into the history of mankind, and of previous industrial revolutions, shows that continued population growth in the face of scarce and limited resources has placed pressures on society to find productive means to better utilize resources and engineer new forms of production for enhanced capacity (Brown and Wolk, 2000). For example, in the 17th century, water was used in the form of steam to power mechanized production; in the 19th century electricity drove mass production and to light the world (Rudolph and Ridley, 1986; Brower, 1994; Smil, 1994). These periods have been termed Industrial Revolution 1.0 and 2.0, respectively. In the 20th century, electricity, electronics, and information technology were employed to automate industrial production. This was the third industrial revolution or Industry 3.0 (Schwab, 2016).

Today, in a convergence of technology, energy, and information, set against a rapidly growing population, Industry 4.0 is born (Marr, 2018). The major difference between Industry 3.0 and Industry 4.0 is the fusion of connectivity, intelligence and flexible automation. It is this fusion of Industry 3.0 with breakthrough technologies and the ability to interact across the physical, digital and biological domains that make the fourth industrial revolution a fundamentally different challenge for the industrialization of developing nations such as Cambodia (Leurent, 2019).

Mr. Klaus Schwab Founder and Executive Chairman of the World Economic Forum, on January 14, 2016, effectively summarized the history of the Industrial revolution as follows:

“The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.”

Two key trends frame the importance of, and potential trajectories for Cambodia Industry 4.0. The first of these is the proliferation of communication and technology platforms that can help Cambodia more easily transition

towards a knowledge economy. This argument is supported by the insight that currently two-thirds of the population are under 30 and have grown up with significantly more exposure to technology than previous generations. Second, the ability to properly harness the potential of technology is crucial for the growth, development and diversification of the Cambodian economy.

The strength of Cambodian industrialization and its potential trajectories, set against the global backdrop of Industry 4.0, is predicated on key factors that are long standing in the literature on the topic. These are discussed in turn below.

Technological adoption and adaptation

The key factor most crucial for the transition towards Industry 4.0 is technology. With regard to industrialization, technology concerns the application of science to industrial or commercial processes (Schwab, 2016). At the heart of the entire process, technology represents the factor through which the key processes that demarcate an industrial revolution take place. First, technology provides the ability to make use of new basic materials to drive new forms of development. In the second industrial revolution the development of crucible steel methods fueled the mass production of steel to support industrialization. The Industry 4.0 equivalent would likely be the technological development of lithium for batteries. Technology additionally facilitates the use of new forms of energy sources to power industrialization; such as the steam engine, electricity, and petroleum. In the Cambodian Industry 4.0 context, the discussion of energy will be best framed around the national development of a sustainable long-term supply to fuel industry.

Regionalism

For Cambodia, as a low-middle-income nation in 2020, the development of Industry 4.0 is likely contingent on the ability to work within its regional framework for economic collaboration, growth, and diversification. The justification for this is best supported historically.

On April 30, 1999 Cambodia was admitted into the Association of South-East Asian Nations (ASEAN). Membership in ASEAN has subsequently supported Cambodian development through its ability to support the domestic

institutional reforms required for regional development, as well as removing a large number of trade barriers to support economic growth. Far from being one-sided, ASEAN recognizes Cambodia for her abundance of domestic resources and strategic geographical location in the region. As Cambodia was among the more recent members admitted into ASEAN in 1999, older members of the bloc viewed the admission of the kingdom as a burden to the groups planned success (Bowring, 1997). During the ASEAN Summit in November 2000 in Singapore, ASEAN adopted a program to narrow the development gap, known as the *Initiative for ASEAN Integration* or IAI (ASEAN, 2000). Under the IAI, Cambodians were able to receive practical training and institutional support within the ASEAN members' support structure. Now, 20 years after joining ASEAN, technical support and collaboration has grown into economic prosperity, with average annual GDP growing by over 7 percent per year, and Foreign Direct Investment (FDI) increasing annually: at less than \$100 million in 2000, ASEAN member countries invested \$603 million in 2017 alone. With a combined population of 640 million, the world's third largest consumer market, and an aggregate GDP surpassing \$2.7 trillion, the ASEAN-Cambodian relationship will matter a great deal for Industry 4.0.

Infrastructure

Infrastructure is the foundation and framework for industrial development. Transportation routes provide the necessary links for raw materials, producers, and consumers, both domestically and with foreign trading partners. The transport network features include railways, roads, seaports, airports, utilities (electricity grids, drinking water, and sewage), and communications networks. Communication provides the system that carries the messages among suppliers of raw materials, producers, and consumers. Under Industry 4.0, internet connectivity is perhaps the most important communication channel as it represents a channel for instantaneously connecting all of the planets' inhabitants.

Labor

Labor is the human element of industrialization. It represents the allocation of skills and training in the economy towards the employment opportunities

available. Industry 4.0 is expected to automate a large number of currently labor-intensive positions. In the Cambodian context this would threaten thousands of jobs in the garment and tourism sectors. Accordingly, the allocation of labor is predicated on the development of the economy and its diversification into new Industry 4.0 spheres of employment (MLVT, 2014). The discussion on this key factor is less concerned about the number of workers available, and more about the inherent capacity to meet the needs of Industry 4.0

III. Policy Initiatives to Achieve the Ideal Scenario

In order to deliver Cambodia to the ideal scenario described in section one, based in the key factors above, there are a number of policy initiatives that will need to be undertaken. These initiatives will be framed in line with the identified key factors (technology adoption and adaptation, regionalism, infrastructure, and labor) as well as cross-cutting measures such as political and institutional will, technical capability, and financial commitment.

The Development of Governance Structures

For any industries to operate successfully and prosper there must be rules and regulations to protect industry and incentives to promote innovation and technological upgrading. There also must be public and private sector partnerships to ensure that these incentives are aligned with regulatory requirements. For the private sector, company executives must take the lead in efforts to adopt Industry 4.0; while for the public sector, the government must show the will to lead by creating a focal point in the form of the appointment of a high level official/office responsible for national adoption of new technologies. This entity must be able to form a country vision and strategy for Industry 4.0 to thrive and succeed (Rethy et al., 2019).

The Ministry of Labor and Vocational Training (MLVT) is well placed to take a lead on this front. Working alongside the National Employment Agency, the MLVT can undertake a national technology audit that highlights the kingdom's current rate of technology utilization within service and industry. Having identified the status quo circumstance, both agencies will be able to identify where there is potential

for investment and growth within Cambodian business. Without a national view of the technology picture the rate of adoption could be inconsistent and ad hoc. Having identified the opportunities, it will be necessary to establish a set of established rules and procedures that focus on incentivizing technological upgrade, whilst minimizing any adverse risks.

Outside of industry it will be important to understand how technology is used by the public in their everyday lives. The past twenty years has seen an increasing uptake of technologies from smart phones to assisted driving vehicles to voice controlled intelligent personal assistants. In the next twenty years we can expect Cambodia to continue its uptake of technologies to include the widespread use of online banking, e-citizen platforms, and renewable energy systems (to name but a few). Accordingly, it will be prudent to adopt a set of governing principles regarding the use of these technologies. For example, with a potential for the increasing use of drones in consumer product delivery there is a space to establish rules on safe drone routes to ensure that privacy is not infringed upon and there is no risk of collision resulting in injury.

Beyond the rules and regulations surrounding adoption, there will be a need to educate citizens appropriately for a changing workplace and evolving social dynamics. Industry 4.0 will usher in new skills requirements across industry that will require workers to be trained in accordance.

Ensuring Domestic Technical Capability

Owing to the fact that Industry 4.0 is the fusion of cutting edge, smart, and connected machines, and their interactions across the physical, digital and biological domains Cambodia must be willing to invest in the latest technology and bring in all stakeholders, from the legislator to the regulator and to the people at the factory floor.

To ensure connectivity, intelligence and flexible automation, Cambodia must mobilize technical teams at all levels to actively participate in the development of Industry 4.0. There are two core components to the development of domestic technical capabilities, as set out below.

First, there is the question of the Khmer language and the challenges that it confronts in the context of machine-readability. The writing system of the Khmer language is complex and difficult for humans to read and impossible at present for a machine to properly parse because there is no Natural Language Processing rules in place yet. In English, a word is separated by a space; but in Khmer there is no space between words. A space can be entered at the end of a sentence. For example, the Khmer sentence: “លាមករាវង្ស” is grammatically correct but ambiguous. By adding a white space between the word, a machine can determine the meaning of the word; but can humans understand the sentence? By adding a space to separate the word, the sentence will have totally different meanings: “លា មករាវង្ស” is different from “លាមក រាវង្ស” which is different from “លាមករា វង្ស” In English, there is only one row or layer of characters allowed; but in Khmer there are five rows or layers of characters allowed. This makes it difficult or impossible for the machine to process the word. For the same reason, Optical Character Recognition cannot be used to process the Khmer language.

These Natural Language Processing and Optical Character Recognition problems are the stumbling blocks for any computing using Khmer language. Attempts have been made by Google to translate Khmer language and Khmer street signs; but results have been generally negative. This is due to the inability to read and processes Khmer language by machine.

Without modification of the Khmer writing system, Cambodia will have no choice but to continue to use the system built for foreign languages, i.e. English, Chinese, French, etc. A simple feature of the “Google Near Me” will allow English language users to effectively employ the system to track and locate devices that have enabled their location to be seen. This feature is part of Google and is stored in SensorVault (Valentine-DeVries, 2019). The content in SensorVault is in English and cannot be translated by Google Translate into Khmer. Even if it tries to translate into Khmer, the result will not be understandable. Thus, in the area of law enforcement for example - a crime happens, and an investigator needs to determine what devices were nearby that particular location at that particular time, in order to establish the closest probability of a crime committed by the owner of one of those devices. This hypothetical Cambodian investigator will

need to gain assistance from overseas in order to help decipher the location information in the Google Sensorvault.

The second aspect relates to the question of security. Currently Cambodia has some capable programmers but lacks the software engineers necessary in order to meet the software development demands that the country requires in order to achieve the ideal 2040 scenario. Cambodian programmers are able to write small programs that are able to do a small task; but are unable to develop the complex software required to handle personal information, finance, and other areas. The Royal Government must provide professional software engineering training for this group in order to ensure a readily available supply of Cambodian software security experts who are able to support the development of Industry 4.0 in the kingdom.

Building Trust in the System: Cybersecurity

Public confidence in a system is a natural prerequisite to the adoption and widespread utilization of a system. Without public confidence therein, demand and utilization will remain stagnant - a basic ingredient for failure. The current cybersecurity system of Cambodia is not safe for serious applications involving personal privacy or finance. Moreover, it does not have the requisite features to block malicious users or protect from intrusions. Currently, anyone can use Cambodia as a launching pad to attack systems in any country in the world. In line with creating general governance guidelines, as discussed above, there should be a taskforce established in a public-private partnership to develop a suitably safe and secure cyberspace within the kingdom.

Ensuring Investment

Similar to any project undertaken by Cambodia, financial commitment to the project is one of the critical success factors. Without financial commitment any project is bound to fail. In order to ensure a successful transition, there are three potential routes to be explored.

Firstly, the kingdom could seek foreign investment for technological infrastructure upgrades. Under the current Belt and Road relationship with China, for example, Cambodia could seek additional investment for widespread

5G network infrastructure. In a similar manner, there are opportunities for investment in renewable energy systems and waste management centers from national partners in Europe and Asia.

Secondly, a portion of government spending could be earmarked for technology investments. In addition, public investment would be necessary for managing the necessary governance infrastructure at a ministerial level.

Thirdly, public-private partnerships could be encouraged to ensure that the requisite technological expertise is in place from the private sector to efficiently deliver technological growth and development.

Technology Adoption and Adaptation

Cambodia must develop inclusive and enhancing technologies to support its transition towards Industry 4.0. As Mr. Christian Patron, Head of Innovations and Digitalization in Production System, and Marcel Figner, Strategy Digitalization and Smart Data Analytics Production System, of the BMW Group put it, *“one of the main tasks in the Fourth Industrial Revolution environment is to identify highly effective applications and to standardize and scale these rapidly within an international production system. Nobody has a better take on a solution’s effectiveness than the people in the process”* (Patrn and Figner, 2019).

There are several means of encouraging rapid adoption of technologies in the current Cambodian economy, both at personal and industry level, with a view to promoting national growth and development. Three features of the economy provide illustrations as to how this initial phasing can work in practice. These are the garment sector, agricultural practice, and migration. All three are expected to undergo major transition as Cambodia meets middle-income status, however, the role of technology is to ensure the most effective utilization of available resources at a moment in time. As we cannot be certain as to the precise nature of future technologies it is a valuable exercise to consider the immediate opportunities presented for economic prosperity under the adoption of more advanced technological practices.

- **Connecting Garment Workers.** Everyone at the garment factory floor is connected through an app to provide reports on his or her activities.

When a problem occurs for one employee and negatively affect costs and productivities, a flag is set and alert everyone on the factory floor. When an effective solution is found for a problem, it is highlighted and report to everyone in the factory floor. Everyone on the factory floor is encouraged to actively participate in the cost cutting and productivity increases in the production process and that all app built for this process should be democratized.

- **Connecting Cambodian Youth.** Every youth and every worker abroad are connected through a government-endorsed app with location data embedded. All workers abroad, with government endorsement, can register with the app about their employment, industry and location to serve as a mentor. Any young person with proper government identification (ID) can register with this app to receive mentoring services. Mentors can provide information about their employment, industry, location and availability of the job to their mentees. Outsiders without government endorsement, or potential traffickers cannot access this app.
- **Connecting Agricultural Workers.** A special sensor, installed in the farm, can be made to detect the soil chemistry and soil moisture and transmit that information to the receiver; which then transmit to the farmer's mobile phone and upload to the central server for analysis. Based on the information sent from the mobile device, with location data, the central server can analyze the received information, match with the central soil content database, pinpoint the location of the farm and make recommendations accordingly. The same sensor can be made to transmit the soil moisture content, query the Water Resource and Meteorology server, and intelligently recommend as to when the farmer should add water or should just wait for the rain. These processes can be automated and spare the farmer from the guessing works as to what fertilizers to use and when to add water to the farm.

IV. Industrialization Under the Baseline Scenario: Business as Usual 2040

What is the price for Cambodia of not embracing Industry 4.0?

Cambodia could choose not to do anything with Industry 4.0, but such a decision could entail serious risks for the country's economic growth and development. As the production and manufacturing industries upgrade around the globe under the presence of new technologies and processes, Cambodia's failure to adapt will see its strategic investment advantage eroded. Where a competitive labor market had previously sustained the kingdom's economic development, Industry 4.0 will place even greater importance on effective, efficient, and systematic production processes that minimize unit cost and maximize gains. This reduction in comparative productivity will see investment flow away from the kingdom and towards more tech-ready destinations such as Nigeria.

From a labor force perspective, the lack of 4.0 readiness has the potential to cause two distinct issues. First, for those who wish to excel in industry, foreign employment destinations will be sought after, causing a brain drain within the kingdom. Second, wages could remain suppressed as the workforce is deemed unproductive. It is unlikely, in the face of being ill prepared for industry 4.0, that the labor market employment opportunities will have changed considerably from the options available today. Agriculture will continue to underpin the economy, while garment manufacturing will migrate elsewhere as firms see Cambodia as a sub-optimal market.

From a tourism perspective, if Cambodia is unable to provide a suitable level of technology infrastructure for tourists then there will be a concomitant decline in visitors and, accordingly, national revenue. This is of particular concern when we consider who the tourists of 2040 will likely be. By 2040, the Chinese and Indian markets will stand as two of the largest inbound tourism markets as a result of a middle-class explosion. With a great emphasis placed on the technologies that make travel less cumbersome, such as cashless payment and booking platforms, the absence of suitable infrastructure will encourage potential visitors to take their business elsewhere.

In the absence of suitable governance structures, investment in new technology will remain ad hoc and minimal. There will remain some moderate uptake of systems that seek to meet consumer demands such as online banking and movie streaming. Investment in new technology will, in the absence of a limited governance structure, primarily come from the private sector and remain limited.

Perhaps worryingly, should the benefits of industrialization be poorly understood or communicated, Cambodia may find itself retroactively enacting laws and legislation that damage the opportunity for economic growth and development. For example, if a new technology governing the productive processes of garment manufacturing is seen as a threat by workers in that industry, it may be outlawed in the country. While the short-term outcome would see workers retain their jobs, the long-term reality is that the factories would relocate to a more suitable production base.

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Chapter 5 | Regional Economic Integration

Mr. SOK Kha

“JapanCorp” is a Japanese multinational corporation that produces machinery components and electronics devices. The company owns multiple production plants in several countries in Asia, including Cambodia. The decision to open their factory in Cambodia was driven by a combination of the firm’s risk diversification program, enhanced market access in the region, and the availability of skilled Cambodian labor. In addition, the operation was at minimal cost due to the RGCs pro-trade and pro-investment policies.

The completion of all legal procedures necessary to get the factory up and running was smooth and swift. Employing over 1,200 Cambodian workers, JapanCorp built its production facilities in a special economic zone on the outskirts of Phnom Penh. The zone boasts a liberal business environment, an effective administrative system, and efficient infrastructure.

A large number of the workers are sourced from a number of national TVET institutions. These institutions are in partnership with multiple industry players, including JapanCorp, to build human resource capacity corresponding to the needs of industry. Frequently, these firms send their technical staff to provide training to students at various educational institutions. Workers at the plant also have access to the company’s different in-house training programs. High-level technical and senior management staff are frequently sent to the firm’s Thailand plant for senior technical training.

JapanCorp's Phnom Penh plant focuses on assembling small- and medium-sized motors, household electrical appliances, and digital equipment. It sources most parts from plants in Thailand and Vietnam, in addition to domestic factories owned by Cambodian, Japanese, and Chinese manufacturers. Most of the assembled finished products are exported to ASEAN markets, China, Japan, and India. These are among the markets with whom Cambodia has bilateral free trade agreements.

The plant's financial transactions with business partners are done digitally through a swift and secure online banking platform. The firm commissions a partnered customs broker to deal with import and export procedures. Thanks to the firm's 'Authorized Economic Operator' status and an improved customs process with full-fledged automation, the import and export process is fast and efficient. Inbound and outbound logistics are supported by the inter-connected infrastructure developed under China's Belt and Road Initiative (BRI) and ADB's Greater Mekong Subregion (GMS) Economic Corridor Program in addition to Japan-backed port capacity expansions.

I. Regional Economic Integration: The Ideal Scenario

The description above represents a snapshot of the culminating vision for the next twenty years. It is motivated by Cambodia's anticipated impressive growth within both regional and global value chains (GVC). Hummels et al. (2001) and Koopman et al. (2010) define GVC participation for a reference country where the country embeds its value-added in exports both looking backward and forward. The backward participation happens when the country's domestic firms use foreign inputs for exporting activities. The forward participation happens when the country's exports are used as inputs by firms in partner countries for their own exports. Kowalski, P. et al. (2015) provides a good contextual analysis on GVC participation and policy context in developing countries. Connecting to the global value chains is a powerful driver for economic growth in terms of job creation, greater opportunities for domestic firms, enhancement of productivity, sophistication, and diversification of exports. In this spirit, the vision of having a strong participation in the GVC is not

new for Cambodia but the result of decades-old strategic decisions about the future.

By 2040 Cambodia will have built upon the initial basis it established to embed itself further up the value chain, through the pursuit of policies and reforms for promoting foreign investment and cross-border trade.⁴ The effort has led to a significant economic transition towards upper-middle income status and higher value-added manufacturing and production.

To aid its ambitions, the kingdom has established a number of special economic zones (SEZs) around outer-city transport hubs. These have been established in Phnom Penh, Sihanoukville Seaport, Poipet, Bavet, Battambang, and Svay Rieng. These zones are designated as duty-free industrial parks to encourage production and foreign investment. In addition to their productive merit, each zone has developed a technical and vocational training college (TVET), funded by industry, in order to train domestic workers in the relevant skills and competencies to meet market demand.

The quality of Cambodia's human capital has substantially improved through upskilling in a targeted program of digital education. Recognizing the necessity of digital literacy for a productive and adaptive workforce, Cambodia has successfully overseen a digital revolution around banking, governance procedures, and communication. The extensive utilization of e-platforms, and the streamlined procedures surrounding them, has seen Cambodia become a sought-after destination for foreign investment and business development. Having intelligently earmarked a need for foreign firms to invest in domestic

⁴ As has been the case since the country's return to a market-oriented economy in 1989. The latest and most important 'economic growth strategy' – the Industrial Development Policy 2015–2025 (IDP) – has continued the goal of modernizing Cambodia's industrial structure from a labor-intensive industry to a skill-driven industry, through connecting to regional and global value chains; integrating into regional production networks and developing interconnected production clusters along with efforts to strengthen competitiveness and enhance productivity of domestic industries; and moving toward developing a technology-driven and knowledge-based modern industry.

workers through schemes such as the TVET colleges, there is a growing regional challenge from Cambodian firms in high end electronics manufacturing.

In addition, in 2040 Cambodia continues to enjoy strategic and economic benefits from its membership in an increasingly integrated and cohesive ASEAN community, which in itself is the hub of economic and political-security architecture in the wider region around which GVC activities are organized. With global production shifting toward the Asia Pacific, most countries in the region, Cambodia included, are becoming 'factory' economies, which source much of their value-added from other regional countries to produce exports. Large corporations will have a stronger interest in opening factories in Cambodia as part of their 'China+1', 'Thailand+1' or 'Vietnam+1' approach to take advantage of the increasingly connected region and to diversify their operations.⁵ As such, Cambodia's manufacturing sector will have experienced a greater transition toward higher value-added products while textile and related garment industry will have incorporated higher value-added activities.

Cambodia's ranking in the World Bank's Doing Business Index as well as its governance indicators will have seen significant improvement, with another series of reforms to address the long-standing governance and public capacity issues – thanks to strong commitment by the government. The kingdom's economic success continues to give legitimacy to their regime and administration. These reforms will have addressed significantly the public capacity constraint issues of coordination, accountability, government effectiveness, rule of law enforcement, corruption, and will have strengthened the country's business environment including business licensing and operating permits, customs and trade regulations, tax rates and tax administration, and regulatory policy uncertainty. With these reforms, the majority of businesses will have formalized themselves and engaged more extensively in GVC activities. At

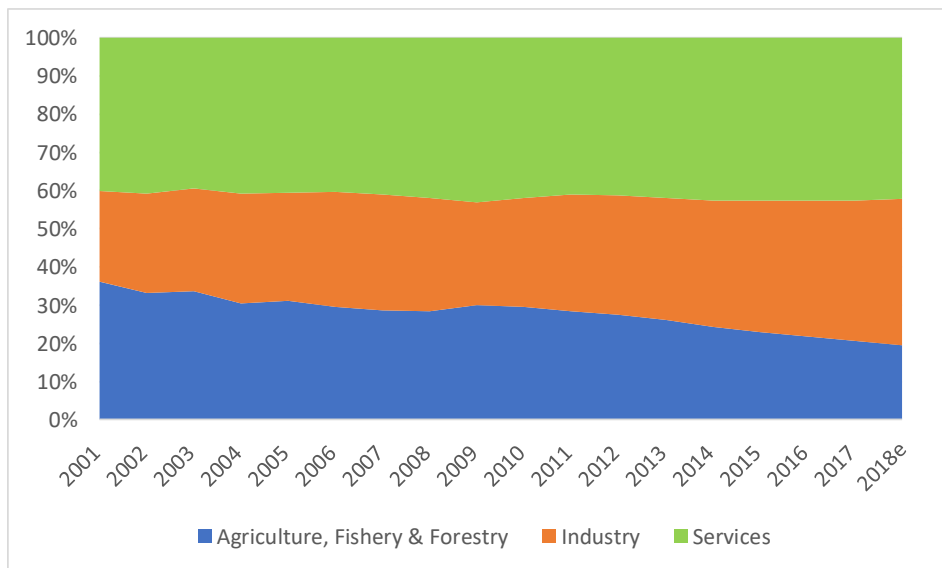
⁵ These 'X Plus 1' refers to a strategy whereby corporation branches out from their plants in X by opening production facilities in other regional countries, basically to diversify risk, control cost, and access to new markets.

the same time, these reforms will have unlocked the full potential of Cambodia's private sector in all leading industries.

II. Scenario Space and Key Factors for Regional Economic Integration

Since 2001, the real GDP growth rate has averaged 7.7 per cent per year and has been at least 6 per cent every year except in 2009, during the global economic slowdown. In 2018, the economy recorded a strong growth rate of 7.5 per cent and GDP size of around US\$24.4 billion. Figure 1 illustrates the sectoral share of the economy during the same period. Industry accounts for 36 per cent of GDP, up from 22 per cent in 2001. The share for services holds stable at 39 per cent from 38 per cent, while agriculture declines almost halfway to 18 per cent from 34 per cent during the same period.

Figure 1: Sectoral share of the economy, 2001-2018



Source: Ministry of Economy and Finance (MEF).

Currently, Cambodia's GVC engagement is limited to only a few industries. On the industry front, the country has thus far embraced the 'factory Asia' growth model, relying on its inexpensive low-skilled labor and foreign value added to boost its garments and footwear for exports. The fact that garment exports

account for 77 per cent of total exports, with 80 per cent being sold to just eight partner countries, mostly to the EU and US,⁶ is worrisome. Despite its membership in the Association of Southeast Asian Nations (ASEAN), Cambodia has not yet fully reaped the benefits of this regional integration, considering the country's insufficient volume of intra-ASEAN trade compared to other countries in the region. Only around one fifth of Cambodia's exports are sold to ASEAN member states.⁷ The use of tariff preferences among Cambodian businesses is low and relatively few Cambodian companies apply for preferential certificates of origin under ASEAN-related Free Trade Agreements. On the agricultural front, primary processing still makes up the majority of agro-industry.

Against this backdrop, the 2040 vision is to see Cambodia securing a strong position in the GVC and the country becoming one of the most competitive countries in the region. This is predicated on the development of the following key factors: (i) geography, (ii) overseas market access, (iii) public sector capacity, (iv) infrastructure and logistics, (v) improved industrial human resources, and (vi) an adaptive and innovative economy.

Geography. The growth prospects, demographics and social dynamics of the Mekong Subregion attract the interest of many global investors. This subregion is an integral part of the ASEAN community and will have witnessed a rapid pace of intra- and extra-regional connectivity and integration, shaping the ways businesses operate in member countries in terms of value chain expansion. Moreover, the Mekong Subregion is well positioned as an engine of regional development cooperation and multilateralism, with the emergence of over a dozen cooperative mechanisms pertinent to the region and various aspects of its development. These include the Greater Mekong Subregion (GMS), the Ayeyawady-Chao Phraya-Mekong Economic Cooperation (ACMECS), the Lancang-Mekong Cooperation (LMC), Mekong-Japan Cooperation, Mekong-Ganga Cooperation (MGC), Mekong-ROK Cooperation, the Lower Mekong Initiative, and China-led Belt and Road Initiative (BRI) among others. They

⁶ Atlas of Economic Complexity, Center for International Development.

⁷ Ibid.

promote infrastructure development, industrial zone development, human resource capacity development, trade links, and people-to-people connectivity. Cambodia will have benefited greatly from these mechanisms, from connectivity to labor market development to cross-border trade.

Overseas Market Access. Following the return to a market-oriented economy in late 1980s, Cambodia began its campaign to liberalize the country's economy to increase trade and attract foreign investment. For example, Cambodia joined ASEAN in 1999 and the World Trade Organization (WTO) in 2004. Broadly, they are the two main multilateral institutions helping Cambodia expand its merchandise export market. Membership in these institutions continues to help Cambodia attract more foreign investors and have access to greater and more secure markets abroad.

By 2040, we anticipate that Cambodia will have fulfilled the integration process with ASEAN and investors in the kingdom can produce and export their products to the ASEAN regional and other dialogue partners' markets. ASEAN alone will see its population reach 770 million and collectively this grouping will be among the top four economies in the world in purchasing power parity terms, alongside China, India, and the US. The anticipated social dynamics are highly positive with rising income and greater access to the flourishing digital economy. A huge middle class along the China-ASEAN-India corridor will create high consumer demand with significant spending.⁸ The successful conclusion of the Regional Comprehensive Economic Partnership (RCEP) facilitates trade and investment and further deepens the engagement of Cambodia with other ASEAN member states and ASEAN's six free trade agreement partners including Australia, China, India, Japan, South Korea, and New Zealand. While the RCEP negotiating text was not available at time of this study, the trade bloc agreement is meant to be a single tariff offer by RCEP partners to all the ASEAN countries and from ASEAN members to all RCEP partners. This means Cambodia is treated the same as Thailand, Malaysia, and others, in terms of market access. The opportunity for

⁸ See Economic Research Institute for ASEAN and East Asia. (2019, June 11). ASEAN Vision 2040: Towards a Bolder and Stronger ASEAN Community.

