Micro-Policy Intervention

CONTEMPORARY POLICY DISCUSSION IN CAMBODIA

វេទិកាអនាគត
FUTURE FORUM

Acknowledgements

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The Organization

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.

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Chapter 1 | Introduction

Michael Renfrew

The primary objective of Policy Lab has been to create a platform which will motivate, train, mentor, and promote Cambodian youth in critical, systematic, creative, and equity-oriented policy making. It is the conceptualisation of Future Forum; Cambodia's primary independent public-policy think-tank, founded by OU Virak in 2015.

Our Vision is of a just, democratic, dynamic, and prosperous Cambodia shaped by the needs of its people. To make that vision a reality, our mission is to nurture a community of young thinkers, develop positive policy solutions and engender critical debate.

We employ evidence-based policy debate, analysis, and recommendations to inspire Cambodian people (especially youth) to achieve democratic, political, and socio-economic change that will benefit all people of Cambodia. By adopting a measured, analytical, and considered approach, we identify underlying policy recommendations to help shape Cambodia's discourse, and rather than simply identifying problems, we adopt a solution-oriented approach, and use research to equip key decision-makers with detailed, specific, constructive policy solutions to Cambodia's issues.

It is within this vision that Policy Lab was formed. Drawing on Future Forums national network of policy makers and researchers, young policy researchers and analysts were invited to participate in a four-month training program to develop their insights into critical policy contributions.

Specifically, Policy Lab was designed to develop a considered and critical policy culture in Cambodia through engagement with, and connections between, multiple levels of Cambodian civil society, working towards equitable development through policy conception and implementation. By engaging mentors from existing civil society organizations, the Policy Lab initiative can embed the program more deeply and ensure maximum sustainable impact and engagement.

This program has an express commitment to open dialogue, mutual respect, blue sky thinking, and foresighting; with a structured commitment to gender and social equity models. However, rather than simply transplanting a foreign best practice model - the programs in-built feedback mechanisms work to ensure an organic process of program development that both respects and actively facilitates modes of dialogue, discussion, and interaction that draw upon the unique culture, norms, and informal institutions that define the Cambodian civil society space. Accordingly, Policy lab provides an opportunity to sow the seeds of dialogue and civic participation will grow utilising Future Forum's established network.

The program commenced in August 2019 with the nationwide recruitment of thirty young policy analysts. Successful applicants were subsequently invited to participate in a four-day training retreat in Kirirom. The primary objective of the retreat was to provide an intensive training schedule around policy needs identification, conceptualisation, and analysis. In addition, the retreat provided a valuable platform for community building, collaboration, and knowledge exchange.

Following the retreat, our young analysts underwent a three-month process of editorial training and support towards the production of their policy contributions. This collection represents the outcome of their hard-work, insight, and development.

Chapter 2 |No Outdoor Trash:

Root Cause Analysis and Policy Suggestions

Vichny CHANCHEM

Executive Summary

Suggested Policies:

- Introduce public water refill stations.

Alternative policies:

- Waste Reduction:
  - Promote a more comprehensive usage of reusable containers.
  - Introduce more refill-shops in the market.
  - Change people's behavior to use more of their own bags by providing incentives.
- Management and Control:
  - Prevent improper disposal of waste on the street and in the public through laws and regulations.
  - Fine those who violate the law.

Introduction

The problem of waste is one of the biggest challenges in Cambodia. Phnom Penh alone generates around 1 million tons of waste per year in which 51.9 percent is organic, 20.9 percent is plastic waste, 9.9 percent is paper waste and the rest, 17.3 percent, is general waste (Clean Green Cambodia, 2019; see the figure below). According to a report done by the Ministry of Environment in 2018, the amount of waste in Cambodia has been increasing by 10 percent each year. The causes of this problem are population growth, an increase in consumption, a variety of packaging types and a lack of understanding on how to sort waste (Hiezle, 2018). In Cambodia, the responsibility of waste collection and management falls under the Phnom Penh Municipal Hall and a contracted waste collecting company, Cinti (Thou, 2019). However, with the current situation as observed, Cambodia is still

having problems regarding waste. Effective policies and solutions have to be taken seriously to tackle the issue. This paper will focus specifically on outdoor waste that is unmanaged and improperly thrown away on the street and in public places in Phnom Penh.

An article published by Phnom Penh Post on March 3, 2015 described that the government of Cambodia had taken a step forward into tackling waste management issue in Cambodia by funding 5 million USD to its sub-governments to assist municipalities with initiating their own strategies for improving garbage management. Without any concrete review of the impacts of the program, it could not be concluded whether the project was successfully implemented (Turton, 2015). Regardless, it is evident that there still is much work that needs to be done to solve the problem of unmanaged outdoor trash.

It is worth pointing out that most of the trash in Cambodia is generated from plastics, such as single-use plastic bottles, plastic bags, plastic boxes, straws so on and so forth. There is no clear data as to how much total plastic waste is generated in Phnom Penh, however, according to UNDP (2019), around 10 million plastic bags are used daily.

Background to the Problem

Causes of Outdoor Trash

The four main factors that contribute to the problem of trash being misplaced include: (1) excessive amounts of unnecessary waste, (2) cheap and accessible plastic bags & bottles, (3) people's behavior, and (4) the lack of enforcement in waste management.

(1) Excessive amounts of unnecessary waste:

Today it can be seen that consumers in Phnom Penh are very exposed to variety of goods sold in the market, from essential supplies to food and beverages. With these goods comes various types of packaging that result in huge amounts of waste. Vast numbers of single-use plastic bags, boxes, straws, cups and as well as bottles are being consumed daily. From massive shopping malls to small marts and local markets/businesses, plastic bags are one of the main ingredients in this issue as people are not accustomed to bringing their own bags to the market. Plastic bags are handed out to consumers even with the smallest of purchases.

(2) Packaging supplies are cheap and convenient:

The excessive use of plastic containers is also driven by the cheap convenience of plastic packaging. Consumers can find plastic bags, bottles and cups available everywhere in the market at a low cost. Plastic supplies are popular because of their convenience. Even for parties, people like to use plastic to reduce the clean-up afterward. According to an article from the United Nations Development Program Cambodia, in Phnom Penh alone, around 10 million plastic products are being used on a daily basis, as goods are wrapped, packed and served with plastic each day (UNDP, 2019).

(3) The behavior of the people:

The behavior of people is one of the most difficult challenges to tackle regarding the issue of outdoor trash. People like to use plastic bags, bottles and single-use kitchen supplies, as it is very convenient and has been a practice since those supplies were introduced everywhere in the market.

(4) Lack of enforcement in waste management:

Last but not least, waste management is also an issue. Regardless of the amount of waste from the consumption of goods, outdoor trash should not become problematic if waste management practices properly tackle the issue. In Phnom Penh, the waste collecting company does not operate effectively. From time to time, waste is left uncollected for days (Sahmakum Teang Tnaut, 2019).

Why should we care about unmanaged outdoor trash?

Public Health Effects

Personal and human health is under threat by excessive unmanaged outdoor trash. With waste being improperly disposed of in public spaces, people are directly in contact with germs and micro-bacteria. These bacteria and germs can be harmful and can pollute the air that we breathe in every day. Breathing in the dirty air can cause several issues, such as respiratory illnesses, aggravation of cardiovascular systems, development of diseases such as asthma, bronchitis, emphysema, and possibly cancer (Spare The Air, n.d.). Water pollution can also be

an issue, as wastes can end up the waterstream and pollute and harm those who are using the water.

Aesthetic & Tourism Effects

With trash being dumped uncontrollably on the street, in the rivers and in many other public places, the aesthetics of Phnom Penh can be affected heavily. According to the Ministry of Tourism, in 2018, 4,096,870 international tourists arrived in Phnom Penh International Airport (2018). This large inflow of foreigners is critical to Cambodia's economy, brings about a productive workforce, and betters the economic well-being of families. If this issue is left untouched, trash may be seen everywhere in Phnom Penh, the sidewalk, river and other tourist destinations in the city, leading to a decrease intourism.

Micro-Interventions: Introducing Water Refill Stations

Overview

One of the possible solutions to reduce the number of single-use plastic bottles is to introduce more public water refill stations. Currently, there is a small number of water refill stations in Phnom Penh. However, most are indoors, like in coffee shops, rather than set up outdoors for public use. With more public water refill stations, consumers could use their bottle to refill water when needed. This way only one bottle would be used for an extended period of time and reducing the consumption of plastic bottles.

Justification

As mentioned above, a huge amount of trash in Cambodia is plastic. One of the most commonly used plastic containers are single-use plastic bottles. In Cambodia, the tourism industry alone produces 4.6 million single-use plastic bottles every month (McCormick, 2019). Therefore, one of the most feasible and effective solutions to keeping the city clean is to introduce more public water refill stations to reduce the wastes generated from single-use plasticbottles.

Intervention

However, if we look at the situation in Cambodia, the habit of refilling water is still a challenge. The first reason for that is because there are not many refill stations outdoors, making it inconvenient for people to hold onto their refill bottle as it is hard to find refill stations. To tackle this challenges, more water refill stations should be introduced to the public, and people will be encouraged to use them because of their convenience. Secondly, people are not yet convinced of the safety of the water from the refill stations. Efforts must be made to assure people the water from the stations is safe to drink. In addition, the water refill stations themselves can be set up with the option of cold or hot water, increasing satisfaction of water refill station users.

This policy could be used as an experiment in Phnom Penh City and data could be collected for numerical analyses on the effectiveness of the intervention. The amount water consumed from the station every day could be tracked, enabling calculations on the number of single-use plastic bottles reduced and the users financial savings. If the data shows the water refill stations can reduce the amount of trash from plastic bottles, the policy should also be introduced to other cities/provinces of Cambodia.

Alternative Policies

Besides the use of water refill stations, the following alternative policies are also suggested to tackle the issue of trash outdoors.

1) Reducing waste:

Before looking at how to clean up the streets and the rivers that are full of trash, we should look at how that trash can be reduced in the first place. There are many things that can be done, namely using reusable containers, increasing the amount of refill-shops and changing the behavior of people.

More refill-shops—shops where consumers have to bring their own containers (bags, boxes, bottles) to the shop to refill and get what they need from the store—should be introduced into the market. Even with purchasing a freshly made beverage, consumers can bring their own reusable bottles or cups. If these practices are implemented and well-practiced, Phnom Penh will become a city

with less trash than today. However, to be able to do that, refill-shops and refill stations should be encouraged to join the market. The government could encourage this through providing shop owners with a tax incentive for a certain period as well as reducing their taxes.

Beside refill-shops, it is also possible to reduce unnecessary waste through using reusable container supplies. For instance, many big shopping malls in Cambodia have already been encouraging their consumers to bring their own bags by charging 4000 riel for each plastic bag consumed. However, this initiative can only contribute to a small percentage of waste reduction as it is not as widely implemented.

Other shops could participate in such efforts through providing incentives to those who bring their own bags and encourage others to change their behavior. This could be done by providing shoppers some percentage of discount on the overall purchase if they bring their own bags. The government could help to promote this through providing participating shops and malls with some sort of tax incentive just like with the refill-shops.

2) Waste Control/Management:

Apart from reducing trash, waste management and control is another important solution to take a look at. The government or the Municipality of Phnom Penh should lay out certain rules that people must follow. For instance, for those who are caught misplacing their trash should be fined a certain amount of money. Rules could also be instituted to prohibit people from putting their trash bin in front of their homes and declare them responsible for cleaning the area and the street in front of their houses. If caught violating those basic rules, they would be punished with fines of a certain amount.

Conclusion

In conclusion, there are four main contributors to the excessive unmanaged outdoor trash in Cambodia, including the large amount of unnecessary waste, the cheap price and convenience of packaging supplies, the behavior of people, and the lack of enforcement in waste management. Outdoor trash can harm people's health, affect the aesthetic of Phnom Penh, and discourage tourists from exploring

the city. Therefore, it is crucial to take effective measures to manage outdoor trash. In doing so there are two levels of approaches that should be taken into consideration. At the micro-level, water refill stations should be introduced to the public. Through the provision of many functions on the water refill station (such as providing the option of hot and cold water), the use of plastic bottles or cups will decrease, reducing unnecessary waste. At the macro-level, this issue can be tackled by providing more incentive for people to use their refill bottles, containers, or bags when shopping or through laws and regulations on improper waste disposal. The elimination of outdoor trash is very important as it increases the aesthetic of the city as well as people's quality of life. This is crucial to the city's economic vitality as tourism is a sector greatly contributing to the Cambodian economy. This effort must not be undertaken by only the government or only the people, but rather by a combination of these two actors.

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Chapter 3 | Accessible and Affordable Daycare:

Unlocking Women's Earning Potential

Pichmolika KHIM

Executive Summary

Balancing daycare and income generation is a recurring gendered challenge encountered by mothers around the world, especially in developing countries. Cambodian mothers, in general, have faced a daycare barrier to maternal employment, and have experienced great consequences disproportionately bearing the brunt of unpaid caregiving responsibilities when daycare is either inaccessible or unaffordable.

The absence of accessible and affordable daycare has negative impacts on three groups: parent(s) from low-income families leaving the workforce to become a full-time caregiver; children with the needs of adequate care for their early childhood development; and the government suffering from the decline in annual economic growth due to the loss of labor productivity and national revenue.

This policy paper will propose three policy alternatives:

(1) promote an enterprise-based system,
(2) encourage factory workers to utilize the daycare centers at the factories, and
(3) establish a negative income tax system.

Introduction

Since the earliest days of civilization, females have always been characterized as inferior to their male counterparts. For thousands of years, the patriarchy has

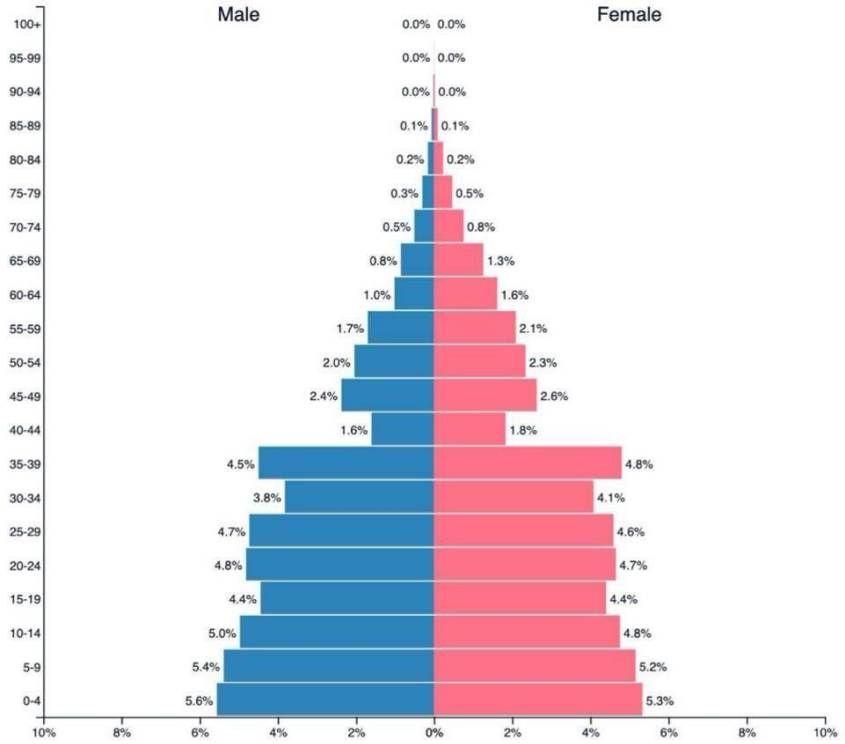
been embedded in every society and has become a foundation for the construction of all traditions and cultures worldwide. The notion of gender inequality has been passed down from generation to generation. The basic roles women and girls are expected to fulfill are cooking, maintaining the household, reproducing, raising the children, and performing other light 'feminine' tasks. These expectations oblige women and girls to carry their responsibilities accordingly. The patriarchy further shapes women and girls' roles beyond the private/household sphere. The disproportionate division of household responsibilities between men and women limits women's opportunities to participate in public life. The absence of women and girls' roles in the public sphere hinders the development of society. Moreover, the under-participation of women and girls will eminently affect their livelihoods which are already at a disadvantage.

Fordecades, despite the tremendous efforts made by the Royal Government of Cambodia (RGC), the Ministry of Women Affairs (MoWA) and partnership organizations on tackling gender inequality, the participation of women and girls in public life has remained insignificant compared to their male counterparts. A majority of women continue to face many obstacles rooted in the stereotypes and expectations towards women. Currently, women empowerment has become an objective in combating gender inequality issues. Women empowerment has appeared in countless forms and various ways, but more often than not, the main focus of women empowerment is on achieving a quota, rather than on tackling the roots of the issues. This policy paper specifically emphasizes on the most crucial, yet commonly neglected barriers to increasing women's earning potential in Cambodia. Daycare is a significant topic of concern for modern Cambodian families.

According to the National Institute of Statistics (2019), the provisional result of the 2019 census shows that the female population makes up 51.5% of Cambodian population. Unfortunately, because the NIS has yet to release the full report of the recently finished 2019 census, the Cambodian population pyramid below is taken from a different source. More than half of the population are females, and a significant proportion of them are of early working age (15-24 years) or prime working age (25-54 years), suggesting a huge number of potential workers within the economy and the opportunity for economic

growth. This development prospect is likely to be hampered by insufficient daycare access which restricts employment opportunities for women.