Cambodia is substantial given a strong export capacity the country will realize per the scenario set out herien.

Cambodia will also have opened new markets by concluding its accession into the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CP-TPP) and bilateral free trade agreements (FTA) with a number of potential partners, i.e., Japan and China. With that, Cambodia will have reduced overdependence on the ASEAN Framework as the foundation for FTA and capitalized on broader oversea market access opportunities in terms of tariff concessions and rules of origin under the respective arrangements. This helps Cambodia to stay on par with its peer ASEAN neighbors who have already entered into economic and trade partnership agreements with these markets to a different extent. A bilateral FTA with Japan, for example, provides better market access than current trade relations, which are governed by the GSP for LDCs and the ASEAN-Japan Comprehensive Economic Partnership (AJCEP) Agreement. A bilateral FTA with China will elevate already-strong economic ties with China, with whom Cambodia established the Investment Promotion and Protection Agreement in 1996 and Comprehensive Strategic Partnership Agreement in 2010.

Infrastructure and Logistics. The successful transition up the global value chain requires a country to have an efficient logistics system and suitable infrastructure. Currently Cambodia has plans in place to promote some development along these lines. For example, the Master Plan for ASEAN Connectivity (MPAC) was adopted in 2010 and enhanced in 2016 to promote connectivity in all dimensions, including infrastructure, digital, logistics, regulatory, and people-to-people connectivity. The cooperation among Mekong countries commenced with the launch of GMS in 1992 by the ADB, bringing together Cambodia, Laos, Myanmar, Thailand, and Vietnam (frequently referred to as CLMTV) and the southwestern region of China. The transport sector has been the most prominent of all investment projects under the GMS framework. The country's 'missing link' of road and rail networks that form important domestic and cross-border transport corridors will have been completed under these and other mechanisms initiated by major powers including China and Japan, among others.

Of particular importance is Cambodia-China cooperation. This so far appears to be most promising in addressing physical transportation and logistics obstacles, with China-led financing institutions including the Asian Infrastructure Investment Bank (AIIB), Silk Road Fund, and the New Development Bank becoming alternative sources of financing for infrastructure investment projects in Cambodia. The China-led Belt and Road Initiative (BRI) and its associated projects such as the Sihanoukville Special Economic Zone (SSEZ) greatly contributes to skills growth in the labor market in general as well as to the development of the multi-purposed Special Economic Zone in Sihanoukville. The PHN-SHV expressway and two new airport projects in Phnom Penh and Siem Reap will be in full operation in the next decade and significantly enhance connectivity and logistics within Cambodia and beyond, improving logistic efficiency, reducing trade costs, and deepening regional integration.

Improved Industrial Human Resources. The quality of Cambodia's human capital will also have substantially improved through upskilling and mobilizing the workforce in the context of a broad-based industrial and digital economy. This is enhanced by the mainstreaming of human capital development in many of the aid programs which coincides with the galvanizing of reform momentum in the educational system including: raising teacher salaries; strengthening the integrity of the examination process integrity; integrating information and communication technology (ICT) and science, technology, engineering, and mathematics (STEM) skills into the educational system; improving TVET quality to meet the needs of industries; and linking the formal education system and TVET to industrial policy.

An Adaptive and Innovative Economy. Cambodia is poised to embrace a full-fledged digital economy. An enabling legal environment is needed, including the introduction of an e-commerce law, competition law, consumer protection law, and regulations regarding data security and privacy. An improving ICT infrastructure is helping to develop Cambodian business: including the Asia Submarine-Cable Express (ASE), and the Asia-Africa-Europe-1 (AAE-1), and fifth generation mobile network.

The use of technology will have spread to and benefited all sectors. Agriculture will have seen a substantial improvement in productivity, diversification, commercialization, and exports, with an increased level of mechanization. Although rice remains the dominant crop, the sector will witness growing production and exports of other crops such as rubber, vegetables, sugarcane, cassava, maize, cashew nut, pepper, palm oil, mango, and banana. Secondary processors will have grown bigger in both number and capacity due to the increasing use of modern technologies and spillovers from increased local and foreign investment possessing the financial and technical capabilities to process crops geared toward export. The manufacturing sector will have experienced a greater transition toward higher value-added products. There will be a noticeable development in newer manufacturing and export sectors, i.e., electronic equipment, machinery, and automotive spare parts. The service sector will have seen the highest level of ICT utilization, led by the embrace of digital transactions and fintech.

III. Policy Initiatives to Achieve the Ideal Scenario

What follows is an attempt to lay out a road map to transform anticipation into action such that Cambodia will realize the ideal scenario outlined above in this chapter. The menu of priorities and issues to address is long and daunting when it comes to building stronger value chain linkages between domestic and foreign firms that help embed Cambodia's 'factory economy' deeper in regional and global value chains.

Strengthening Market Access Abroad. Advancing bilateral FTAs negotiation with its key economic partners for new market opening is key. As for multilateral agreements, Cambodia must work with other countries in the region to expedite negotiations on the RCEP and explore the opportunity to join the CP-TPP and Asia-Pacific Economic Cooperation (APEC). Expanding market access has become even more crucial now than ever before, given the potential removal of duty- and quota-preferential access treatments, such as Brussels' Everything But Arms (EBA) and Washington's Generalized System of Preferences (GSP).

For domestic firms to benefit from any new market opening to its fullest, promoting information access as to the new trade agreements and how these businesses could benefit from them is equally important. Trade financing must be encouraged to help SMEs export their products. Cambodia may mobilize technical cooperation with other more advanced partner countries including Japan, South Korea, China, and Australia, to help SMEs develop better and quality products that are more competitive.

Building Stronger Reform Momentum in Trade and Investment. Despite ASEAN membership, the use of tariff preferences among Cambodian businesses is low and only relatively few Cambodian companies apply for preferential certificates of origin under ASEAN Free Trade Agreements. A majority of businesses cite a lack of information as the main reason for not using preferential access from free trade agreements. Other bottlenecks include excessive and time-consuming documentation processes and the increasing complexity in border measures, among others. While trade facilitation has thus far seen a noticeable improvement (i.e., online Certificate of Origin, implementation of ASYCUDA at all ports and checkpoints, launching of Cambodia's National Trade Repository (NTR) and CNSW, the country's compliance and commitments of the ASEAN Economic Community (AEC) have only been partially completed. Within this context, Cambodia needs to strengthen the implementation of its commitments to trade liberalization under both ASEAN and WTO agreements and push forward trade- and investment-related reform momentum to fully reap the benefits of ASEAN integration.

To enhance the implementation of the kingdom's commitments to trade liberalization, Cambodia needs to make more progress in digitalizing trade facilitation. Legal and regulatory frameworks for electronic transactions and signatures as well as for accessing and sharing information and data need to be put in place. All trade-related agencies have to adopt and deploy the ICT system to simplify and automate their trade-related procedures. At the time of writing, there is an overall absence of coordinating institutional mechanisms in this regard. Going forward, work towards the establishment of the Trade Facilitation Committee must progress without delay, to create a coordinating platform for resource mobilization for strengthening human, technical, and organizational

capacity to give a boost to digital trade facilitation implementation. Some development programs are already in place where Cambodia may consider leveraging these institutions' support in this regards, i.e., UNCTAD Empowerment Program on National Trade Facilitation Bodies, EU-ASEAN Regional Integration Support (ARISE Plus). In its operation, this mechanism needs to ensure full empowerment of the lead agency and encourage greater participation of both relevant public agencies and trader communities to secure broader stakeholder buy-in.

Cambodia must speed up its efforts in the establishment of a fully-operational and well performing NSW to integrate with the ASEAN Single Window (ASW) and adopt ICT eco-system for business-to-government (B2G) and business-to-business (B2B) that connects trade, logistics, business, and government together to better support needs in the fast-evolving business landscape. While the NTR has enhanced the transparency of trade-related information and trade regulations, the information contained on the Trade Repository will necessarily change to reflect updates as the NTR evolves over time. An improved management of non-tariff measures (NTMs) is also called for to ensure transparency, streamlining of certification procedures, and the harmonization of NTMs where feasible. With the majority of NTMs being technical barriers and sanitary and phytosanitary (SPS), one major way of reducing the trade cost and burden on business and consumers is to invest in robust quality infrastructure that aligns with international standards, i.e., testing laboratories, conformity assessment, and certification and accreditation bodies.

The contribution of Cambodia's open trade and investment regime to connecting domestic and foreign firms along the value chains has not always been as strong as it could be due to a broad range of issues, i.e. lack of industrial cluster, high rates of informality, credit constraints, inadequate supply and cost of energy, among others. The SEZs have proven successful at attracting investment and diversifying the manufacturing base to some extent, i.e., manufacturing and export base in new sectors such as electronics, bicycles, automotive parts, and agri-business products. The spillovers, however, from these zones to the rest of the economy have been limited, particularly due to limited private sector capacity that cannot produce significant backward

linkages. Improvements would be seen if non-SEZ businesses co-locate with SEZ investors. That is, if these firms could operate on SEZ land, even if they do not receive the same incentives that SEZ investors receive. This would create more clustering and encourage spillovers into the broader economy.

High rates of informality⁹ make any effort in connecting the domestic businesses to regional and global firms challenging, while at the same time masks the severity of business regulation constraints, i.e., business licensing and operating permits, customs and trade regulations, tax rates and tax administration, regulatory policy uncertainty, corruption, and anti-competitive and informal practices. To entice firms in the informal sector to move into the formal sector, serious reforms are required to address these constraints.

Interventions should focus on improving both sides of the cost-benefit equation of going formal. On the cost side, this includes not only the time and costs associated with registering a business, but also the ongoing compliance and administrative burdens associated with regulations, taxation, and dealing with government authorities. The benefits side includes improved access to financial and other business development services. At the same time, trust between the government and informal businesses must be built. Businesses are more often than not concerned about the government wanting more information about them (to tax and regulate them) rather than about possible assistance. The government needs to build this trust, especially with the small business community, perhaps through engaging business associations such as the Federation of Association of Small and Medium Enterprises of Cambodia (FASMEC) and strengthening the Government-Private Sector Forum (GPSF).

According to the National Bank of Cambodia, credit provided to the private sector has risen but much of the credit growth has been directed to construction and real estate-related activities (35 per cent in 2018); credit growth contribution of agriculture and manufacturing are much lower, at 0.6 and 0.4 per cent respectively (National Bank of Cambodia, 2019). The credit constraints hinder

⁹ 98.8 per cent of businesses of less than ten employees being unregistered, according to Cambodia Inter-Censal Economic Survey 2014.

diversification of the Cambodian economy by constraining growth in sectors where access to finance is particularly challenging. It has prevented businesses' ability to expand, to invest in new equipment and technology, to gain access to foreign markets, and to manage their liquidity efficiently. Better credit management must be in place to ensure the health of the overall financial sector, i.e., regulate lending and additional taxes on sales and purchases of property, especially for speculative purposes. Cambodia also needs to consider enacting legislation that would allow more financial flows for investment (in manufacturing) purposes, with special collateralization and other schemes. Increasing the supply of educated entrepreneurs – individuals who can run productive businesses – is equally important. This will help the Cambodian private sector to be more efficient and dynamic; such entrepreneurs are more likely to create modern, registered businesses rather than inefficient and informal ones. Development partners could provide technical assistance to complement investment in business incubators.

Improvements in Governance and Public Capacity. The Anti-Corruption Law adopted in 2011 and the creation of the Government's Anti-Corruption Unit have yet to produce a significant reduction in corruption. In the near term, hopefully, the Prime Minister's "sharp" new package of reform measures with his five approaches of "looking into the mirror, taking a shower, scrubbing away the dirt, treating wounds, and conducting surgery" will galvanize reform momentum to specifically address these long-standing governance issues, especially corruption. However, winning people's hearts and regaining public trust in state institutions will not materialize in a short span of time.

Over the long term, the country needs to demonstrate stronger and more consistent political commitment and leadership to carry out the existing reform agenda and to initiate new ones. Leaders must be more adaptive to changes when it comes to reforms and improving institutional capacity, ridding themselves of the belief that 'if there is nothing wrong, there is no need to fix.' Leaders must be more down-to-earth if they are to be more effective in changing social mindsets and values in battling with corruption, which is at present rooted in all aspects of life in the country. Cambodia must encourage and empower more fresh blood in steering the kingdom ahead. Continued suppression of the

bright and innovative younger generation in the public sector only results in these individuals leaving or becoming demoralized. To ensure consistent institutional capacity improvement, an independent assessment and monitoring mechanism must be set up to evaluate the performance of each government ministry and state agency.

Governance and public capacity improvement is also vital for proper management of foreign investment to ensure that such investment is consistent with national development objectives. A case in point that calls for proper investment project screening is the 'China issue' in Sihanoukville. The influx of Chinese investments, and thus development, has picked up at a lightning speed in the coastal town. However, basic public services are often failing to keep up with the increasing economic activity. Problems over trash collection and the already-limited water and electricity supplies are worsening. While some Cambodians have been made better off by these investments, minimal trickle-down benefits and adverse effects have left many locals frustrated. Locals view projects as staffing too many Chinese, offering limited job opportunities to Cambodians. Chinese businesses also crowd out local ones, with Chinese money inflating prices of literally everything. The deadly collapse of a Chinese-owned building under construction in the coastal town in 2019 that killed 28 and injured another 26 people was another example of weak rule of law and corruption in the management of foreign investment projects. The building was reportedly being built as a hotel and believed to have been 80 per cent complete without receiving requisite legal approvals. This highlights the needs to strengthen the enforcement of rules and laws.

Upgrading Infrastructure and Logistics. Cambodia is not self-sufficient in electricity. Presently, the country largely uses conventional electricity production to reduce costs and to increase electricity supply. The high share of hydropower means that energy supply is subjected to seasonal changes in the water in the reservoir. The high electricity demand during the dry season only adds pressure to a limited energy supply stemming from frequent droughts, longer dry seasons, and the intensifying impacts of climate change. Unstable electricity supply frequently forces factories and businesses to use their own generators, which is typically more expensive than using energy from the power grid.

Cambodia must diversify sources and broaden its power generation base in a cost-efficient manner while reducing greenhouse gas emissions. Private investment in energy infrastructure should be strongly encouraged.

Geographically well-located in a dynamic region of the Mekong and ASEAN with a vast sub-regional and regional transport network already in place, Cambodia has also laid out the future path of transport infrastructure and logistics development as well as necessary conditions for their sustainability in its national Logistics Master Plan. It sets out an ambitious multi-year strategy for the country's entire transport and logistics sector to improve roads, railways, ports and inland waterways, urban transport, trade logistics, and to strengthen the capacity of all institutions engaged with transport infrastructure and operations. It is only logical to implement existing domestic and cross-border transportation infrastructure and connectivity development strategies in order to achieve improved logistics performance to support the industrial development.

The connectivity development focus of many cooperation mechanisms already in play will contribute to this implementation. Future engagement of private investment through public-private partnership (PPP) models must be encouraged. Some past and ongoing projects have already demonstrated the increasing importance and successes of PPPs in delivering necessary physical infrastructure, i.e., three international airports in Phnom Penh, Siem Reap, and Sihanoukville; the kingdom's railway network; and the Phnom Penh - Sihanoukville Expressway. However, the government should at the same time ensure improvements in data reporting, and transparency - especially around foreign debt, i.e., open government procurement and adherence to high social and environmental standards.

Industrial Human Resource Development. The pressing issues regarding human resource capacity must also be addressed. With economic growth increasing labor costs, the official minimum wage level has risen

commensurately over the years,¹⁰ eroding the country's competitiveness vis-à-vis other traditionally low wages countries such as Bangladesh, Myanmar, and Vietnam. This calls for further improvement in labor productivity so to catch up with wage inflation.

The underlying causes of relatively low human capital, and thus lower labor productivity, are complex and interrelated. For example, the cost of schooling is a barrier to education for relatively poor children. Although primary education is free, parents must pay for uniforms, books, and school supplies, as well as various informal fees. Due to their low compensation, teachers often collect informal fees for extra tuition creating a barrier to education. Low completion rates for secondary education reduces the supply of potential students for TVET and university. University degrees, particularly in the social sciences, are much preferred by students and their families to a TVET education – however, they do not match the demands of employers. Quality of education has also been a major issue. Furthermore, skills gaps and mismatches are linked to both access to and quality of education and skills training as well as to the priority (i.e., financing) government gives to different levels of the education system. Insufficient information and coordination with the labor market further compound this problem.

Unfortunately, there are very few quick solutions. Long-term solutions will require reforms to the country's education and training systems, as well as the provision of education and job market information to reduce skill mismatches. The government must make further investment in specialized education (i.e., ICT and STEM) and advanced vocational training with joint involvement from all key stakeholders including the public sector, industrial enterprises, and workers. The reforms must seek collaboration with industry experts and engage teachers

¹⁰ Following the latest round of negotiation between manufacturers, unions, and the government, a new minimum wage of US\$182 for the garment sector will kick in January 2019, up from US\$170 in 2018. The amount is more than triple from US\$61 merely 7 years ago in 2012.

who have hands-on industry experience for TVET curricula development, making it more relevant.

PPPs must also be encouraged, i.e., such as public funds used to contract out management of public schools – with subsidies tied to student performance. Other innovative financing mechanisms such as education bonds are also worth considering, i.e., modelled on development impact bonds. A relatively simple action to improve education would be providing information for parents and students to help them make informed decisions and reduce the information asymmetry that currently exists. Students and their families can find it difficult to differentiate between type, quality, and financing costs of educational providers. Information on returns to education, training, or educational quality can be a low-cost method to overcome mismatches and lead to a better allocation of students and ultimately improved skills. Targeted information must be credible, clear, and concise.

Toward an Adaptive and Innovative Economy. Embracing a fully functional digital economy requires a fully functioning digital society where individuals are equipped with certain capabilities and skills to become digital citizens and workforce. Through its national education system, Cambodia must promote digital literacy; further facilitate the growth of new tech-savvy entrepreneurs and tech companies; and build trust and security in ICT utilization. While the development of an enabling legal environment has seen relatively good progress (the National Assembly only recently approved the country's most anticipated e-commerce law and the competition law is expected to follow suit), the government needs to strengthen regulatory capacity and practice to better manage any tensions arising from data security and privacy, disruptions, competition, taxation, among others. Cambodia needs to encourage a more vibrant ecosystem for the digital startup, i.e., through business plan competitions, mentoring support, HUBs, networking events, co-working spaces, accelerators, seed funding, angel investors, and crowdfunding. At the same time, the country needs to mitigate the negative implication of the digital economy transformation on job markets.

External Environment. The Mekong has become more and more of a new growth center and strategic frontier in Asia. Currently, this is a region of prosperity and potential but also a region of uncertainty. There is a huge shift in economic power in Asia. The United States' retreat from multilateralism and a fractured Europe, alongside a more assertive China and a rising India has resulted in tremendous geopolitical uncertainty arising from the process of realignment of power in the region.¹¹ Within the Mekong context, member countries' cooperation depends largely on major powers, who frequently lead most of the cooperation dialogue processes. Cambodia needs to manage this external environment and make certain that this environment works in favor of the country's growth and development needs.

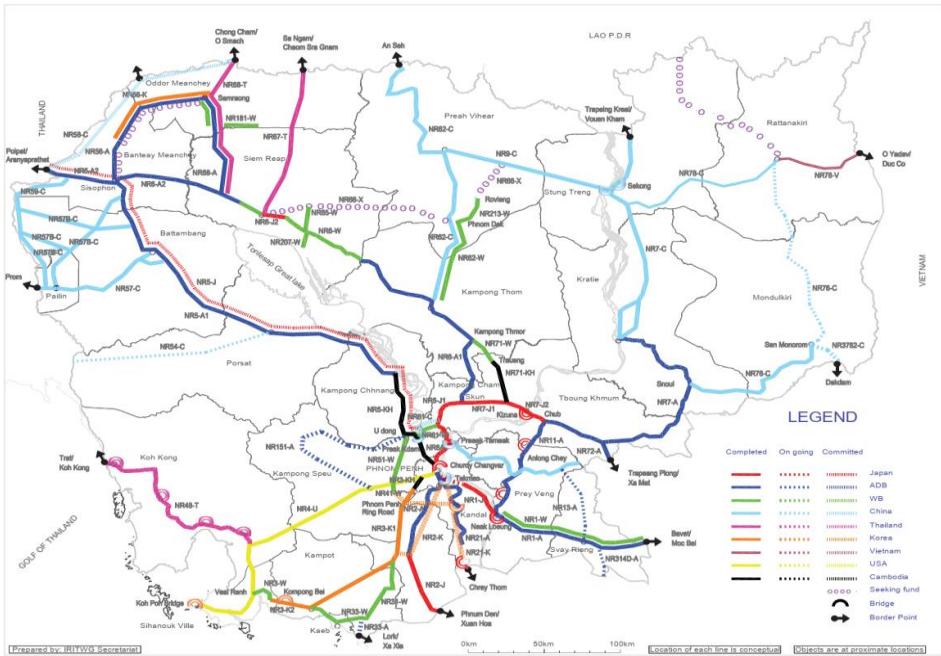
While Cambodia is currently viewed as one of China's closest allies in Southeast Asia, the country has begun efforts to diversify its strategic partnerships with other existing and emerging major and middle powers to support its economic interests. The fact that Cambodia has become more and more alienated by the Western world continues to incentivize the Cambodian government to deepen its relationship with Beijing. Given the strength of the Chinese economy (estimated to surpass the US by 2040) and its ever increasing cooperation and integration with countries in the Mekong and ASEAN, China will continue to maintain its economic influence in Cambodia, in terms of trade, investment, and lending. This reality is likely to hold true for years to come. This highlights the need to manage well Cambodia's future relationship with a rising China. The prospect of capital outflow suppression by China to resolve its own current account issues could disrupt Cambodia's economic momentum. Diversifying sources of trade and foreign capital inflows is just as important as diversifying strategic partnership.

Likewise, Cambodia must work more to diversify development cooperation. The current environment can work effectively for this purpose as various regional major and middle powers, i.e., Japan, Korea, India, among others, have

¹¹ See Economic Research Institute for ASEAN and East Asia. (2019, June 11). ASEAN Vision 2040: Towards a Bolder and Stronger ASEAN Community.

demonstrated their increasing interest in building stronger partnerships and cooperation with Cambodia and the region in which it resides. To turn this to its advantage, Cambodia must seek a significant role in guiding the development agenda for these cooperative frameworks and ensure linkages, complementarities, and synergies with other local and national programs as well as across different frameworks. While collaboration among different frameworks is challenging due to different levels of political will, commitment, and financing resources, the substantial commonality in transport and connectivity infrastructure focus as well as geographical overlap has great potential for building innovative collaboration mechanism among them inside Cambodia and beyond, i.e., project selection, financing, and delivery; filling in the missing links; and cross-border projects. The synergies will stimulate both hard and soft infrastructure development, effective trade and investment, and industrial human capital development for Cambodia, strengthening and diversifying the industrial base and enhancing competitiveness and productivity in order to move up regional and global value chains. Figure 2 illustrates how transport-related infrastructure projects financed by different development agencies including World Bank and bilateral donors such as Japan, China, South Korea, USA, Thailand, and Vietnam complementarily contribute to reducing transport and logistics costs while connecting the multimodal transport system through a vibrant national logistics system. Cambodia can also consider extending development cooperation to support the country's readiness for the Industry 4.0.

In addition, Cambodia must ensure that partnership and cooperation with major and middle powers, in any form, do not concern governments alone. These must be built at all levels of society working together to ensure sustainability and to maximize and share benefits while minimizing the negative impact to the greatest extent possible.

Figure 2: Road Network Development Programs as of 2015

Source: Infrastructure and Regional Integration Technical Working Group (IRITWG)

IV. Regional Economic integration Under the Baseline Scenario: Business as Usual in 2040.

The business-as-usual scenario indicates that in 2040 there will be little progress regarding industrialization and the diversification of production and export base if measures are not taken to address all of the pressing issues discussed above. As garment exports account for 77 per cent of total exports, with 80 per cent of which sold to just eight partner countries (primarily to the EU and US), Cambodia's production and export base is narrow and growth becomes vulnerable and gradually constrained over the long term. Concerns regarding diversification and competition looms large after the country faces potential removal of trade preferential treatments from its traditional markets. The fact that the EU has signed free trade agreements this year with Vietnam adds even bigger pressure on Cambodia, one of the four ASEAN countries without any on-

going FTA negotiation with the EU.¹² Closer to home, only around one fifth of the country's exports are sold to ASEAN member states. Accordingly, Cambodia in 2040 under this baseline scenario will rely on a few fragile markets while at the same time depend largely on trade agreements with key economic partners under ASEAN framework. This leaves the country in a relatively uncompetitive position in terms of overseas market access.

Challenges in Fulfilling Commitments to Trade and Investment Liberalization. The overall score as to ease of trading across borders is relatively poor¹³ and worrying if there is no acceleration of efforts to fulfill Cambodia's commitments to trade liberalization under ASEAN and WTO agreements. Major bottlenecks will remain, including excessive and time-consuming documentation process, low trade logistics performance, and complexity in border measures, among others. Particularly within the ASEAN context, issues regarding common regional product specialization, quality and standards, lack of understanding and adequate information as to how to import and export, will continue to set back the efforts of Cambodian firms to engage in GVC activities.

Limited Improvement in Public Capacity Constraints. Cambodia already has a low score for most aggregate governance indicators, i.e., voice & accountability, government effectiveness, regulatory quality, rule of law, and corruption control.¹⁴ Transparency International's global Corruption Perceptions Index 2018 ranked Cambodia very low: 161 out of 180 countries. Governance and public capacity issues will remain if certain measures described in earlier section are not taken. The implication of having failed to address all of these governance and public capacity constraint issues will put greater pressure on Cambodian private sector development. This yields far-reaching negative

¹² The European Union secured free trade agreements with Singapore and Vietnam. Separate talks with Indonesia and the Philippines are ongoing, while talks with Malaysia and Thailand have been on hold.

¹³ Ease of doing business in Cambodia, World Bank Group. Available online at: <https://www.doingbusiness.org/en/data/exploreconomies/cambodia>

¹⁴ World Bank's Governance Indicators.

externalities, as it affects the efficiency of public services ranging from investment-related business licensing and operating permits applications to taxation to custom clearance and other services. Informality prevails. The practice of having to give gifts to officials to get things done will prevent quality foreign investments from entering Cambodia.

Low Infrastructure Capacity and Logistics Performance. The country continues to face challenges in mobilizing resources and relies heavily on external financing for infrastructure and connectivity development. Even with the successful establishment of the Law on PPP, if enforcement and implementation does not build up momentum, this will result in a lack of motivation among private sector actors to engage in public infrastructure development projects in a consistent manner. Logistics performance is already significantly lower than many other regional countries. The Logistics Performance Index 2018 (LPI) ranked Cambodia at 98 out of 160 economies; the country scored the worst and positioned itself at 130 for the infrastructure component of the Index.¹⁵ Within the energy sector, Cambodia in 2040 would continue to rely heavily on conventional electricity production, i.e., hydro and coal power plants, to reduce costs and increase the electricity supply to cope with increasing demand. This practice will also result in critical environmental challenges.

If there is no action to address them, all of these issues will continue to result in uncompetitive energy prices and trade costs, which in turn will have negative implications for the investment climate and the costs of doing business in the country. As trade costs weigh heavily on Cambodia's export structure and exporting firms' performance, relatively higher trade costs will hinder the countries competitiveness even further.

Low Labor Productivity. Low labor productivity only weighs on expansion and diversification objectives. Over the short term, with wages rising rapidly and Cambodia facing the potential removal of existing trade preferences, the country's attractiveness for the garment and textile industry investment is likely

¹⁵ <https://lpi.worldbank.org/international/global>, accessed on August 27, 2018.

to erode. Over the long term, fierce competition with other countries producing similar products intensifies. This industry faces a substantial risk of being overtaken by other low-wage nations, including Bangladesh and Myanmar, where relatively abundant and inexpensive labor forces cannot yet command the same wage hikes for which workers in Cambodia have fought. Human resource capacity constraints will continue due to the low education and skill levels of the workforce; uneven quality and retention rates in primary and secondary education; and inadequate TVET responsive to labor market demand.

Failing to Embrace a Digital Economy

Similarly, the workforce in this baseline scenario is not capable of embracing the arrival of Industry 4.0. Technological changes will destroy some jobs, particularly among occupational categories in the factories, while generating new high-skill oriented jobs and occupations for which the workforce is not well prepared. Cambodia is already categorized as one of the countries in the world with the lowest stage of digital readiness, being ranked 109 among 139 countries by the World Economic Forum in its Networked Readiness Index.¹⁶ Our business-as-usual scenario indicates Cambodia's digital transformation as not getting better as the country fails to embrace a competitive digital economy, giving rise to information asymmetries, higher transaction costs, ineffective and inefficient delivery of products and services, and lower productivity of capital and labor.

Challenges in Managing the External Environment

Cambodia's overdependence on China will only increase should the kingdom decide to limit its engagement with other partners to the level extant at present. The absence of investment diversification will make the country extremely vulnerable to disruptions stemming from China's capital controls. A slowdown or reversal of FDI inflows from China will significantly affect private sector growth.

¹⁶<http://reports.weforum.org/global-information-technology-report-2016/economies/#indexId=NRI&economy=KHM>, accessed on September 03, 2018.

This overdependence on China will also increasingly constrain Cambodia's policy options as regard both international relations and economic development, giving rise to the risk of damage to the spirit of unity, cohesiveness, and centrality of ASEAN. The debate as to whether China has had the upper hand in ASEAN is ongoing, with different narratives presented as to whether Cambodia and a few other less-developed ASEAN members have facilitated Chinese veto power over ASEAN. In a worst case scenario, this will likely lead to the cracking of the ASEAN shield that has long protected and promoted Cambodia's economy, security, and stability.

However, there is also a strong likelihood that other ASEAN states will not try to distance themselves too much from China so as not to miss out on the economic and development opportunities that China has to offer. As far as Cambodia is concerned, the deeper the country falls into China's sphere of influence, the more it will be alienated by the West, leaving the country more prone to issues regarding democracy, human rights, transparency and information access, social and environmental care, and engagement with civil society.

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Chapter 6 | Economic Diplomacy

Mr. DARAVUTH Sithy Rath and Mr. VRAK Thanit

At 26 years old, Ms. Sovann was recently appointed as the first Tech Ambassador to Phnom Penh. On a particularly pleasant Tuesday morning she is on route to attend a business meeting at the Sokha Hotel with representatives and serial entrepreneurs from major tech companies from Silicon Valley. They are interested in expanding their connections with domestic digital FinTech companies in the city.

Following the conclusion of the meeting, she takes a quick lunch while making a phone call to city officials in Beijing to agree on the specifics of setting up a tech exhibition with Chinese counterparts in Phnom Penh. She then takes a cashless public bus and proceeds to an afternoon meeting, where she will meet with Smart Cities representatives from ASEAN and other major metropolitan areas, such as Sydney and London, to discuss potential smart city collaborations in the areas of safe and sustainable transport, 5G networks and digital connectivity.

After the meeting is finished, Sovann escorts the participants to tour Phnom Penh City Centre, which is now a vibrant innovation center hosting numerous scexhibition centers, clusters of digital companies, and a newly established business school alongside policy labs and specialist research and training institutions. In the evening she visits the “Factory Phnom Penh” to deliver a talk on “The Roles of Women in Maximising the Gig Economy” to a large crowd of independent local and international online workers with major companies in India, the U.S., and other countries. She then returns home to work on a collaborative research project with scholars and policymakers at the World Economic Forum (WEF).

I. Economic Diplomacy: The Ideal Scenario

The Fourth Industrial Revolution (Industry 4.0) is characterized by disruptive technological and digital revolutions and the adoption of emerging technologies and innovations. Given the promising economic benefits technologies can offer to both developed and developing societies, governments are continuously fashioning a variety of policy instruments and frameworks to capitalize on emerging opportunities.

In light of its embrace of new technologies in the context of Industry 4.0 combined with its expanding connectivity to the global economy, Cambodia's economic diplomacy – in our ideal scenario – will experience significant transformation in the lead up to 2040. This will occur at two levels. At the sub-national level, domestic technological development and digital transformation will enable non-state actors, such as cities and multinationals, to assume greater responsibilities for achieving the objectives of the state's economic diplomacy in 2040. At the international level, the government's economic diversification strategies and transparency-enhancing reforms provide an onramp for Cambodia's trade and investment activities to become much more significant in 2040. Overall, new actors with enhanced responsibilities and partnerships with expanded scope and areas of cooperation will materialize, providing more options and platforms for Cambodia to reinforce and expand the momentum of its policy actions geared towards fostering greater international engagement with other major actors in both Asia and other rising mega-regions.

The feasibility of this vision, however, is contingent on the following key factors, which will determine the path of Cambodia's economic diplomacy in 2040:

- The transformation of Phnom Penh, as well as other cities, into smart, innovative, and digitally connected commercial centers, providing a conducive platform for digital start-ups and tech companies to operate while also strengthening collaboration with overseas firms.
- The empowerment of Phnom Penh's diplomatic and economic functions, particularly in the area of public relations involving smart city collaboration or other forms of cooperation with major economic hubs across the globe.

- The development of the “gig economy” in Cambodia, which will provide a unique platform for ordinary Cambodian citizens to engage in flexible and independent work while also reinforcing people-to-people connectivity with other nations abroad within both online and offline communities.
- Continued GDP growth in Cambodia, which will lead to expanded trade and investment activities, resulting in increased participation in global value chains (GVCs) and other markets.
- Greater participation in regional and international economic arrangements due partly to intensive and sophisticated structural reforms and industrial/sectoral developments within the domestic economy.

These factors will develop in the broader context of Industry 4.0. According to Professor Klaus Schwab (2018), Industry 4.0 is a transnational force which centers the adoption of emerging technologies and digital innovations to critically redefine and transform the nature of economic progress and activities in diverse sectors of both developed and developing nations worldwide. Its continual penetration into our domestic communities also convinced many experts to label it as a counter-force to existing anti-liberal forces of trade protectionism and political populism (Schwab, 2018, Strait Times, 2019). With many nations now focused on transitioning their nations towards “smart” and “knowledge-based” economies, globalization 4.0 is indeed fast approaching (World Economic Forum, 2019). The core elements of economic diplomacy as conceptualized here include “economic statecraft, economic security, trade diplomacy, commercial diplomacy, financial diplomacy, aid diplomacy” (Amariei, 2014)

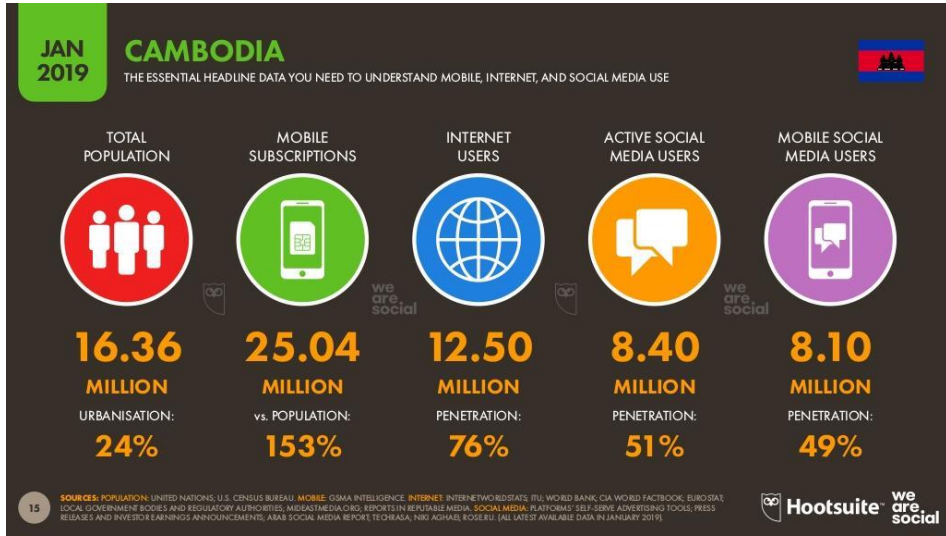
II. Scenario Space and Key Factors for Economic Diplomacy

In the domain of economic diplomacy, the government is currently pursuing a policy of “economic diversification” with the aim of expanding its economic partnerships abroad; to strengthening its integration into the global economy;

and to cementing its vulnerability against economic uncertainty (Vannarith, 2019; Heng, 2019).

As part of its economic restructuring efforts to stiffen resilience against unpredictable shocks, the kingdom is now heavily focused on positioning its digital economy as a key driver of economic development (Vannarith, 2019). In the “Rectangular Strategy Phase IV,” nurturing readiness for the “digital economy and industry 4.0” was noted as an area of priority for the government (Royal Government of Cambodia, 2018). In the recent 13th Outlook Conference, convened by the Cambodia Development Resource Institute (CDRI) in March 2019, digital transformation was recognized as the “next growth engine” vital for transitioning the country towards middle-income status by 2025 and deepening its integration into the regional and global economic arrangements (Cambodia Development Resource Institute, 2019). With the goal of establishing a mature and full-fledged digital economy by 2023, the Royal Government of Cambodia (RGC) is now pursuing a host of activities, ranging from the organization of a “Digital Cambodia Conference” in March 2019 to the establishment and implementation of various policy initiatives and master plans (i.e Cambodia ICT Masterplan 2020), to speed up the process of technological adoption and economic digitalization (Khmer Times, 2019; Heng, 2019). Indeed, the practice of “going digital” to adapt to the evolving dynamics of the international economy has now become a staple priority in the national policy agenda. Major changes in policy directions and trajectories alongside new trends are therefore expected to emerge in Cambodia in the coming years.

Figure 1: Statistics of the Digital Economy in Cambodia



Source: Digital Cambodia 2019

Figure 2: Cambodia's Annual Digital Growth



Source: Digital Cambodia 2019

The key factors that are vital for shaping a positive outcome for Cambodian economic diplomacy briefly discussed above are explored in greater detail below.

City Diplomacy: A New Machinery for Cambodia in 2040

According to the Rectangular Strategy Phase IV (2019 – 2023), economic diplomacy is an integral component of Cambodia’s foreign policy, given its current standing as a small and underdeveloped nation in Southeast Asia (RGC, 2019). Despite frequent demands for multi-stakeholder cooperation and the decentralization of authority, the bulk of Cambodia’s current economic diplomacy is still primarily state-centric. This reality, however, will certainly experience a marked shift by 2040. The current wave of globalization is increasing the diffusion of power to a wide range of actors across all societal levels. New instruments of diplomacy continue to develop, one of which is ‘City Diplomacy’ – i.e. international activities carried out by autonomous cities functioning like sovereign states to represent themselves and advance their interests abroad (Jackson 2017).

In today’s multi-layered international environment, a variety of innovative cities, ranging from Bristol in the United Kingdom to Nanjing in China, have been actively pursuing their own international engagement strategies to expand their outreach abroad (City Nation Place, 2019). In 2015, the World Economic Forum estimated that 750 of the world’s largest cities contributed nearly 57% to global gross domestic product (GDP). By 2030, this figure is expected to increase to 61% (Santiago, 2015). For Cambodia, a city that could be capable of championing such diplomacy in 2040 is Phnom Penh. With a current population of 1.5 million people, Phnom Penh is Cambodia’s most vibrant and dynamic metropolis. Its economic environment provides fertile ground for various national champions, flagship educational centers, and active commercial areas to develop (World Population Review, 2019). The United Nations’ 2018 *World Urbanisation Prospects* report also projects that Phnom Penh’s demographic composition will continue to grow at a rate of 2.82% by 2035, the likelihood of further expansion through 2040 (United Nations DESA/Population Division, 2019).

In an ideal scenario, in 2040 the city of Phnom Penh will become a dynamic and innovative economic “center of gravity” in the country, providing a desirable market for a host of domestic and multinational tech companies to operate. These firms will also play central roles in driving collaboration with other

stakeholders abroad to stimulate national development while also strengthening Cambodia's relations with other states and integration into the global market economy in the context of globalization 4.0.

Smart City Collaboration: A New Engine of Diplomacy

In addition to transforming Phnom Penh into a center of gravity for technology firms, globalization 4.0 will also incentivize Phnom Penh to develop itself into a "Smart City" capable of leveraging technology to improve public service delivery and to catch up with other smart and knowledge-based cities in the region. The need for better knowledge as to smart city management will push Phnom Penh to foster greater collaboration with smart cities across the world.

During the 32nd ASEAN Summit in April 2018, ASEAN leaders designated Phnom Penh, as well as two other Cambodian cities, as 'pilot cities' for experimentation with smart city innovations in the "ASEAN Smart Cities Network (ASCN)" – a policy platform to facilitate cooperation on smart city developments and other relevant policy matters in the ASEAN region (ASEAN, 2018). Distinct from many of its predecessors, this network creates a unique institutional space for ASEAN's external partners, such as China or Japan, to partake in the customization of people-centered policies and initiatives alongside other ASEAN participating cities (Thuzar, 2018). In line with this agreement, Phnom Penh has begun to reach agreements to foster collaboration with other future-oriented cities – a move integral to promoting Cambodia's economic cooperation with the outside world. Acknowledging China as an emerging power in the tech industry of the Asia-Pacific region, Phnom Penh inked a "Sister City Relationship" agreement with Beijing in May 2018 to share technical resources and to connect Phnom Penh to Beijing's expanding digital ecosystem (Xinhua, 2018). Phnom Penh also has strong sister-cities relationships with such cities as Boston and Bangkok. During the Belt and Road Forum in April 2019, Prime Minister Hun Sen signed an agreement with China to allow Huawei to assist Cambodia in constructing "5G networks" to dispel digital and internet-based systems conducive for smart city innovations and operations (i.e. smart homes/offices) in Phnom Penh (Narin, 2019). In March 2019, Japan also agreed to support Cambodia's Ministry of Land Management to implement smart city principles centered on urban

management and the integration of IT technologies in the modernization of urban spaces (Manet, 2019). Recently in July 2019, Phnom Penh inked a partnership agreement with Ho Chi Minh City to collaborate on smart city developments and transforming both cities into active commercial hubs in the future (Senase, 2019). Continuity and expansion of such initiatives in the future will be essential to achieve the ideal 2040 scenario via the growth of Phnom Penh's smart city collaboration.

Income Status and Growth Pattern

Cambodia is currently a lower middle income country, defined by the World Bank as having a per capita gross national income (GNI) between \$996 and \$3,895. With a GNI per capita of \$1230 in 2017,¹⁷ the RGC plans for the country to become the upper middle income country by 2030 and a high income country by 2050. To reach an upper middle income level, a country needs to have a GNI per capita between \$3,896 and \$12,055. For the high income status, a GNI per capita of \$12,055 is required (World Bank, 2018).

In 2040, Cambodia could reach an income level of approximately \$7,000, halfway to reaching high income status in 2050. Economic growth in Cambodia has remained strong since 2000, averaging at slightly over 7% year-on-year (World Bank, 2018). As regards the demographic situation, more than two-thirds of the population are classified as within the working-age population between 2018 and 2048 (Table 1) (RGC, 2018).

¹⁷ Extracted from World Development Indicator

Table 1: Trends in Dependency Ratio, Cambodia¹⁸

Age Group	1998	2008	2018	2028	2038	2048
0-14	42.8	33.7	28.5	25.9	22.1	20.8
15-64	53.7	62.0	66.5	67.3	68.8	67.9
65+	3.5	4.3	5	6.9	9.1	11.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Dependency Ratio- Overall	86.1	61.2	50.3	48.7	45.4	47.2
Dependency Ratio- Young	79.7	54.3	42.8	38.5	32.1	10.6
Dependency Ratio- Old	6.4	6.9	7.5	10.2	13.3	16.5

Source: NIS, Ministry of Planning, RGC, 2011

Diversification and Modernization of Trade and Foreign Direct Investment

By 2040, products and services of the three sectors in Cambodia will, ideally, be more diversified. Cambodia will need to shift its focus from garment and footwear over the long run, in part due to price volatility in imported fabric and yarn production (Dezan, 2017). Although Cambodia has won the World's Best Rice Award four times, in 2012, 2013, 2014, and 2018 (World Bank, 2018), the country will also need to expand development of other potential higher-value crops such as pepper, durian, and coffee. According to Dubuis, the cohesion and mutual development of the agricultural and industrial sectors are essential as development in one sector will be beneficial to another and vice versa (Dubuis, n.d.). With regard to the service sector, there has been a rise of trade in services as a percentage of GDP in Cambodia from roughly 20 percent to 34.5 percent between 2000 and 2018. However, in the past 15 years, the average share of service exports as a component of the total exports of goods and services has

¹⁸ Calculated from Census Projection Report, 2010

been approximately 30 percent.¹⁹ Travel service contributes around 80 percent of service exports in addition to delivering a 50 percent share of total service imports. Nonetheless, the share of ICT in service export is still minimal, between 1 and 2 percent – illustrating the challenges in achieving the ideal scenario and for Cambodia to reach an upper middle income status.²⁰

FDI has accounted for about 10 percent of GDP over the last 10 years (World Bank, 2018). Chinese investors were the most active among foreign investors and accounted for three-quarters of total FDI in the construction sector (infrastructure, commercial, and residential real estate) in 2018. Cambodia granted significant land concessions and licenses to Chinese firms in mining, hydropower, garment, and agro-industry sectors between 1994 and 2012 (Touch, 2015).

Table 2: Investment Capital by Country

Year	2012		2013		2014		2015		2016	
Total	\$2.9 Billion		\$4.9 Billion		\$3.9 Billion		\$4.6 Billion		\$3.6 Billion	
Rank	Country	%	Country	%	Country	%	Country	%	Country	%
1	Cambodia	42,1	Cambodia	66,8	Cambodia	64	Cambodia	69,3	China	29,9
2	China	20,7	China	15,7	China	24,4	China	18,6	Cambodia	27,6
3	Korea	9,9	Vietnam	6,1	Malaysia	2,2	U.K	3	Japan	22,8
4	Japan	9,2	Thailand	4,4	Japan	1,7	Singapore	2,2	Thailand	4,6
5	Malaysia	6,0	Korea	1,8	Korea	1,7	Vietnam	1,9	Korea	4,6
6	Thailand	4,5	Japan	1,6	Vietnam	1,3	Malaysia	1,6	U.S.A	3,4
7	Vietnam	2,9	Malaysia	1,0	UK	1,1	Japan	1,3	Singapore	3,0
8	Singapore	2,6	Singapore	1,0	Singapore	0,9	Thailand	1,2	Vietnam	2,5
9	U.K	0,5	U.K	0,4	Thailand	0,9	Korea	0,2	Korea	0,2
10	U.S.A	0,4	France	0,3	Australia	0,5	Canada	0,2	India	0,6
11	Others	1,2	Others	0,9	Others	1,3	Other	0,5	Others	0,5

Source: The Council for Development of Cambodia

¹⁹ World development indicator, World Bank

²⁰ World Integrated Trade Solution

Table 3: Investment Capital by Sectors in Percentage

Sectors	2012	2013	2014	2015	2016	2012-2016
Agriculture	18,8%	22,7%	6,7%	10,4%	13,3%	14,5%
Industries	50,2%	22,3%	72,1%	19,8%	32,9%	37,5%
Infrastructure	7,7%	52,8%	9,0%	67,4%	15,1%	34,2%
Tourism	23,3%	2,1%	12,2%	2,4%	38,8%	13,9%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Source: The Council for Development of Cambodia

In the 2040 ideal scenario, Cambodia will have diversified its FDI and have reduced its dependence on China in this area.

High value-added knowledge-based services and activities clustering in global cities are sources of attraction to multinational corporations due to the cost advantages in terms of distance; a wide range of complementary services and sophisticated infrastructure; and a cosmopolitan environment welcoming of foreign investment (Estrin, Cote, et al., 2018; Goerzen, Asmussen, & Nielsen, 2013). Besides attracting investment from abroad, global cities could provide the advantage of digital platforms for the emergence of new global firms in marketing their services abroad.

Trade Agreements and Service Sector Development

In the global economy, the trade in services and data will play a more important role than the trade in goods based on recent trends.²¹ In comparison to trading in goods, trade in services is much more complicated in that it involves a wide range of transactions such as “IT services, transportation services, tourism services, local offices providing banking, insurance, and communications services, and the short-run movement of service workers in these industries”

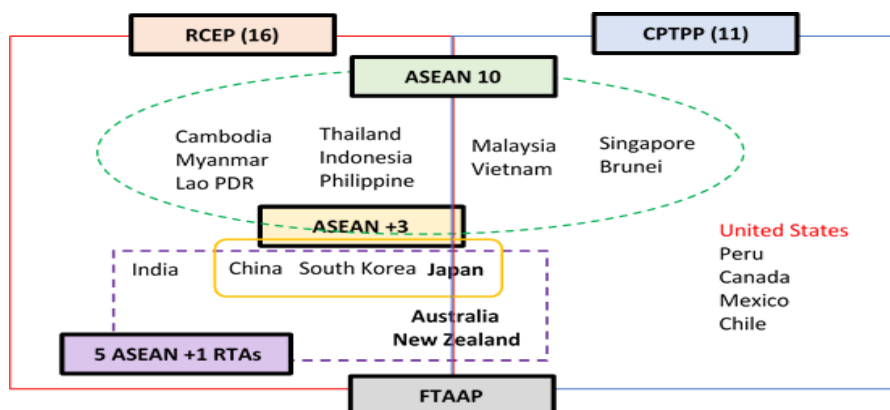
²¹ Trade in services has surpassed trade in goods in the past decade with the former achieving a 60% growth rate higher than the latter.

(Estrin, Cote, Li, Meyer, & Shapiro, 2018). Therefore, a new type of business model will be needed to facilitate the growth of the service sector.

In UNCTAD's estimation, the total value of both domestic and cross-border e-commerce transactions increased by 56% from 2013 to 2015, with a total value of \$25 trillion. There are a few key points to note about the future of trade. First, with digital technology, there will be an ease in market entry and a rise in product diversity, which could help to reduce production and distribution costs. Second, the structure of trade could be transformed by the Internet of Things (IoT), artificial intelligence (AI), 3D printing, and blockchain. Thus, new rules and frameworks for digital trade will need to be designed and implemented in the near future. New sources of comparative advantage in digital trade include the regulation of intellectual property rights, data flows, and privacy as well as the quality of digital infrastructure. Since storage devices, power supplies, and cooling systems are the most important in supporting digital technology, energy infrastructure is essential to the digital intensive sector (WTO, 2018).

In the Asia-Pacific region, there are many overlapping Regional Trade Agreements (RTA), known as "spaghetti bowl effect" or "noodle bowl effect" (Park, 2018)²² (Figure 4). However, the largest free trade agreement, Free Trade Area of Asia-Pacific (FTAAP) is still a vision since it was raised in 2014 (APEC, n.d.). However, if FTAAP could be realized, there will be a consistent and unified framework for each country in trade as well as a reduction of trade diversion. According to Egger and Larch (2008), however, expansion of existing RTAs is more likely than the new creation of a new RTA.

²² These include (1) East Asian Free Trade Area (EAFTA), comprising of ASEAN+3 countries; (2) Regional Comprehensive Economic Partnership (RCEP), including all ASEAN members and five ASEAN+1 RTAs; (3) Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)[2], consisting of Brunei Darussalam, Singapore, Malaysia, Vietnam, Australia, New Zealand, Chile, Peru, Canada, Mexico, and Japan; (4) Free Trade Area of Asia-Pacific (FTAAP), including all APEC members.

Figure 3: Regional Trade Agreements in the Asia-Pacific Region

Source: Modified and updated from Park (2018)

The concept of gains from trade in terms of trade creation and trade diversion was initially developed by Viner (1950) and more recently expanded and applied by Park and Park (2017), Baier and Bergstrand (2004), Magee (2003), and Egger et al. (2008), and Baldwin and Jaimovich (2012). According to Meada (1955) and Salvatore (2013), gains of state from free trade agreement depends on the larger market size of the member state; high tariff, high trade volume, narrow development gap, and competitive industrial sector in the pre-RTA stage; and geographical proximity. However, gaps in the levels of economic development among members could hinder the progression of, and diminish the benefits, received from an RTA (Park, 2018).

Cambodia is part of many regional and bilateral trade agreements such as World Trade Organization (WTO), ASEAN Free Trade Area (AFTA), Regional Comprehensive Economic Partnership (RCEP), Belt and Road Initiative (BRI), ASEAN–Australia–New Zealand, ASEAN–China, ASEAN–Japan, ASEAN–India, ASEAN–Korea. With the proliferation of digital technology, future RTAs could be strengthened. In 2040, Cambodia could be part of a larger and more unified trade bloc – the Free Trade Area of Asia-Pacific (FTAAP) – with an extension of external members in the Americas and Europe.

Cambodia has sought to expand its trade agreements with other trading blocs in the past few years. Cambodia asked to join APEC during an informal dialogue

between APEC and ASEAN leaders in Vietnam in 2017 (Ven, 2017). Cambodia and the Eurasian Economic Union (EAEU) signed Memorandums of Understanding to enhance cooperation in trade in 2016; however, the volume of trade between the two regions remains small, and currently, Cambodia seeks to develop trade agreements with EAEU (Hor, 2019; Sok, 2019). The chief economist of the Cambodia-based research firm, Business Research Institute for Cambodia, suggested that Cambodia enter CPTPP if it wanted to maintain trade and business competitiveness relative to neighboring countries such as Vietnam (Hor, 2018).

III. Policy Initiatives to Achieve the Ideal Scenario

Developing City Diplomacy

Phnom Penh's digital economy is still in a nascent stage of development, but the above-mentioned discussions demonstrate that its current trends of development is already leaning towards an international dimension. It is imperative, however, to emphasize that these trends will only be sufficient to achieve the optimal scenario if there is significant effort from both the public and private sectors in maintaining an urban digital environment with stable infrastructures, transparent regulations, and resilient cybersecurity systems – all of which are necessary conditions for a vibrant digital economy to thrive. Yet, many, if not all, of these conditions are still either absent or sub-standard in the present interlude. The recent Rectangular Strategy Phase IV (2018 – 2023) has already outlined a long-term strategic framework for consolidating the digital economy, comprised of four pillars, but sound and effective policies, underpinned by vigorous implementation efforts, are needed to bring these prospects to fruition. For Phnom Penh to harness the full potentials of its digital prowess, therefore, the following policy measures should be set in motion:

Priority #1: Establishing a National Digital Economy Framework

First and foremost, the government needs to introduce a comprehensive, strategic, and innovative “Digital Economy Framework,” which will function to grant protections to the already operating digital companies in the form of technical assistance, cyber-security, competition principles, etc. Initiatives have

already been made by the Council of Ministers to enact a national “E-Commerce” and “Cyber Law,” both of which are pivotal components of a sound and comprehensive digital economy framework.

Priority #2: Developing Associations to Oversee the Digital Economy

Second, the government also needs to develop an institutional unit to oversee the progress and implications of the growing digital economy. Malaysia, for example, currently has its own “Malaysia Digital Economy Collaboration (MDEC),” spearheading progress towards “Digital Malaysia” via the development of five priority sectors: (i) ICT services, (ii) e-commerce, (iii) ICT manufacturing, (iv) ICT trade, and (v) content and media. A “Digital Free Trade Zone (DFTZ)” has also been established to facilitate the commercial activities of e-commerce companies and others (United Nations Development Program, 2018).

The National Bank of Cambodia (NBC), has already developed the “Cambodia Fintech Association (CFA)” to cooperate closely with similar associations in Thailand, Singapore, and Taiwan to support the growing fintech landscape in the kingdom (Kunmakara, 2018). Such a move is commendable and should be repeated in other critical areas aside from Fintech. In this regard, the government can work towards establishing associations to tackle pressing issues, namely the sharing economy or digital disruptions. These associations should have stakeholders from both the public and private spheres. In the future, support should be provided to develop these entities into national associations, working hand-in-hand with line ministries and relevant international bodies in overseeing the digital economy in Cambodia.

Priority #3: Fashioning an International Digital Engagement Strategy

Finally, the government should also consider fashioning an “International Digital Engagement Strategy,” similar to what France did in 2018. This strategy must seek to designate Phnom Penh as a center of excellence in digital transformation not only in Cambodia but also in the broader Southeast Asian digital community.

The strategy will be pivotal not only for attracting digital players into Cambodia but also bolstering its participation in global digital markets.