Figure 1. Cambodia's Population Pyramid (2019)



Source: Population Pyramid 2019. Retrieved from United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2019 Revision.

Background to the Problem

Daycare Context in Cambodia

The Royal Government of Cambodia's responsibility for public daycare is mainly visible through the state's efforts in providing preschool education with maximum three-hour sessions per school day to children between three to six years old. Regardless, Cambodia's public daycare is inadequate. Besides preschool education, the RGC has shown no commitment to public daycare matters, including daycare for children under three years old. The lack of public daycare gives rise to private daycare with high fees, allowing only high-income families to access such resources.

My (2019) states that Articles 73 and 16 of the Constitution and the 2007 Education Law stress the state's role in providing daycare, especially to "women

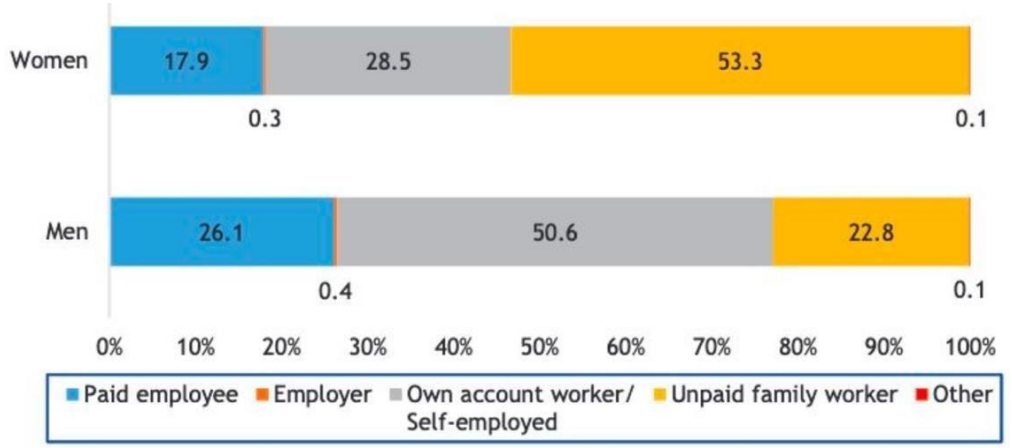
without support who have many children under their care." The National Policy on Early Childhood Care and Development (NP-ECCD) of 2010, the Action Plan of NP-ECCD, and Goals 4 and 5 of the Cambodian Sustainable Development Goals (CSDGs) are the relevant policy frameworks. Together, the policies prioritize one-year preschool educations with daily three-hour sessions and endorse the state's role in caring for children under six years old. Notwithstanding, the state passes on these provisional daycare responsibilities to enterprises under the Labour Law.

The Cambodian Labor Law (1997), Article 186, states "An employer who employs 100 women or more must set an operational nursing room. If an employer is not able to set up a daycare center for children over 18 months of age, then they must pay women employees the cost of providing daycare for their children." The details on childcare coverage outside of the factory are not provided by the Law. Better Factories Cambodia's assessment of factory compliance (2018) indicated that twelve functioning daycare centers were reported during the assessments. Three of those reported the presence of some children. The reasons why factories may not provide care include: (1) additional costs that impede on the marginal profitability of factories and its competitiveness; (2) potential physical harm infants and young children on factory premises; (3) inadequate management of child care facilities; (4) insufficient space on premises; and (5) the risk of accidents when transporting children to-and-from home and the factory. Out of all 395 factories, 166 factories provided a childcare allowance varying between $5-$20/month. Nearly half of those factories paid $5, while one-third paid $10. According to the World Bank (2019), garment workers spend $47-$105/month for informal childcare provided by relatives and friends, which is comprised of a $25-$70 service fee and $22-$35 for children's food while garment worker's salary is approximately $180/month. Therefore, the negligence of public-funded daycare and legal enforcement of enterprise-based daycares are limitations of the above policies, which strongly affect low-income families, especially garment workers and poor women-headedfamilies.

In target 5.4, as part of Goal 5 in the CSDGs framework, UNDP (2016) recognizes the value of unpaid care, domestic work and shared responsibilities within the household. Public services, infrastructure and social protection policies are to be provided to address the work-life balance and promote decent work for women.

The consumption of women and girls' time by household responsibilities hinders women empowerment, participation in the labor force, engagement in economic activity and school attendance. As of 2013, women were doing almost three times more unpaid work than men (National Institute of Statistics, 2013). By 2016, women in Cambodia were doing four times more unpaid care and domestic work than men according to UNDP (2016). Evidently, the gap in the disproportionate share of unpaid work between men and women has widened remarkably in the period of three years.

Figure 2. Employment Status by Gender (2013)



Source: Cambodia Inter-Censual Population Survey 2013

All these frameworks show that public daycare is key to achieving gender equality and rapid development. The absence of daycare threatens to pull out low-income parents from the workforce to become full-time caregivers. Domestic businesses and foreign companies are then faced with inadequate human resources. The annual economic growth is declining due to the loss of labor productivity and national revenue. How can Cambodian youth help alleviate the problem? How can the RGC and organizations (IOs and NGOs) respond directly to the concern? It starts with the actions of individuals to tackle the problem on a micro-level. The government also needs to have a concrete plan and allocate funds for providing accessible and affordable daycare. Support from organizations with sufficient knowledge and resources will be needed as well.

Literature Review

The concept of masculinity and femininity has a consequential effect on the division of labor inside the household between men and women. Generally, there are certain household tasks which are exclusively assigned to women. The traditional responsibilities women are expected to do are childcare and household chores, which are time intensive tasks regardless of household structure and size (Seebens, 2011), while men mostly do work for wages. A time allocation study has shown patterns of increased engagement of women in unpaid care work when there are children in the household, while no significant effects on men at all (Budlender, 2008). Fengdan et al. (2016) highlighted that the time spent on housework increases for both spouses when they have young children in the household, but the wife's time spent on housework increases considerably more than the husband's (89.3 minutes vs. 29.8 minutes).

Ilahi (2000) found a negative relationship between the need for childcare and propensity of adult women to participate in income generating activities. From economic and gender standpoints, childcare is important because: (1) the early years investment into the upbringing of children is critical to their long-term development; and (2) time is usually allocated to childcare at the cost of other activities. The substitution of the time mothers spend on childcare with the time they spend on income generating activities have both short term and long-term consequential effects. In the short term, the lack of accessible and affordable childcare may impact employment rates because mothers are induced to halt labor force activities. In the long run, the lack of childcare alternatives might avert incentive of potential mothers to invest in their education as they may realize that their probability of their future participation in labor force is low, decreasing the accumulation of human capital. Thus childcare is a major constraint to women (economic) empowerment.

The imbalance of shared responsibilities in the household between men and women is not to be understated. If childcare is available, women could acquire more free time to participate in the labor force. This will add on to the family's household income due to the presence of two earners. It is widely believed that couples of two earners provide more resources for their family and are more likely to share the responsibilities of unpaid household activities equally than single-earner couples.

The Impacts of the Absence of Accessible and Affordable Daycare

Inadequate provision of daycare not only jeopardizes the effectiveness of programs designed to increase women's opportunities in income generating activities, but also leads to increased economic stress and longer workdays (Folbre, 2018). This factor undermines the international and national efforts promoting women empowerment. For families in which husband and wife are both income-earners, women are most likely to leave the workforce if an alternative for childcare is not available (Ilahi, 2000). Access to affordable daycare is one of the keys to unlocking women's earning potential.

The absence of accessible and affordable daycare negatively effects early childhood development, especially given the fact that migration in Cambodia is highly prevalent. According to UNICEF (2019), an equivalent of one-fourth of the population is internal migrants, of which 8.3 percent are adolescents between 10 and 19 years of age. Numerous children are being left behind in the care of grandparents who may not be able to provide adequate care necessary for healthy child development. This is concerning, as it is the early years when the brain develops most rapidly and has a high capacity for change, which lays the foundation for health and wellbeing throughout a child's life (World Health Organization, n.d.).

A practical example of free daycare services can be seen in the Korogocho project under Africa Population and Health Research Center (APHRC). According to International Development Research Centre (2017), subsidized access to daycare in Korogocho increased the percentage of working mothers from 48.9% among those without free daycare to 57.4% among mothers with subsidized daycare. The gap between male and female participation in the labour force narrowed by 8.5% due to the increase of working mothers. This public childcare success is a great model to learn from and should be adopted by the Cambodian government.

Micro-intervention

Based on the recurring challenges, statistical data, and a literature review on the matters of daycare and women's participation in labor force, which have been illustrated and analyzed above, this paper makes the following policy recommendations to the policy makers and organizations:

Policy 1: Promote enterprise-based daycare

A) Overview

This policy's main focus is free private professional childcare training. By narrowing the stakeholders, this initiative can be implemented by an individual or a small organization with sufficient funding.

B) Justification

As mentioned above, early childhood development is crucial to children's health and well-being throughout their lifetime. Hence, a part of solving the accessibility and affordability of daycare is both the availability of daycare centers and the professionality of caregivers.

C) Implementation

Providing free private professional childcare training will create incentive for citizens who would like to become caregivers in their respective area. The course is to be provided by private institutions that specialize in professional training. Students who complete the training receive a certificate of recognition as a qualified caregiver. Caregivers can establish a private daycare service at home. They can set up a nursing room that will be suitable for children aged 6 months to 36 months. According to Better Factories Cambodia (2018), an "ideal nursing room", as defined by Helen Keller International (HKI), has (i) basic standard of cleanliness; (ii) functional refrigerator; (iii) internal locking entrance door; (iv) comfortable chairs, ideally recliners; (v) easy access for lactating workers; (vi) breast-milk pump machine; and (vii) informative pictures/posters related to childhood development topics. The cost of building a nursing room is approximately $1,600, with an additional $150 for the equipment within the rooms. Bear in mind this estimated cost is from the assessment of garment factories in Cambodia, installing a nursing room in the house of caregiver probably costs less compared to building a new one.

Policy 2: Encourage factory workers to utilize the daycare centers at the factories

A) Overview

Many factories in Cambodia have a daycare center on-premise, although most are not functional. On top of that, many mothers who are factory workers usually spend half of their monthly salary on informal daycare services provided by their relatives or friends. Combine these two factors, therein lies the solution.

Rather than individual mothers seeking informal daycare services for their children, mothers who work in the same factory can collectively hire professional caregivers to work in an on-premise daycare center.

B) Justification

Primarily, this policy enables mothers to concentrate on work without worrying about their children. Moreover, they will have more disposable income to spend on improving the nutrition of their whole family, especially of the children. At the same time, children can receive the proper care needed for their childhood development.

C) Implementation

Recall the legal provision above: a factory with more than 100 workers is required to have a childcare center. Therefore, the center of this policy recommendation is for individuals to take initiative and propose the idea to factory workers, especially mothers with children under 36 months. Factory workers have the right to request the opening of a functional daycare center if the factory already has one set up. Together they can foot the bill for formal daycare service on-premise, a cost-effective alternative to childcare service.

Policy 3: Establish a negative income tax system

A) Overview

Negative income tax is a form of welfare in which money is given to citizens who have an income below the state threshold.

B) Justification

This policy can help alleviate the financial burden experienced by poor households and give them the funds to provide their children with the proper nutrition and care necessary for healthy early childhood development.

C) Implementation

In this respect, the state will give money for daycare services to households with young children (0 - 36 months) with an income below $400/month. The household income is the total gross income of all members of a household. The rate of subsidy is 50 percent. For every $1 earned below the threshold, the family would receive $.5 to spend on daycare services.

Notwithstanding, it is important to notice that this specific policy alternative requires more attention and research from scholars and policymakers as the concept of negative income tax is still unknown and foreign to Cambodia. It

might become a key solution to many recurring issues around basic services in Cambodia.

Conclusion

Accessible and affordable daycare in Cambodia is a fundamental to enhance women's economic empowerment, which has been overlooked by the government for decades. This policy paper has highlighted the multidimensional structural issues of the inadequate daycare system on Cambodia and how it affects local women, especially young mothers' access to the workforce. The absence of accessible and affordable daycare produces various negative consequences on women, households, and the nation as a whole. More importantly, early childhood development is crucial for children who are the future of Cambodia and are going to be the main source of economic growth in the Industrial Revolution 4.0. For these aforementioned issues, the paper has suggested three different policy recommendations that can be implemented on a grassroots level. These micro-policies will allow researchers or/and entrepreneurs to make a positive impact on the daycare system in Cambodia and help mothers and children from low-income families.

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Chapter 4 | Green Friday:

A Clean-Air Day to Reduce NDC's in Phnom Penh

Muyngim ENG

Executive Summary

What could be more important than breathing?

The expansion of industrial and construction sectors, rapid growth in urban population and the increased use of motor vehicles is contributing to increasingly poor-quality air in major cities, including in Cambodia.

Air pollution not only causes difficulty in breathing, it also contributes to higher rates of death and economic deprivation. It is directly associated with non-communicable diseases including respiratory and cardiovascular diseases which cumulatively killed 7,000 people in Cambodia in 2015 (World Health Organization, 2016). As Cambodia's population grows, urbanization increases and it further develops as an industrial economy, there is a risk that air pollution will continue to grow with harmful implications particularly on health.

Traffic congestion is a visible daily problem in Phnom Penh, which reflects the increasing amount of motorized transportation. If green transportation is not actively promoted, people in Phnom Penh will increasingly suffer from the toxic air.

To tackle this problem, 'Green Friday' is proposed as a social movement campaign which aims to reduce the air pollution in Phnom Penh by encouraging people to use green transport beginning with one day a week by using a motivational intervention called 'Avoid-Shift-Improve-Reward'.

Introduction

Like climate change, pollution endangers the stability of ecosystems and threatens human health and wellbeing around the world. The Global Burden of Disease (GBD) Study reports that pollution was responsible for an estimated 9 million deaths in 2015, while the World Health Organization (WHO) analysis

concludes that living in unhealthy environments was responsible for 12.6 million deaths in 2012 (GDB, 2015; Prüss-Üstün et al., 2016). Pollution contributes to productivity losses, healthcare costs as well as the costs resulting from environmental damages (Scovronick et al., 2015; National Resources Council, 2010a). The nature of pollution has changed as a consequence of a number of factors, including: the uncontrolled growth of cities, rising demands for energy, the global spread of toxic chemicals, progressively heavier applications of insecticides and herbicides and an increasing use of petroleum-powered cars, trucks, and buses (Smith and Ezzati, 2005; Omran, 2005). Consequently, there is a rise in both ambient air and chemical-based pollution.

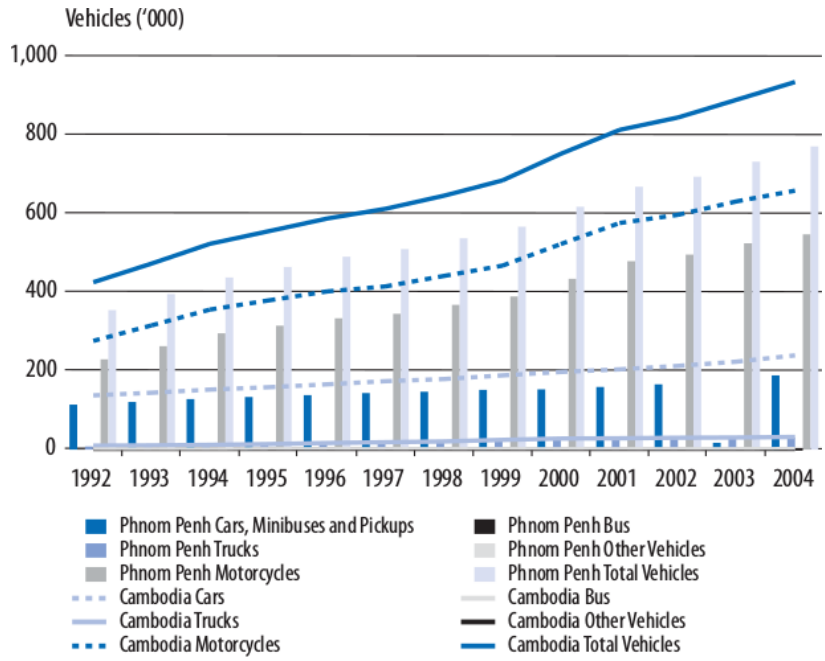
Air pollution is getting worse, especially in rapidly growing cities due to concentrations of economic activity, population, energy consumption, construction activity, and traffic congestion (Wilkinson et al., 2007). It occurs when chemicals, particulates, or biological materials such as sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), leads (Pb), and total suspended particulates (TSP) are introduced into the atmosphere (Choudhary and Garg, 2013). Those pollutants primarily originate from industry, generators, biomass fuel, and transportation. Air pollution creates smog and acid rain, and causes non-communicable diseases including ischemic heart disease, strokes, chronic obstructive pulmonary disease and lung cancer (World Health Organization, 2019).