Enhancing Smart City Systems

The journey to effective, efficient, and sustainable smart city development requires prudent planning and implementation if it is to successfully contribute to the 2040 ideal scenario. In the current national policy agenda, smart city development is a priority for the government, but proper frameworks and action plans are still in progress. For Phnom Penh to become an internationally engaged smart city, the articulation of strategic and coherent policy measures is highly needed.

Priority #1: Development of a Smart City Roadmap

First, urban planners in Phnom Penh should develop a roadmap that outlines the vision and policy priorities of Phnom Penh over the next 10 to 20 years, aligning itself with the Rectangular Strategies and the ASEAN Smart Cities Framework. Presently, developments in the city follow a framework called “The Phnom Penh Masterplan for 2035,” which addresses issues pertaining to urbanization, land use, and other matters (Halim, 2016). Urban developers and investors have also dubbed Phnom Penh as a strategic hub of economic development in Southeast Asia (Kimsay, 2019). The absence of a clear and comprehensive smart city framework, however, will render such prospects null. Phnom Penh should look for assistance in developing a unified policy framework as soon as possible to capitalize on the coming opportunities. The framework, moreover, should outline actionable strategies for residents and policymakers of Phnom Penh to work towards encouraging the adoption of technological and digital solutions to urban problems; promoting urban development with respect to sustainability and long-term durability; integrating data science; encouraging public participation; and preserving socio-cultural authenticity in the midst of globalization.

Priority #2: Expand the Outreach of Smart City Engagements

Phnom Penh needs to also identify, in an outward-looking manner, a set of international smart city networks to which it can reach out for technical

assistance and support. Aside from the ASEAN Smart City Network, Phnom Penh should also look to other smart city networks in Europe and the U.S. to create central platforms for city officials to engage in city-to-city collaboration and multi-city coordination.

Improving the “Gig Economy”

The challenge of maximizing the gig economy lies in the task of establishing an enabling environment for it to operate effectively, underpinned by adequate government support and attractive incentive schemes. Meeting the preconditions set out below is thus a vital priority for the government to nurture a well-functioning and well-regulated gig economy in Cambodia in the lead up to 2040.

Priority #1: Boosting Internet Connectivity, Cyber Security, and Human Capital

Internet connectivity must be strengthened and amplified to secure a stable platform for a “human cloud” to operate. The Cambodian ICT Masterplan 2020 has already been set in place, so stringent efforts need to be invested into effectuating the priorities outlined. The rolling out of 5G networks to enhance the “Internet of Things (IoT)” is also an option to pursue given the country’s substandard internet connectivity. Second, a stable cyber-security system should be established to protect digital nomads from Internet frauds, online economic crimes, hackers, and other threats in the current digital sphere. Lastly, STEM education should be encouraged among the younger generation to continue the current progress of digital adoption for sustainable and effective national contributions.

Investment

Priority #1: Reducing the Cost of Doing Business

In recent years, there has been a slowdown of FDI from China to Cambodia. Cambodia’s rank in The Ease of Doing Business Index declined from 131st in 2017 to 138th out of 190 countries in 2019. In comparison to Vietnam and Thailand, ranked at 69th and 27th respectively, there are still many challenges

for firms operating inside Cambodia due to the absence of strong infrastructural development and regulatory weaknesses (Dezan, 2017; Ly et al., 2019). The price of electricity, as noted previously, is quite high in Cambodia compared to its neighboring countries as stated by the World Bank (2017). In addition, Cambodia's rank in logistics capacity declined from 73rd place to 98th out of 160 countries on the 2018 Logistic Performance Index (LPI) (World Bank, 2018). These are the trends that must be reversed in order to achieve the ideal scenario set out above.

Improving infrastructure inside the country is crucial and requires stronger cooperation between the private and public sectors. The private sector will need to be incentivized to work with government in designing, funding, and implementing infrastructure projects through private-public partnerships. In addition, demand for electricity is projected to rapidly increase with a predicted average annual growth rate of 9 percent between 2015 and 2040 (Shigeru, K. and H. Phoumin, 2019). Developing, installing, and operating the equipment for renewable energy such as wind, solar, photovoltaic, and hydropower is significant in fulfilling future electricity demand. Yet renewables rely on the existence of a skilled workforce able to engage in construction, engineering, installation, distribution, technical assistance, consultation, and equipment maintenance (Brockman, 2018) – which the kingdom currently lacks.

Priority #2: Strengthening Supply Chain Linkages

The concentration and quality of supply chain linkages between foreign and local firms are at present minimal (Chheang, 2017). Technological spill-overs are also limited due to the continued locus of management, coordination, and production design among foreign firms (International Labor Organization, 2017). Cambodia should begin to strengthen its institutional capacity and reduce the cost of doing business to strengthen the confidence of foreign investors. Also, enhancing human capital through STEM education and vocational training as well as entrepreneurship will support the development of local firms in the ability to access new technologies from abroad.

Trade Agreements

Priority #1: Expanding Entry, Increasing Capacity

APEC has not accepted any new members since 1998. India, which has sought membership in APEC for some time has been blocked due to its location beyond the Pacific Rim, its biased treatment of foreign investment, and its inability to complete certain economic reforms (Ayres, 2018; Mohamad, 2019; Singh, 2016). A report produced by the Asia Society Policy Institute (ASPI) suggested that India improve its business relations between foreign and local firms, make tax and land reform, show its enthusiasm to join, and create a support lobby (Singh, 2016). Cambodia could learn from the case of India, and take an active approach towards membership in APEC. Moreover, if Cambodia wants to be part of mega-regional trade agreement by 2040 or earlier, it needs to strengthen its capacity to absorb benefits from RTAs. Simultaneously, Cambodia needs to be well-prepared in tackling new issues arising from RTAs such as “electronic authentication, consumer protection, intellectual property, cross-border electronic transfer of information, data localization, and cybersecurity” (WTO, 2018).

IV. Economic Diplomacy Under the Baseline Scenario: Business as Usual in 2040

Under our baseline scenario, in 2040 the transformation of Phnom Penh into a smart and globally connected city has been underway for twenty years. It serves as the backbone for Cambodia’s national digital economy. Now in its twentieth edition, Startup Kingdom, the annual Tech Startup Report in Cambodia, has stated that around 500 digital startups are present in Cambodia, the majority of which are based in Phnom Penh. The relatively small growth of this sector is attributed to a growing global services sector.

These startups in the baseline scenario are operating primarily across services in the industries of fintech, digital media and advertising, and e-commerce. A number of policy mechanisms set forth by the government established an early pathway towards a more suitable city infrastructure in the kingdom. However, the lack of local innovations to smart city design proved to be a setback against

the potential growth opportunities. Reliance on foreign knowledge and experts – primarily from China - in the task of nurturing digital cities and innovation has significantly hampered the country's path towards invigorating its innovation system and has made the process of governing and managing these foreign smart city innovations costly. Fostering indigenous innovations through effective citizen empowerment and education would have been a much more suitable and risk-averting approach to developing a durable starting point for smart city development and city diplomacy in Cambodia.

Cambodia's economic structure in 2040 has continued to shift its focus from the agricultural to the industrial and service sectors, in particular growing its tourism market as the globe experiences a middle-income spending swell. However, agriculture still remains a crucial sector in the Cambodian economy for delivering development opportunities around poverty reduction. Cambodia's 2040 rural population still remains high at around 70%, with a high level of agricultural employment underpinning rural Cambodians' income. As predicted in 2019, the rural sector has become far more "productive, more competitive, and more market-oriented" ("The Future of Cambodia", 2019) – but this has not provided a sufficient basis to achieve upper middle income status.

Owing to the absence of a digital innovation strategy, the kingdom has focused on securing productivity improvements across established sectors. Due to limited technical capacity and human resources, it has been difficult for Cambodia to access advanced technology from abroad, which has delayed the diversification process in targeting digital trade and investment. Moreover, changes in trading patterns, the rise of trade in high value-added knowledge services, and the demand for new regulatory frameworks have resulted in further difficulties for Cambodia to reap the benefits of a digital economy in 2040.

Establishing a sustainable energy infrastructure, essential to support higher demand in a digital economy, has also not been an easy task. Supply still remains subject to unseasonal disruption when rainfall is low – a major barrier to development. This has resulted in minimal investment from firms seeking to operate in the region. Although Cambodia has undertaken some economic

diversification, dependence on China has led to a reduction of trading opportunities with Europe and America. Furthermore, the progression of mega-lateral RTAs formation has remained slow and with the new trade framework, more discussion and negotiation is required, which has further delayed the process of unification of regional trade.

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Chapter 7 | Energy

Dr. HENG Pheakdey and Ms. Maureen Boyle²³

Can we see a future Cambodia as a society that has reduced its energy demand and dependence on imported fuels such as oil and coal and moved towards forms of renewable energy such as solar, wind, and biogas? We can view this society in 2040 through the eyes of Phnom Penh resident Sothy, who works with a university, teaching students in the department of energy futures. Sothy travels to work on public transport, among the busy foray of cyclists on the dedicated bike paths, street vendors using biogas to cook, electric motorbikes and people engaged in car-pooling. On his way to work, Sothy admires the beautiful architecture in the city with buildings that are surrounded by cool green trees and shade, and the use of insulation in the buildings with louvers on the windows to increase air flow. The building that Sothy works in is four storeys high, is surrounded by tall shady trees and provides an environment in which to work that feels close to nature. His favourite bird, the Great Hornbill is often seen outside his office in the trees that surround the building. The building has a 20kW solar photovoltaic system on the roof, and includes battery storage to provide electricity for use in the building. The solar power system is also connected to the national grid, which allows for supply of electricity to the grid at peak times during the day when energy is needed the most. Many buildings and industries in Phnom Penh now use solar PV and batteries, which has the

²³ Maureen Boyle extends her appreciation and thanks to Curtin University for the funding that was provided through the Curtin University Postgraduate Scholarship, supported by the Australian Government Research Training Program.

added benefit of providing support for the grid, which is needed with the recent installation of wind energy production in Kampot province.

I. Energy: The Ideal Scenario

In 2040, Cambodia's energy sector reflects the transformation that occurred in the prior decades with the realization of 35 percent of renewable energy on the national grid, comprising mostly of solar photovoltaics (PV) and wind energy. Biomass generation was also increased off grid using agricultural residues, as well as an increase in the use of biogas for cooking and to replace diesel fuels in the agriculture industry. A Renewable Portfolio Standard (RPS) was implemented to achieve an additional 35 percent of renewable energy in Cambodia. The RPS as a policy mechanism, provided the investment incentive and a market for increased renewable energy generation in Cambodia. The percentage of renewable energy in Cambodia increased over time and included intermediate targets, such as 20 percent of renewable energy in 2025, from a base of one percent of renewable energy in 2018-2019. The benefits of increasing the percentage of renewable energy over time allowed for the introduction of solar and wind energy forecasting in Cambodia's network to maintain security and reliability of the grid. In addition, storage costs reduced significantly in the previous two decades, which enabled Cambodia to install storage on the national grid to provide further support for renewable energy on the network.

Another significant factor that occurred to increase reliability, enable frequency control, and allow for additional intermittent generation on the national grid in Cambodia was the integration and trading of electricity between Cambodia, Laos, Thailand, and Vietnam through the ASEAN Power Grid. Having additional support for the national network in the form of a larger, regionally connected grid was crucial in allowing for increased solar PV and wind energy in Cambodia. As Cambodia is now generating enough solar and wind energy to meet national demand, along with the legacy of coal, hydroelectricity, gas and fuel oil, Cambodia was able to begin exporting excess generation to Thailand and Vietnam. This has allowed for increased revenue, as well as reducing the need for the building of additional coal-fired power plants in Vietnam and Thailand.

Another factor that led to reduced demand, and thus the follow on effect of lessening the need for additional generation capacity, was the implementation of energy efficiency in the building sector in Cambodia. The introduction of regulations for energy efficiency standards in new buildings, including insulation, shading and airflow requirements reduced the use of air conditioning in Phnom Penh, which led to significant reductions of energy use in this sector. In addition, a program to assess the effects of solar hot water systems on energy use was trialled in Phnom Penh, with promising results. The trial resulted in energy reductions from the use of solar hot water and lower electricity bills in the trial households and it is likely that the Royal Government of Cambodia will develop and implement a program of incentives for many more households to switch from electric to solar hot water.

Cambodia also saw 100 percent of households in the country electrified in 2030, which was achieved through the extension of the national grid where feasible and through incentives and reduced tariffs that were provided by the government for the provision of affordable remote area power supplies, including the use of solar micro and mini grids in areas that were located too far from the national grid. Rural Electrification Enterprises (REEs) in the country, also began installing solar PV on their distribution networks in areas of high demand, such as at transformer sites to reduce costs. This had the added benefit of making the extension of distribution lines to some areas more affordable for REEs, thus leading to increased electrification in areas where this was feasible. The combination of grid and off grid electricity, increased diversity of supply and the increased reliability of the national grid led to all households in Cambodia having at least 23 hours of electricity per day, with at least 2000 watts of power, enough to power most appliances, such as fans, washing machines, and refrigerators. All households in Cambodia also transitioned to the use of gas, biogas and improved cookstoves, which has led to reduced wood fuel use in cooking and improved health outcomes for the population as a whole.

II. Scenario Space and Key Factors for Energy

The Royal Government of Cambodia's priorities for energy include: ensuring sufficient supply; increasing electrification and accessibility; reliability; and a

reduction of tariffs with minimal impact to the environment (Economic Research Institute for ASEAN and East Asia, 2019, p. 15; Keo, 2019). These priorities are worthy goals for the energy sector in Cambodia and this chapter will discuss potential ways to meet these priorities with a focus on security, equity and sustainability. The four key factors listed below will influence the path of development in the energy sector and will be crucial for Cambodia to ensure a secure, equitable and sustainable energy future in 2040.

1. Access and affordability of sufficient electricity for people in Cambodia that includes at least 23 hours of electricity per day at an affordable tariff.
2. National supply of electricity, which includes 35 percent of renewable energy by 2040 (excluding large-scale hydroelectricity).
3. Achievement of energy security that reduces energy imports such as coal and oil; encompasses a diversity of energy sources for electricity supply; and ensures reliability of the national grid.
4. Reduction of energy demand in Cambodia through the implementation of energy efficiency across sectors, in particular the building and residential sector.

These goals will be discussed further in this chapter; however, the authors also suggest that the ideal scenario for Cambodia with growing energy demand is to not only increase renewable energy generation but to actively avoid the need to build additional coal and hydro-electricity through demand reduction. As discussed by York and Bell (2019), historically when new energy sources are added to an energy mix, this does not necessarily replace traditional sources of energy, such as coal, oil or in the case of Cambodia, wood fuel. Although globally, renewable energy sources such as wind and solar are increasing, they still only comprise about two percent of the global energy supply (York & Bell, 2019, p. 41). We can see this trend on a smaller scale occurring in Cambodia. Over the last ten years in Cambodia, energy generation capacity has been increasing with economic growth and increasing electrification. What has been found however, is that although many areas are becoming electrified, the use of wood fuel is still prevalent and makes up a significant amount (up to 60 percent) of primary energy use in the country (Participant 20, 2019; Luukkanen et al., 2015). With

only 33 percent of the population using clean fuels (such as gas) for cooking - wood fuel and charcoal are still the dominant energy sources for cooking in Cambodia.

Cambodia's energy trajectory is one of growing demand and increasing electrification with the expansion of the national grid. At the time of writing, the total installed generation capacity in Cambodia was approximately 2500 megawatts (MW). This consists of approximately 35 percent from coal, 48 percent from hydroelectricity, 2 percent from fuel oil and less than 1 percent from renewable energy (other than hydro). Remaining power usage (approximately 14 percent) is imported electricity from Thailand, Vietnam and Laos (Electricity Authority of Cambodia, 2018b). With increasing economic growth, rising electrification rates, and continued urban population growth in Cambodia, electricity demand has been increasing at a rate of approximately 18 percent per year during the period from 2010 to 2016 (Economic Research Institute for ASEAN and East Asia, 2019; Intelligent Energy Systems & Mekong Economics, 2016, p. 14). Projections of electricity demand into the future are that demand will increase by 7.5 times to 2040 (Economic Research Institute for ASEAN and East Asia, 2019, p. xviii). The residential sector traditionally consumes the highest proportion of electricity at 50 percent, with commercial and services at 28 percent and industrial use constituting 18 percent of demand (Intelligent Energy Systems & Mekong Economics, 2016, p. 14). The trend of increasing energy demand for Cambodia and many other countries within ASEAN, such as Vietnam and Thailand is a reality that appears set to continue with the pursuit of development that relies on high levels of energy consumption.

Electrification in Cambodia is growing with latest figures stating that 81 percent of households were electrified in 2018 (Economic Research Institute for ASEAN and East Asia, 2019, p. 37). This has exceeded the target of 70 percent of households electrified by 2030, however the levels of energy access and hours of supply for households in Cambodia could be improved. A World Bank study examining 3,300 households in Cambodia found that 63 percent of households in the kingdom have approximately 8 hours of electricity access per day, which equates to tier 3 access under the multi-tier framework (Dave et al., 2018, p. 29). Tier 3 access can power medium load appliances, or provide approximately 200-

799 watts of power (Dave et al., 2018, pp. 3-4). Households that are located off grid and using other sources of energy such as a solar home system or a rechargeable battery are mostly in tiers 0-2, which equates to approximately four hours of electricity per day or enough to power load appliances up to 200 watts (Dave et al., 2018). A simple solar home system in Cambodia traditionally ranged from 60 to 250 watts. Research undertaken by den Heeten et al. (2017, p. 8) exploring patterns among over one hundred solar home system users in Cambodia showed that mean energy consumption was 310Wh per day with most energy consumed at night. Under the multi-tier framework this would be considered tier 3 access.

Cambodia is relatively self-sufficient in traditional biomass sources, with wood fuel making up a significant percentage of the primary energy supply, with figures varying from 45 to 60 percent (Asian Development Bank, 2018, p. 2; Participant 20, 2019). Firewood is the dominant fuel used for cooking in the country, with 62 percent of households reliant on wood fuel; 5 percent using charcoal; and 31 percent use gas. Approximately 33 percent of households use a clean fuel stove, which is mostly Liquefied Petroleum Gas (LPG) or biogas. A small percentage of the population, 2 percent, use electricity for cooking (Asian Development Bank, 2018). The remaining primary energy supply consists of 38.5 percent of oil and petroleum products; 10.7 percent of coal; 3.6 percent of hydropower; and 2.8 percent of electricity imports (Asian Development Bank, 2018, p. 2). Biomass and oil are the most dominant fuels, with oil used mostly in the transport sector (Economic Research Institute for ASEAN and East Asia, 2019). Oil imports for transport fuel are projected to increase quickly in the future leading to further dependence on imports (Luukkanen et al., 2015, p.874). Oil and gas exploration is occurring both offshore in Cambodian waters and onshore, however there does not appear to be certainty of domestic supply from this early stage exploration (Asian Development Bank, 2018, p. 3).

Energy security is discussed here in relation to primary energy supply, which includes transport fuels and biomass, as well as in relation to electricity. Energy security based on availability, affordability, reliability, efficiency and environmental sustainability is a significant issue for Cambodia. A study undertaken by Sovacool et al. (2011) assessed the energy security of the

European Union, United States, China, India, Japan, South Korea, Australia and all countries of the Association of South East Asian Nations, including Cambodia. Energy security was assessed based on the factors mentioned above, which go beyond the security of fossil fuel supplies and include an analysis of areas such as energy efficiency, affordable electricity, stability of electricity prices, land use and the percentage of households dependent on traditional fuels such as wood and charcoal. The study found that Cambodia's energy security has declined over the decades from 1990 to 2010. Cambodia rated the fourth lowest on the energy security index for the decades studied. Vietnam, India and Myanmar were considered the least energy secure countries in the study with Japan, Brunei and the US rating highest (Sovacool et al., 2011, p. 5850).

A later study by Kanchana and Unesaki (2014) evaluated the energy security of nine ASEAN member nations (excluding Laos). This particular study used indicators relating to supply security – that includes a reliance on imported fuels and diversification of energy sources as well as socioeconomic and environmental dimensions, including energy efficiency and issues related to carbon emissions. The main emphasis however to determine energy security in this study relates to the availability of energy sources and “energy import dependency” (Kanchana & Unesaki, 2014, pp. 164-165). “Self-sufficiency of energy resources” is conceptualized as the capacity to meet energy demand using domestic resources, excluding renewable energy sources such as hydroelectricity, but including coal, oil and natural gas. Cambodia is not self-sufficient in oil, gas or coal and imports 100 percent of its petroleum products. In the near future, it is expected that Cambodia will increase its demand for oil faster than its economic growth rate, which will create a worsening of the trade balance (Economic Research Institute for ASEAN and East Asia, 2019, p. 3). Cambodia sources most of its oil imports from Thailand, Vietnam and Singapore (ibid, p.5).

From a cost perspective, the Royal Government of Cambodia prioritizes keeping tariffs low to provide affordable electricity. Providing affordable electricity is a worthy goal to ensure energy access and provides another incentive for Cambodia to avoid the building of too much additional coal or hydroelectric generation that may increase costs in the future. There have been instances in

other countries such as Ghana that saw the government increase the amount of additional generation as a response to power outages and they are now finding themselves in the situation of having excess energy with high costs as a result of take or pay contracts and a reliance on the private sector for energy infrastructure (Sarkodie, 2019).

Cambodia appears to be wary of take or pay contracts and has so far managed to avoid investing in additional generation that would see the country in a similar situation. However, a recent announcement to purchase 2400 MW of power from Laos, extending out to 2027 (Chea, 2019), could create a situation of excess energy and high costs in the future, depending on the type of contract signed. Given the recent power outages in Cambodia, the experience in Ghana as discussed by Sarkodie (2019), is a cautionary tale for Cambodia to plan and effectively provide projections of their energy needs for industry and the population to increase investment in generation, proportionally to growing demand. In addition to costs over time, Cambodia would be wise to consider the import costs of fuels over time and avoid an overreliance on imported coal and oil.

III. Policy Initiatives to Achieve the Ideal Scenario

Access and affordability

For rural electrification, the rate of electrification does not reveal the complete story about availability in terms of hours per day, quality aspects such as voltage and frequency and what people are using electricity for (Sovacool et al., 2011, p. 5849). Innovative projects such as those from Okra Solar could assist Cambodia to focus more on the energy needs of communities and ensure sufficient energy access. The technology developed by Okra Solar is a direct current (DC) distributed micro grid system. Although the power capacity of Okra's initial demonstration site is still considered to be low by global standards, for example approximately 5kW of solar PV for 40 households, Okra Solar aims to provide 24 hours of electricity per day for households through power sharing in the system. There has been no independent study undertaken on energy access levels for households using the Okra Solar system in Cambodia, therefore determining

the tier level under the multi-tier framework is not appropriate. However, it is more likely to meet tier 4 access based solely on hours of electricity available per day to meet household needs. The system is also more efficient due to the use of DC electricity and the sharing of power among houses. Okra Solar also considered the power needs of households in detail and ensure that energy efficiency is considered in the purchase and use of appliances on the system. The load that the distributed micro grid can meet at this stage is still lower than grid electricity, with the grid providing around 2300 watts on average, which is enough to power high load appliances such as air conditioning.

Thus, the Okra system is a vast improvement on simple solar home technologies in terms of availability of electricity per day, loads and efficiency, but high load appliances are still limited on the current demonstration system. Okra Solar however had indicated that the system is modular and scalable over time, so additional capacity can be added to the system (Participant 14, 2018 & 2019).

These types of innovative energy projects are worth supporting through government policy mechanisms such as those referred to by Kivimaa and Kern (2016) as “price performance improvements”. These can include subsidies to increase the competitiveness of innovations that meet specific criteria, for example providing minimum standards of energy access (tiers 4 or 5) to communities located off the national grid. Other criteria for subsidies to private companies could also include the implementation of a knowledge sharing arrangement, where firms are required to provide data about their respective projects and energy use in provinces to government officials to enable better service planning. If the Royal Government of Cambodia were to provide tariff subsidies for rural electrification, it is recommended that companies providing the energy service meet minimum standards of energy access as well as providing information to the government to facilitate better future energy planning in the kingdom. Although some success has been gained from the solar home system market in providing electricity to households in rural areas, what has been found is that when people have access to electricity, their energy use grows. Thus, the small scale solar home systems, over the longer term, often do not meet the needs of households when additional load is added to the system. As discussed by den Heeten et al. (2017, p. 9), to resolve the issue of under sizing

of systems, there is a need for up to date user load profiles with a view to the future energy needs of users as the aspirations of people's energy needs often increases, particularly if income increases. In addition, the needs of households in relation to cooking should also be considered and a program to implement clean cooking solutions across rural Cambodia where wood fuel is dominant is recommended.

A final aspect of ensuring that energy remains affordable is related to REEs in Cambodia. In April, 2019 a dialogue was held with the renewable energy industry in Phnom Penh and it was discussed at this event that REEs in Cambodia are looking to reduce their operating costs and some would be willing to invest in solar PV for self-consumption at transformer locations on the grid. REEs are currently unable to integrate solar into the grid, however if solar was used for self-consumption (and not exported), this may assist REEs and support the grid by reducing the load and improving reliability in areas of high energy use. To ensure reliability is maintained, the allowance of solar PV for use by REEs on the national grid could start as a trial or the amount of solar PV could also be capped by Electricite du Cambodge (EDC). Allowing REEs to reduce their overall costs with the use of solar PV in areas of high demand, could also ensure lower tariffs in rural Cambodia over the longer term.

National supply of electricity to include 35 percent renewable energy by 2040

Renewable energy targets need to be ambitious, but also realistic and to consider that many renewable energy sources, such as solar and wind have lower energy densities than fossil fuels (Braun & Glidden, 2014, p.17). This is important to consider in planning for energy generation in Cambodia as energy productivity (doing more with less energy) is just as important. Another aspect to consider is the future of energy technologies and not ruling out that affordable future technologies may exist in 2040, or indeed in 2030, that make a sustainable future much more likely. Intermediate milestones that will provide an estimate of how fast renewable energy markets are expected to develop for investors (Heng, 2018) should accompany any targets for renewable energy. This will take some foresight; however, we know that energy demand is growing

incredibly quickly in Cambodia and it makes sense to incorporate renewable energy technologies that are affordable and exist now into the supply mix.

A supportive policy instrument in place such as a Renewable Portfolio Standard (RPS) would assist to transition Cambodia's energy sector towards renewable energy and is an effective way to quantify the amount of renewable energy that is being installed in Cambodia. An RPS is a policy mechanism used by states globally to increase the amount of renewable energy generation within the energy mix. The RPS usually has a minimum percentage obligation, for example, the authors recommend a minimum of 35 percent by 2040 for Cambodia. The percentage of renewable energy in the national grid increases over time and can include intermediate targets, such as 20 percent by 2025. The targets can include both new renewable energy generation and existing generation; however, the authors would not recommend including existing generation as this can weaken the target and result in profits over and above that which is reasonable to utilities and companies already owning renewable energy generation assets (Yin & Powers, 2010, pp. 1141-1143).

In Cambodia, the target would also need to exclude large scale hydroelectricity, which is also classified as a renewable energy source. The RPS targets can be met by one, or a combination of additional renewable energy generation, purchasing renewable energy generation from another supplier or purchasing renewable energy certificates or credits (Economic Research Institute for ASEAN and East Asia, 2019, p. 62). The latter approach could potentially be implemented through the purchase of credits from household and industrial solar PV that could add to the generation mix and assist in meeting the overall RPS target. The Australian based Renewable Energy Target (RET) utilizes renewable energy certificates from household PV systems named Small-scale Technology Certificates (STC) and larger renewable energy projects utilising Large Generation Certificates (LGC) from projects such as wind farms and utility scale solar. All certificates contribute to meeting the nationwide RET of 20 percent of electricity or 9500 gigawatt hours (GWh) from renewable energy sources by 2020 and has the added benefit of accounting for energy generation from renewable energy sources in the country. Each renewable energy certificate is equal to one megawatt hour (MWh) of electricity of anticipated

generation over the life of the renewable energy system. Other states in Australia have independent renewable energy targets, such as South Australia's 50 percent of renewable energy by 2025 (Chapman et al., 2016, p. 1266).