Background

Neglecting Air Pollution in Cambodia

There are a number of factors that are assumed to have contributed to the issue of air pollution in Cambodia, including growth in industries that are large contributors to reduced environmental quality (for example, construction and logging), the increase in income and resulting lifestyle shift towards larger, luxury vehicles, and the growth in motorized transportation. In 2016, more than 3.2 million vehicles were registered, with motorcycles accounting for 84% of the total registered vehicles (UNESCAP, 2016). In addition, traffickers continue to illicitly import low quality gasoline which contains highly toxic chemical substances such as sulfur and lead (United Nations, 2021).

Figure 1. Motorization Growth in Cambodia and Phnom Penh from 1992-2004[1]



There are two additional failings Cambodia is experiencing with regards to effectively tackling the issue of air quality:

1. **A failure to deal with pollution while developing (Edward, 2008):** While recovering from the Khmer Rouge regime and working towards a middle-income status country, environmental quality has fallen in priority.
2. **Fragmentation of the agendas for environmental health and pollution:** Responsibility for pollution-related diseases tends to fall between the Ministry of Health and the Ministry for the Environment. With no explicit party in charge, actions are often not taken. The separation of public health from environmental protection has also slowed the growth of research on pollution-related disease, leading to the virtual elimination of coursework in environmental health science from the curricula of most medical and nursing schools, therefore impeding the development of environmental health policy (Greenberg et al., 2016).

[1] Ministry of Public Works and Transport (MPWT) data, Phnom Penh Municipal Traffic Police data, and National Institute of Stati stics estimates (NIS). Quoted in NIS, 2015.

Air pollution and NCDs

It is a problem that the full scale of pollution and its contribution to the global burden of disease is not well recognized. Particulate air pollution is associated with severe NCD risk factors, inducing atherosclerosis, increased oxidative stress, increased insulin resistance, endothelial dysfunction, and cognitive function decline (Schraufnagel et. al, 2018). In 2018, air pollution was recognized by the WHO as one of the key risk factors for NCDs, alongside unhealthy diets, tobacco and alcohol consumption, and physical inactivity (World Health Organization, 2019). Ambient air pollution is the second leading cause of deaths from NCDs, after tobacco-smoking, killing 2.8 million people in 2018 (World Health Organization, 2019). The main NCDs associated with air pollution include ischemic heart disease, stroke, chronic obstructive pulmonary disease and lung cancer (World Health Organization, 2019). In Cambodia, reports indicate that 7,000 people died from pollution-related diseases, including NCDs, in 2015 alone (World Health Organization, 2016).

Future trends in mortality associated with air pollution

In the next 35 years, there is projected to be more than a 50% increase in fatalities related to ambient air pollution, from 4.2 million deaths in 2015 to 6.6 million deaths in 2050 (Lancet, 2018). Additionally, air pollution disperses globally as airborne pollutants travel across natural boundaries, continents and oceans (National Research Council, 2010b). Thus, Cambodia both receives polluted air from other countries and disperses locally produced polluted air to neighboring countries.

Micro-Intervention: Green Friday

Overview

In Phnom Penh, the imbalance between the fast-growing number of inhabitants and increase in motorized traffic and the lack of initiatives, knowledge, and investment on urban sustainable development is leading to an increase of congestion, air pollution, and public health risk.

To combat this, a “Green Friday” initiative is proposed. “Green Friday” is an initiative encouraging people to use green transportation. This micro-intervention aims to increase the use of green transportation in Phnom Penh, while decreasing the use of private motorbikes and cars. Green transportation in

this context describes human-powered transportation (walking, cycling, etc.) and public transportation. Green Friday would be a weekly event where Phnom Penh residents commute by walking, cycling, public transport, or e-vehicles.

Justification

Air pollution has been found to cause increases in NCD's around the world. The WHO has acknowledged air pollution as one of the major NCD risk factors, thus combatting it is crucial to achieving SDG 3: *Ensure healthy lives and promote wellbeing for all at all ages* (United Nations, 2021). The proposed intervention of 'Green Friday' can contribute to the decrease in NDC's through acknowledging the issue and promoting positive behavior change.

While noticeable, long-term impacts on air quality are likely to only be achieved through mass intervention at city, country, and even global scales, educational and behavior changing interventions may serve to bring the issue of clean air to the forefront of people's minds and result in greater action towards improving overall air quality.

Implementation

Green Friday aims to promote green transportation among Phnom Penh residents based on the holistic strategy of: Avoid- Shift- Improve- Reward.

- **Avoid:** traffic jams
- **Shift:** to green transport
- **Improve:** the environment and health
- **Reward:** Provide discounted products/services at coffee shops or other businesses

This micro-intervention would be implemented using 4 key steps:

Step 1: Pilot the project

The first step to successful implementation is to pilot this project at a local university by encouraging students and staff to use green transportation.

To motivate the participants to use green transportation, a number of mutual benefits must be provided to incentivize the targeted population. Collaboration with local businesses is key as motivation for participating involves a reward-based strategy comprising of discounts at local businesses. This strategy emphasizes the importance of corporate social responsibility while recognizing

the economic benefits to businesses of promoting a green, clean image to their customer base. Initial potential stakeholders include coffee shops where students and staff go to study or socialize and supermarkets where they go shopping.

Those participants using green transportation will get a stamp from a staff member of the business upon presenting evidence that they travelled by green transportation, for example by parking their bicycle or presenting a time-stamped photo of them travelling by public transport. Each day they use green transportation, they will accrue more points. The more points they earn the more discounts they willget from relevant coffee shops andsupermarkets accordingly.

Step 2: Build a community of likeminded people

If step 1 proves successful, then step 2 begins. The creation of a community can be used to spread the uptake of the intervention – a community allows people with a similar goal to share and learn from each other, while supporting and getting support from other members. With the increased use of social media and the high rate of smartphone ownership in Phnom Penh, communities can be created, fostered, and grown online.

Step 3: Creation of a Green Friday App

Creation of a Green Friday Mobile App would serve to legitimize the project and build a brand that people can identify. The app can provide a space to track green transportation activity and safely store rewards from local businesspartners.

Step 4: Extension of Green Friday into national policy.

Through promoting awareness and encouraging behavior change around green transportation, air quality, and it's links to NDC's in Cambodia, Green Friday could become a key force in influencing policy makers to focus attention and resources on increasing the quantity, and improving the quality of, green transportation. Changes can be small but significant, including the creation of more pedestrian-friendly, smoke-free spaces.

Conclusion

Green transportation is a global trend to make cities more livable in the future by promoting low emissions, low energy consumption, and by reducing pollution.

Green transportation emphasizes the advantages of bike-riding, walking, and use of public transportation. Green Friday is a campaign aimed at increasing the use of green transportation and would be a great initiative for Phnom Penh that would contribute to sustainable urban development efforts.

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Chapter 5 |Physical Activity Friendly Offices Contributing to a Decreased Risk of Noncommunicable Diseases

Marina HUL

Executive Summary

In recent years, the percentage of non-communicable diseases (NCDs) has risen dramatically, seriously affecting human health. According to the World Health Organization, NCDs kill 41 million people each year, equivalent to 71% of all deaths globally (World Health Organization, 2018a). The root causes of NCDs are tobacco use, alcohol consumption, poor diet and physical inactivity (World Health Organization, 2018b). Most people are unaware of the importance of physical activity and its important role in human well-being. Your body structure is made for movement.

Imagine being an office worker, sitting in an uncomfortable room for around 6 to 8 hours straight per day—what could happen to your body? This paper suggests a solution to address this issue.

Introduction

Cambodia is a developing country which faces many challenges and issues, especially the lack of healthcare services and an established education system. However, it is also a rapidly growing economy, with an associated rise in work opportunities. From 2016 to 2017, alone, the number of employed persons in Cambodia increased from 8,608,000 to 10,416,000 (Trading Economics, 2021). At the same time, non-communicable diseases (NCDs) account for 64% of Cambodia's deaths, with risk factors including tobacco and alcohol consumption, air pollution, poor diet, and physical inactivity (World Health Organization, 2018b). The focus of this paper is the NCD risk factor physical inactivity, particularly that amongst office workers.

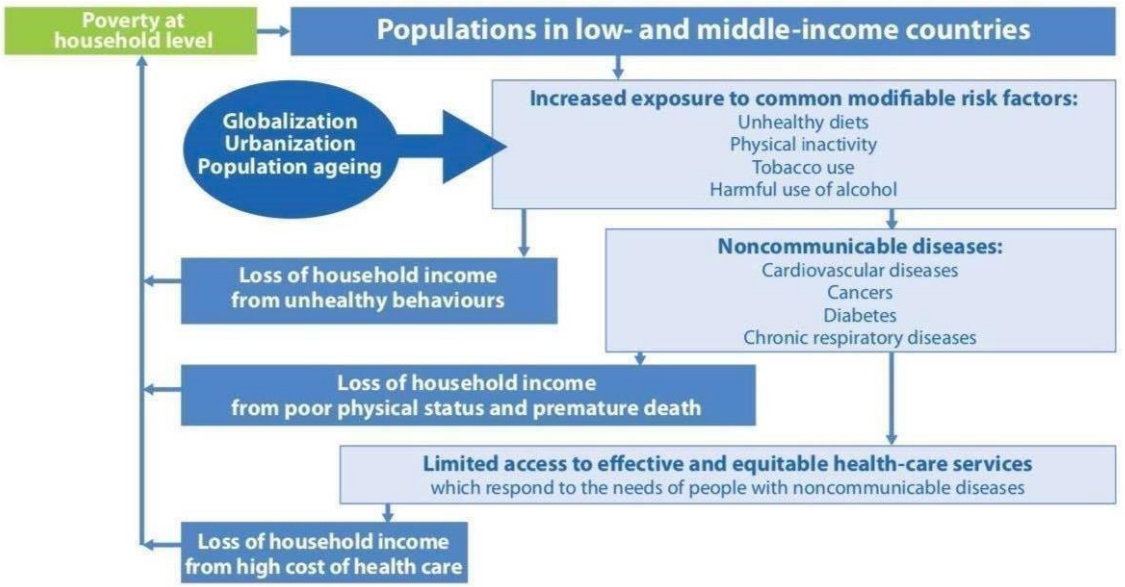
Background

Low- and lower-middle-income nations are expected to see dramatic increases in the burden of premature death and disability from noncommunicable diseases by 2040 (Bollyky et al., 2017). In most geographic regions, these increases will result from large demographic changes such as population growth and ageing that will not be sufficiently offset by the comparatively slower improvement in treating the rates of morbidity and mortality of noncommunicable diseases (World Health Organization, 2016). In lower-middle-income nations, most of the increase in noncommunicable diseases will be experienced by populations aged thirty-five and older (World Health Organization, 2016). In low-income nations, the surge in disability-adjustedlife-years lost to noncommunicable diseases will be experienced across all age groups, but particularly among working-age adults and teenagers (Bollyky et al., 2017). For Cambodia, a focus on prevention is required to manage future risks.

The highest burden of non-communicable diseases relates to four risk factors: (1) harmful use of tobacco, (2) alcohol consumption, (3) unhealthy diet, and (4) physical inactivity (World Health Organization, 2018b). Action to prevent these four risk factors partially lies in non-health sectors, which makes the control of these diseases one of the most powerful examples of the need for multisectoral collaboration, requiring a whole of government and society approach (World Health Organization, 2021b).

Preventing NCDs is important for eliminating poverty because these diseases have a negative impact on productivity, family income, and result in a substantial proportion of household income being spent on health care in low-income countries (Engelgau, 2012). NCDs have a negative impact on national economies and, by association, also on poverty levels (Sturm, 2005). The costs for NCD health care, medicines, the health costs from diseases associated with tobacco and alcohol consumption displace household resources that otherwise might be available for education (World Health Organization, 2011). This problem is particularly acute in very poor families, which have the most to gain from education of their children.

Figure 1. Link between poverty and NDC's (World Health Organization, 2011).



The problem of sedentary behavior

Sedentary behavior causes 3 million deaths each year worldwide (Patterson et al., 2018). Adults who engage in sedentary activity for over 8hrs a day have a significantly increased risk for developing noncommunicable diseases (Patterson et al., 2018). Moreover, people with uninterrupted sedentary bouts of 30 minutes or more have the highest risk for death if total sedentary time exceeds 12.5 hours per day (Diaz et al., 2017).

Office workers are vulnerable to NCDs as a result of their long periods of sitting and reduced rates of physical activity. After adjusting for age and body mass index, the risk of NCDs and cardiometabolic risk factors for office workers was 40% greater compared with those engaged in more active field work (Jalayondeja et al., 2017). In a survey of 2,000 office workers in Britain, 45% of women and 37% of men reported spending less than 30 minutes on their feet at work daily, and more than 50% regularly ate their lunch at their desk (Gallagher, 2015). 78% of the office workers surveyed felt they spent too much time sitting down, and nearly two-thirds worried that sitting at work was negatively impacting their physical health (Gallagher, 2015). Gavin Bradley, from Get

Britain Standing, told BBC News “we're all victims of our environment, we've taken a lot of activity out of the workplace and we're sitting longer and longer…we need new and innovative ways of addressing the issue” (Gallagher, 2015).

Conventional office designs are often unsuitable for encouraging regular physical activity and good posture. However, office design which promotes physical activity, accessible sport facilities, and available time to exercise are three possible ways to encourage physical activity. Within these solutions, strategies include office redesigns to provide enough sunlight to the building, attractive stairs so people are encouraged to use them more than the elevator, and techniques to promote standing (Cooper and Clarke-Cornwell, 2021). To deliver these innovative and effective interventions to addressing the issue, a healthy work-life balance should be practiced. This requires the participation of both the individual and employer.

The rise of physical inactivity

There are a number of factors behind the crisis of physical inactivity amongst office workers. Many employees focus on work and therefore don’t devote time to care for their health. Additionally, conventional approaches to physical activity, such as going to a gym or sport club, are often seen as expensive. However, keeping physically active does not require an expensive gym membership or costly clothing – there are simple, effective ways to stay fit at a low-cost and little time expense with a correctly designed environment. Purposeful outdoor spaces can offer a good space for physical activity; however, Phnom Penh has few areas where this exists. In addition, the polluted environment dissuades people from going for a walk or run, or to use the outdoor gyms dotted around the city. It is imperative that offices in Phnom Penh take steps to increase their employees’ physical activity.

Micro-Intervention: Physical Activity Friendly Offices

Overview

To overcome the issue of physical inactivity in a society that is shifting away from manual labor to other types of work, including office-based employment, the proposed micro-intervention aims to promote physical activity friendly offices via four key alterations:

1: Office redesign

Companies will strive to provide environments that encourage physical activity as much as possible. This is important for worker productivity, and may be achieved in the following ways:

- **Adequate lighting:** allowing for natural light to enter office spaces. Natural light is important for health including for healthy sleep, which can aid in motivation to undertake physical activity (Boubekri et al., 2014).
- **Provide a variety of workspaces:** it is important that seats are ergonomic for the overall health of an employee's posture but staying in one space for a full working day promotes inactivity. Thus, it is recommended that multiple working areas are available, to encourage people to move about more throughout the day. Standing desks are another way in which people can benefit physically from their office environment (Cooper and Clarke-Cornwell, 2021).
- **Stairwell maintenance and design:** Ensuring stairwells are accessible, safe, and well-lit can increase use. Making them attractive through design and decorative aspects including color can also encourage more people to take the stairs than the elevator (Cooper and Clarke-Cornwell, 2021).

2: Access to sport facilities

Ensuring access to sport facilities can be achieved in various ways. In Phnom Penh, working spaces are changing to focus on communities rather than isolated offices. Factory Phnom Penh is one example of this, where there is a focus on shared working spaces and facilities to meet all resident requirements, including a gym. Collaboration between local businesses facilitated by government schemes that focus on access to sport facilities is another way to achieve adequate access.

3: Flexible working hours

Allowing employees to have a more flexible working day can encourage them to become more physically active. Employees may struggle with energy levelspre- or post-workday that discourage them from exercising. In providing increased flexibility, employees may be better able to schedule times for exercise. This not only benefits employees, but employers as well. Exercise can increase productivity in work due to endorphin release and overall better health (Friedman, 2014).

4: Promoting healthy eating

Providing a nice space that is clean and adequately stocked with utensils and fridges can encourage employees to eat more home cooked foods, which tend to be healthier than eating takeaway foods.

Justification

Employees of office-based jobs can spend a lot of their day sitting in one place, often in uncomfortable seats, moving very little until it is time to go home (Gallagher, 2015). As people spend a lot of their waking day at the office, encouraging physical activity in and around office spaces can greatly increase employee health and wellbeing, and reduce their likelihood of developing NDCs.

Authorities such as the World Health Organization recommend that in order to combat NCDs countries should develop preventative programs to manage this emergent health crisis (World Health Organization, 2021a). Programs of action must contain specific objectives, targets, timetables, budgets and monitoring frameworks in relation to specific risk factors (World Health Organization, 2021b).

By promoting collaboration between all actors, policymakers can work with businesses and employers to encourage office design and employment frameworks conducive to active lifestyles. Initially, not every company or organization may support this idea, but the first step would be to find a workplace to pilot this idea and monitor the impacts in order to illustrate benefits to other organizations.

Implementation

There are three steps to developing this project.

Step 1: Office Design

Work with an architect to develop a prototype of a physical activity friendly office space, to be modelled both in 3-D and as a technical drawing.

Step 2: Spread the word

Work with relevant stakeholders to display prototype models at conferences and trade fairs. Also, promote the model to representatives from relevant Government ministries.

Step 3: Pilot the design

After gaining further support, partner with a workplace to conduct a pilot case study. Assist them in their office redesign and monitor changes in employee behavior and health via regular surveys. Share the results with the public to demonstrate the positive effects of office redesign.

Conclusion

The human body is made for movement. Physical activity is one of the most effective ways to maintain people's wellbeing and reduce their likelihood of developing NDCs. The proposed micro-intervention meets this need held especially by office workers, through redesigning office space, providing access to sport facilities, and promoting flexible working hours. As NCDs account for 64% of deaths in Cambodia, it is critical that proactive steps are taken to reduce the prevalence of NCDs in the Kingdom (World Health Organization,2018b).

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Chapter 6| E-Government in Cambodia

Socheata VINH

Introduction

Thanks to the advancement of Information and Communication Technologies (ICT), our lives have been transformed in macro and micro ways. At the micro level, people have access to the Internet through their smartphones and computers to seek information, connect with friends and family as well as collaborate with their colleagues at work. On a macro level, companies can use ICT to take control of their internal communication. Advertising companies have new ways to reach mass audiences. The government can deploy ICT to provide better public services, disseminate information to the public, communicate with businesses, as well as collaborate better internally. It has been a global trend for the public sector to adopt ICTs, in what is called e-governance. According to the UN E-government Survey (2018), which analyzed the scope and quality of online services and the status of telecommunication infrastructure and human capacity, there is a steady growth in e-government globally. The E-government Development Index score for Cambodia has increased from 0.29 in 2014 to 0.37 in 2018 (UN, 2018).

The trend of adopting ICTs in the public sector has occurred not only because of increased availability of ICT devices and internet coverage, but also because e-government yields great benefits. For governments and citizens, e-government can contribute to good governance and reduce corruption by promoting transparency, efficiency and citizen engagement in public service delivery (Rubasundram & Rasiah, 2019). It also supports the availability of public services such as health, education, water and sanitation, as well as sound infrastructure and utilities, which are crucial to build a resilient society, one of the main goals of SDGs (UN, 2018).

Background to the Problem

The state of e-governance in Cambodia

Making public services available to citizens via the internet, which is convenient and low cost, improves transparency, accountability, and efficiency. The application of ICTs in the operation of government institutions decreases transaction times and financial expenses, leading to improved internal workflows and more resource sharing between public sector agencies (UN, n.d.). It also acts as a two-way communication bridge between government, business and citizens. Moreover, providing public services can increase national revenue by encouraging businesses to register and pay taxes.

In 2000, Cambodia set up National Information Communications Technology Development Authority (NiDA) to establish and implement the Government Administration Information System (GAIS) with the objective of compensating for the loss of income from lowering import tariffs upon joining ASEAN (Phu, 2009; Sang, Lee, & Lee, 2009). The core objective of the project is to establish the Electronic Approval System, real estate registration, resident registration, and vehicle registration. All of the services, except the Electronic Approval System, were widely used and fulfilled their initial purpose of generating income for the government in the form of fees and taxes. Despite the increased efficiency provided by the Electronic Approval System, it was scarcely used, and only for technical documents or reports only, while other administrative documents were still handled in the traditional ways (Phu, 2009).

However, other sectors have found immense success in their implementation of e-government. In 2017, the Ministry of Public Works and Transportation launched online vehicle registration—500,000 vehicles were registered through the platform in one year (Sen, 2018). In the same year, the General Department of Taxation announced an e-payment platform for citizens to pay taxes on the department's website, as well as access information about taxation, live chat and call center numbers (Hor, 2017). Although there is no indicator to prove that the online taxation payment platform has increased tax collection, it has saved valuable time and money for citizens and businesses. Moreover, the Ministry of Economy and Finance has written a proposal to establish a one-stop business registration portal which is currently being discussed within the General Department of Taxation (Chea, 2019).

With the support from KOICA (Korean International Cooperation Agency), the Cambodian ICT Master Plan 2020 was established in 2014. There are four key focus areas:

1. Empowering people (providing ICT trainings and promoting ICT literacy and awareness)
2. Ensuring connectivity (building national infrastructure for e-government and improving cybersecurity, ICT-related regulations, and Internet access nationwide)
3. Enhancing capabilities (building a national ICT ecosystem compatible with the global ICT ecosystem, industrializing ICT, developing national standardized bodies, and investing in ICT research and development)
4. Enriching e-services (expanding e-government services, extending e-public services, enhancing e-commerce environment, e-tourism, and e-education) (KOICA, 2014).

One Window Service Offices (OWSOs): Hopes & Challenges

Improving the effectiveness, quality, transparency, and availability of public services to citizens is the focus of the government's Rectangular Strategy. The establishment of One Window Service Offices (OWSOs) and District Ombudsman (citizen offices) are examples of this commitment to enhancing public services. By transferring service provision to local councils, computerizing the process and establishing a clear information center, the public can access accurate information about government policy, which lowers the chances of corruption, and provides efficient and reliable services in a timely manner (Neb,2017).

However, there are still some obstacles facing the operation of OWSOs. As cited in Neb (2017), the Ministry of Interior's National Committee for Sub-National Democratic Development noted that some OWSOs struggle to achieve results because of a failure to educate citizens on OWSOs' services. According to the "Citizen Feedback Cards"—a survey tool used by Advocacy Policy Institute in 2012—although the average expense of some services within construction sector has decreased almost 10 times and the duration of the service has shortened across three sectors, the knowledge of prices, procedures and requirements of OWSOs remained low in all sectors. Moreover, some public servants are unaware of their right to information (Neb, 2017). In the same survey, some citizens

reported their unwillingness to use the service due to the long traveling distance, complicated processes, fear of extra expenses, long waiting period, and a distrust in OWSOs. Evidently, despite the services being provided in a new centralized office, there are difficulties in attracting citizens to use theservices.

Advancements in e-education

Besides the digitization of public services, there are advances in education as well. In 2019, UNESCO, the Ministry of Education, Youth and Sport (MoEYS), and the Ministry of Labour and Vocational Training launched a mobile app (BEEP) for out-of-school youth to study lower secondary curriculum on a flexible schedule (World Education, 2019). Moreover, MoEYS manages a blog, called Open Educational Resources (OER), offering study materials in a digital format for students and teachers from preschool to high school (OER, 2020). The ministries are also working on further projects to digitize information and services in order to educate even more citizens. However, time, human, and financial resources are still needed to develop more concrete and secure infrastructure in e-government.

Challenges in the Cambodian ICT Sector

Even though the government is constantly working on applying ICTs to their systems, citizen participation remains low. According to the 2018 UN E-Government Index, while Cambodia ranked 145 among 193 countries worldwide, it only ranked 171 in the 2018 UN E-Participation Index (UN, 2018).

The availability and accessibility of the Internet is not the reason for low e-participation. One report, *Mobile Phones and Internet Use in Cambodia* (2016), found that at least 48% of Cambodian citizens (15 to 65 years old) own a smartphone which granted them the access to the internet; however, only 37% of the respondents claimed to use the Internet, and more men were found to actively access the Internet than women (48% and 26%). The report also presented the main purposes of using the internet: entertainment (74.4%), news (33.2%) and information seeking (30.2%) (Phong et al., 2016). Because of the increase in variety of smartphone models available, and the ability to purchase increase a smartphone for under $200 (Walker-Todd, 2020), the number of smartphone owners in Cambodia has most likely grown in the three years since that survey.

Despite the high rate of Internet penetration and mobile use, many users only connect to Facebook, not making use of the Internet connectivity to its full potential (Va, 2019). There is also a digital literacy gap between urban youth and rural youth (Va, 2019). To tackle this problem, Smart Axiata, Google and GSMA, with the support of MoEYS and MoPT, have partnered to roll out a digital literacy and internet safety program for more than 1,400 grade 10 and 11 students in Phnom Penh, Kampong Cham and Kampong Chhnang (Kanagaraj,2019).

Micro-implementation

A) Overview

While many Cambodians have internet access, very few utilize the full potential of this connectivity, especially when it comes to e-services. To make it a habit for citizens to seek e-services, this project proposes the creation of a mobile application that provides contacts and emergency-related information for ambulance, police and fire departments.

B) Justification

While Internet coverage in Cambodia is growing, citizens' internet usage and perception of available access to public information and services via the internet remains limited. By looking at the previous study about the implementation of OWSOs, it is clear that it takes time and effort to persuade citizens to switch their habits and use online tools to seek information or public services. Therefore, there is a need to tie mobile and internet usage with the e-services provided by the government and to build trust in e-government solutions. Only then will citizens make it a habit to turn to digital solutions, which saves time and money. As emergency incident could happen anytime, emergency information is important to citizens because it could save lives. Therefore, the tendency of having people downloading and using the mobile application is high.

C) Implementation

The application will have three main parts. The first is a list of contact numbers for emergencies, such as the fire department, ambulance and police departments; the user can call any department by tapping the phone number on the list. Moreover, right after the call ends, instructions will pop up that the caller can follow to take control of the situation before help arrives.

The second part is instructions for less urgent emergency situations (health, crime and fire related) that citizens can handle on their own, for instance, how to help someone who is choking, how to use a fire extinguisher, or how to report missing belongings. The third part would be a map showing places where citizens can ask for help, in case there is no response to the phone call or there is a need to go to the place directly. There will be a function for users to switch between medical centers (public and private hospitals) and police stations.

Even though it is hoped that citizens do not encounter such serious incidents and therefore may not use this application all the time, it will still be recommended to install it on their phones, just in case. Furthermore, they can prepare themselves for the emergencies by exploring the functions of the application and learning the information in their own time. After the development of the application, there will be a Facebook campaign promoting the application to the public, specifically to the people who already have access to the Internet and smartphones.

Conclusion

The advancement of ICTs has enabled its utilization in public sector which brings many benefits to the government, citizens and businesses by easing the communication and information sharing between the three actors. The government has been working on adopting ICTs in providing public services and information through various means. Meanwhile, although the citizens encounter less obstacles in accessing and using smartphones and the internet, they are still hesitant to use the e-public services due to a lack of trust and understanding. Therefore, bolstering citizens' habit of using e-public services is crucial to increase engagement and confidence in the platforms. An emergency mobile application, which provides contacts and emergency-related information for ambulance, police and fire departments, is proposed to initiate this habit-building process. As citizens use the application, they build trust and familiarity with digital public services, boosting citizen engagement in e-governance in the long run.

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Chapter 7|Education and Health:

Working Together for Innovative Actions Against Non-Communicable Diseases in Cambodia

Sophearom CHHEA*

Executive Summary

Non-communicable diseases (NCDs) currently contribute to 71% of global deaths (WHO, 2018a). Risk factors that contribute to NCDs include tobacco use, poor diet, alcohol consumption and physical inactivity. This paper makes a series of recommendations to address these risk factors. Health education may help reduce the prevalence of non-communicable disease risk factors. Tobacco is a leading risk factor which globally kills over 8 million people every year, including many in Cambodia (WHO, 2020). Specifically, promoting smoking cessation counseling among health science students could significantly impact tobacco use. In the long-term, smoking cessation programs should be a required component in health science curriculums. This article outlines a prototype program for such a component.

Introduction

Globally, NCDs have been the leading cause of deaths and major health issues in the 21st century. NCDs include chronic diseases such as cardiovascular diseases, cancers, chronic respiratory diseases and diabetes, and affect both individuals and broader communities over many generations as the result of genetic, physiological, environmental and behavioral risk factors. NCDs affect all ages, sexes, countries and regions around the world representing 71% of all deaths globally and killing around 41 million people each year (WHO, 2018b). In Southeast Asia, NCDs are the top killers and cause 8.5 million deaths each year (WHO, n.d.,a).

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NCDs are preventable. They are associated with four leading behavioral risk factors: tobacco use, harmful use of alcohol, physical inactivity, and unhealthy diets (WHO, 2018a). Consequently, these lifestyle behaviors lead to 4 metabolic changes in the body, namely raised blood pressure and blood glucose, obesity, and raised blood lipid. Air pollution is also another environmental risk factor for NCDs (WHO, 2018a).

Background to the Problem

The Current Status of NCDs in Cambodia

Cambodia is a developing country in the Southeast Asian region with a population of 15,288,489 (Ministry of Planning, 2019). The capital city, Phnom Penh, is located at the confluence of three great rivers: the 'four arms' of the Mekong river, Tonle Sap and Tonle Bassac. It is the largest city in Cambodia with 2,129,371 people or 13.9% of the total population (Ministry of Planning, 2019). Cambodia is rapidly developing but has a lower level of development compared to neighboring countries. Households, especially in rural areas, depend greatly on agriculture and related sub-sectors. Currently, Cambodia faces the threat of emerging NCDs, in tangent with malnutrition and infectious diseases (Ministry of Health, 2013). The majority of NCDs in Cambodia are cardiovascular diseases, cancers, diabetes and chronic respiratory diseases, which are leading to a growing burden on the health care system (Ministry of Health, 2013). Ischemic heart diseases and cardiovascular diseases are currently the top causes of premature death. An ageing population, factors associated with urbanization, unhealthy diets, tobacco use, physical inactivity, and harmful alcohol use are the key drivers of NCDs in Cambodia.

NCDs are estimated to represent 64% of all deaths in Cambodia. They contribute to 24% of deaths from cardiovascular diseases, 14% of deaths from cancers, 4% of deaths from chronic respiratory diseases and 2% of deaths related to diabetes (WHO, 2018a). According to a survey conducted in 2010, 8 out of 10 people in Cambodia had one to two NCD risk factors while 1 in every 10 respondents had three or more risk factors. The people who had 3 or more risk factors were 2.2 times more likely to be men and 1.7 times more likely to live in urban areas; and these trends increased with age (Oum et al., 2010).

Surveys on NCDs conducted in 2004 in two villages in Siem Reap province and another two villages in Kampong Cham province showed that in the rural areas of the province, 5% of adults had diabetes and 12% had high blood pressure. In the semi-urban areas, 10% of the population had diabetes and 25% were diagnosed with high blood pressure. A nationwide survey in 2005-2006 found that 48% of men and 3.6% of women smoked cigarettes. 1% of men and 17% of women chewed tobacco (Oum et al., 2010).

A 2010 NCDs survey reported that 26.2% and 2.9% of population were daily and non-daily smokers respectively. The daily smokers were 10 times more likely to be men than women (49.3% Vs 4.8%). The daily smoking rate was 1.5 times higher in rural areas when compared to urban areas (28.2% Vs 18.1%). The mean age of tobacco smokers was 20.4 years for all respondents. Exposure to environmental tobacco smoke (ETS) in workplaces and homes was more frequent for women than men, and more frequent for rural than urban participants (Oum et al., 2010).

Alcohol is one of the risk factors responsible for the increasing development of NCDs in Cambodia. 63.5% of national survey respondents were alcohol drinkers. 53.5% of total respondents had drunk alcohol within the past 30 days. Men were current drinkers (within the past 30 days) at a rate of 2.4 times that of women. However, women were 1.2 times more likely to report drinking in the past 12 months (Oum et al., 2010).

In the 2010 national survey, fruit was consumed by respondents on an average of 2.6 days per week. This varied from 2.4 days for men to 2.8 days for women, as well as from 2.5 days in urban areas compared to 3.1 days in rural areas. Additionally, the mean of vegetable consumption was 5.3 days. Vegetable intake among men and women was similar and the respondents in rural and urban areas consumed equivalent levels of vegetables. Vegetable oil was consumed by most of the households interviewed (71.9%). Urban households used vegetable oil at a rate 14% higher than rural households (83.2% vs 69.5%). Lard was used by 14% of households on average, with rural households using lard twice as much as urban households (15.5% vs 6.7%). Respondents also reported they take 1.6 takeaway meals per week on average (Oum et al., 2010).

76.1% of respondents in the 2010 survey reported high physical activity, 13.3% moderate activity and 10.6% low physical activity. Women undertook moderate

physical activity at a greater rate than men (15.6% vs 10.9%) and rates of physical activity were higher in rural regions. The median time for physical activity was 4 hours and 4 minutes per day. The activities contributing to physical activity included work (84.9%), transport (11.3%), and recreational activity (3.8%). 11.2% of survey respondents had mild hypertension; the proportion of hypertension was significantly higher in urban areas, among women and increased with age (Oum et al., 2010).

The 2010 survey also found that 1.4% and 2.9%, respectively, were the rates of impaired fasting glycaemia and diabetes. The prevalence of diabetes in urban areas was 2.4 times higher than in rural areas. 20.7% of respondents had high total cholesterol and this prevalence was higher among women, in urban areas and increased with age (Oum et al., 2010).

Why have NCDs risen in recent years?