Research undertaken by Ritzenhofen et al. (2016) assessed three mechanisms for increasing renewable energy generation; feed in tariffs (FIT), RPS mechanisms, and market premia. The researchers assessed these mechanisms according to affordability, reliability and sustainability. The model that Ritzenhofen et al. (2016) used to assess the mechanisms accounted for investor behaviour and the reaction of customers and was not a "generation focused" perspective (Ritzenhofen et al., 2016, p. 226). Their study found that there was less volatility in the price of electricity under a RPS scheme than under a FIT scheme. They also found that FIT rates, when improperly set can result in over or under investment in renewable energy sources and distort the electricity market (Sarkodie, 2019, pp. 236-237). The authors also note that if a focus on reliability is required by policy makers, RPS is favourable as FITs do not improve market integration of renewable energy sources. In addition, increasing renewable energy generation can be achieved at a lower cost under a RPS scheme than with FITs (Ritzenhofen et al., 2016, p. 237). FITs have also been shown to increase inequitable outcomes in Australia on household electricity prices for homes without solar (Chapman et al., 2016, p. 1278). A study by Yin and Powers (2010) on the effectiveness of RPS mechanisms in the United States confirms that there is a "significant and positive effect" on renewable energy development within states of the US with the use of RPS policies. Nevertheless, they caution against the trading of renewable energy certificates across jurisdictions as it can weaken the mechanism (Yin & Powers, 2010, p. 1149).

For these reasons, the authors believe that a RPS mechanism is the best policy instrument to increase the percentage of renewable energy over time as energy generation assets increase in Cambodia. However, we would also recommend that if the Royal Government of Cambodia chooses to develop a policy mechanism, such as RPS to increase renewable energy, that an independent study is undertaken to determine the effect on long term electricity prices, the cost of infrastructure investments to accommodate renewable energy and interactions with current regulations such as the *General Conditions for*

connecting Solar PV Generation sources to the Electricity Supply System of National Grid (Electricity Authority of Cambodia, 2018a). In addition, careful consideration should be given to whether Cambodia allows the purchasing of renewable energy certificates or credits from household solar PV to form part of a RPS mechanism as it may not be the best option from an electricity generation point of view (Chapman et al., 2016, p. 1277). It is also important to avoid cross subsidization of renewable energy such as solar PV. If a feed in tariff was introduced along with a RPS mechanism, this could have the long term effect of increasing electricity prices for customers without solar PV (Chapman et al., 2016, p. 1267 & 1275). There are several lessons from Australia's implementation of the RET mechanism for increasing renewable energy generation as detailed in the paper by Chapman et al. (2016). However, Cambodia can avoid many of these mistakes and reduce the complexity that occurred in Australia as a result of separate state governance and regulatory regimes in the Australian electricity market.

It is also acknowledged by the authors that the Cambodia Basic Energy Plan does not recommend a FIT or RPS mechanism for solar PV in Cambodia, but instead recommends opening the market to local, foreign entities, the private sector and the Asian Development Bank (Economic Research Institute for ASEAN and East Asia, 2019, p. xix). However this advice is then contradicted in the Basic Energy Plan, and it is recommended over the longer term that a study on FIT is conducted, while also acknowledging that it is likely to increase electricity prices (Economic Research Institute for ASEAN and East Asia, 2019, p. 64 & 69). The impetus for a FIT mechanism appears to be more focused on attracting investors to the renewable energy sector in Cambodia, however from a policy perspective and in consideration of the priorities of the government to have reliable, secure and affordable electricity, we would recommend that the focus remains on these priorities, and thus an RPS mechanism as discussed here is favoured over a FIT mechanism.

Achieving Energy Security, Reliability and Diversity of Supply in 2040

Cambodia is not yet entirely comfortable with intermittent solar and wind generation on the national grid and this is a valid concern for EDC as variability with wind and solar PV generation exists that can threaten the reliability of centralised power systems (Akrami et al., 2019). However, the risks related to reliability can be mitigated, as will be discussed, and Cambodia is in need of additional electricity generation that is not prone to drought, as the power outages and load shedding that occurred in Cambodia from mid-March to end of May 2019 showed. The current national grid in Cambodia has been set up to prefer dispatchable energy (i.e., coal, gas, oil and hydro generation). Thus from a technical perspective, better planning and focus on actual energy needs in the country would be preferable to building a great deal more dispatchable generation that is a focus of centralized energy systems.

To ensure energy security, reliability and diversity of supply, Cambodia will need to increase the diversity of energy supply in the country to reduce the use of imported fuels such as oil and coal. It is feasible for Cambodia to meet more of its energy demand with solar PV and wind energy and the recent announcement of additional solar PV to the national grid is highly welcome (Keo, 2019). Options for ensuring reliability and frequency control on the national grid with the introduction of variable solar and wind systems include: smart grids utilising bidirectional communication links; energy storage systems; interconnection of the national grid regionally; ancillary services such as load following; improving market design; flexible conventional units; and maintaining greater control over renewable generation (Akrami et al., 2019).

The authors are aware that EDC is starting to look at some aspects of increasing the flexibility of the grid with the European Union co-funded grid modernization project and ensuring flexible conventional units, such as the recently announced 400MW liquefied natural gas (LNG) and heavy fuel oil (HFO) plant. Cambodia could increase the flexibility of the grid by considering some of the other measures noted here, such as storage, solar energy forecasting, and better integration of the national grid in Cambodia to other countries in the region that

form part of the ASEAN Power Grid. Solar energy forecasting has the potential to be a cost effective measure for Cambodia to increase grid flexibility and reliability. The Philippines currently uses solar and wind energy forecasting on its network and this places the country in an advantageous position for the integration of renewable energy to other ASEAN nations due to their ability to predict electricity generation (Huang et al., 2019, p. 719).

Regional and market integration with Laos and Thailand is a strength for Cambodia and this integration could be improved within the region to ensure secure energy supply (Huang et al., 2019). Clearly some of the interventions noted here to increase flexibility on the national grid - particularly storage - would be costly initially. However, storage costs are likely to reduce in the near future. Also incorporating mechanisms to create more flexibility in the grid now with the use of renewable energy, is likely to reduce the need for additional costly generation in the future. Cambodia also has the advantage of having less infrastructure than other countries in ASEAN, which may provide an advantage to incorporate renewable energy sources (Huang et al., 2019, p. 719). With support in place for additional solar energy on the national network, Cambodia may also want to consider the option of wind energy, with enough wind resources in southern Cambodia to validate investment from the private sector (Promsen et al., 2014). The private sector in Cambodia is already undertaking significant steps towards wind energy in the country.

In addition to solar and wind energy, Luukkanen et al. (2015) discuss the use of agricultural waste, such as rice husk and straw as potential sources of fuel available in Cambodia and Laos for electricity generation. In particular, they note the use of diesel in rice mills and sugarcane processing that could be replaced with other biomass fuels such as rice husks (Luukkanen et al., 2015, p.875). However, the potential for the use of rice husks in Cambodia for electricity generation is limited at this time due to several factors, including the use of rice husks for paddy drying in large mills; export of excess residues from rice harvesting to Thailand; and the lack of technology and financing in Cambodia to make electricity generation from rice husks viable (Participant 16, 2018).

The government of Thailand implemented a program for Very Small Power Productions to generate electricity from renewable energy materials (in this case rice husks), which increased support in Thailand for this form of generation and it now forms an important source of fuel in the energy sector in Thailand (Ueasin et al., 2015). If Cambodia wishes to utilize the extensive resource of agricultural waste in the country, such as rice husk for electricity generation, it would be beneficial for the Royal Government of Cambodia to provide research and development funds toward that end, due to the high capital investment cost and to improve efficiencies as well as ensuring the most efficient application of the technology (Ueasin et al., 2015, p.2760; Verbong et al., 2010, p.277). The potential for the use of agricultural waste for electricity generation exists in Cambodia and it may prove to be an important source of dispatchable power in the country for use on the national grid, yet government research and development support will be crucial if this technology is to be utilized to its full potential.

Benefits that are noted here to ensure grid reliability; integrate additional renewable energy on the national grid; increase diversity in Cambodia's energy supply and work towards greater regional interconnection through the ASEAN Power Grid has the potential to reduce Cambodia's reliance on fuel imports. However, this would need to occur in conjunction with targeted energy efficiency measures, particularly in the building and residential sector to avoid simply adding renewable energy generation, while traditional sources of fuel such as coal and oil continue to increase.

Energy efficiency

The residential and building sector in Cambodia is contributing to additional energy demand in the country and there are many gains that could be made by 2040 through implementing energy efficiency in these sectors. The Ministry of Mines and Energy have an action plan and strategy for energy efficiency, with a goal to reduce energy demand in Cambodia by 20 percent compared to business as usual. The plan also prioritizes decreasing dependency on imported fuels, as well as energy efficiency in industry such as rice mills, garment and brick

factories, commercial buildings, domestic cooking, line losses from REEs and household appliances (Ministry of Industry Mines and Energy, 2013).

Energy efficiency in buildings and the residential sector in Cambodia could also be approached more in the sense of “wellness” that is created with buildings. Many of the newer apartments and buildings being constructed in Phnom Penh adhere to a global vision of modernity, however the particular climate of Cambodia is not considered within the design (Kishnani, 2012, p. 47). Throughout the 2019 power outages in Cambodia, it was not possible to stay indoors in many buildings in Phnom Penh without electricity to power fans or air conditioners, as it was simply too hot. The comfort and well-being of residents are barely considered in the design of buildings and they mostly have limited access or consideration of nature, such as trees, light, air flow or views to have a connection with the outdoors (Kishnani, 2012, p. 79). Traditional architecture in Cambodia is likely to have these aspects, however the modern development path that Cambodia is following with buildings in Phnom Penh, is not conducive to energy efficiency or a connection with nature. Consideration of these aspects of buildings in Phnom Penh would also assist in reducing energy demand through natural cooling.

A further aspect of energy efficiency in the residential sector is the use of solar hot water, which is underutilized at present in Cambodia. Given that many houses and apartments in the capital use electric hot water, there is a case to be made for solar hot water. There are reliable, local suppliers of solar hot water systems in Cambodia that could be engaged to supply and install these systems on residential homes, hotels and businesses in Cambodia. In addition, the use of solar water pumping in rural areas is another area that the government could incentivize for farmers.

Energy efficiency in the transport sector is also required in Cambodia with an increased demand for petroleum products, and an increase of petroleum imports. Diesel oil, gasoline, and LPG demand increased by 7.2 percent per year from 2012 to 2016. The growth rate of LPG grew the most at 23 percent. The growth of petroleum products is projected to continue to increase until 2040 (Economic Research Institute for ASEAN and East Asia, 2019, p.2). Energy savings

in the transport sector could occur from import restrictions on old cars; a preferred tax system for fuel-efficient cars; and fuel consumption regulation by type of vehicle. Other options for reducing energy use in the transport sector include electric vehicles, electric bikes, and compressed natural gas – all of which have the effect of decreasing oil demand. In addition, public transport routes or car-pooling services for common journeys within the city would also assist in reducing oil demand from the use of cars and motorbikes. The use of more communal transport also could reduce congestion on roads in Phnom Penh at peak times if more people were using public transport or car-pooling services.

IV. Energy Under the Baseline Scenario: Business as Usual in 2040

With the current trajectory in Cambodia of rapid industrial development and increasing energy demand, intervention across the four key factors noted in sections two and three is required. The interventions required in energy access and affordability, national supply, energy security and energy demand that have been discussed in this chapter will avoid a business as usual scenario that could lead Cambodia into a precarious situation in relation to electricity costs, reliability and pollution.

For key factor one - energy access and affordability, further incentives need to be provided for the private sector and REEs to provide sufficient electricity to households that are located in areas that do not provide sufficient return on investment due to low demand and high costs to extend the distribution network. In a business as usual scenario, if incentives, such as tariff subsidies are not provided for areas without energy access, it is likely by 2040 that all households will have access to some electricity in Cambodia; but reliability and quality of supply will remain an issue if households are reliant on simple home solar systems at best, or car batteries at worst. Not having access to sufficient electricity to meet daily needs can affect people's educational and employment prospects. As discussed above, with appropriate incentives and ensuring that the quality of energy supply is at a minimum of tier 4 or 5 supply, the government can be confident that the population will receive affordable energy services to meet their needs. In addition, sufficient hours, reliability and quality

of energy services in rural areas will assist people to access opportunities for income generation and education. Ensuring that all households have access to clean cooking solutions, such as biogas or gas will also assist in reducing pollution, deforestation and improving health outcomes for people that are no longer required to cook on traditional fuel stoves.

Under a business as usual scenario for key factor two, relating to national supply, Cambodia's energy use will continue to grow rapidly, with further coal and heavy fuel oil generation assets potentially built, as well as increased electricity imports to meet growing demand from Laos in particular. Cambodia has already begun to develop solar PV utility scale generation, which is promising, however this needs to be planned, staged and integrated into the national grid to ensure stability and prevent solar PV being dismissed as unreliable if potential issues arise due to an unplanned increase of renewable energy generation. Preventing solar PV on the network is not the solution as costs for solar PV generation are competitive; however, ensuring that the national grid is effectively able to absorb intermittent generation on the network, will have longer term benefits. These benefits include a staged, planned and regionally connected network that incorporates 35 percent renewable energy by 2040. Providing a policy directive of 35 percent renewable energy by 2040, with a market mechanism such as RPS to encourage investment, along with supporting grid functions as outlined, would provide more far reaching benefits than simply relying on the private sector for energy infrastructure. In addition, the growth of renewable energy could be controlled by the government over time by setting intermediate renewable energy targets.

In relation to energy security, key factor three, Cambodia's total primary energy supply (TPES) is projected to increase to almost 13 million tonnes of oil equivalent (Mtoe) in 2030 at an average rate of almost 4 percent per year. Fossil fuels would also dominate Cambodia's future and increase to 60 percent in 2030. An increasing share of fossil fuels in the TPES would occur due to an increase in coal for power generation in the country. Oil consumption will also continue to increase in the future due to the continued growth in the ownership of cars and motorbikes in Cambodia. With a continued reliance on imported fuels in Cambodia, emissions from the energy sector are likely to increase with

the increased consumption of coal and oil, and renewable energy is likely to contribute less than 15 percent of the total energy mix. Along with a smaller amount of renewable energy generation, if steps are not taken now to integrate variable sources of energy such as wind and solar into the network, the flexibility and reliability of the network could be compromised.

The final key factor of energy demand is crucial and interrelated with all of the other key factors. Without some form of energy efficiency in the building sector, many of the current residential buildings being constructed in Cambodia, particularly in Phnom Penh will increase energy demand significantly in order to maintain internal comfort levels. In addition, transport options in Cambodia need to be drastically improved to prevent ever increasing oil consumption, road congestion, air pollution and safety. Without intervention in the transport sector and the increasing use of private vehicles, road congestion in major cities like Phnom Penh is likely to become significantly worse and potentially unmanageable. Public transport options that are frequent and on major routes, electric bikes, and vehicles and car-pooling initiatives can assist with road congestion and pollution.

Overall, Cambodia is developing rapidly with increasing energy demand and electrification. Now is the time for Cambodia to plan effectively for a 2040 that includes renewable energy sources and an openness to future technologies. A key to achieving this will be integrating viable renewable energy options available now, such as solar PV into the national grid and planning for how energy demand in the country can be met in the most efficient, affordable and sustainable way for the future.

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Chapter 8 | Environment and Climate Change

Mr. OUNG Ty Keithya

If we can work towards a positive outlook for climate change adaptation and mitigation in Cambodia, what would it look like?

Ms. Sothy is a middle-aged woman from a farming household based in a rural village of Kampong Cham province. Her family is practicing crop diversification for their farmland. Primarily the family grows rice, utilizing a drought-resistant seed, as their main source of income. In addition to rice, they also use plots on their farmland to grow other crops such as tomatoes, pumpkins, mangoes, and cassavas. During April, whilst her village is going through a long dry season with very little rainwater, Sothy waters her farm through the irrigated pipelines. The water supply available for this process is being pumped from a communal village water storage. This irrigation and storage system was installed and supported by district authorities, alongside the farming committee in her province. To power her farm, Sothy uses a biodigester in which she inputs waste from farm, both animal manure and farm waste. In return, the biodigester provides her with biogas for clean cooking, and organic fertilizer for better crops and healthier soil. Most households in her village also use this type of clean energy because it is affordable.

In the afternoon, Sothy attends a community meeting as she is an active member of the farming committee in her province. The committee organizes bi-weekly meetings and trainings to help educate farmers about the issue of climate change, in addition to training them in up-to-date agricultural and

adaptive techniques. Through these community meetings, trainings and practices, Sothy's family and many of her neighbors have been well-informed about Climate Change and have strong adaptive capabilities in terms of agriculture, water and food security.

Later in the evening after the meeting, Sothy prepares her schedule for tomorrow as she has to participate in a community forest program with her neighbors to help preserve the forest near her village. In exchange for their efforts towards preserving forest land, Sothy and her family receives quarterly remuneration towards household bills. The family is able to save some of that money to buy and install solar panels.

I. Environment and Climate Change: The Ideal Scenario

When forming ideal scenarios for Cambodia regarding climate change, it must be pointed out that the kingdom is one of the most vulnerable countries in the world to the impacts of climate change despite it being among the developing nations that contribute the least to emissions of global greenhouse gases (GHG). According to USAID, Cambodia's total GHG emissions in 2013 were 51.67 million metric tons of carbon dioxide equivalent (MtCO_{2e}), a mere 0.11% of the global total (USAID, 2017). The kingdom, however, ranked 13th in the Global Climate Risk Index from 1995-2015, and eighth in the World Risk Index 2016. In 2014, Standard and Poor's ranked Cambodia's economy as the most vulnerable in the world to the effects of climate change (NCSD, 2017).

However, if changes to the global climate are minimal (see "Global Factors" in "Section 2: Scenario Space and Key Factors"), the impacts on vulnerable countries like Cambodia can also be expected to be less severe. In this regard, positive outlooks in 2040 for Cambodia in terms of climate change adaptation can certainly be imagined. The following are key factors in reaching the ideal scenario for Cambodia regarding climate change in 2040.

Program and Policy

By 2040, an effective, comprehensive, and fully functioning Cambodia Climate Change Strategic Plan (CCCSP)²⁴ will have been put in place by the Royal Government of Cambodia (RGC). The CCCSP 2014-2023 will have been updated and thoroughly reinforced and re-mandated to match the country's development pace, directions, and priorities, and will have gone hand in hand with its efforts to meet its Sustainable Development Goals (SDGs). The RGC will have taken full ownership of the CCCSP, with support from local and international partners. The program will be fully in force, with supporting policies and regulations from the relevant ministries and departments in place. With regards to adaptation programs, the National Adaptation Program of Action (NAPA) will have been tailored to fit all development situations and adaptation needs for each of the 24 provinces and Phnom Penh. Implementation will have been decentralized, with the local authorities at all sub-national levels—district, commune, and village—effectively carrying out adaptation programs for their communities and people.

Community and Agriculture

By 2040, communities in all provinces and the capital will be resilient to the impacts of climate change. They will have a broad knowledge of climate issues and will be well-apprised of adaptation methods. Farming communities especially will be well versed on using drought-resistant crops. Communities will be adequately irrigated and have water storage systems in place in anticipation of severe dry seasons and droughts. With effective irrigation systems and drought-resistant agricultural techniques, communities' adaptive capability will have increased, with them more resistant to water vulnerability and food security issues. Additionally, each province will have a weather-forecasting center in place to predict local weather conditions and impending natural

²⁴ Cambodia Climate Change Strategic Plan (CCCSP) is the first-ever strategic plan produced by the Royal Government of Cambodia to mainstream climate change policies into National Strategic Development Plan (NSDP) to have a national response to climate change adaptation from all relevant ministries and government institutions.

disasters such as floods and powerful storms. Communication systems between the provincial and local authorities will be well connected to ensure communities have effective early warning systems in place.

Land Management and Forestry

By 2040, the RGC will have effectively and sustainably developed its land management master plan. The relevant ministries will have worked together effectively to have found a sustainable balance in land use management, classifying land for development and land for conservation. The management of economic land concessions (ELCs) will have been substantially improved through necessary amendments to the Land Law. Potential investors will have been thoroughly scrutinized and audited to ensure a legitimate and sustainable business plan was in place before being granted an ELC. Existing ELCs will have been rigorously reviewed before being allowed to resume activities. Under the new law, the ELC period will have been reduced, and if developers are not abiding by the law, their status will be revoked and permanently canceled. The RGC will have identified feasible measures for sustainable land use management dedicated to effective forest conservation. Cambodia will also be participating in international and regional carbon trading schemes. The RGC will have fully developed and implemented its national Reducing Emission from Deforestation and Forest Degradation (REDD+) programs, sharing the benefits sustainably with deserving beneficiaries and communities.

Awareness and Behavior

By 2040, the majority of the Cambodian population will be well informed on climate change issues. Public awareness of the issue will have gradually translated into positive behavioral changes, with most people now concerned with reducing their carbon footprint. With infrastructure having been improved and public transport made widely available, an increase in the use of public and mass transport systems over personal vehicles can be expected. With increasing economic growth, middle and upper-income families will have likely adopted greener energy solutions in household use, installing solar panels in their homes, for example. With public awareness resulting in a focus on reducing the carbon footprint per capita, more environmentally friendly lifestyles can be

expected, if not from the majority of the population then at least from the middle and upper-income bracket that can afford to do so.

Business and Industry

By 2040, Cambodia will have in place sustainable trends in manufacturing and the private sector. “Green” business models will have emerged that will have set the new norms for companies and start-ups. Producers will prioritize raw materials from sustainable sources as resources become increasingly scarce. Production processes will be structured to minimize environmental impacts, waste outputs and carbon footprints. Most manufacturers and producers will have switched to sustainable energy sources, especially renewable energy from solar, hydro, biomass and wind sources. Such business models will be encouraged by the government, with the support of the public. The government will incentivize businesses and industries to put in place sustainability plans and environmentally friendly practices, with Cambodian consumers putting greater value on products and services from sustainable sources. Sustainable business will become the new norm for the private sector in Cambodia.

With these ideal scenarios in place, Cambodia can look to having a net zero carbon footprint and being a carbon-neutral country by 2040. While this may seem a bold target, the Cambodian government at all levels and people from all income brackets and societal statuses could work together to lay out a 20-year nationwide master plan for the kingdom to not only adapt to climate change, but also reduce its carbon footprint and become carbon neutral by 2040.

II. Scenario Space and Key Factors for Environment and Climate Change

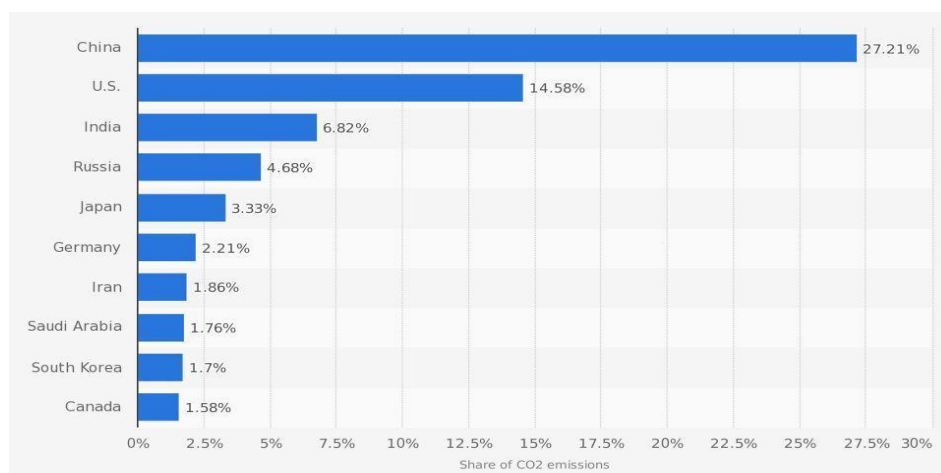
Before moving toward the proposed roadmap, with policies and interventions put in place to progress the kingdom toward the ideal 2040 scenario as outlined in Section 1, the key factors influencing the Cambodian context regarding climate change should be outlined. In addition to the key factors outlined in Section 1, Section 2 includes global factors that could have policy implications for the government.

Global Factors

In creating a climate change vision for Cambodia in 2040, global climate change trends cannot be omitted from the discussion, as they impact the national situation in both the short and long term. Cambodia can therefore only have an optimistic outlook with regard to climate change if the global effort moves in a positive direction.

Let's imagine that international efforts have by 2040 been able to keep the global temperature rise to well below 2°C above pre-industrial levels, with efforts taken to limit the increase even further to 1.5°C as committed to in the Paris Climate Agreement of 2016. This will have meant that all of the 194 signatories have adhered to the targets set in their Intended Nationally Determined Contributions (INDCs).²⁵ Most importantly, the major GHG emitters, China, the United States, India, Russia, and Japan (Germanwatch, 2017), will have consistently remained committed to reducing their GHG emissions.

Figure 1: Largest producers of territorial fossil fuel CO₂ emissions worldwide in 2017, based on their share of global CO₂ emissions.



Source: Germanwatch, (2017)

²⁵ INDCs: refers to the nationally determined contributions which each country sets their own targets to contribute to climate change mitigation effort. INDCs is one of the key tools to achieving 195 signatories to a climate agreement for the first time.

China will have had to have remained fully committed to reducing its carbon footprint. This might not be as unlikely as previously thought, with the Chinese government ratifying the Paris Agreement and actively promoting and heavily investing in renewable energy such as hydro, wind and solar power (Engels, 2018 & Hsu, 2018). However, the Chinese Ministry of Environment will need to double its reduction efforts as pressure mounts internally from the pollution problems plaguing China's major cities. China needs to start taking real action, not only for the globe, but for the well-being of its own citizens.

China taking a leadership role in climate change mitigation efforts will hopefully compel the United States to take strong action. One major factor that could allow for this is the 2020 presidential elections, which could see a new president in the White House representing a new administration that strongly supports climate change mitigation. Most importantly, a new administration could see the US rejoin, sign, and ratify the Paris Agreement, and lay out nationwide strategic plans to transform a heavily fossil fuel-reliant economy into one based on renewable energy.

Notwithstanding action from the two heaviest GHG polluters, China and the United States, which currently account for around 41% of total global GHG emissions, other countries such as India, Russia, and Japan will need to take steps to tackle climate change.

Japan is already working on a long-term strategy to decarbonize and has set the ambitious net zero emissions target of 2050 (Hurst, 2019). With millions of its people highly vulnerable to climate change, India is on the front line regarding the effects of climate change, with violent heatwaves killing thousands, especially in low-income communities (Awasthi, 2018). India is therefore also working hard nationally to tackle climate change. With the creation of additional carbon sinks of forests and tree cover, India could reach its Paris Agreement commitment ahead of its 2030 deadline (Sethi, 2018). Russia, despite being one of the signatories of the Paris Agreement, has yet to formally ratify the framework. However, there had been some recent positive signs that Russia was closer to ratifying the agreement by the end of 2019 (Ayres, 2019), possibly to fill

the climate change leadership void left by the US after its withdrawal from the Paris Agreement.

Aside from these major emitters, there is also a need for united and global responses from all nations to significantly reduce CO₂ emissions to keep the global temperature well below 2.0°C above pre-industrial levels.

With the aforementioned commitments and actions taken by the major GHG polluters, a huge reduction in global emissions can be expected by 2040. According to Intergovernmental Panel for Climate Change (IPCC) scientists, if the global temperature remains at 1.5°C above pre-industrial levels rather than 2.0°C, many climate change disasters (IPCC, 2018) could be avoided. In the long term, if the global temperature were to remain at this level for decades, it could be possible for the damaged environment to regenerate.

Ice sheets in the Arctic, Antarctica and Greenland could reform and sea levels remain stable, with islands and low-lying areas avoiding devastating flooding. Ocean warming and acidification could slow, and vulnerable marine ecosystems such as coral reefs could begin to revive; desertification could slow and forest cover regrow. Ecosystems could find a healthier balance, with plants and species again thriving in their habitats. As for humankind, future generations would be able to enjoy a beautiful and non-hostile planet.

National Factors

With regard to national factors and contexts, this section will outline the situation regarding key factors: (i) Program and Policy; (ii) Community and Agriculture; (iii) Land Management; (iv) Awareness and Behavior; and (v) Business, which will provide an overview of the climate change issues Cambodia is currently facing.

Programs and Policy

There are two main ongoing policies proposed and being implemented by the RGC in response to climate change issues. The CCCSP and Cambodia's INDCs represent the most prominent action plans and documents outlining key national efforts in climate change adaptation and mitigation.