The 2030 agenda for the Sustainable Development Goals (SDG) are threatened by the high rate of NCDs. The SDG 3 (Good Health and Well-Being) target aims to decrease the premature deaths from NCDs by one-third (WHO, n.d.,b). NCDs have been shown to impede poverty reduction in low-income countries by increasing healthcare costs. Vulnerable and socially disadvantaged people get sicker and die sooner than people of higher social positions because they are at greater risk of being exposed to harmful products such as tobacco, more likely to have unhealthy dietary practices, and have limited access to health services (WHO, 2011). NCDs, in particular, result in lengthy and expensive treatments and the potential loss of breadwinners, forcing millions of people into poverty and potentially delaying development, especially in low-income settings. NCDs impose huge economic costs for low and middle-income countries. Healthcare costs for diabetes in Latin America and the Caribbean are estimated at USD65 billion each year. In 2005, China estimated losses of USD18 billion relating to heart diseases, stroke and diabetes (WHO, 2011). In Cambodia, the government has increased health expenditure from 6.8% of the total budget in 2008 to 7.6% in 2014, for a total cost of USD1,057 million in 2014. 7% of this budget (USD73.99 million) was spent on expenses relating to NCDs (Health Policy Project, 2016). Evidently, NCDs cause severe economic consequences that impoverish families, burden health systems and weaken countries' economies.

What has Cambodia done for NCDs?

Four main conditions—cardiovascular diseases, cancers, respiratory diseases and diabetes—represent around 90% of the NCD burden in Cambodia and 80% of this burden is avoidable (Ministry of Health, 2013). Policy initiatives to reduce the four common risk factors could be made at a whole of population level.

The Cambodian Ministry of Health has initiated the National Strategy Plan for Prevention and Control of Non-Communicable Diseases from 2013 to 2020, focused on the following priorities:

1. Reduce population exposure to common factors by accelerating tobacco control, scaling up alcohol control, promoting healthy diets, physical activity and helping to prevent cases of cancer.
2. Pursue cost-effective detection, treatment and palliative care by providing integrated management of NCDs through primary care, single-visit screening and early treatment for cervical cancer and increasing access to palliative care (central and local).
3. Enhance NCDs surveillance by establishing hospital-based cancer registry, improving data collection on NCDs care and monitoring risk factors through consistent national surveys at regular intervals.
4. Improve NCD coordination across the MoH, develop a national multisectoral action plan for NCD prevention and control, establish a whole of government mechanism to oversee implementation, and finance a fund dedicated to NCD prevention and control from the taxation of tobacco and alcohol (Ministry of Health, 2013).

Policy Recommendation

The Cambodian healthcare system is overwhelmed by more NCD patients than it is able to treat. There is an increase of risk factors in the general population including unhealthy diet and alcohol consumption. As a result, deaths due to NCDs are projected to rise annually. To reduce burdens in the healthcare system and prevent premature death, several recommendations should be considered:

1. Strengthen the implementation of existing effective laws, policies, Prakas and guidelines in the Kingdom of Cambodia.

2. Monitor and evaluate the National Strategy Plan for Prevention and Control of Non-Communicable Diseases and National Multisectoral Action Plan as developed by Cambodian Ministry of Health.

3. Develop laws on food safety and alcohol control in Cambodia.

4. Provide health education and awareness campaigns in the community, school, and workplaces on the impact of tobacco use, unhealthy diets, alcohol consumption and physical inactivity.

5. Provide additional financial support and develop human resources in relevant ministries/agencies/authorities especially the Ministry of Health.

6. Promote physical activity and healthy diets through mass media or social networks and limit the promotion of tobacco and alcohol throughmarketing.

7. Build more bilateral or multilateral collaborations with local and international agencies both in relation to finance and to support development of human resources.

Micro-intervention: Smoking Cessation Program

A) Overview

This micro-intervention suggests establishing services for counseling on smoking cessation at health facilities and providing sufficient education and information for the public on the impact of tobacco use on health, the economy, and the environment. This intervention would not only correlate with the suggestions above, but also with the National Multisectoral Action Plan for the Prevention and Control of Non-Communicable Diseases (2018-2027) (Royal Government of Cambodia, 2018).

B) Justification

Globally, smoking is a leading risk factor relating to NCDs. Tobacco use kills more than 8 million people annually across the globe (WHO, 2020). Tobacco is linked as a causative factor to all of the priority NCDs in Cambodia. Two million Cambodians use tobacco and 42.5% of adult men smoke cigarettes (Ministry of Health, 2013). It was also reported that 1.6 million Cambodian adults (16.9%) aged 15 and older smoked (Ministry of Planning, 2015). More than 50% of the population is exposed to environmental tobacco smoke (ETS) at home or at workplaces, including 47% of children (Ministry of Health, 2013). One of the interventions for tobacco use, as recommended by the WHO, is to educate the

public on the harm of smoking, tobacco use, and secondhand smoke (WHO, 2018a).

C) Implementation

As an educator, to contribute to the reduction of NCD burdens in the health system, the integration of an elective course on tobacco cessation is initiated for health science university students. Health science students are educated members of the population who have access to health information. Their roles are important for NCD prevention as they will be the prescribers and dispensers of medicine and health educators of the future. As counseling for smoking cessation is one of the responsibilities of health professionals, their recommendations will potentially change peoples' behavior relating to tobacco use. Integrating skills on smoking cessation in the health science curriculums will have a significant impact on prevention of NCDs related to tobacco use.

The curriculums of health sciences in Cambodia follow the national program approved by the Ministry of Health and Ministry of Education, Youth and Sports. Skills to educate the public on smoking cessation are not clearly integrated as a full course with specific learning outcomes. Consequently, health graduates are not able to perform this responsibility effectively so as to serve the community. This intervention will improve health science students' knowledge, skills and behavior in particular and reduce tobacco use in general. The intervention is detailed below:

Intervention title	**Smoking Cessation, an integrated elective course**
Location	University of Puthisastra, Phnom Penh, Cambodia
Project goal	Integrate smoking cessation into health curriculums for final year health science students.
Program description	Smoking cessation is an outcome-based program developed to provide a deep outstanding of tobacco use and its risk factors, complications, and strategies for prevention. This course is designed to run for 15 hours and last for one semester. Its outline was developed by a medical expert in health sciences. The formative and summative assessment will be used to evaluate students at the end of the course.
Implementing Agency	Research Campaign team of University of Puthisastra Mr. Sophearom CHHEA, project manager Ms. Muyngim ENG, technical executive Ms. Marina HUL, operational executive Ms. Vichheka PISETH, finance executive
Project indicators	-Numbers of university students who participate in the program -Course syllabus -Teaching and learning materials -Assessment tools -Monitoring and evaluation reports

Implementing Partners	-Policy lab -University of Puthisastra -Ministry of Education, Youth and Sports -Ministry of Health
Project period	27 April 2021 to 08 August 2021
Project participants	100 health science university students
Contact persons	Mr. Sophearom CHHEA, Assistant Dean, Faculty of Pharmacy, University of Puthisastra Telephone: (+855) 86 345 710 Email: csophearom@puthisastra.edu.kh
Course outline (15 hours)	-Epidemiology of tobacco use (trends, effect of second-hand smoke, tobacco-related diseases, benefits of quitting). -Nicotine pharmacology and principles of addiction. -Drug interaction with smoking. -Assisting patients with quitting (behavioral approaches and brief interventions). -Recommended medications for tobacco cessation. -Forms of tobacco (e.g. cigarettes, cigars, smokeless tobacco, and electronic cigarettes). -Impacts for specific populations (e.g. pregnant mothers, individuals with mental health conditions).

Conclusion

NCDs are strongly associated with people's daily behavior: dietary patterns, physical activity, alcohol and tobacco use. Tobacco use, one of current leading risk factors, is projected to increase in coming years (WHO, 2018a). Tobacco use leads to chronic diseases such as cancers, heart diseases, strokes, lung diseases, type 2 diabetes, and more (WHO, 2018a). Currently, over 2 million Cambodian citizens utilize tobacco and more than half of population is exposed to environmental tobacco smoke at domestic or work environments (Ministry of Health, 2013). On average, Cambodian smokers spent around $9.7 USD per month on manufactured cigarettes, while lowest income earners (below $1 USD per day) spent on average $7.1 USD per month (Ministry of Planning, 2015). Smoking prevalence is inversely related to educational achievement, higher among adults with 0-6 years of education (20.5%) than those with 7-12 years (14.2%) (Ministry of Planning, 2015). Generally, providing an educational program to tackle the NCDs burden, particularly tobacco use, aligns with 2030 agenda for the Sustainable Development Goals (SDG), WHO recommendation called 16 "Best Buy" intervention, and National Multisectoral Action Plan for the Prevention and Control of Non-Communicable Diseases (2018-2027). Suggesting a micro-intervention by integrating smoking cessation education into curriculums for health science students will have sustainable and significant impacts on tobacco use reduction in the Cambodian context. After this 15-hour course

running through the whole semester, students will be able to deeply understand and apply the smoking cessation skills efficiently in health facilities and communities.

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Chapter 8 | Digitizing Cambodia's Diminishing Writing Industry

Dalis SAR

Executive Summary

With the rise of technology, the culture of reading books, magazines and newspapers has declined. Readers, particularly teenagers and young adults, are now shifting their attention from books to other media and activities that revolve around their electronic devices. This has seriously impacted authors and writers, and even greater consequences are expected in the future. If the demand for books continues to decrease there will soon be fewer authors. Most importantly, globalization has brought people closer. As a result, English has become one of the most common languages for communication. In response to the influence and domination of foreign languages, Cambodian authors must be encouraged and supported as their achievements are an essential contribution in helping to protect and foster the development of Khmer literature. With that in mind, this paper suggests establishing a Khmer Literature website to encourage Khmer authors to publish online. Readers will be required to pay a fee in order to access content and revenue will be allocated in the form of royalties paid to authors, with a small administrative charge deducted for operational costs.

Introduction

Khmer literature has slowly developed from one era to the next. In the past, it was mainly used for official government purposes. After the period of the French protectorate when the country's education system was restored, many classical literary works were published and the printing system was introduced (Jarvis, et al., 2006). As a result, 48 novels were issued to the public by the end of the French

protectorate in 1953. Meanwhile, from 1954 to 1969 more than 500 novels were released. While these numbers show the huge success of Cambodian literature (Smyth, n.d.), unfortunately this prosperity did not last. When the Khmer Rouge took over Phnom Penh in 1975, many works were destroyed and most intellectuals were killed or fled to other countries. This was a great loss for Cambodia.

By the end of the Khmer Rouge regime, Cambodia began to rebuild all of its devastated sectors, including the writing industry. Although there were some signs of slow progress, the market was not profitable. Many intelligent people, experienced writers, students, and resources had vanished, leaving a largely illiterate population intent on trying to survive. Literacy has become one of the main struggles for the country. Bit-by-bit Cambodia has been able to reduce the illiteracy rate and by 2017, according to the Cambodia Socio-Economic Survey, the percentage of adult literacy for both genders had reduced to 82.5% (Ministry of Planning, 2018).

One hundred and thirty-eight publishing houses now function in Cambodia; however, there are no statistics relating to the number of books that Cambodians read each year. Consequently, there are no precise statistics on the culture of reading in Cambodia (Ban, 2019). Nevertheless, authors now face another challenge: the increasing popularity of social media and online entertainment competing with reading culture.

Background to the Problem

The Decline of Physical Books

From 1980-1991, Cambodia was able to print 441,910 Khmer books. At the same time, the number of imported volumes was about 1.5 times greater, at 674,918 books (Altbach & Hoshino, 1996). Unfortunately, the total number of physical books sold to the public is unknown, but Sipar, one of the largest publishing houses in the country, has printed 2,300,000 books since 2000 (Sipar, 2019). At the same time, due to the small demand from customers, publishers in Cambodia struggle often struggle to even make back the cost of production (Jarvis, et al., 2006).

Factors that discourage authors from writing

There are many reasons why authors hesitate to write and publish, which has

gradually led to the decreasing number of writers in Cambodia. First, improvements in technology, which increases access to information, has directed popular interests, particularly those of young people, away from reading. Through this technological growth, the internet has become a platform of creation, connection, and exploration for billions of users around the globe. According to the Telecommunication Regulator of Cambodia (n.d.), the number of internet subscribers continues to increase every year. From more than 13 million subscribers in 2018 to 16 million in August 2019, almost every Cambodian has access to the internet. Online social entertainment such as social media, online games, e-books, videos, movies, and music have become extremely popular, coupled with a decreased popularity of reading physical books.

A survey on the reading habits of students aged 17 to 25, at the Royal University of Phnom Penh, revealed that their reading sources were 83% books, 67% online news, and 43% school materials only (Nou & Prum, 2016). This is quite concerning, as almost half of the students do not engage with any other reading materials besides those assigned to them. In addition, 67% only read from their electronic devices (Nou & Prum, 2016). While 53% of students spent more than 8 hours a month reading, 17% spent only 1 to 2 hours (Nou & Prum, 2016). Consequently, not many teenagers seem to explore books beyond those required for their studies. This results in less book consumption from youth and explains why most of the target audience for Khmer literature consists of children and elders.

Secondly, writers are underpaid and many cannot earn enough to make a living from writing alone. According to a survey conducted through the Publishing in Cambodia project, only those who work under contract receive wages, while most independent writers do not make any income from writing. Thus, they typically make the decision to sell their work to publishers or printing houses (Jarvis, et al., 2006). Mao Samnang, one of the most well-known Cambodian novelists, earns 1,219,000 riel to 2,033,000 riel ($300 to $500 USD) per novel she writes. However, her earnings have nothing to do with how popular her work becomes. She is paid a onetime fee by a publishing house, which can then print her book as many times as they like. Meanwhile, very few printing houses offer royalty payments. One of these, Neak Meas Printing House, offers authors 500 riel (12 cents) per book, which amounts to about 1,478,700 riel ($360 USD) per printing round, which is usually around 3000 copies. If their work is successful

and is reprinted, the author will be paid per copy until their death. However, such practices that honor authors intellectual rights are rare in Cambodia (VOA, 2008). For the average novelist, regardless of the time and energy they put into their work, their income from writing only covers the most basic daily expenses. This has deterred many talented young authors from writing (Seourn, et al., 2010). At the Royal University of Phnom Penh, while the Department of Khmer Literature has an enrollment of three hundred students annually, most graduates select the field of teaching rather than writing, as they are afraid that they might not survive on such a low income (Khan, 2016).

The third reason deterring Cambodians from pursuing writing careers is the lack of trust in publishers, which is only exacerbated by loose copyright laws. According to the Law on Copyrights and Related Rights, ratified by the National Assembly in 2003, "the author of a work shall enjoy an exclusive right on that work, which shall be enforceable against all persons." Most importantly all writers are entitled to retain both moral and economic rights of their work (Kingdom of Cambodia, 2003). Despite these laws, writers still face insecurity in terms of their work being stolen or republished, and often feel that their rights as owners are abused (Seourn, et al., 2010).

As previously stated, most Cambodian writers sell their work to publishers due to the risk of not making a profit when publishing independently. If writers choose to publish on their own work, they need to front up to 2,033,000 riel ($500 USD) for publishing costs. If they choose to sell their copyrights directly to publishers they receive no future profits or royalties even if their work becomes successful (Ellen, 2013). Moreover, there are doubts as to whether the publishers follow contracts and print the exact number of books agreed upon. A publisher can easily reprint and sell more books without the writer's knowledge (Ellen, 2013).

Micro-Intervention

A) Overview

One promising solution is to encourage authors to put their work online in order to keep up with the increasing trend of online engagement. With the aim of creating a competitive market, trusted and well-established publishing houses, who already have a full understanding of the book industry and an extensive

knowledge of marketing strategies, could design interesting websites where writers could release their work.

B) Justification

Nowadays, writers who publish their pieces on the internet find that it is more convenient, eco-friendly, faster, and reaches a wider audience. In recent years, there seems to be signs that Cambodian writers are trying to participate more fully in this trend. After facing the many obstacles when trying to get a book printed, one writer decided to publish online through Sabay e-novel. For each short story, he received payments of 1,219,000 riel to 2,033,000 riel ($300 to $500 USD) (McPherson, 2014).

C) Implementation

As mentioned above, the e-publishing sector in Cambodia has yet to become competitive. There are few publishers in this field and a current unwillingness to take risks where readership is low. Therefore, it is critical to design attractive, effective websites that can capture the attention of readers.

Currently, there are millions of websites on the internet; however, it is common for users to encounter many problems. Most websites use outdated designs and low-quality images or have too many advertisements on the screen, poorly written content, slow speeds, clickbait, or loose security systems (Garnett, n.d.). Hiring a professional design team is a must, especially when the website involves the use of personal information, such as credit card numbers for paid content. Although it might be expensive, prices come in different ranges, beginning at 406,000 riel to 2,031,000 riel ($100-500 USD) per website. Further upgrade and development of the website can be undertaken once the income revenue stream begins.

Web design alone is unlikely to be enough to captivate readers. Cover design for individual novels or stories must also be considered. The old adage ‘do not judge a book by its cover’ is well known yet somehow still ignored by many. However, garnering readers attention does not stop there. People tend to choose the book that most easily captures their attention and the read the summary on the back. If it suits their tastes then they will make a purchase. The same goes for novel or story covers released online.