Cambodia Climate Change Strategic Plan: The RGC has made impressive progress since 2013 in mainstreaming climate change policies through establishing the first CCCSP 2014-2023 (NCCC, 2013). It represents significant progress as “the CCCSP is a significant step toward embedding climate change into the National Strategic Development Plan (NSDP) 2014-2018 and sectoral development plans of all relevant ministries,” said Prime Minister Hun Sen in 2013 (NCCC, 2013).

The integration of the CCCSP into the NSDP and sectoral planning aims to mainstream climate change policies into national and sub-national planning. At the ministerial level, up to 2016, three ministries, the Ministry of Agriculture, Forestry and Fisheries (MAFF), the Ministry of Water Resources and Meteorology (MOWRAM), and the Ministry of Public Works and Transport (MPWT), successfully incorporated climate change into their planning and budget processes (NCSD, 2017).

The CCCSP lays out eight strategic objectives:

1. Promote climate resilience through improving food, water, and energy security;
2. Reduce sectoral, regional, and gender vulnerability to climate change impacts, and minimize risks to health;
3. Ensure the climate resilience of critical ecosystems (the Tonle Sap, the Mekong River, coastal ecosystems, and highlands, etc.), biodiversity, protected areas and cultural heritage sites;
4. Promote low-carbon planning and technologies to support sustainable development;
5. Improve capacities, knowledge and awareness for climate change responses;
6. Promote adaptive social protection and participatory approaches in reducing losses and damage due to climate change;
7. Strengthen institutions and coordination frameworks for national climate change responses; and
8. Strengthen collaboration and active participation in regional and global climate change processes.

Cambodia's Intended Nationally Determined Contribution: The RGC has also outlined climate change policies as part of its commitment to the global GHG mitigation effort by submitting its INDCs as required by the Paris Agreement. Cambodia's INDCs are divided into two main parts: adaptation and mitigation.

Adaptation: The document proposes priority action for adaptation planning, which mainly includes:

- Promoting and improving the adaptive capacity of communities, especially through community-based adaptation action, and restoring natural ecological systems to respond to climate change;
- Implementing management measures for protected areas to adapt to climate change;
- Strengthening early warning systems and climate information dissemination;
- Developing and rehabilitating flood protection dykes for agricultural and urban development;
- Increasing the use of mobile and permanent pumping stations in response to mini-droughts, and promoting groundwater research in response to drought and climate risk;
- Promoting aquaculture production systems and practices that are adaptive to climate change;
- Repairing and renovating existing road infrastructure, and ensuring effective operation and maintenance, taking into account climate change impacts;
- Strengthening technical and institutional capacities in conducting climate change impact assessments and climate change projections, and including climate change in sectoral and sub-sectoral development plans.

Mitigation: According to its submitted INDCs, "Cambodia proposes GHG mitigation contributions for the period of 2020-2030 conditional on the availability of support from the international community [...]."

In the proposal, "Cambodia sets out two major actions:

- i. **Energy, Manufacturing, Transport, and Other Sectors:** A proposed reduction of 3,100 GgCO₂eq compared to baseline emissions of 11,600 GgCO₂eq by 2030; and
- ii. **Land Use, Land Use Change, and Forestry (LULUCF):** Voluntary and conditional actions to achieve the target of increasing forest cover to 60% of national land area by 2030, which is expected to reduce 7,897 GgCO₂ by 2030 compared to projected sequestration of 18,492 GgCO₂ in 2016” (RGC, 2015).

Community and Agriculture

The agriculture, forestry, and fisheries sectors are highly dependent on climate and accounted for 26% of Cambodian GDP in 2012 (World Bank, 2015). These sectors also represent the livelihoods of the majority of the rural population (79% of the total population). According to a 2014 climate vulnerability assessment²⁶ on Cambodian communities conducted by the Mekong River Commission (MRC), 17.2% (279 communes) of Cambodia’s communes were highly vulnerable, while 31.5% (512 communes) were quite vulnerable to multiple climate change hazards (MRC, 2014).

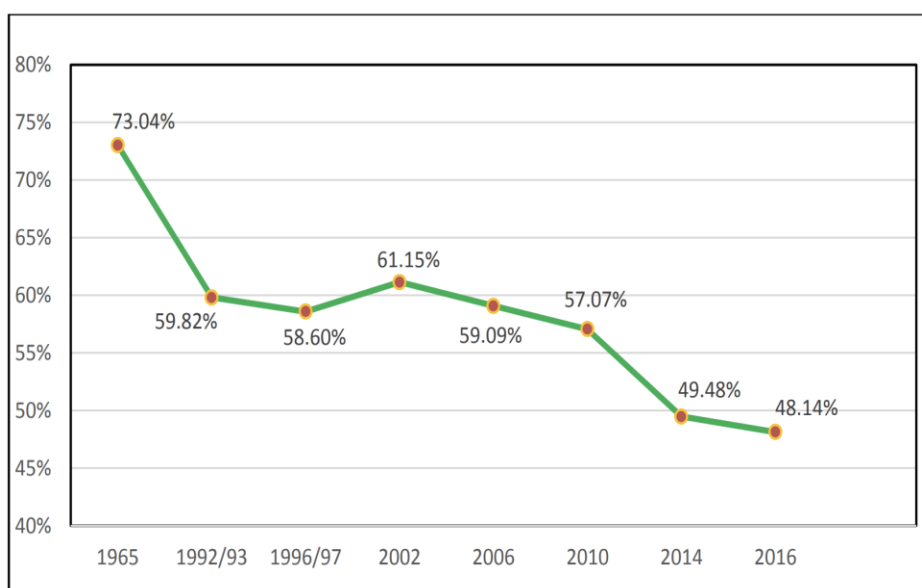
Extreme weather events are also being intensified by climate change, damaging the agricultural sector as losses in production were mainly due to flooding (around 62%) and drought (around 36%) based on data from the past 20 years (NCSD, 2017). These natural hazards are predicted to become more frequent, and the poor are likely to be the hardest hit. Poor physical infrastructure and irrigation systems, combined with weak health care systems, poverty, and high rates of illiteracy, will leave the underprivileged the most vulnerable to climate change (NCSD, 2017).

²⁶ The vulnerability assessment determines vulnerability through three components: (i) Exposure: the nature and degree to which a system is exposed to significant climatic variations; (ii) Sensitivity: the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli; and (iii) Adaptive Capability: dynamic and influenced by economic and natural resources, social networks, entitlements, institutions and governance, human resources, and technology.

Land Management and Forestry

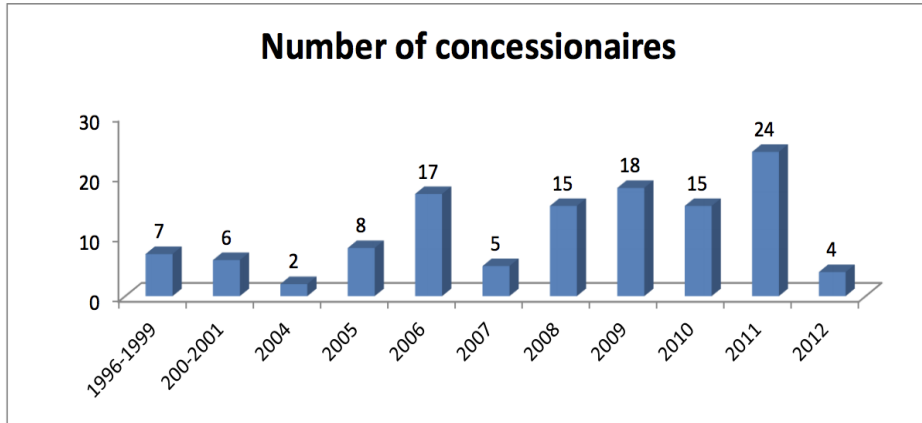
The kingdom has carried out eight national forest cover assessments. According to the assessments conducted by Cambodia's Ministry of Environment (MoE) from 1965-2016 (see Figure 2), forest cover has declined by around 25%, with the 2016 forest cover at 48% compared with the 73% recorded in the first assessment in 1965. Causes for the decline include civil war, population increase, and land being used for agriculture, among others (MoE, 2018).

Figure 2: Forest Cover Statistics from 1965-2016



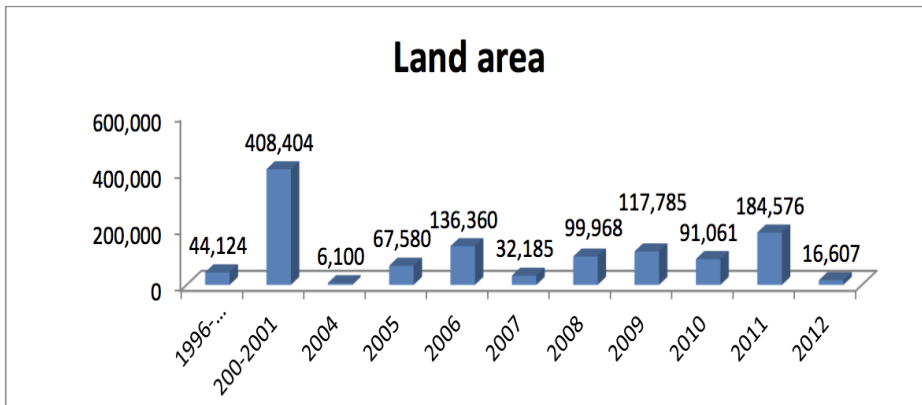
Source: MoE, 2018

Discussions on land use and forestry in Cambodia cannot exclude ELCs, as they accounted for 14% of land use (Harfenist, 2015). ELCs were formalized in 2001 as a “long-term lease that allows a concessionaire to clear land in order to develop industrial-scale agriculture, and can be granted for various activities including large-scale plantations, raising animals, and building factories to process agricultural products,” according to Sub-decree No. 146 on Economic Land Concessions (2005). According to data from the Ministry of Agriculture, Forestry, and Fisheries (MAFF) (see Figure 3), 121 companies had received ELCs, with a total area of 1,204,750 hectares.

Figure 3: Number of Concessionaires Granted ELCs, 1996-2012

Source: MAFF, 2014

The data (Figure 3) indicates that the granting of ELCs peaked in 2011, with 24 companies receiving ELCs with a total land area of 184,576 hectares (Figure 4). However, the majority of ELCs were granted between 2000 and 2001, totalling 408,404 hectares (Figure 4).

Figure 4: Total Granted Land Area (in hectares)

Source: MAFF, 2014

However, in May 2012, the RGC issued Directive 001 on “Measures to strengthen and enhance the effectiveness of management of economic land concessions

(ELCs)”, announcing a moratorium on the granting of new ELCs and a review of existing ones. Directive 001 resulted in a dramatic drop in the number of ELCs granted, with none issued in 2013. More than 330,000 hectares of land have been seized from ELCs to be redistributed to people in the form of social land concessions (SLCs) (ADHOC, 2014). However, the report suggested the directive also reflected a “lack of engagement in a long-term commitment to the suspension of ELCs, allowing the granting of ELCs to be resumed at any time” (ADHOC, 2014).

Awareness and Behavior

The MoE conducted two “Knowledge, Attitude, and Practices” (KAP) studies—KAP1 in 2011 and KAP2 in 2016—to gain understanding on public perceptions of climate change in Cambodia. The methodology of the nationwide studies included (i) quantitative surveys of 2,401 respondents in KAP1 and 1,000 in KAP2 across 25 provinces; and (ii) qualitative interviews; as well as 67 in-depth key informant interviews for KAP2 (MoE, 2016).

The key results include:

- “The majority of respondents considered their own and family members’ health to be the most critical issue as related to climate change impacts;
- “The term ‘climate change’ has become slightly better known since KAP1, while ‘global warming’, ‘greenhouse gas’ and ‘ozone layer’ are still not well understood because of their technical complexity and problematic translation into Khmer and local minority languages” (MoE, 2016);
- An increasing number of respondents were aware that their daily activities could contribute to climate change. The activities referred to were strongly connected to agricultural production and firewood collection;
- The majority of the respondents clearly remained uncertain as to how to adapt to climate change in a cost-effective manner;
- Television, radio and word of mouth remained the key sources of information, playing vital roles in communicating details on climate change to people regardless of their socio-demographic background;

- “The press and the media only covered climate-related information when natural disasters or extreme weather events were to strike and related meetings and workshops to take place, and then only if they were funded to do so” (MoE, 2016);
- The main obstacles to the mainstreaming of climate change included a lack of financial, technical, and human resources, as well as limited local institutional capacity.

Business and Industry

Business, industry, and energy are the main sectors in a country’s development. They represent the majority of manufacturing jobs and production outputs, with products and services that contribute largely to a country’s GDP. They are not only the backbone of social and economic development, but also a main driver of poverty reduction for many developing nations. However, these sectors are also responsible for most of the pollution put into the atmosphere and waste into the environment. Starting from the first step of resource extraction to the final product, the whole production cycle produces harmful by-products and waste (either solid or liquid), and emits greenhouse gases and other pollutants.

According to economic analyses and research, textile and garment manufacturing and rice processing accounted for half of the industrial sector in 2007 (MIME, 2007). The textile and garment industries still represent the largest proportion of the manufacturing sector, which accounted for 31% of the Cambodian economy in 2016 (ADB, 2018).

In 2013, the MIME developed a sectoral “Climate Change Strategic Plan for Manufacturing Industry and Energy” for the implementation of “green industry initiatives” to promote energy efficiency in industry and improve environmental standards. The assessment report on these initiatives is yet to have been released by the ministry.

III: Policy Initiatives to Achieve the Ideal Scenario

The roadmap toward the ideal 2040 scenario for Cambodia regarding climate change requires nationwide collaboration between all levels of government, the public and communities from all societal levels, civil society groups, scientists

and academia, business owners, and producers and consumers. The roadmap focuses largely on Cambodia's mission to adapt to climate change (adaptation) as one of the countries most vulnerable to its effects. The kingdom also needs to look into key potential industries and areas in which to mitigate the problem by reducing GHG emissions (mitigation).

It is necessary to point out that this roadmap does not necessarily look to completely reform and renew the existing CCCSP; however, it will aim to close institutional, policy and implementation loopholes in the current plan and bridge these gaps with certain restructuring and feasibility measures. The roadmap will be divided into two parts: (i). Adaptation Reinforcement; and (ii) Mitigation Plan and Low-Carbon Development. While these are two separate missions, there are certain linkages between the two, especially with regard to resources, including the funding, technology, and human capital required to implement plans effectively.

Adaptation Reinforcement

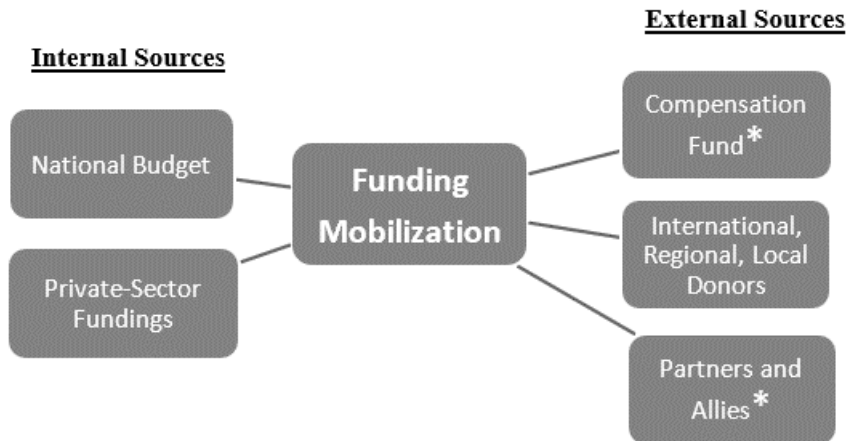
Despite comprehensive national and sub-national institutionalization and coordination, the implementation of adaptation programs and policies still encounters numerous challenges (NCSD, 2017). Thus, the roadmap aims to provide practical measures for the RGC to take to reinforce Cambodia's current adaptation programs and policy implementations for 2020 to 2040. There are four key areas in the current national strategic adaptation plan that will require increased attention and reinforcement: financing, sub-national implementations, data and science, and technology.

Financing

Adequate and sustainable funding is imperative to ensure the effective sustainability of the program. According to the MoE, financial capacity is one of the major limitations to its national adaptation program, the National Adaptation Program of Action (NAPA) (MoE, 2006). The RGC therefore needs to establish strategies and mechanisms for funding mobilization. According to the 2017 report "National Adaptation Plan Process in Cambodia" by the MoE's National Council for Sustainable Development (NCSD), there are two main

sources of funding for all national climate-related programs in Cambodia: (i) internal sources from national budget and private-sector funding; and (ii) external sources from international and bilateral donors.

Figure 5: Funding Mobilization for National Strategic Adaptation Plan



Source: National Council for Sustainable Development, 2017

*Proposed mechanism by this paper

According to the 2015 Climate Public Expenditures Reviews, one internal source of funding for climate change projects was the National Budget, with an increase from \$21.7 million in 2009 to \$52.7 million in 2014. Another was the private sector. It was estimated that around \$185 million was invested by the private sector in climate change-related projects (NCSD, 2016). Despite the increases in funding from the National Budget and the private sector, the financing gap remains an issue for climate change projects in Cambodia. The kingdom was until 2018 around \$400 million short of funding for its climate change priority projects (NCSD, 2017). The roadmap will focus on external funding sources and propose three potential mechanisms the RGC can utilize for the National Strategic Adaptation Plan.

External Sources of Funding for Climate Change Projects: Compensation Fund: Cambodia needs to form a strong coalition with other Non-Annex 1

countries.²⁷ This means joining with other most climate change vulnerable countries to propose to the United Nations Framework Convention on Climate Change Convention (UNFCCC) the formation of a Compensation Fund. This refers to mandatory annual funding that developed countries, particularly major GHG polluters, are required to pay to compensate the most vulnerable countries for their climate change adaptation efforts. The Cambodian government should work closely with other vulnerable nations to form a lobbying committee, either regionally or internationally, to enforce this funding proposal at the UNFCCC, especially in preparation for the Conference of the Parties (COP26) meeting in 2020.

Lobby Group: In order to successfully pitch for a Compensation Fund at international conferences, the National Climate Change Committee (NCCC) must ensure the Cambodian delegation to attend the COP conferences is comprised of skilled and highly effective negotiators. The delegation should be made up of people who can best represent Cambodia's national interests and, most importantly, who can galvanize support from fellow Non-Annex 1 Parties and lobby other COP participants in successfully establishing the Compensation Fund.

International Organizations and NGOs: Cambodia receives most of its climate change funding from international organizations or development partners such as the Asian Development Bank (ADB), the International Fund for Agricultural Development (IFAD), the World Bank, the Swedish International Development Cooperation Agency (SIDA), the European Union (EU), and UN agencies such as

²⁷ **Non-Annex 1 parties:** Refers mostly to developing countries. Certain groups of developing countries are recognized by the UNFCCC as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. The Convention emphasizes activities that promise to answer the special needs and concerns of these vulnerable countries, such as investment, insurance, and technology transfer.

the World Food Programme, World Health Organization (WHO), and United Nations Development Programme (UNDP) (Table 3).

They are the main financial contributors to Cambodia's climate change adaptation efforts. While the kingdom must maintain the financial commitments from these organizations, it should also request more attention to the environment and agriculture. As shown in Table 1 below, only a small proportion of NGO and development partner finance went to the agricultural and environmental sectors.

Table 1: NGO and DP (Development Partners) Support by Sectors in 2014-2017

Sector Names	2014			2015			2016			2017		
	NGO Own Fund	DP Fund	Total	NGO Own Fund	DP Fund	Total	NGO Own Fund	DP Fund	Total	NGO Own Fund	DP Fund	Total
Health	79.0	29.0	108.0	78.1	30.7	108.9	73.6	38.4	112.0	75.4	35.8	111.1
Education	54.8	8.5	63.3	47.5	10.7	58.2	59.6	8.8	68.4	52.1	7.8	60.0
Community Welfare	47.7	11.7	59.4	64.5	8.1	72.6	60.5	8.6	69.1	42.3	4.4	46.7
Rural Development	15.1	18.0	33.1	24.4	13.6	38.0	25.6	13.4	39.0	21.5	10.4	32.0
HIV/AIDS	11.6	10.4	21.9	5.6	9.7	15.3	5.5	9.9	15.4	6.1	13.8	19.9
Governance	2.9	6.3	9.3	2.2	7.2	9.4	3.3	9.1	12.4	1.7	11.2	12.9
Agriculture	7.4	7.5	14.9	7.0	7.5	14.5	12.6	6.8	19.5	8.9	3.5	12.4
Environment	6.0	6.8	12.8	4.1	9.1	13.3	6.4	9.2	15.5	1.5	2.9	4.4
Others	6.3	6.8	13.2	4.2	5.2	9.4	3.3	4.5	7.8	1.7	4.9	6.6
Total	230.7	105.1	335.8	237.7	101.9	339.6	250.3	108.7	359.0	211.3	94.6	305.9

Source: CDC, 2018

Partners and Allies: Partners and allies here refer to a “country” as an entity and the relationship and bond Cambodia has developed bilaterally. These bilateral relationships can be seen through aid and development. Each year, Cambodia receives hundreds of millions of dollars in grant aid from strategic partners such as China and Japan (see Table 2). However, none of these bilateral donors has substantially mainstreamed its development assistance to climate change. For instance, China has used only eight percent of its entire official development assistance (ODA) to Cambodia on Climate Change, while Japan has used only 14% (see Table 3).

Cambodia should request more grant aid or loans from its strategic partners toward climate change projects. Setting annual quotas such as 30-40% of total annual development aid toward climate change would greatly increase funding for climate change adaptation projects. While infrastructure projects are clearly

important and have received the most funding (CDC, 2018), investing in sustainability and climate-resilience is prudent and forward-looking with regards to ensuring Cambodia is resilient to natural disasters such as flooding.

Table 2: Official Development Assistance (ODA) Disbursement by Bilateral Donors 2008 – 2018 (in USD Million)

Development Partners	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 (Est.)	2018 (Proj.)
Australia	49.1	47.8	63.4	78.2	79.5	59.3	64.9	55.9	51.9	56.3	41.3
Canada	11.5	16.7	12.8	18.5	20.5	11.8	5.7	3.8	3.0	1.6	0.7
China	95.4	114.7	154.1	332.0	460.7	436.6	347.8	339.4	265.3	223.5	251.4
Japan	126.4	134.0	140.0	114.4	172.3	130.8	111.4	110.4	119.7	126.4	168.0
New Zealand	2.8	2.3	5.2	4.4	3.8	3.2	6.0	4.9	4.0	5.3	5.5
Republic of Korea	33.0	15.8	35.2	45.3	46.2	50.1	80.3	61.7	31.9	51.2	24.6
Switzerland	3.9	3.0	3.1	4.5	4.3	7.8	11.8	13.0	15.8	13.8	10.0
United States of America	55.7	56.9	63.3	64.4	85.0	93.5	91.6	101.0	71.1	76.0	35.7
Sub-Total: Other	377.6	391.3	477.2	661.8	872.3	793.1	719.6	690.0	562.6	554.2	537.2

Source: CDC, 2018

Table 3: Development Partners Mainstreaming of Climate Change in 2016-2017 (in millions of dollars)

Development Partners	2016 (Total)	2017				Total ODA Disbursement by Donors	Climate Change as % of Total Disbursement
		Minor	Moderate	Significant	Total		
WFP	16.4	-	14.1	3.3	17.3	17.3	100%
WHO	9.5	1.5	-	8.0	9.5	9.5	100%
World Bank	13.1	0.5	30.3	1.0	31.8	39.7	80%
IFAD	15.5	-	4.9	6.8	11.7	14.7	80%
UNDP	3.4	-	0.5	5.3	5.8	7.4	78%
ADB	49.2	38.1	59.9	8.1	106.1	146.0	73%
UN Women	0.7	0.3	-	-	0.3	0.5	66%
UNIDO	0.5	-	-	1.2	1.2	2.1	55%
Australia	13.3	12.0	18.9	-	30.9	56.3	55%
FAO	0.1	-	1.5	1.0	2.6	4.8	54%
Germany	9.8	4.8	4.8	0.3	9.9	36.5	27%
Czech Republic	0.3	0.1	0.2	-	0.3	1.2	23%
Canada	0.2	0.3	-	-	0.3	1.6	21%
USA	9.9	1.3	9.5	1.7	12.5	76.0	16%
Republic of Korea	5.1	7.5	-	-	7.5	51.2	15%
Japan	12.7	18.1	-	-	18.1	126.4	14%
Sweden	5.1	2.9	-	-	2.9	20.3	14%
EU/EC	8.8	0.4	6.9	0.5	7.8	59.8	13%
Switzerland	1.7	1.6	-	-	1.6	13.8	12%
France	4.9	0.9	9.0	-	9.9	103.3	10%
China	92.3	18.1	-	-	18.1	223.5	8%
Others	-	-	-	-	-	111.4	0%
Total (Exclude Pipeline Projects)	272.5	108.4	160.5	37.1	306.1	1334.7	23%

Source: CDC, 2018

Program and Policy Reinforcement

Within the CCCSP, national adaptation programs and policies are mainly implemented through the NAPA. As a least developed country and among the nations most vulnerable to the impacts of climate change, Cambodia is required by the UNFCCC to develop its national NAPA to establish policies and action plans on adaptation (MoE, 2006). Since its implementation in 2006, NAPA has greatly contributed to Cambodia's adaptation efforts, particularly through the promotion of resilient water management and agricultural practices in rural areas (UNDP, 2014). However, the NAPA programs still encounter challenges with technical and coordination loopholes, especially at the sub-national level (NSCD, 2017). This section aims to provide key feedback on the programs and planning processes that would enhance adaptation efforts between 2020 and 2040.

Program Localization: Adaptation programs must be localized to fit with the development situations and priorities in each community. Institutionalizing and coordinating adaptation measures has been designed with a top-down approach through the development of the CCCSP; however, each adaptation program should be designed and developed through a bottom-up approach. Policy-makers must work closely with communities to identify their vulnerabilities and environment to effectively draft adaptation measures to suit their specific concerns and needs (see the "Policy, Knowledge and Information Synergy" section to understand more). Ideally, each province should identify its most vulnerable communities, design specific adaptation methods, and assign the appropriate bodies to execute and oversee the implementation process.

Program Decentralization: To implement adaptation programs effectively, the local government working directly with vulnerable communities needs to have adequate authority and possess a sense of ownership of the program to effectively implement the adaptation measures. Moreover, the decentralization of adaptation programs to sub-national authorities would also mean setting up strong institutional frameworks on the ground and enforcing coordination between national and local government. In other words, all sub-national level authorities—provincial, district, commune, and village—must be aware of the

adaptation program for their community and of their coordination and implementation tasks and responsibilities.

Capacity Building at the Sub-national and Community Level: Decentralized adaptation initiatives will not be effective if sub-national administrators are incompetent and lack technical knowledge and expertise regarding adaptation policies. Thus, building the capacity of sub-national administrations should be carried out simultaneously with the program being decentralized. Officials at the sub-national level are the ones who work closely and connect with community leaders and members on the ground. It is therefore important to train these officials as the programs also aim to improve the adaptive capacity and knowledge of the communities. In addition to funding, adaptive knowledge and skills training are vital resources that need to be distributed to the grassroots and administrations on the ground. In addition to existing capacity training programs, the NCCC should allocate funding to provide opportunities to local and sub-national administrators and community leaders to attend conferences and workshops with adaptation experts to enhance their social and technical knowledge and skills regarding adaptive methodologies and program management.

Policy, Knowledge and Information Synergy: Knowledge and information synergy is a useful tool in guiding policy cycle, specifically regarding the relationship between the three key groups involved in planning and implementing adaptation programs. The following are the definitions and roles of these three key groups:

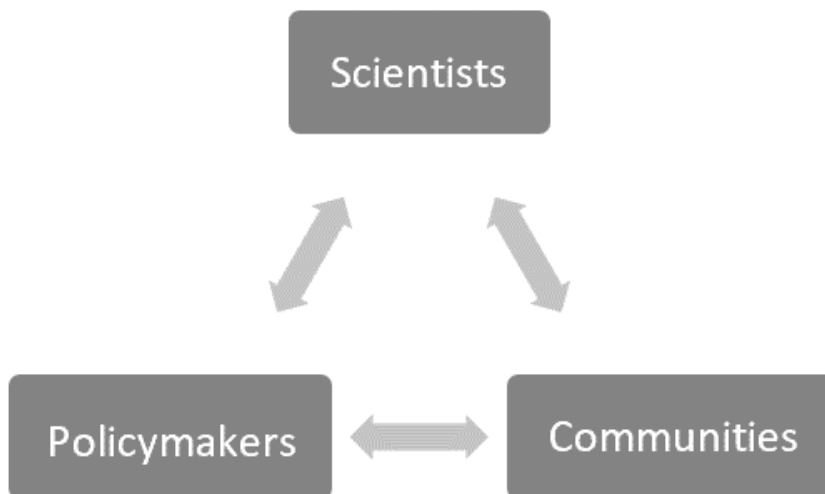
1. **Scientists:** Refers to the scientists, researchers and engineers whose specialized knowledge and skills are crucial in providing up-to-date knowledge, information, and discoveries regarding, for example, climate science, weather variation, hydrology, and water resource management.
2. **Policymakers:** The groups of officials and administrators whose main responsibility is to utilize the scientific knowledge and information supplied by scientists to draft into the policies, regulations, and programs for the adaptation methods to be implemented by communities.