While the design is crucial, it is also important to recruit as many writers as possible. The first step is to provide clear contract guidelines, including website publishing instructions and, more importantly, the percentage of their royalties. To attract a sufficient number of authors, it is necessary to pay them an adequate percentage of the revenue. For example, to gain access to a book, readers could pay for each chapter at a proposed cost of 3050 riel ($0.75 USD). If the publishing website takes a 10% cut of the revenue, the author could receive the remaining 90%. Therefore, if the authors are able to publish frequently they will be able to earn an adequate salary per month. For example, if they publish one chapter per week they can earn almost 11,000 riel (a little under $3 USD) per reader in a month. If they can attract 50 readers a month, then they might earn around 549,000 riel ($135 USD) per month. If they have 100 readers they could earn around 1,098,000 riel ($267 USD), while with 1000 readers they could make 10,980,000 riel ($2,673 USD).

To sustain the publishing website and generate more income, some advertising can be added. The website owner can charge a flat rate, which is common for new startups. This allows the advertiser to choose space on the website for a specified period of time at a price agreed on by both parties (AdSpeed, 2010). Moreover, since the website is promoting paid content it might be able to enter into a partnership agreement with a national bank. Likewise, the advertising revenue may allow them to provide additional bonuses to the authors.

Essentially, the website should guarantee the safety of authors' copyrighted work by first, registering with the Department of Intellectual Property Rights, and second, taking firm action against reposting or illegal sharing. Existing laws can be strengthened by simply implementing a properly designed system that ensures proper enforcement. In the past, without such a mechanism, ignorance and the lack of proper practice have prevailed. As soon as paying for content becomes an accepted custom, people will realize how important the ownership of copyrights are for writers.

Conclusion

The writing industry is now being threatened by many factors, but mainly by the third industrial revolution. Technology is slowly diverting attention away from traditional reading practices, and will only continue to do so. Authors and writers

cannot make a dependable income due to the unprofitable market conditions, combined with weak law copyright enforcement and ignorance of intellectual property rights. Fewer people reading results in fewer people writing. This is a huge for concern in the writing industry. In order to boost the culture of reading it is necessary for everyone to become a part of this movement. Little by little the micro-intervention of an online platform for Khmer literature will surely make big changes in the writing sector, changing the perception of writers from low-income workers to talented individuals whose work helps preserve the Khmer language.

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Chapter 9| Fake Online News Content:
Crime in the Digital Age

Chihor NGOV

Executive Summary

Journalism in Cambodia is shifting its direction from its previous version, traditional media, to the online world. As Cambodian society is digitizing itself to catch up with the rest of the world, the way people consume media is changing. The increase of fake content on online websites and social media raises concerns for people who consume news online and the credibility of journalists who provide news content online.

Introduction

In the past, fake news was predominantly spread in the form of propaganda, which was distributed intentionally and purposely. But now, as online journalism is growing and extending its powerful influence on social media users, propagandists are utilizing this new trend to spread fake news. The previous problems of fake news, disinformation, and misinformation, which occurred in traditional media, have not changed their form, but simply changed their medium. Online media itself does not create any new forms of fake content or disinformation, but rather facilitates easier and faster spread of fake news, with a greater reach and a more significant impact.

Facebook stands as the largest social media platform in the world, with 2.41 billion monthly active users all around the globe (Clement, 2019), followed by Google's YouTube, with 1.9 billion monthly active users (Lua, 2019). In Cambodia, there are 8.8 million Facebook users (Ang, 2019) which is equivalent to half of the current Cambodian population (The World Bank, n.d.). As Cambodian society keeps developing, the number of social media users, especially Facebook users,

also keeps going up. Hence, quality news is needed, so that people who are on the internet can be informed correctly and properly.

As the problem grows bigger and bigger, what can be done at the professional level? What can professional journalists do to combat fake news? And how can people, from the grassroots level, protect themselves from fake news?

Fake news is widely spread throughout social media platforms, and it shows no sign of declining. While it is not possible to remove fake content from social media, social media platforms can be used to debunk fake content spread inside the platform itself. This paper suggests that social media itself can be used as a tool to spread media literacy knowledge, in the form of Facebook campaigns that educate people on how fake news or disinformation is spread.

Background to the Problem

Why is there so much fake content on the internet?

The concept of fake news and propaganda is not new to the world of media practitioners, yet most social media consumers struggle to distinguish between fake content and professional news information (UNESCO, 2018).

Social media now plays a crucial role in delivering news information to people. Cambodian citizens now consume the vast majority of their news through online platforms like websites or Facebook pages (Jensen, 2015). When accessing news online, consumers need to be very careful and critical to identify which news content is real and which is fake.

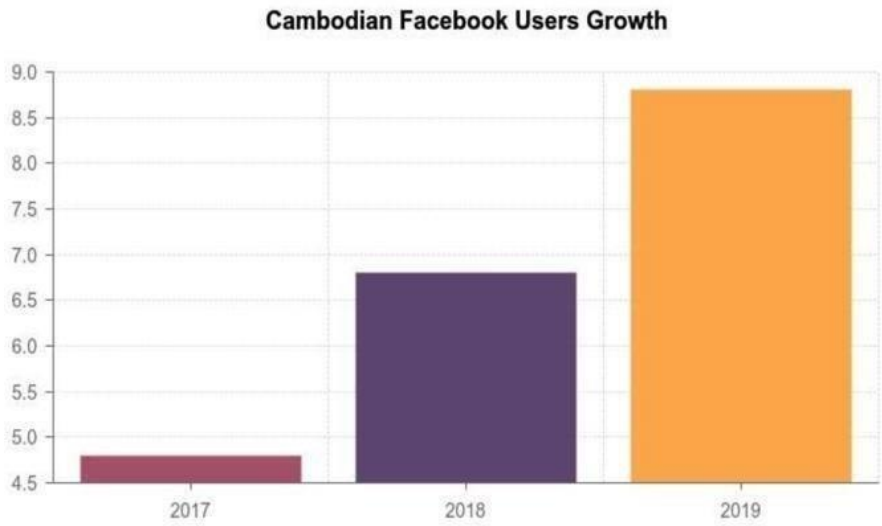
As fake news often adopts the format of professional news content, it is hard for new media consumers to distinguish between the two. A study in the US confirmed that fake information was more popular than real news, and fabricated news was retweeted on Twitter more often than true information (Lazer, et al., 2018). While social media does not create any new forms of fake news, it does help false content spread faster and more easily (Plaisance, 2016).

Why should Cambodia care about online fake content?

The growing social media community

Due to the growth of social media capacity in Cambodia, the market of online journalism has grown exponentially. Moreover, the social media community in Cambodia continues to grow every year. Facebook is the most popular social

networking site in Cambodia and its use among Cambodians has increased immensely in recent years. The number of Facebook users in Cambodia has now reached 8.8 million people, half of the current Cambodian population, compared to 6.8 million users in 2018 and 4.8 million users in 2017 (Ang, 2019). That means the number of Facebook users in Cambodia has increased by 29% in the past year, and by 83% in the past two years.



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As the number of social media users continues to rise, concerns over issues of online propaganda, including fake news and disinformation, similarly increase. Combatting this issue requires effort from every stakeholder— including the government, professional media outlets, journalists, and citizens—to fight fake news on the internet, specifically on Facebook.

Author Opinion: What is the future trend of information distribution?

Online formats will continue to be an increasingly popular platform for journalism and media. Technology allows online journalists, bloggers or propagandists to share their content, whether real or fake, to the public on a greater scale than

ever before. Some traditional media sources will sooner or later adopt online formants, and seek to attract social media, including Facebook, users. At the same time, there are also news outlets that have been specifically created for online audiences. Together, these patterns will most likely result in an increase of online news and a decrease in traditional media. As the internet continues to increase in speed and accessibility, even more people will engage with online platforms. As a result, people will consume online news more than ever, and may believe most content they see and share it with their family or friends.

What are the impacts on citizens?

People make decisions based on the information they have, so consuming false content could lead to serious problems. The Fédération Professionnelle des Journalistes du Québec (n.d.) lays out five different ways that fake news could possibly influence people:

Financial impact: Getting the wrong information may lead citizens to spend their money on the wrong things. Consuming fake content on the internet regarding online shopping leads people to waste their income on useless and possibly unhealthy products (Fédération Professionnelle des Journalistes du Québec, n.d.). In Cambodia, there are a lot of online shops that operate as Facebook pages. Some unauthorized sellers produce their own body lotions and sell them to online buyers. This act not only exploits the buyers' money but may harm the buyers' health as well (Khy, 2019).

Fear: Fake content could create chaos in society and plant fear inside people's minds (Fédération Professionnelle des Journalistes du Québec, n.d.). For example, the current outbreak of coronavirus in China caused chaos in Cambodia because some Cambodian Facebook users spread false information about the presence of coronavirus in the Kingdom. One Facebook user posted a video of a woman, working in the hotel in Sihanoukville, the province where the case of coronavirus in Cambodia was found, passing out and claimed she was infected with the virus. The video went viral cross the country and created fear among Cambodian Facebook users. Later on, the woman in the video clarified that she was simply tired and did not have the virus.

Racist ideas: Some Facebook posts intend to disparage certain races, genders, or religions (Fédération Professionnelle des Journalistes du Québec, n.d.). When

people consume news that contains racist content, it is more likely that they can become racist. For example, during the coronavirus outbreak in Wuhan, China, multiple incidences of racism occurred in France. People in France avoided interaction Asian people in general simply because coronavirus was from China.

Violence: Some fake content uses rumors to attack specific people. When the news goes viral, and is consumed without proper background context, online users can intentionally or unintentionally harass or bully the person targeted by the fake news (Fédération Professionnelle des Journalistes du Québec, n.d.). In March 2018, there was mob violence against a university professor when the Facebook's users accused him of causing a traffic accident. A rumor of the professor hitting a motorbike driver went viral on Facebook, leading a group of motorists to chase after him, and finally, caused a mob to attack the professor, causing serious injury. As published by Khmer Times, what actually occurred was that the motorbike driver was drunk and lost control of himself, then fell off the motorbike next to the professor's car (Buth, 2018).

Political decisions: What would happen if fake news is spread during the national election? Political fake news is very dangerous in terms of choosing the representatives of a country (Fédération Professionnelle des Journalistes du Québec, n.d.).

The impact on professional media outlets

Professional news will be affected as the amount of fake news on the internet increases. As people shift to consume the majority of their news online, professional news outlets and journalists need to publish their work on the internet as well so that people have access to accurate news. However, there are problems in identifying what is credible online news and what is not. As the internet is a free space for everyone, all content can be thrown online without verification, or with very limited fact-checking. This raises questions about the credibility of online news. This concern has led the Cambodian Ministry of Information to propose amendments to the Press Law to combat misreporting (Pech, 2019).

Fake content is written in a similar, but more provocative, way than professional news in order to attract more readership. By frequently encountering fake content, people may come to believe such content is real. This poses a big

challenge for professional news organisations as they fight for accurate and ethical news content in this modern age. They have to work harder than ever to ensure that people still choose to read quality news.

The obstacle of the development

Fake content not only effects citizens at a grassroots level, but also can influence the implementation of government policies as well. When fake news about new government policies is spread to the public, it influences their opinion of such policies. Once people's opinions have been formed, it is hard to change them, even when based on inaccurate information. When public opinion is altered through disinformation, people will react accordingly. Such could potentially influence how the government and other development organizations put their policies into practice. Once citizens acquire a negative perception about a policy, it can be difficult for the government or non-governmental organization to earn their trust back.

Micro-Intervention

A) Overview

The suggested solution is to run a social media campaign to raise awareness about fake information on the internet. The campaign will be run on Facebook, as it is the largest social networking site in Cambodia. The campaign will come in the form of multimedia, including texts, photos, infographics, and videos. This project will last for 2 months, due to the limitations and resources of the project implementer.

B) Justification

This campaign aims to raise media literacy, understanding, and skills among Cambodian Facebook users aged from 18 to 30, as this group of people represents 73% of Facebook users in Cambodia (Ang, 2019). By targeting this population, the project will reach the biggest portion of Facebook community in Cambodia.

C) Implementation

This campaign will use four media formats to educate Facebook users on media literacy skills. The first format is text. Text will convey a short description on how to spot fake content on Facebook. Moreover, text can inform people about fake news criteria through articles explaining how fake news is spread.

The second media format is photography. Photos can illustrate the messages in a more effective and visual way, which benefits those who do not want to read long texts. The photos can be screenshots of fake contents posted on Facebook. In this manner, photos play the role of fake news debunkers. Photos can also be used to show what professional news content looks like.

The third proposed format is infographics, which are a creative way to convey messages to audiences. Using graphic design, media literacy knowledge can be provided to targeted audiences on Facebook, illustrating how fake information is formed and spread.

The final media format to be used in this Facebook campaign is video. The campaign can employ short videos, around one or two minutes, talking about media literacy and how to spot fake content or disinformation. The videos can be interviews with media experts or explanatory videos about media literacy.

Conclusion

While the spread of fake news on social media has become a serious problem, this paper displays it is possible to use social media itself to combat the issue. Equipping social media users with the tools, via a Facebook campaign, to identify fake news or dubious sources empowers them to protect themselves from misinformation. Due to the immense popularity of Facebook in Cambodia, such a campaign is likely to be successful in reaching its target audience and stopping the spread of misinformation.

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Chapter 10|Solar Rooftop Promotion in Rural Areas

Vichet PRUM

Executive Summary

The problem of secure electricity coverage and consumption was a prominent issue in the city as well as in rural areas throughout Cambodia in 2019. Electricity is an essential basic necessity for people and serves as oxygen for the economy. This paper suggests this issue can be resolved by increasing solar power generation and illustrates productive pathways towards increasing the affordability and distribution of solar energy.

Summary Points

- In 2018, 97.6% of Cambodian households had access to an electricity source, of which 71.5% was on the grid, and 26.1% was off the grid (World Bank, 2018).
- For a few months of 2019, Cambodia faced a 400MW electricity shortage due a prolonged regional drought that caused low water levels and impacted the production of electricity in some hydro-electricity power plants upstream along the Mekong river. This resulted in staggered 6-hour blackouts occurring daily in Phnom Penh (Tum, 2019).
- Solar power has been touted as a sustainable means of providing the required electricity to every Cambodian household (Seng, 2019a).
- By 2019, Cambodia had invested in two solar operations, in Bavet and in Kompong Speu Province. The Royal Government of Cambodia has planned to build more solar power operations in Pursat and Kompong Chnang, with a cost of US$116 million (ODC, Electricity production, 2019).

- In order to promote solar panel installment throughout the country, the government should work with related ministries and deliver policy recommendations such as promoting lump-sum subsidies, reducing taxes on solar panels, providing loans via microfinance companies and providing technical assistants from developing partners to rural areas to increase the affordability of solar panels.

Introduction

There are nearly 5 million Cambodians that have no access to electricity and are reliant on firewood or batteries; with the Royal Government of Cambodia aiming to provide full accessibility to all rural areas by 2030 (ADB, 2018a). Most electricity consumption comes from the burning of non-renewable energy sources and from the importation of electricity from neighboring countries such as Thailand, Vietnam, and Laos (Chan, 2017). In Asia, Cambodia is known to have the high irradiation necessary for solar energy generation. This has led to the prediction that within the next few years Cambodia can become a regional leader in the ASEAN sustainable renewable energy market (Seng, 2019b). The Royal Government of Cambodia has introduced national strategic plans such as the Power Development Plan 2030, the Rectangular Strategy, and the National Strategic Development Plan, and has collaborated with related ministries such as the Ministry of Mine and Energy, the Ministry of Economy and Finance, the Electricity Authority of Cambodia (EAC) and other development partners to plan for safe, clean and sustainable energy production in the future (WWF, 2016a). Given the suitability of solar energy for the Cambodian market, the requirement to provide electricity access throughout the Kingdom, and a history of strategizing around energy; how can the government promote rooftop solar panels in order to fulfill the electricity demand in rural areas before 2030?

Background to the Problem

Why is electricity a concern for Cambodian households?

According to World Data, the average electricity consumption per capita in Cambodia is 360 kwh, while a total of 5.86 billion kwh is consumed annually

by the country as a whole (2019). Every Cambodian household pays electricity bills at an average of 720 Riels per kwh (May, 2018). Electricity demand is met by the following sources: fuel oil (1.9%), hydro dams (48.5%), coal fired stations (34.5%) and importation from neighboring countries such as Vietnam (11%), Laos (0.7%) and Thailand (2.8%) (ODC, Energy, 2019).

In April 2019, when the weather was extremely hot, around 1.5 million households in Phnom Penh, as well as in the countryside, faced a six-hour cut off from the grid's electricity supply on a daily basis. This caused a negative impact on business (Khan, 2019). Small household businesses lost a lot of their customers as well as their income due to the issue, while larger businesses had the ability to buy expensive generators in order to maintain their normal operations (Hoekstra, 2019b). As we can see, the electricity shortage negatively impacted the condition and standard of living in Cambodia, entailing that this problem is of high concern for our daily life and our country.