3. **Communities:** The leaders and members of communities who are the direct beneficiaries of adaptation programs and the groups most vulnerable to the impacts of climate change. The role of the community is to provide their on-the-ground adaptation experiences, concerns, and feedback to policymakers and scientists.

In this relationship, the scientists provide the technical knowledge and information to the policy-makers, who use it to form policies and programs to be implemented by the communities. After a certain time, the communities must be given a platform for feedback on whether the policies and programs meet the actual situation on the ground. With this feedback from the communities, policymakers can adapt the programs and policies accordingly to fit each specific community.

Through monitoring and evaluation (M&E) systems and participatory processes, the synergy between the three groups will, through the sharing of knowledge and a healthy feedback loop, ensure that the adaptation programs and their implementation is well suited to the situation and needs of each community.

Figure 6: Policies, Knowledge, and Information Synergy



The Utilization of Technology and Science

This section outlines how the roadmap aims to reinforce the use of technology and science in adaptation policy and program planning to modernize national adaptation efforts as a whole. In order to imagine and create a more positive outlook for Cambodia regarding climate change by 2040, policymakers need to treat technology and science as crucial resources, and update existing adaptation programs with all the technological resources available locally, regionally, and internationally.

Data-driven Policy and Technical Capability: Policy decisions and program planning for climate change should be driven by data and localized to fit the specific concerns of each community. In order to promote scientific thinking into decision-making, the NCSA needs to develop a climate change technical team (CCTT). When dealing with complex scientific information, interpreting meteorological data, or assessing the vulnerability and adaptive capacity of a community's water resources, hydrogeological systems and soil structures, it is imperative that the CCTT is comprised of highly trained scientists, engineers, and researchers. CCTT officials should be capable in accurately studying, gathering, and interpreting necessary technical and scientific information for policy use. Improving the scientific knowledge and technical skills of CCTT members will come through capacity building measures. There should be frequent platforms for sharing knowledge, where the Cambodian CCTT can work closely with technical experts from neighboring countries and international and regional organizations, learning from the different successes of each NAPA program.

Technology as Alternatives to Funding: In the section on adaptation planning, the roadmap proposes different measures for financial mobilization. However, as an alternative to financial assistance and grant aid, Cambodia should regard technology as crucial in improving community resilience and adaptive capacity to the impacts of climate change. Cambodia should propose and be open to material or in-kind assistance in the form of the sharing of technology and equipment useful for adaptation efforts. Examples of material assistance include pumping stations using solar energy to power irrigation system to farms and homes, sprinklers and drip irrigation used on farms, the construction of

communal water reservoirs, and drought-resistant crops during the dry season and periods of drought. In addition to physical or in-kind assistance, technological or technical assistance can come in the form of research and development and training sessions. With this type of assistance, donor assistance is not limited to just funding or financial aid. This would allow resource flows and important opportunities for technological advancement in farming practices and supplying water, which would also greatly assist adaptation efforts.

Modernizing Agriculture, Water Supply, and Disaster Management: The following techniques and technologies are not new to the adaptation discussion. However, Cambodian rural communities remain vulnerable to climate change impacts mainly due to a lack of sufficient physical infrastructure in place for water management and a lack of agricultural training. National and sub-national authorities must continue to work closely with implementation partners, stakeholders, and community leaders to set these activities and infrastructural development as priorities for program implementation.

Agriculture

In most vulnerable communities, agricultural techniques remain conventional and non-adaptive to a changing climate. National authorities need to work with sub-national officials and community leaders to establish farming communities that can share information on adaptive agricultural techniques and technology. The following are some agricultural technologies that could help farmers adapt to climate change.

Crop diversification: This method allows farmers to have multiple harvesting seasons. Farmers should be given practical information on developing their farmland to be able to yield multiple harvests.

Drought-resistant crops: These do not need a lot of water and can survive droughts. Farming communities should be provided with the seeds of drought resistant crops and practical know-how on their cultivation.

Rainwater harvesting: Rainwater collected and stored in rooftop tanks can be utilized for farming. Material assistance such as providing homes with

rooftop water tanks and piping systems would help farming families store rainwater for agricultural purposes.

Water supply and resource management: There is a need for each community to have integrated water management systems in place for the efficient use and management of the resource. Each community, particularly those identified as vulnerable, must be equipped with adequate irrigation systems.

Irrigation and integrated water resource management: Authorities and experts should study each community's hydrology and soil structure, establishing the layout for an integrated water resource management system and designing irrigation to meet the community's layout and physical structure.

Technologies for water pumps: In addition to well-equipped irrigation systems for communities, authorities also need to ensure there is electricity for the movement of water. Solar and wind pumps are among the popular and growing technologies that can be energy options to support irrigation systems. Solar pumps use solar power to pump water to farms or homes, while wind pumps use energy from wind to do so.

Disaster Management

The National Committee for Disaster Management (NCDM) and sub-national authorities need to establish weather centers in each province stationed with meteorology and climate experts. Technical assistance from implementing partners and international organizations should be utilized to put in place a system for the analysis and storage of data.

Climate information

Provincial technical teams will need to have the technical capacity to gather and store information on climate and accurately interpret the data. This information would help in establishing accurate early-warning systems for impending disasters and predict precipitation levels, crucial information for farmers.

Early-warning systems

Provincial, district, and commune authorities will need to set up effective communication systems, whereby warnings for impending natural disasters can be quickly issued to communities.

Flood protection dykes

Physical infrastructure such as flood protection dykes should also be constructed to protect irrigation and water storage systems from flooding.

Investing in Adaptation: The Role of Business and Technology: In addition to government adaptation programs and initiatives, there is a huge role for business to play in helping communities adapt to the effects of climate change through technology and research and development. The role of business and investment in climate change adaptation is usually overlooked. However, this could be a potential area for a win-win strategy for both the private sector and communities.

Currently, companies such as ATEC are providing heating solutions such as digesters that produce biogas from the decomposition of manure, and there are others helping communities transfer water with solar-powered pumping stations. Such companies deserve more attention as they are the businesses of the future, those providing solutions to communities' issues while creating jobs.

The role of the government in encouraging such investment is through providing more incentives, such as tax exemptions and tax credits. The government could also assist the businesses currently providing such services and products to communities through subsidies. For instance, with the NAPA, a UNDP-monitored program, having found that communities using biogas digesters are more resilient to electricity and water scarcity, the government should look into providing subsidies for businesses that provide homes with such technology.

Mitigation Plan and Low-Carbon Development

In this section, the road map will identify pivotal strategies associated with key industries to help Cambodia to lower emissions to achieve its INDCs by 2030. Moreover, this "Mitigation Plan and Low-Carbon Development" section also

aims to be a foundation for government policies to transform the country structurally and systematically, not only to reduce its carbon footprint but also to gradually turn Cambodia into an environmentally friendly nation that pollutes less.

Promoting Energy Efficiency, GHG Inventories, and Environmental Standards

Cambodian industry is highly energy inefficient, with consumption per unit of output more than twice as high as many nations in the region and other developing countries (MIME, 2013). Three sectors, construction, transport, and industry have been identified as priority areas by the Cambodian Ministry of Industry, Mines, and Energy (MIME) in cooperation with the EU under the National Policy, Strategy, Action Plan on Energy Efficiency Program (ADB, 2018). In addition to this existing initiative, strengthening energy efficiency and energy savings, tracking GHG inventories, and enforcing environmental standards can contribute hugely to GHG emission reductions to meet Cambodia's INDCs.

- **Construction sector:** Energy efficiency building codes for new buildings, particularly office and commercial spaces and shopping malls, should be established. A GHG inventory inspection scheme to keep on track of buildings' GHG emissions should be developed, while emissions reduction should be encouraged through incentives and awarding "role models for green building". Construction permits should be expanded to meet environmental as well as construction standards, with studies to be carried out on introducing Leadership in Energy and Environmental Design (LEED) green building certification.
- **Transport sector:** Inspections on vehicle energy performance should be enforced, while biofuels should be promoted and fuel-efficient hybrid vehicles and zero-emission technologies incentivized. Public transport should be promoted through cost reductions for passengers and subsidies for investors.
- **Industry sector:** Audits on energy efficiency should be brought in, with the providing of accredited energy audits enforced. GHG inventories and production cycle tracking should be implemented and the use of

renewable energies promoted, with environmental impact assessments on new manufacturing firms enhanced.

Expanding the potentials of Renewable Energy: Hydropower, Solar, and Biomass in National Electricity Generation and Energy sector

Cambodia has great potential in its renewable energy industries. According to the 2018 “Tracking SDG:7 The Energy Progress Report”, renewable energy accounted for 65% of Cambodia’s total energy consumption in 2015. This comprised 46% from traditional biomass such as wood, charcoal, and dung, 15% from modern biomass such as biogas produced from human and animal waste, and three percent from hydropower (ADB, 2018). With regards to electricity generation, hydropower represented 52% of total national electricity capacity. However, the kingdom still struggles with issues such as electricity access and shortages, and a dependence on imported oil (ODC, 2015). The government should therefore grasp the opportunity to improve energy diversification through expanding renewable energy industries.

Energy Diversification and Expansion of Renewable Energy Industries:

Despite heavy investment in hydropower, particularly from China, Cambodia should look into other renewable energy sources to expand its potential, and create markets and economic opportunities. Biomass, carbon-neutral or low-carbon energy, is one of the main renewable sources of energy in Cambodia. Biomass accounted for more than 40% of residential fuel use for cooking and heating (ODC, 2015). With regard to solar, there are national programs such as the Rural Electrification Fund and numerous private investment projects that use solar power for both home use and electricity generation (ODC, 2015). The government should look to expand the markets for these renewable energy sources by not only supporting large projects and investment, but also by incentivizing and providing the necessary facilities for small local businesses looking to use renewable sources to provide energy solutions for remote communities.

Improving Electricity Access Through Renewable Energy: The government should tackle the issue of electricity access and shortages by connecting

renewable energy sources to the electrical grid. The government should provide incentives to encourage investors in solar power to provide low-cost solar solutions for electricity generation, especially in rural and remote areas. Despite 52% of large hydropower plants being connected to the national grid for total electricity consumption, there is great potential in connecting small and medium-sized off-grid hydropower plants to increase generation for communities with limited electricity access.

Enhancing Forest Programs and ELC Legal Framework and Enforcement for LULUCF sectors

According to a 2016 national assessment of land use, forest cover accounted for only 48.14% of Cambodia's total land area (this figure included plantations of rubber, palm oil, and other perennial crops), while the REDD+ program's assessment was of only 45.05% forest cover (excluding plantations) (MoE, 2018). Either figure is far from achieving 60% forest cover of total land area by 2030. Cambodia has one of the fastest rates of forest loss in the world, increasing by 14.4% between 2001 and 2014 (Hansen, 2017). There are two feasible courses of action to be outlined to regain national forest cover and increase Cambodia's carbon sink (forest) for emissions reduction to meet the kingdom's INDCs.

Enhancing the National Forest Program and REDD+ Program: The relevant authorities should collaborate with forest experts and implementation partners on classifying land as development land or protected land for forest conservation, with forest areas reclassified into protected areas, protected forest, community forest, forest concessions, and production forest. Moreover, the RGC should work with relevant ministries to enhance the implementation of REDD+ program by moving from the readiness phase to the program implementation phase. This can be done through setting up improved REDD+ technical teams and putting in place the necessary monitoring, reporting, and verifying (MRV) systems to apply for available funding to move forward to the implementation stage.

Enhancing ELCs Legal Framework and Enforcement: Land use and forest conservation issues in Cambodia cannot be resolved without discussing the legal enforcement of ELCs. According to a report by Forest Trends using NASA

satellite imagery, ELCs in 2013 accounted for 14% of Cambodia's land area, an almost four-fold increase compared with 2004 data (Harfenist, 2015). The relevant ministries need to therefore review the existing laws and regulations on ELC management. The revision should focus on the reassessment of existing ELCs to see whether the businesses and land have been sustainably managed. The enforcement of forest governance must also be heavily inspected, assessed, and improved to reduce corruption and the possible collusion between officials and illegal loggers. The issuing of new ELCs should also be restricted until they have been proven sustainable after environmental impact assessments and other relevant studies have been thoroughly carried out.

Advancing Green Industry and Businesses

There is a huge potential for green industries to stimulate the Cambodian economy through production and development while taking environmental and social considerations into account. Such enterprises can not only contribute to economic growth through market and employment creation, but also to climate change mitigation and emissions reduction through sustainable business models. There are two ways to promote green industries in Cambodia: (i) by greening existing industries; and (ii) by creating new green industries and businesses.

Greening Existing Industries: The relevant authorities should form inspection teams comprised of energy experts, environmental impact analysts, chemical experts, and those involved in relevant fields to conduct quarterly or annual inspections of existing businesses focusing on:

- **Production efficiency:** Optimizing the production and use of natural resources and raw materials;
- **Environmental performance:** Improving waste management and minimization, and enhancing pollution controls in production and buildings.
- **Risk minimization:** Controlling and managing chemicals and hazardous waste, as well as implementing other social safeguards and employee protections.

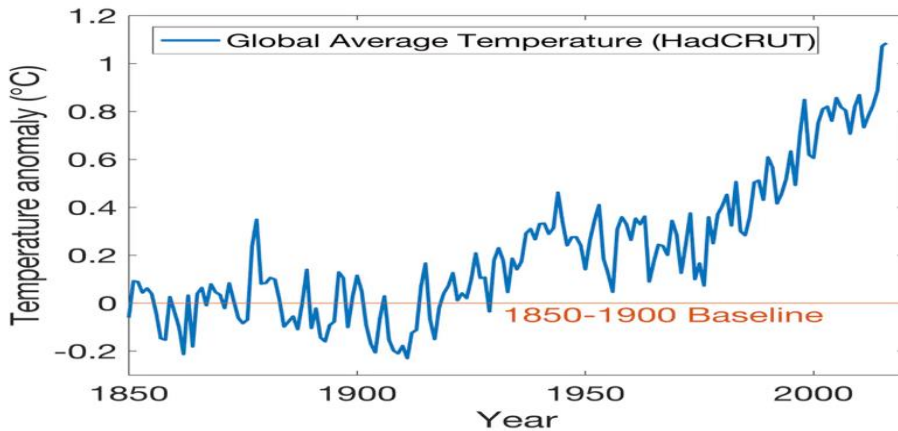
Creating New Green Industries and Businesses: With limited green industries in the Cambodian market, there is great potential for prospective investors. New green industries and businesses can also provide answers to existing social and environmental issues such as plastic waste, sustainable packaging, recycling, and so on. “Green” businesses and industries not only refers to those with environmental objectives, but also those with environmentally friendly production processes and sustainable waste disposal system. These are businesses that adhere to the environmental standards mentioned in the previous section “Greening Existing Industries”. The government can play a huge role in promoting such business models by providing incentives and advantages such as loans, tax credits, or subsidies for potential investors.

IV. Environment and Climate Change Under the Baseline Scenario: Business as Usual in 2040

The “Baseline” section will provide an overview of the future regarding climate change in the scenario of “Business as Usual”, whereby all nation states, particularly the major polluters, have not taken drastic measures to reduce global GHG emissions. This section also offers predictions on the possible impacts, vulnerabilities, and sensitivities in Cambodia in scenarios in which the Cambodian government has failed to implement suggested policies and action plans, with the country operating in a business-as-usual manner.

Global Business as Usual Scenarios

According to the IPCC’s 2018 “Global Warming of 1.5°C” summary report for policymakers, it is estimated that human activities have already caused a 1.0°C raising of the global average temperature above pre-industrial levels. At the current rate of warming, this likely to reach the 1.5°C mark between 2030 and 2052.

Figure 7: Global Average Temperatures from 1850 to 2018

Global temperatures are on the rise and are about 1°C above late 19th century levels. Author provided

The report also projects that the global average temperature could reach 1.5°C above pre-industrial levels if GHG emissions continue at the current rate, resulting in trillions of dollars in damage, with inundated coastlines, intensifying droughts, and increasing fatalities from heat waves and extreme weather events (Davenport, 2018; McEvoy, 2018). “The United States along with Bangladesh, China, Egypt, India, Indonesia, Japan, the Philippines, and Vietnam are home to 50 million people who will be exposed to the effects of increased coastal flooding,” the report states.

The IPCC report mainly compares the impacts between 1.5°C and 2°C global warming above pre-industrial levels. It states that a 1.5°C rise in the global average temperature above pre-industrial levels is a hugely important threshold for climate impacts. An increase of half a degree Celsius (between 1.5°C and 2°C) could result in irreversible ice sheet loss and a consequent rise in sea levels. Although the report says it is unlikely that the global temperature could reach the 2°C threshold before 2040, reaching the 1.5°C limit by 2040 would only make the journey toward the irreversible impacts of climate change at 2°C that much faster.

According to the IPCC report, the catastrophic impacts between a half-degree difference in temperature (between 1.5°C and 2°C) include:

- **Sea level rise:** Sea levels are expected to rise 10cm higher this century under 2°C of warming than 1.5°C, exposing an extra 10 million people to coastal flooding and saltwater getting into farmland and supplies of drinking water;
- **Biodiversity loss:** Out of 105,000 species studied, the rate of loss doubles between 1.5°C and 2°C warming to 16% for plants and eight percent for vertebrates, tripling to 18% for insects.
- **Thawing permafrost:** An estimated 1.5-2.5 million more square kilometers of permafrost will thaw this century with 2°C warming compared to 1.5°C;
- **Ocean acidification damaging coral reefs:** Marine ecosystems will be hit by ocean acidification and warming, with 2°C virtually wiping out coral reefs, compared to a 70-90% decline at 1.5°C;
- **Agriculture and fisheries:** For farming and fishing communities especially in the Arctic, drylands, islands, and the poorest nations, limiting global warming to 1.5°C reduces the number of people susceptible to poverty and climate-related risks by up to several hundred million by 2050. The quantity and quality of staple crops suffers under 2°C warming compared to 1.5C, as does livestock, which would be disastrous for food availability in many parts of the world.

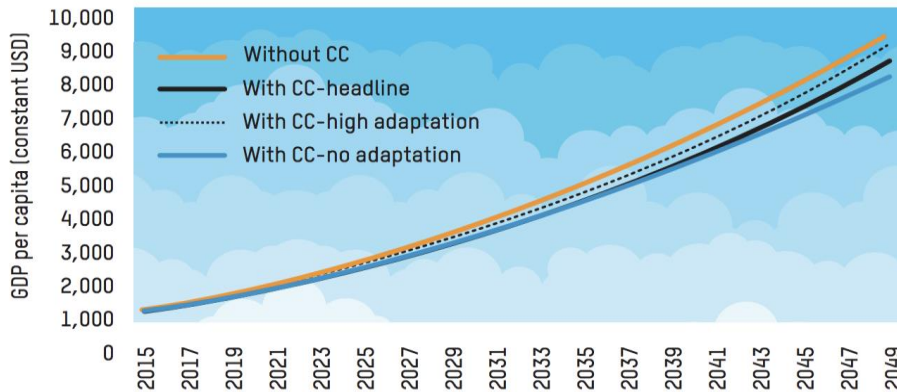
Cambodia's Business as Usual Scenario

In the scenario in which global GHG emissions continue to rise at the current rate, the impacts of climate change would also be worsened for most vulnerable nations like Cambodia. The kingdom's vulnerabilities to climate change would be further exacerbated if adaptation policies and action plans were not implemented effectively to increase Cambodian people's adaptive capabilities and resilience.

The Cambodian Ministry of Economy and Finance (MEF) and the National Council for Sustainable Development (NCSA) released the "Modelling of Climate Change Impacts on Growth" report in April 2018 that used a Climate Economic Growth Impact Model (CEGIM) to project possible impacts on the Cambodian economy (DCC, 2018).

The report's major findings were that without climate change, the CEGIM projected that real GDP would grow at an average of 6.9% per year from 2017 to 2050, with Cambodia achieving upper middle-income country status by 2035. However, with climate change, GDP growth would be reduced to 6.6% in 2020, 2.5% in 2030, and 9.8% in 2050 (see Figure 6)

Figure 8: Impact of Climate Change on Economic Growth

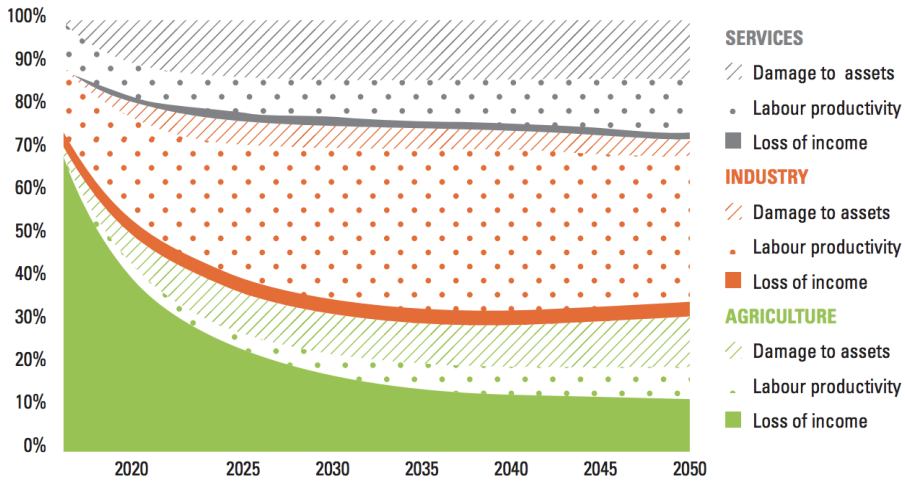


Source: MEF & NCSD, 2018

Note: CC-headline refers to the current rate of adaptation

The report (MEF & NCSD, 2018) categorizes losses and damage resulting from the impacts of climate change on the economy in different sectors into three types: damage to assets, reduced labor productivity, and loss of income (see Figure 6). According to Figure 8, by 2050 reduced labor productivity would account for 57% of all losses and damage. Industry, especially manufacturing and construction, would be among the sectors impacted hardest by reduced labor productivity. Loss of income represents 17% of all losses and damage, and is mostly concentrated in the agricultural sector. Damage to assets accounts for 26%, but is slightly higher in the service sector due to a projected damage to roads.

Figure 9: Economic Impacts of Climate Change by Sector and Type of Impact (% drop in absolute GDP 2050)



Source: MEF & NCS D, 2018

However, the report concludes that with the current levels of spending and the efforts being made on adaptation, Cambodia could avoid one-third of climate change impacts (33%) by 2050. And if adaptation policies and efforts are further strengthened and effectively mainstreamed into sectoral action plans, two-thirds of impacts (66%) could be avoided by 2050.

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Chapter 9 | Social Protection

Ms. YOU Sotheary

Kravanh is 7 months pregnant and is employed as a cleaner in Phnom Penh. Her husband, Prayuth, works as a garbage collector. She has 7-year old twins living with her parents back in her hometown in Kampong Cham province. Her twins study in grade two at a local primary school located 15 minutes away from her parents' home. Due to the income level of the family the school provides two free meals every school day, under the "home-grown" school feeding scheme. Helping to support this scheme in their retirement, Kravanh's parents utilize their 50 square meter backyard to grow vegetables to supply some of the primary schools in their district. While visiting her parents and children during Khmer New Year, Kravanh gives birth prematurely. In a compounding turn of events, Prayuth also finds himself in a traffic accident and in need of medical attention for a broken foot. Fortunately for the family, the couple receive quality healthcare in the district hospital. Their state-sponsored health insurance fully covers their hospital fees under the universal health coverage scheme. Kravanh is entitled to 6-months paid maternity leave, while her husband can take 45 days of paid paternity leave under the paid parental leave schemes. With the existence of inclusive social protection schemes, Kravanh and her family are able to cope with the unexpected turn of events in their life.

I. Social Protection: The Ideal Scenario

By 2040, Cambodia will manage the external shocks and domestic economic stresses that negatively impact the livelihood and well-being of its citizens through the utilization of a responsive social protection system. It is designed to

ensure that social wellbeing is resilient to economic downturns, and that support is provided to Cambodians who require assistance. Primarily, it is designed to deliver equality of opportunity across Cambodia as the country moves along its growth pathway towards upper-middle income status.

Three core features underpin the system:

- Improved resilience to economic downturns. Cambodia has effectively secured income security for the working-age population, elderly, and children, while securing access to essential health care for all segments of the population.
- Widened opportunities for Cambodians to absorb the benefits of regionalization and globalization through strengthening the capability and skills of Cambodians to meet the demands of the labor market and improve access to needs-based and high quality education and vocational training for both the rural and urban populations.
- Enhanced equity for Cambodians to enable the poor and near-poor populations to live a dignified life with an adequate standard of living such that poverty is not passed from one generation to the next generation.

Cambodia achieves the 2040 social protection vision by establishing a social protection floor that insures all Cambodian citizens and residents. The social protection floor is defined as a minimum provision of social protection that guarantees access to essential health care, underlying income security, and effective public goods and services for Cambodians. The basic social protection schemes include the following components:

- Access to essential health care guaranteed by the health care service providers, both private and public, through universal health care coverage.
- Childhood security and protection systems that include access to nutrition, education, care, and other necessary goods and services.
- Basic income security and a good quality of public service provision for persons of working age who are unable to earn sufficient income in cases of sickness, structural unemployment, maternity, and disability.

- Basic income security and high quality of public goods and services for the elderly.

Public Policy Rationales

According to the Constitution of Cambodia (Articles 36, 46, 72, and 75), providing social protection to Cambodians is the responsibility of the government. Cambodians are entitled to the rights to life, the attainment of an adequate standard of living, and the enjoyment of the highest attainable standard of physical and mental health in accordance with the Universal Human Rights Declaration. There are two public policy rationales for the government of Cambodia to promote comprehensive social protection in Cambodia.

First, the Cambodian government can ensure that citizens are protected against external shocks and domestic stresses. Second, Cambodia can ensure a fair distribution of the economic resources to all segments of Cambodian society in order to promote economic growth and development

By 2040, previous problems regarding a lack of prioritized policy programs, low funding of social protection schemes, and inadequate data management capacity in social protection programming will have been addressed through effective social protection mechanisms. The six core developments by 2040 are listed below.

- Adopting a social security law that provides clear guidelines on social protection schemes, responsible agencies, and finance mechanisms to design and implement the social protection schemes.
- Providing universal health care to insure all Cambodian in both formal and informal sectors and in all age brackets in accessing health care services.
- Designing and implementing a home-grown school feeding program to increase child nutrition and promote socio-economic development.
- Providing unemployment insurance to ensure that all Cambodians, especially women, can access necessary services to upgrade their skills and knowledge to obtain employment opportunity and can reduce the risks associated with the loss of incomes.

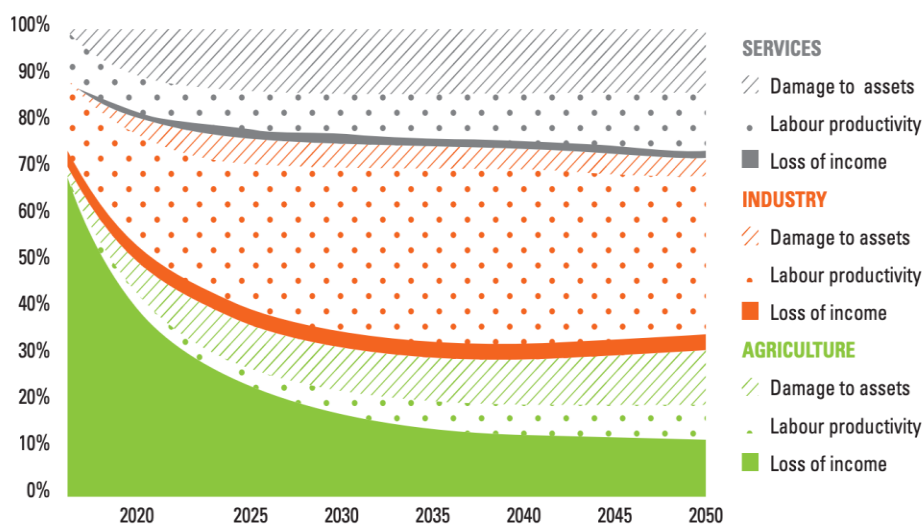
- Providing national pension schemes to ensure all Cambodians, particularly the old age population, have sufficient incomes.
- Providing parental leave to promote equitable access to social services and economic opportunity for women and men and to provide sufficient support to children in the first twelve months.