In order to address these issues, the Royal Government of Cambodia and Ministry of Mines and Energy have implemented many plans and mechanisms to fulfill the electricity demand of Cambodians. The Rectangular Strategy in 2013 and National Strategic Development Plan in 2014 have pointed out four priorities for power development: further expanding electricity production, strengthening energy security, ensuring reliable and affordable electricity supply and distribution, and further encouraging private sector investment in technical and economic efficiency. The Electricity Authority of Cambodia has also worked with Electricite Du Cambodge to establish the Rural Electrification Fund in August 2012. The 2012 Fund has two mandates: to promote equitable rural electrification coverage by facilitating affordable, accessible prices for households in rural areas and to encourage the private sector to take part in providing sustainable rural electrification services (EDC, 2013). By 2017, around 336 Rural Electricity Enterprises other than EDC had supplied electricity to off-grid areas by diesel generation (ADB, 2018b). REF also established two programs: the "Solar Home System" in order to facilitate remote rural households' access to electricity and the "Power 2 Poor Program" in order

to provide interest free loans to meet the demand of poor households. 210 households in Koh Kong Province and 47 households in Takeo Province benefited from the P2P program (EAC, 2018).

In Cambodia, electricity is generated from four main types of power stations: hydropower, thermal power, diesel power, and wood and biomasses power. 90% of electricity is generated by hydropower and thermal power (VDB, 2018). There are two coal-fired plants in Sihanoukville and the government has given the green light to invest in a new two-unit coal-fired power plant in Sihanoukville Province (CCA, 2018). There are 7 hydropower plants that are connected to national grid to provide electricity for the nation and the government has recently revealed a plan to construct another hydropower plant in Pursat Province by the end of 2019 (CCA, 2019). In terms of renewable sources, there are two solar facilities located in Svay Rieng's Bavet and in Kompong Speu's Oudong district (Chea, 2019). Besides these two generators, Cambodian firm SchneiTec Co. Ltd was given permission to build three 60 MW solar energy plans in Pursat, Kompong Chhnang and Kompong Speu provinces to help to ease Cambodia from future power shortages (Lipes, 2019).

Micro-implementation

Short Term Solutions

Reducing Solar Panel's Tax to Lower Solar Batteries' Price

To install solar panels on a rooftop costs about $50 to $100 for the panels, with additional prices set by Cambodian solar energy companies for other equipment to connect to the grid. In order to store electricity, solar panels also need battery storage, which are expensive, costing around $400-$600 with a lifespan of 10 years. For the whole country, the government's Solar Home System program will spend an estimated $500-$750 million, based on the market size of existing battery charging stations (Anderson et al., 2015). Solar panels and other components, such as batteries, are subject to VAT. While solar batteries are subject to a 35 percent import duty, other solar equipment has a lower import tax of 7 percent (Perez-Gascon, 2017). Because of this high tax, solar batteries are extremely expensive. If the government reduced this tax, the price would decrease, allowing more

government investment on solar systems and greater obtainment of electricity from solar energy in the future.

Providing Loans for Rural Areas via Microfinance

Since the cost of solar system equipment is very expensive, some households located in rural or off-grid areas cannot afford solar electricity or electricity generated from diesel. Rural Electrification Enterprise has cooperated with international institutions like ADB and WB, and has received loans to invest in microfinance companies that can provide rural households with low-interest rate loans (between 15% to 18% per year) to afford rooftop solar panels (Oung, 2008). If the government works with microfinance companies in order to reduce the interest rate to zero, people in rural areas will be able to afford and install solar panels on their rooftop and receive sustainable and efficient electricity.

Providing Technical Assistance by Developing Partners

With the emergence of many organizations that focus on renewable energy, more developing partners could provide technical assistance to rural households that would like rooftop solar panels. They could assist with some training programs or campaigns to increase the technical feasibility of solar panel installation or they could provide free installations. With the help of these organizations, households in rural areas may be encouraged to put solar panels on their rooftops, helping the government reach its goal of complete national electrificiation by 2030.

Long-term Solutions

Liberalizing the Electricity Market

The EDC has a monopoly over the country's electricity provision market, so they have authority to set the electricity bills as well as supply the electricity. The government should open the electricity market further or liberalize electricity generators, so that other electricity companies will want to invest and compete with EDC in the market. Then, people will have the incentive and the ability to choose any company that provides affordable, accessible, and efficient electricity. Take a look at case of waste management: the government plans to allow 3 or 4 more companies to invest in waste

management, which will limit the monopolizing power of CINTRI, lower the service cost, and lead to more effective collection of city trash (Chan, 2019).

Conclusion

With the four recommendations mentioned above, I believe that solar energy is the only suitable choice for Cambodia's electricity in the coming years, and it might meet the goal of supplying electricity to off-grid areas before 2030. If we wait until 2030 for EDC to expand the grid, people in rural areas will not have electricity access for 10 more years. Moreover, we are not even sure whether EDC can expand the national grid to rural areas by 2030 or not. Obviously, it is crucial to invest in the development of solar power in Cambodia in order to meet the national electrification goal by 2030.

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Chapter 11| Enhancing Youths' Soft Skills Through Up-Skill Project-Based Learning

Setthikun SUN

Executive Summary

While Cambodia is on the path toward a digital economy and is integrating into the global fourth industrial revolution, its labor market still faces issues of skills shortages and gaps in meeting the demands of the business sector. With increasing labor costs and a low degree of diversification, Cambodia may soon lose out to competition from neighbouring countries. Skills gaps and shortages can currently be found in soft skills such as communication, problem-solving, leadership, and critical thinking—topics which have not been part of the existing university curriculum. These skills gaps leave firms deficient and unable to compete fully.

Policy Recommendation: As a means to address the skill gaps especially on soft skills, this paper proposes a youth up-skill project-based learning project to be integrated into the higher education curriculum to enhance or replace the requisite 'major assignment.' The project would allow students to initiate social projects and use the skills and knowledge in their disciplines to guide the solutions or methods of addressing social issues.

Introduction

Dominating discussions at the World Economic Forum, major newspaper headlines, and reports from International Non-governmental Organization is the exploration and analysis of the changing work environment brought about by technology. It began with the first industrial revolution, which put the jobs of those in the handicraft sector at risk. It struck again in the second and third revolutions, threatening those who could not adapt to new technology—a computer-based internet sector bleeding into established traditional industries

such as newspapers, radio, or magazines (Sentryo, 2017). Confronted with these new phenomena where low-skilled labor can easily be replaced by robots, it has been stated that to survive the competition, people need to be equipped with soft skills. "Business Enabler Skills," such as project management, process coordination, collecting, digital design, and analyzing and interpreting data, are essential to the operation of sophisticated machinery, systems, and robots. "Digital Building Block Skills" add strategic value to businesses through management of digital products, programming applications, and robots (Coussin, 2019; Angarwal, 2019; McMurtrey, Downey, Zeltmann, Friedman, 2008).

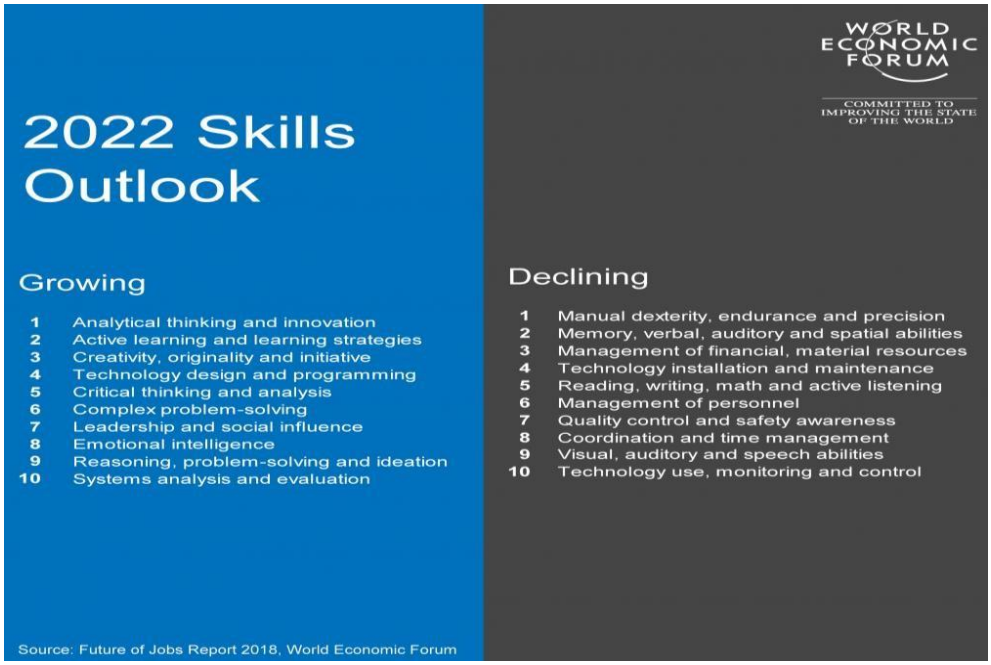
The problem of skills shortages arose from this changing technical environment. With a rush of new innovations and technologies, skills instruction struggled to keep up. Firms demand new areas of expertise that schools do not yet focus on, or the labor markets cannot yet supply. Although it was initially a controversial topic, thinking that it was the result of persistent unemployment, skills shortages were later widely recognized as global issue. The issue arises in situations where, although access to education is available, the educational system clearly does not deliver the qualities needed by the workplace (Bassen, 2014).

Skills shortages or skills gaps are characterized by the inability of the labor market to supply workers qualified to fulfill the demands of employers due to a lack of technical knowledge, information, or mismatched skills. The problem is not a matter of job availability but of supplying employees with the appropriate skills. Finding solutions or alternatives may include new education policies to foster an environment of work-study programs or innovative start-ups to boost soft skills.

Soft skills are perceived to be the major driver of success in the 21st century workplace. Soft skills are non-technical skills which range from adaptability, communication, interpersonal skills, and teamwork, to creative and critical thinking for new innovation and development. The International Labor Organization calls soft skills "core work skills" or "transferable skills" on the basis that learning that can help to improve employability is acquired through social experience outside classes (2013).

The World Economic Forum's (2018) new job outlook for 2022 is now oriented toward these aforementioned traits and less focused on hard skills which can be obtained from academic programs (refer to the chart below). As shown by several social studies, graduate students who are well-equipped with these soft skills are more likely to receive better job offers. They are also found to be more productive, innovative, and efficient, and more likely to develop successful careers. Such people are better able to integrate into the workplace, expand networks, and acquire information and knowledge while demonstrating great leadership or influence (Meeks, 2017; Singh, 2018; Heckman & Kautz, 2012).

Figure 1: World Economic Forum's Future of Jobs Report: 2022 Skills Outlook (2018).



Background to the Problem

An Overview of Cambodia's Economic Setting and Labor Market

In 1993, after the establishment of a legitimate government, Cambodian foreign policy was oriented toward integrating into regional and international markets, reconstructing the nation's image on the international stage beyond genocide, and enhancing diplomatic relations and skills of Cambodians. With such intentions, Cambodia joined the Association of Southeast Asia Nations (ASEAN) in 1999, and the World Trade Organization (WTO) in 2004. Under the framework

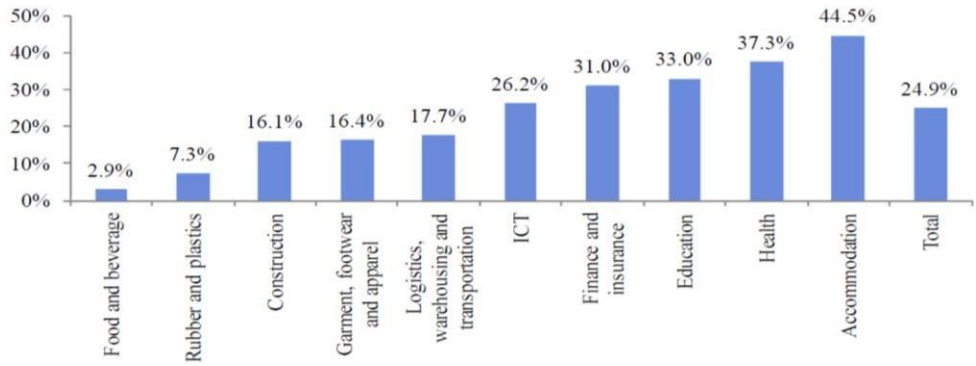
of the WTO, Cambodia received preferential treatment, such as the Generalized System of Preference (GSP) from the U.S., and the Everything But Arms initiative (EBA) from the European Union. This set a favorable environment for foreign direct investment in Cambodia (International Trade Centre, 2015). Thanks to the preferential treatment and tariff reductions on manufactured exports, the industrial sector became a stepping stone for economic growth and development. Industrial policy in Cambodia is highly concentrated on exports, in which garments and textiles are considered to be at the top of the list (World Trade Organization, 2017; Workman, 2019).

Within approximately 20 years of the economic upturn, as a labor abundant country, Cambodia's economic growth derives from the textile, manufacturing, tourism, construction, and agriculture sectors. In 2017, the contribution from the industry sector was approximately 30.88% of the GDP, while the agricultural sector accounted for 23.38% and the service sector for 39.67%. Meanwhile, the industry sector employed 26.78% of the labor force, the agricultural sector 30.77% and the service sector 42.44% (Plecher, 2019a; Plecher, 2019b).

Despite the fact that Cambodia has been heavily dependent on labor-intensive industries for its economic growth, it is considered to be on the right path based on economic theories such as the Heckscher-Ohlin model of international trade or the Ricardian model of comparative advantage. With the discussion of the fourth industrial revolution on the table, labor-intensive countries fear lagging behind the rest of the world which is now focused on using robots to replace human capital, the internet to access data, and the cloud to store the information, data, and reports (Marr, 2018). As described by the UN Resident Coordinator Pauline Tamesis, this changing phenomenon will present a huge opportunity for Cambodia's economic development (UNDP, 2018; Hor, 2018). Now that Cambodia is experiencing a rapid increase in wages, while productivity and competition remain stagnant, new sources of growth must be explored. In response, the Royal Government of Cambodia has modified economic policy to focus on diversification and high-value added industries. Stressed in the Royal Government's Rectangular Strategy Phase III and Phase IV is the quality, competency, and productivity of human resources as a key determinant of Cambodia's competitiveness and long-term economic success (International Relations Institution of Cambodia, 2018). Yet, various perspectives agree,

further concentration, development, and investment in human capital is required to overcome obstacles in the labor market such as pressure for wage growth, skills shortage (refer to the figure below), skills mismatch, and skills gaps (NEA, 2018).

Figure 2: Share of establishments with skills shortages vacancies (NEA, 2018)



Skills Gaps and Skills Shortages: Causes, Impacts, and Types

With the downward trend of garment and textile imports due to the global recession, the long-term sustainability of Cambodia's economic expansion will be highly dependent on diversification and further industrial development beyond the dominant sectors mentioned above. This will lead to a demand for new skills in the labor market.

Although Cambodia is a labor endowment country, the majority of workers have little education or skills, creating obstacles to quickly matching changes in labor demands. Historically, there has been high labor force participation and a low unemployment rate, but youth unemployment is still an issue (International Relation Institute of Cambodia, 2018). This reflects a further need for skills enhancement, economic diversification, and structural transformation for sustainable long-term economic growth.

Skills gaps and shortages have occurred due to huge numbers of poorly educated youth in the labor force. Based on data from the National Employment Agency (NEA), the working population (age 15 to 64) with no educational background accounts for 40.7% of the labor force, while only 14.2% have an upper secondary diploma or above (2018). Even with employment numbers increasing rapidly

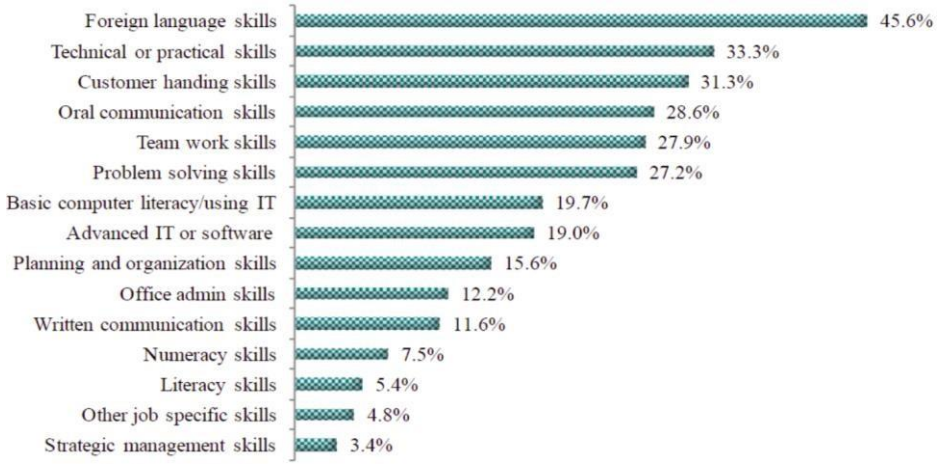
from year to year, the education level of workers has yet to increase. The percentage of the labor force with a diploma has slightly increased, only by 4.6%, between 2014 and 2016 (NEA, 2018). As reported by the Asian Development Bank, the abundant, undereducated young labor force—with only 30% having completed high school— creates a skills gap between the supply and demand in the labor market (causing a skills mismatch), and constrains economic transformation (2015).