II: Scenario Space and Key Factors for Social Protection

The pathway for Cambodia towards 2040 may be uneasy and challenging. Key issues such as the structure of the population, employment, climate change, and external economic shocks play significant roles in determining the development outcomes of Cambodia.

For instance, climate change alone would reduce average GDP growth to 6.6% and absolute GDP by 0.4% in 2020, 2.5% in 2030 and 9.8% in 2050 (Ministry of Economic and Finance and the Council of Development of Cambodia, 2018). By 2050, the projected social and economic damages due to climate change can be seen as: (i) loss of income mostly from declining natural resource productivity; (ii) reduction in labor productivity arising from heat stress; and (iii) damage to assets (Ministry of Economic and Finance and the Council of Development of Cambodia, 2018). According to UNDP, climate change will impact labor productivity due to slowdown or fatigue among workers due to higher temperatures (UNDP, 2018). This low productivity will be the leading factor of GDP loss accounting for 57 percent of the economic loss and damage caused by climate change in the country in 2050 (UNDP, 2018; OECD, 2017; Ministry of Economy and Finance and the Council for Development of Cambodia, 2018). Ministry of Economy and Finance and the Council for Development of Cambodia (2018) highlighted that the low productivity affects all sectors but is particularly high in the manufacturing and construction sectors.

Figure 1: Economic Impact of CC by Sector and Type of Impact (% drop in absolute GDP 2050)



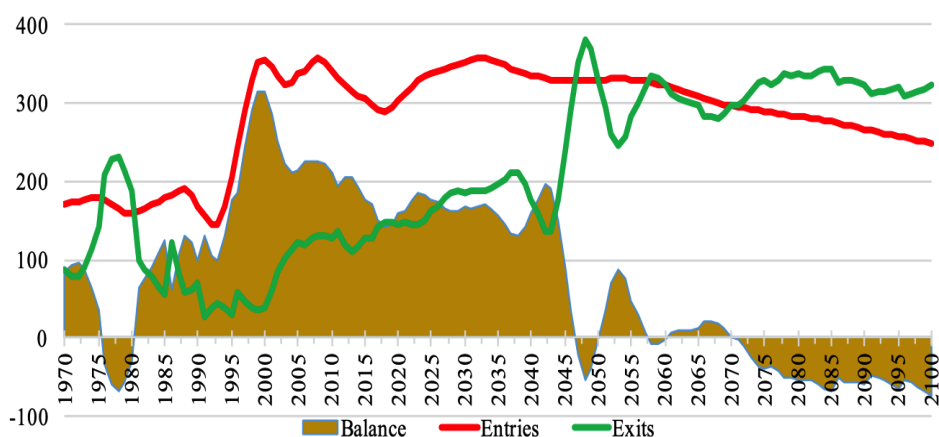
Source: MEF & NCSD, 2018

Climate change, together with other issues such as the movement of external and internal migration, the rapid urbanization and changes to the age structure of the population are the driving factors of increasing demands for responsive social protection (OECD, 2017).

The National Population Policy 2016-2030 projects that Cambodia's population by 2048 will be around 21 million people. In the next 40 years, the elderly are expected to increase as a share of the population by around eight percent, while the younger Cambodian population is expected to decline (RGC, 2016).

The data illustrates an estimated increase of dependence in the coming 40 years. In the absence of a social pension system it is likely that the family will be the significant contributor to ensuring that the well-being of those over 60 is assured (OECD, 2017).

Figure 2: Cambodian Working Age Population (15-64); annual entries, exits and total balance; 1970-2100 (in thousands)



Source: National Employment Agency, 2018

This demographic transition leaves Cambodia with two critical challenges, in the form of an increase in the working-age population and an increase in the school-age population. The National Employment Agency (2018) highlights that the Cambodian economy needs to generate 118.3 thousand additional jobs per annum in order to maintain its employment rate level of 84%.

Cambodia is in the process of strengthening institutional capacity, reforming public finance management and taxation, and having available fiscal space to roll-out the additional development agendas. With these ongoing reform agendas, crafting a new social protection policy is a necessary progressive mechanism to ensure positive outcomes as Cambodia continues its national development.

Key Factors

Social protection in Cambodia remains inadequate due to a lack of prioritized policy programs, low funding of social protection schemes and inadequate data management capacity in the social protection program (ILO, 2017; UNDP, 2017; OECD, 2017; World Bank, 2018). Social protection, including social assistance, social insurance, and safety nets, is currently underfunded due to limited budget allocations (OECD, 2017). As evidence, social assistance still has limited budget allocation and no clear policy priority. Cambodia was below the regional average

in term of social assistance spending – allocating only 10 percent of its social protection expenditure on social assistance in 2016, while average regional spending was 36 percent (ILO, 2017; OECD, 2017).

To date, Cambodia has not developed the type of systems that could be used and scaled up to provide a backbone for the social protection system at large (World Bank, 2018). The OECD reported that no intervention on life cycle had been designed and implemented in Cambodia, which left the majority of Cambodians vulnerable to external shocks (OECD, 2017). The World Bank also highlighted an example of fragmented social assistance programs in Cambodia caused by a lack of clear policy orientation to address the needs of the population and advance the economic development in the country (World Bank, 2018). The OECD highlighted in its report that social insurance in Cambodia is severely fragmented and that it has been poorly developed for the formal sector and non-existent for the informal sector. At the same time, statutory pensions for private and public sector's employees and statutory unemployment insurance for Cambodians have yet to be developed (OECD, 2017). Cambodia has limited data on cost and coverage of social protection, which makes it more difficult to access current social protection status and to inform policy decisions (World Bank, 2018).

The fragmented social protection system in Cambodia leaves many Cambodians, especially the poor and near-poor population, vulnerable to economic shocks. This has slowed down poverty reduction and human capital development. As of 2014, Cambodia's poverty incidence was about 14 percent, while multi-dimensional poverty was about 33 percent (World Bank, 2018; OECD, 2017). According to the World Bank, 8% of non-poor and 27% of poor people reverted to 'very poor' due to an absence of a responsive social protection scheme from 2012 to 2014 (World Bank, 2018). Nearly one-third of children under five suffered from stunting, while the enrolment rates in pre-primary and secondary school remained low with the presence of underfunded social assistance and a low priority of social protection schemes (World Bank, 2018). Maternal and child mortality rates remains the highest in the region caused by water-borne and infectious diseases, limited access to clean water, and no proper sanitation (OECD, 2017). Elderly and disability access are minimal

or are almost uninsured by the national social protection programs contributing to these groups being located in vulnerable conditions and poverty (OECD, 2017). Informal and vulnerable employment, which employ a large proportion of Cambodians, remains the norm in Cambodia, leaving the majority of Cambodian employees vulnerable to uncertainty and shocks (OECD, 2017).

Space for Social Protection Development

Cambodia has invested in the education and health sectors and has seen an increase in investment in social protection in recent years. This strategy is referred to as the “2.5 poverty reduction” (Gill et al., 2016). It has been suggested that having reduced extreme poverty to low levels, Cambodia should now consider expanding to a three-point strategy (3.0 Poverty reduction strategy) which prioritizes the improvement of education and health, alongside the integration of social protection as a full third component (Gill et al., 2016).

The full social protection component in the three-point poverty reduction strategy emphasizes helping the destitute and protecting vulnerable people. The social protection schemes should be prioritized in a poverty reduction strategy to ensure that poor and vulnerable people will be insured and protected. Social protection must be changed from a supplement to a full component in ways that complement, rather than substitute, the first two components of the strategy (Gill et al., 2016). Accordingly, there is a strategic need for Cambodia to develop an inclusive social protection system.

III: Policy Initiatives to Achieve the Ideal Scenario

Six policy initiatives, as noted above, are recommended for the Cambodian government to boost economic development by 2040 including: adoption of a national security law; provision of universal health care; establishment of national pension schemes; designing of a home-grown school feeding program; and providing unemployment insurance.

Initiative 1: Social security law

The social security law should integrate the following elements:

- Establish explicit pension schemes to enable Cambodians of pension age to secure their post-work income and ensure their well-being.
- Provide clear guidelines for disability insurance to protect persons with disabilities from risks and shocks that affect their lives and well-being.
- Set guidelines and requirements for health and medical insurance to make sure that all Cambodians are protected from unexpected health shocks and risks associated with physical and mental health.
- Outline supplemental income for low-income workers.
- Set a provision of unemployment insurance to provide guidelines and explicit conditions for unemployment insurance for all Cambodians.
- Public assistance and welfare services including temporary assistance for needy families, medical assistance, maternal and child health services, child support enforcement, family and child welfare services, and food assistance program

Initiative 2: Universal Health Care

The World Health Organization (2013) highlights Universal Health Care in some countries in Asia, Latin America, and Africa. Evidence from those countries suggests that universal health care has significant positive impacts on the well-being of the people and the economy as a whole. Expanding social protection to all Cambodians would help Cambodia to achieve both SDG ten (reduced inequalities) and SDG three (good health and well-being).

Cambodia can build upon existing programs as follows:

- Expand the coverage of IDPoor to the employees working under vulnerable conditions such as construction workers, hospitality and tourism workers, and garment workers.
- Expand coverage of health insurance for civil servants, police, and military and their dependents.
- Obligatory health insurance for private sector employees with equal contributions by both employees and employers.

- Scale up the Community Based Health Insurance Schemes Model²⁸ to insure informal workers.

Table 1: Selected example of Universal Health Care

Countries such as Thailand, Nepal, and Brazil have embedded universal health care coverage in their respective constitutions, making the provision of primary health care to their citizens an obligation of the government's interventions (Hachette F, 2009; World Health Organization, 2013; Luiza d'Ávila Viana et al. 2015). Experiences from Nepal and Brazil suggest that universal health care policy needs to go hand in hand with decentralization to improve the efficiency of health service delivery. Brazil implemented the Family Health Strategy from 1994 to 2012. This was a community-based healthcare service provided by a team that comprised one physician, one nurse, one nurse assistant, and up to six community health agents (Viegas Andrade et al., 2018:370). The family health team was responsible for providing care for a maximum of 4000 people living in a defined geographic catchment area (Viegas Andrade et al., 2018:370). Brazil also decentralized public health services, which transferred the primary care functions to local government, including contracting and paying health care providers and managing and supplying adequate health infrastructure (Viegas Andrade et al., 2018:370). In addition, local government is responsible for the implementation of universal health care coverage expansion (Viegas Andrade et al., 2018:370). Other lower-middle-income countries in Asia, such as Nepal, have implemented the Free Health Care Policy since 2007. Nepal has decentralized public health care to increase the quality of services and to mobilize resources to finance public health services (RTI International, 2007:4).

²⁸ The Community Based Health Insurance Schemes is implemented by a number of NGOs in 7 provinces under the support of the development partners and contribution of members. As of 2015, 148,148 people joined the schemes (National Social Protection Policy Framework 2016-2025).

Private sector and civil society engagement are crucial as they play complementary roles in delivering universal health care coverage. Brazil, Nepal, and Thailand engaged both the private sector and civil society in providing health care coverage and raising awareness among the population of the benefits of universal health care coverage (World Health Organization, 2013; Luiza d'Ávila Viana et al. 2015).

Initiative 3: National Pension Schemes

A national pension system is considered to be a mechanism to reduce poverty among the elderly and to smooth transition between working years and retirement years such that an individual will not suffer a massive drop in living standards when old age or disability reduce his or her earning ability (Schwarz. AM, 2006). Operating a national pension system requires a good policy, sound technical capacity, and sufficient budget to roll out the scheme. The establishment of a social pension system in a market that is not well established should be seen as an excellent opportunity to strengthen the government's capabilities and efficiency to guarantee the provision of benefits to the population.

National pension schemes should be designed and implemented to cover both formal and informal workers. Existing pension schemes should be scaled up to cover primary sector workers, the self-employed, and those in the construction and hospitality sectors. Development of the pensions scheme should be considered along the following lines:

- For those in the primary sector: the government should establish a contribution pension scheme that enables them to save for their retirement. These pension schemes should include equal contributions by each individual and the Ministry of Economy and Finance.
- Self-employed workers should be integrated into pension schemes. The self-employed workers should be required to contribute to the pension schemes through an opt-out tax enrolment system.
- Construction workers make a significant contribution to the economy with the boom of the real estate and construction sectors. They are

exposed to high employment risks that necessitate protection. The construction workers' pension schemes should be contribution schemes that require the employees, the employers, and the government to contribute.

- Social pension schemes for hospitality workers should be scaled up to protect these workers. The schemes should be contributory schemes that ask for the contribution from the employees, the employers, and the government.
- For the workers in other parts of the private sector, the government should strengthen implementation of the providence fund program to ensure that all firms, including small and medium enterprises, apply the providence fund provision. The employees and the employers should equally contribute to this pension scheme.

Table 2: Selected Example of Pension Schemes covering formal and informal sectors

Sri Lanka has designed and implemented pension schemes to protect workers in both the formal and informal sectors. Five pensions schemes have been rolled out in Sri Lanka including the Public Service Pension Scheme, Employee Provident Fund, Farmers' Pension, and Social Security Benefit Scheme, Fishermen's Pension Scheme, and the Self-Employed Persons' Pension Scheme (Samarakoon et al. 2015). Only the self-employed persons pension scheme is operated under the non-contributory pension scheme; the rest are operated on a contributory basis (Samarakoon et al. 2015). The public service pension scheme was established in the 1950s. The Employees' Provident Fund was established in 1958 to insure private workers on a contributory basis (Eriyagama & Rannan-Eliya, 2003b). This pension scheme is managed by the Department of Labor, while the Monetary Board of the Central Bank is responsible for fiduciary matters, including management of fund investments (Eriyagama & Rannan-Eliya, 2003b).

China also tries to protect its citizens in both urban and rural areas. In 2009, China rolled out the New Rural Social Pension Scheme to insure elderly Chinese in rural areas. China has designed two pension mechanisms -

including a social pension scheme and a contributory pension scheme - to provide a minimum level of income security in old age while also incentivizing saving (Vilela. A, 2013:6). The social pension scheme includes a basic pension that is payable to people aged 60 and over whose children participate in the scheme (family-binding eligibility criteria), funded by the central government (Vilela. A, 2013:6). The contributory pension scheme is designed for rural residents who are aged 16 and over, not in education and not enrolled in an urban pension scheme (Vilela. A, 2013:6).

Initiative 4: Home-grown school feeding program

A home-grown school feeding program is designed to improve the nutrition of school children and boost local economies through promoting nutrition education and better eating habits, in addition to encouraging the diversification of production with a particular emphasis on local crops. Implementing this program will support Cambodia to achieve SDG two (ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture), SDG three (good health and well-being), and SDG four (quality of education).

To design and implement the program, the government should consider:

- Establishing an inter-ministerial mechanism to implement the home-grown school feeding program.
- Designing national school health and strategic nutrition plans and implementation guidelines.
- Integrating the program into the education, health, and agriculture policies.
- Establishing a national school nutrition fund to implement the program.
- Engaging development partners and international organizations to roll-out the policy, e.g., UNICEF, World Bank, ABD, USAID and Save the Children.

Table 3: Selected Example of Home-School Feeding Programs

In recent years, home-grown school feeding programs have been growing significantly worldwide as a means to deliver healthy meals to children and to

stimulate local agriculture and economies through the procurement of food from local, small-scale producers (FOA and WFP, 2018). These programs emerged as an opportunity to improve the livelihood of smallholder farmers and local communities and to strengthen the nexus between nutrition, agriculture, and social protection (FOA and WFP, 2018).

Brazil has implemented such a policy since 1954 as a targeted food aid program designed to fight undernutrition and low levels of education (Sidaner et al. 2012). The program is strongly regulated in Brazil to promote child nutrition in school and socio-economic development at the community level. In 2006, Brazil passed the Organic Law on Food and Nutrition Security, which was a foundation for food security policy. In 2009, the Law on School Feeding was adopted, which was a milestone in the institutionalization of the school feeding program at the federal level. The National Fund for Development of Education under the Ministry of Education of Brazil is responsible for implementation. Brazil also adopted Resolution 38/2009 to lay out technical standards and administrative roles whereby it is mandated that school meals should provide at least 20 percent of the daily nutrition needs of students enrolled in part-time basic education (one meal is offered), and at least 30 percent of the daily nutritional needs when two or more meals are offered in schools located in indigenous communities. It is worthwhile to also note that the government of Brazil engaged with civil society in the process of design and implementation of its policy and the concomitant development of legal frameworks (Sidaner et al. 2012:990-991).

Initiative 5: Unemployment Insurance

Unemployment insurance is necessary for Cambodia in order to minimize economic disruption during future economic downturns. The government should set up an unemployment insurance fund that requires the contribution of the employees, the employers, and the government to protect workers from the uncertainty in employment. These three stakeholders should equally contribute to the unemployment fund of an employee. Providing unemployment insurance to Cambodians will support Cambodia in achieving

SDG eight (decent work and economic growth), SDG ten (reduced inequalities), and SDG one (no poverty).

Table 4: Selected Examples of Unemployment Insurance

The 1999 Asian financial served as a catalyst for Thailand to develop labor insurance in order to protect the unemployed population in the country. Unemployment insurance was introduced in the 1998 Labor Protection Act of Thailand. The involuntarily unemployed are entitled to severance pay which varies based on the employment period of the individual worker.

- For employment duration between 120 days and 3 years, cash assistance is 30 days of the minimum daily wage;
- For employment duration between 3 and 10 years, cash assistance is 60 days of the minimum daily wage;
- For employment duration over ten years, cash assistance is 90 days of the minimum daily wages (Labor Protection Act 1998).

In 2009, the government of Vietnam established a labor protection scheme under the guideline indicated in Decree No. 127/2008/ND-CP. In order to be covered by the law, the unemployed have to meet certain set criteria:

- An unemployed individual must have worked and contributed to the unemployment insurance fund for at least 12 months in the 24 months prior to his/her unemployment;
- An unemployed individual must be registered with the Employment Service Center at the Provincial Department of Labor, Invalids, and Social Affairs when they lose their job, or when their labor contract is interrupted;
- An unemployed individual has not yet found a job within 15 working days after the date of making unemployment registration with the Employment Service Center (Giang & Ngnyen, 2011).

The Unemployment Insurance Fund is funded by the government, employers, and employees. The total contribution is approximately three percent of the total salary of an employee in which all contributors contribute equal shares (Giang & Ngnyen, 2011). The insured unemployed receive benefits

equivalent to 60 percent of their average monthly salary during the six months before unemployment (Giang & Ngunyen, 2011). Bista & Carter (2017) suggest that the unemployment protection act should include specific provisions as to types of contract, employment benefits, payment of benefits, administration and operation procedures, finance mechanisms, and penalties (Bista & Carter, 2017:129-130).

Initiative 6: Paid Parental Leave

To achieve its development goals by 2040, Cambodia needs to reform its economic and social structure in a way that promotes productivity and competitiveness equitably. The provision of parental leave for mothers and fathers would help Cambodia to reach its goals through promoting the well-being of the mother and children while reducing inequality between men and women in employment. Parental leave should be incorporated into the following components:

- Both parents are entitled to a paid leave of absence upon the birth of their child.
- Parental leave should build upon the maternity leave that is already granted to Cambodians. The period of parental leave should be 24 weeks for the mother and at least 12 weeks for the father.
- The government can incorporate paid parental leave in the social security law and develop the national policy on paid parental leave.

Table 5: Selected Example of Paid Parental Leave

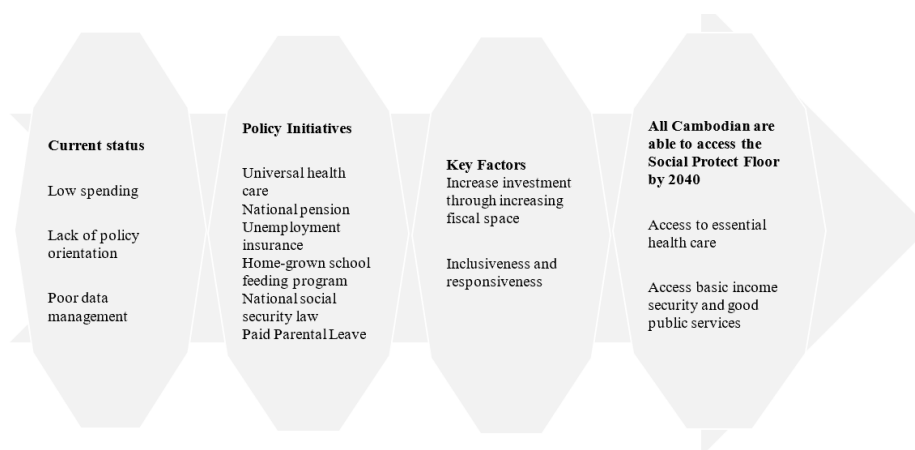
Paid parental leave has been associated with significant positive effects on the health, livelihood, and well-being of both children and parents. A study of 21 countries across the OECD found that in countries providing more than 24 weeks of paid leave, women contributed a higher proportion to household income (UNICEF, 2019:3). A study in Denmark found that policy reforms extending paid parental leave from 14 to 20 weeks led to an increase in mothers' incomes. Cross-national studies found that parental leave of moderate lengthen from 8 months to 1 year, reduce the gender earnings gap (UNICEF, 2019:3). Moreover, a study on the implementation of the one-year

parental leave policy in Germany found that the reform increased the likelihood of maternal employment by 12%, while in another study the policy led to higher employment probabilities three to five years after childbirth among women who took longer leaves (UNICEF, 2019:3).

UNICEF (2019) cited a recent review of the existing literature when suggesting that paid parental leave can contribute to infants' healthy development and survival by facilitating breastfeeding and enhancing parents' ability to obtain immunization and other medical care in the postnatal period. A study of nearly 1 million births over 18 years (1996-2014), as cited by UNICEF (2019), revealed that a one-month increase in the duration of paid maternity leave was associated with a 35% reduction in the risk of bloody diarrhea among children (UNICEF, 2019:2). Studies found that fathers who take paternity leave are more involved in childcare and other unpaid labor at home which may support mothers' breastfeeding and reduce the likelihood of post-partum depression which in turn benefits infant health (UNICEF, 2019:2). Paid paternity leave also contributes to the prevention of gender-based violence in the family. A study on California's paid paternity leave policy found that child maltreatment and physical abuse decreased after the introduction of the Paid Parental Leave Policy (UNICEF, 2019:2).

Windows of Opportunity for Sustainability

In designing and implementing its social protection schemes, Cambodia needs to pay critical attention to the inclusiveness and responsiveness of the policy, ensuring that these initiatives will reach out to all segments of the population. Cambodia has to make the social protection schemes available, accessible, and adequate for all Cambodians through establishing a tax-financed social protection system after 2030 and having a tax-financed social protection in place by 2040. Reaching the desired 2040 social protection depends upon two factors, including increasing public investment in social protection and the inclusiveness and responsiveness of the policy's design and implementation.

Figure 2: Social protection 2040

Fiscal Space

The available fiscal space should be utilized to finance the social protection schemes, particularly the pension schemes, basic social protection floor, and unemployment insurance. The primary public services - especially education and health services - have to go hand-in-hand with social protection programming. Cambodia needs to pay more attention to the equitable outcomes and gender-responsiveness of the education, health, and social protection policies.

Cambodia should establish social protection schemes that are financed by both the contributions and taxation to ensure the minimum income security for all Cambodians and residents and to smooth consumption levels over the lifecycle. The kingdom can increase its fiscal space to finance social protection through increasing tax revenue, reallocating public expenditure, drawing on development assistance, and tackling illicit financial flows.

A progressive pro-poor tax policy and more efficient tax collection and enforcement of the contribution obligations are recommended for the country to reduce poverty and address prevailing inequality. Cambodia should explore policy options that broaden its tax base, including taxes on wealth, personal income, and capital gains. Taxation on mining and natural resource extraction is also a crucial source of revenue to finance social protection. Some Asian

countries have taxed mining and natural resource extraction to finance social protection – Mongolia, for instance, invests a percentage of excess mining royalties to fund its pension programs.

Cambodia can gain fiscal space by tackling illicit financial flows. A study by Global Financial Integrity, as cited by the *Phnom Penh Post*, reports that the country lost a considerable amount of tax revenue due to illicit financial flows. Illicit financial flows made up between 17% to 39% of the total trade between 2005 and 2014 with tax losses at about \$4.5 billion over the last decade (De Gaudemar. M, May 2017). In 2014, illicit financial flows made up between 4% to 15% of total trade, which cost at least \$360 million in lost taxes (De Gaudemar. M, May 2017).

IV. Social Protection Under the Baseline Scenario: Business as Usual in 2040

Cambodia's GDP is projected to grow at an average of 7% from 2017 to 2050. However, without an inclusive social protection program, Cambodia will have a difficult time to break the cycle of poverty due to shocks and stresses. Cambodians will likely experience greater inequality in accessing social protection, as the existing social protection framework is not seen as an inclusive framework that can insure people in the formal and informal sectors. Cambodia has struggled to tackle inequality and the causes of inequality in recent years. For instance, Cambodia's HDI value in 2017 was 0.582, yet remained only 0.469 after the inequality adjustment (UNDP, 2018). A loss of 19.4% of HDI value after the inequality adjustment was due to inequality in the distribution of the HDI dimension indices (UNDP, 2018).

Regarding social protection, Cambodia needs to pay more attention to the 'missing middle' as it makes up a significant share of the total population. The 'missing middle,' who do not qualify as extremely poor and are employed in the informal sector, make up about 21% of the total population at present (UNDP, 2018). They will be more likely to be excluded from social protection programs, including health care, pensions, parental leave, and unemployment insurance. This ultimately leads to an increase in gaps in the social protection coverage by 2040.

Data from the National Population Policy 2016-2030 demonstrates that the elderly are expected to increase as a share of the country by 8% in 2048, which demonstrates a probable increase in the dependency rate in the coming 40 years (National Population Policy 2016-2030). Without a comprehensive social protection program that can guarantee income security for senior citizens, Cambodia's elderly are more likely to live in poverty with limited access to social and health services, creating a more significant burden for family members.

In 2045, the National Employment Agency projected that the Cambodian economy needs to generate 118.3 thousand additional jobs in order to maintain its level of the employment rate of about 84% as in its level in 2016 as discussed above. There will be an increase in the university and upper-secondary population to about 2.4 million and 1.1 million respectively. Without comprehensive social protection programs such as unemployment insurance, home-grown school feeding programs, pension schemes, universal health care, and parental leave, Cambodia is less likely to be able to reach its development goals for 2030 and 2050.

The climate change that harms Cambodian farmers and rural populations is also a threat to Cambodia's development and continues to hurt Cambodia's GDP and household income. Without a social protection system in place, people living in rural areas will not be able to break the cycle of poverty due to anticipated declines in productivity.

Parental leave provides affordable and accessible childcare to Cambodians while fostering equality between men and women. Without paid parental leave, Cambodia might have to deal with other issues caused by inequality in maternity and paternity leaves. The maternity leave that exists currently, with the absence of paternity leave, makes female labor in Cambodia more expensive than that of men, discouraging employers from employing women. Moreover, maternity leave in Cambodia might encourage women to stay home and foster gender equality gaps in employment due to limited or non-existent skills upgrade opportunities for mothers after giving birth.

Cambodia has implemented school meal programs for years in selected provinces. It has been reported that these initiatives have had some positive

effects on school attendance. However, the introduction of a home-grown school feeding program would help Cambodia to reduce child malnutrition and promote socio-economic development at the community level.

In short, without an inclusive social protection mechanism, Cambodia will struggle to achieve its SDG commitments and to reach middle income status by 2030 and high income status by 2050. Cambodia might also face new challenges along the way due to rising levels of inequality and the unequal distribution of economic resources in the kingdom.

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