From the demand perspective, the major cause of the skills gap is the lack of working experience and commitment. Based on a survey of 73 firms, as of 2011 more than 62% stated that university graduates and vocational training graduates in Cambodia do not have the right skills required in the workplace (Khieng, Madhur, & Chhem, 2015). Respondents also mentioned that, with the weak fundamental skills and low-quality training found in Cambodia, they faced difficulties in the process of trying to up-skill their employees (ibid.). According to a 2017 NEA survey on skills shortages and skill gaps, of the 605 establishments studied, 41.9% experienced skills gaps due to employees being 'new to the role,' while 24.2% of the establishments cited incomplete staff training as the reason for employee's skills gap (2018). There has been a positive trend of establishments arranging trainings for employees to skill-up, but it seems that only 18.6% of establishments had training plans and budgets, while only half provided training in technical skills, customer service skills, and oral communications (NEA, 2018).

Employers pointed out that the top skill shortages in the labor market are mostly soft skills, which includes problem solving, communications, and teamwork, as shown in the figures below (Khieng, Madhur, & Chhem, 2015; NEA, 2018). Such necessary skills can be learnt elsewhere without solely depending on in-house training. In a 2015 CDRI report, besides the technical skills for each job vacancy, employers prioritized and demanded that potential employees have soft skills such as teamwork, communication, problem solving and customer service skills. Statistics in the report showed that approximately 24 percent of the firms surveyed reported that inadequate soft skills in potential candidates was a constraint in fulfilling job requirements (ibid.). Even two years later, as evident in a 2017 NEA report, answers had not changed. Firms still stressed how the lack

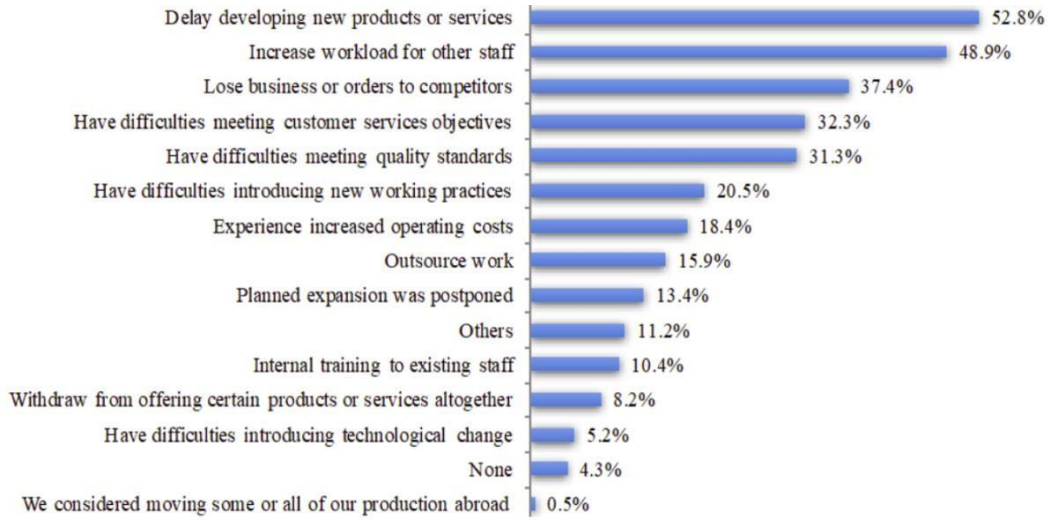
of soft skills among candidates was an obstacle for them to fill vacancies and reach capacity in producing goods and services (NEA, 2018).

Figure 3: Type of Skills Shortage (NEA, 2018)



The impacts of skill gaps are obvious to a certain extent. With skills shortages and skills gaps, firms find themselves in a position of decreased competitiveness as they are not able to deliver goods and services on time or of the quality needed. The development of new products and services, answering customer needs, and the quality of the working environment are also affected by skills shortages. The difficulty in filling vacancies creates a burden and adds to the workload of existing staff. This can cause firms to overwork their employees. With additional overtime payments, operating costs will increase, reducing profits. According to the NEA survey (2018), half of the selected establishments that experienced skills shortages encountered issues such as loss of competitiveness, reduced ability to meet and answer customer needs, inability to provide training due to the lack of budget allocation, lack of qualified trainers, lack of motivation and incentives for employers to join, and the lack of content in training courses.

Figure 4: Impacts of Skills Shortage and gaps (NEA, 2018)



Micro-Implementation: Youth Up-Skill Project-Based Learning

Overview

Project-based learning is the modification of traditional educational curriculum from the lecture-based model to a project-based model, in order to get firsthand experience of the issues discussed. Youth Up-Skill Project-Based Learning is grounded in social responsibility with the idea of repaying society to maintain a balance between economic activity and social quality. It borrows the idea from corporate social responsibility (CSR), in which big firms invest in the communities they make profits from, often by engaging in ethically oriented practices. Project-based learning courses blend social innovation into course assessment and curriculum. It gives students the freedom to initiate projects to address social issues within their own capacity in relation to their major assignments. Using skills learnt and issues discussed in the courses, students initiate small projects trying to solve an issue and become more aware of their impact and contributions to society.

a. Justification

Project-based learning is the best way for students to get hands-on experience, and skills aligned with the top skills (soft skills) needed to enter the job market. By becoming a functioning part of a real-world project students are able to blend

together the concepts, theories, and knowledge acquired in class with real practice that fosters soft skills development.

b. Implementation

Youth Upskill Project Based Learning can be applied by integrating project implementation into the assessment of at least one course per semester of the academic year. This can be achieved through:

Before Project Implementation	
Lecturer	**Students**
1. Firstly, the instructors or lecturers have to modify the assessment of the course major assignment, which is usually comprised of a research paper and its presentation, into the project implementation by requiring students to: ● Write a project proposal, reports regarding the process, fundraising plans, local community engagement assessments, reflections on obstacles and lesson learnt, and present the results of the project.	1. To begin, students must form a team of 10 people at maximum, then brainstorm ideas on the projects that will be related to the major that will require the skills learnt in the course, help to contribute back to the society, and be implementable with limited time and budget.
2. Time and Themes: **. Time given:** One semester. Youth Upskill Project Based Learning will have to happen simultaneously with lectures on different topics and issues.	2. Students visit sites to assess the local situations: **2.1.** Come up with projects to deal with the issues encountered there. **2.2.** Identify target audience or participants.

Within one semester students will be required to: complete the project, write a report, and present the final results. **2.2. Themes of each project for each course must related to their majors:** • International Studies: for instance, for the course of United Nations (UN): System and its Agencies and UN Sustainable Development Goals (SDGs), students may initiate a small project related to a goal of SDGs (for example, fundraising to build a library for primary school in a province as a project to address SDG 4: Quality Education). • History: students may initiate a trip with classmates to a historical landmark, study its history, and create a video to be posted on YouTube regarding the place and its significance. • Media: students may visit different sites in order to study local issues then produce videos interviewing the local people, or publish articles related to the issues, and connect the local people with potential	**2.3.** Identify potential stakeholders, or a list of potential sponsors if applicable. **2.4.** Conduct a risk assessment and risk management plan.

sponsors, stakeholders, and existing projects.	
3. Pre-Implementation Questionnaire: Instructors and Lecturers must hand out questionnaire to evaluate students' skills before project implementation (Communication, Problem Solving, Leadership, Project Management, Time Management, Resource Mobilization, Language Use, Teamwork, and IT skills).	3. Complete a pre-test questionnaire to evaluate Communication, Problem Solving, Leadership, Project Management, Time Management, Resource Mobilization, Language Use, Teamwork, and IT skills.
4. Lecturers instruct students on writing project proposals, planning budgets, and drafting reports.	4. Project proposal: 4.1. Writing project proposal - divide tasks and roles to members and design a team structure indicating roles and responsibilities; draft budget plans; set activity and work schedules; and get approval from lecturer or instructor on the project proposed for the course.
5. Evaluation: **. Overall Evaluation Criteria** is based on the papers and its process (project proposals, budget proposal, presentation, on-going activities journals, teamwork, take home exams, presentation, project outcomes evaluated	5. After the evaluation from lecturers on the project proposal, budget proposal, and activities and work schedules, students will have to make adjustments to the project to ensure it is feasible to implement with the given time and resources.

against project objectives, and project delivery). **. Evaluation of the project proposal** determines whether or not the project is feasible within the limitations of time and resources.	
6. Lecturers plan University networking sessions to match students with stakeholders and facilitate the project implementation.	6. Connect with stakeholders - Conduct fundraising for a small budget to support the project implementation and members during project implementation.
During the Implementation	
1. Follow up with project implementation and provide advice and consultation when necessary.	1. Keep individual journal on the progress, reflections, obstacles, problems encountered, solutions, and lesson learnt.
2. Propose short group meetings throughout the semester, (every two weeks, or monthly) to enable the teams to share their successes, challenges, and concerns.	2. Write team report (minimum of 2000 words) regarding the entire project process, fundraising, local community engagement, obstacles encountered, and lessons learnt.
After the Implementation	
1. Arrange for evaluating presentation with stakeholders present to provide comments and criticisms.	1. Submit the team report.
2. Evaluate the performance – objectives against the result.	2. Make a presentation. Present to stakeholders and address responses.

3. Conduct a post-implementation questionnaire.	3. Complete an after-project questionnaire on skills.
4. Propose points of improvement.	

Conclusion

The changing economic phenomenon defined by progressive development of technology, globalization, and digitalization demands Cambodia to maintain its dynamic and competitiveness in both local, regional, and international markets to sustain economic development. With Cambodia's economy's heavy dependence on a cheap and abundant low skills labor force, it will soon lose its competitiveness in comparison to neighboring countries as wages continue to increase, coupled with arising obstacles to firms' growth and expansion via skill shortages and skill gaps. Skills in high demand but low in supply in Cambodia's labor market are soft skills, which include leadership skills, communication skills, problem-solving, and critical thinking. The integration of youth up-skill project-based learning into educational curriculums might be a solution to enhance the human resources available in the labor market. This initiative will allow students to put the concepts and skills they learn in class into practical use by designing and conducting a project to address a social issue distinctively related to their majors. On one hand, students will obtain soft skills through drafting a project proposal, budgeting resources, working in a team, dealing with different stakeholders, and filling leadership roles. On the other hand, the projects will also contribute to the students' social development and enhance their hard skills. Cumulatively, the benefits of implementing an up-skill project-based program for youth will multifacetedly strengthen Cambodia's future labor force, upholding its competitiveness and building its resilience as it faces the transformations brought by the industrial revolution.

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Chapter 12| Addressing Educational Mismatch in Cambodia through a Digital Platform

Somaly SOEUN

Executive Summary

While the quality of education has somewhat improved over the last decades, Cambodia still faces many challenges, one of which is educational mismatch. Even though the number of university graduates is growing year by year, the skills and knowledge they obtain do not always match the growing market requirements. This issue arises because of the lack of information regarding jobs and market demands. As a result, students tend to choose the wrong major which is not compatible with their skills.

Policy Recommendation: It is recommended that an online digital platform be created where students can find information and advice on choosing an appropriate major at university to help mitigate the problem.

Introduction

The darkest period of Cambodian history, from 1975-1979, completely destroyed whatever form of education the nation had. However, once peace was achieved, Cambodia saw its education sector improving alongside others. By 2013, there were 207,000 students enrolled in higher education (MoEYS, n.d.). While this achievement is encouraging, it is not perfect. The improvement in education brought unintended consequences, such educational mismatch—an issue that already exists in the developed countries, and is becoming more evident in Cambodia (Sam, 2018). To prevent

further exacerbation of this problem, a solution needs to be adopted as soon as possible.

The term “educational mismatch” can be defined in many different ways. For instance, Sam (2018) distinguished between horizontal mismatch, which is the mismatch of an individual’s skills obtained through education and the skills needed by employers, and vertical mismatch, which refers to over-education. On the other hand, Allen and van der Valden (2001) identified the terms ‘educational mismatch’ and ‘skill mismatch’ as two different concepts. They stated in their findings that the two things are not necessarily related (Allen & van der Velden, 2001). Most other studies, however, focused more on over-education and its effect on the economy or individuals. Their definition of over-education is quite simple: it means individuals obtaining more education than needed to fulfill the job requirements (Chevalier, 2001; Dolton & Vignoles, 2000; Tsang, 1987). In this paper, the issue of educational mismatch is examined as both skills mismatch and over-education.

Background to the Problem: Educational Mismatch and its Consequences

Educational mismatch is not widely regarded as an issue, especially among Cambodians. However, this problem is not something that should be neglected, as it can bring about various consequences. According to the OECD, the issue of mismatch is critical (OECD, 2009). Also, the assumptions that it is important to secure a match between the features of jobs and individual capital have already been supported (Allen & van der Velden, 2001). Correspondingly, it was found that the number of graduates in the United Kingdom who received too much education in comparison to their jobs was as much as 40% (Chevalier, 2001). Additionally, there is research showing that over-education occurs transnationally (Capsada-Munsech, 2017). These research studies illustrate that educational mismatch is indeed a problem needing attention in a timely manner. The problem exists not only in the United States, the United Kingdom and other developed nations, but also in developing countries such as Cambodia. According to Sam (2018), 35.43% of Cambodians are over-educated, and 33.25% are working in a different field from their education.

Educational mismatch, especially over-education, can impact an individual's status in a social context, produce job dissatisfaction, counterproductive behavior, lower wages, and lower work input, resulting in lower output for firms (Allen & van der Velden, 2001; Capsada-Munsech, 2017; Chevalier, 2001; Dolton & Vignoles, 2000; Sam, 2018; Tsang, 1987). Allen and van der Velden (2001) found that wages are greatly impacted by the educational mismatch; likewise, job satisfaction and on-the-job searches are affected by skill mismatches. Recent graduates may need to spend a lot of money to back to school because of educational mismatch (Dolton & Vignoles, 2000). In the same fashion, a research study by Chevalier (2001) claimed that over-educated graduates' earnings can be 5% to 26% less than well-suited graduates. This was confirmed by Dolton and Vignoles (2000), who demonstrated that vertically mismatched individuals receive less payment than their counterparts. Equally important, an 8.35% decline in production at businesses was found to have been influenced by just one year of excessive education (Tsang, 1987). We can see that educational mismatch impacts many aspects of individuals' performance, not to mention unavoidable effects on the productivity of firms and nations. Therefore, we can say that this problem must be given attention.

Micro-Intervention

A) Overview

One of the addressable aspects of this issue is the lack of information about major selection among high school students. In today's context, the best way to approach youth is through the use of technology; therefore, a software application or website that provides thorough information about university majors should be created to ease the process. Students can then make decisions without exposure to the risks caused by a lack of data.

B) Justification

If neglected, the issue of educational mismatch can lead to harm to individuals, firms, and even countries. Cambodia as a developing nation has begun to face this problem. Therefore, to address this issue in terms of easing the lack of information for high school students before making decisions about their academic journey, a software application should be created to give them a chance to find out more about choosing an appropriate university major.

C) Implementation

1) Structure

The application will be divided into five different platforms: “home”, “search”, “discussion forum”, “profile”, and “setting.”

In the “home” timeline, users can browse to see such content as an article about the university, a video clip, or graph showing data related to a specific major. The content is posted only by the universities. Users can click on a specific University profile from the timeline to see more about each institution, or they can click on a selected major to learn more about it.

Alternatively, users can also search for universities or majors in the “search” platform. If they search for a specific school, they will be shown its profile, which includes the description of the university, and links to different information, such as majors, fees, location, requirements for enrollment, and so on. If searching for a specific major, they will be shown two different links. The first is about the history of the major, specifically how and when it was introduced to Cambodia’s higher education system, and its significance in contributing to the development of the nation. Also, the link will provide the possible career path for graduates who choose this major. It will also show the statistics on the number of students who took this major and their employment rate (if possible). A graph comparing this major to the overall enrollment and employment rates among all majors will be illustrated alongside the table. The second link will provide the users with all the schools that have that particular major in their curriculum, with direct links to the course description of the major, provided by each university.

The next platform is the “discussion forum,” which can only be accessed by students. On this platform, they can post questions about university majors or other concerns and engage with other users who will provide answers. Questions with many replies will be pinned, and a small “search questions” section can be used to enter specific keywords in order to search for questions that have already been asked. This platform allows students to interact with one another and help each other become a better part of society. Also, it lets students get realistic information from those who have already experienced

the university application process. It can also ease students' anxiety over application process for university enrollment or entrance exams because students can ask others about the requirements and where to go to apply for a specific major.

The fourth platform is the users' "profile." Here they can enter personal information, such as their name and schools they have attended. The confidentiality level of this information is set by the users themselves and they can choose whether or not to share it. In addition, their profile will consist of the items they have marked as "favorite," such as articles or videos posted by the universities or questions from the discussion forum. This material can be sorted into different folders, which only they can access, unless they elect to share the link with others. Also, students can access their "history" to find items they posted or searches made from their profiles.

Last is a "setting" icon, where users can adjust their privacy, block what they do not want to see, select themes for their application, choose whether or not to receive notifications, or even remove their accounts, and so on. The setting focuses on two aspects, the first being the application itself, and the second being the content profile of the students.

2) The Support

The application will compile the data from different universities in Cambodia. This data may include information such as the location, school facilities, available majors and their fees, statistics about the majors, including number of enrollments and number of graduates, and the possible career path for each major as recommended by the universities. The universities will be likely to provide the data for these reasons: (1) the data is not confidential as it is already available on the school website and other publicly available literature,
(2) it is another opportunity to advertise directly to the students, (3) as a fair platform for different universities competing to attract students, they will not want to pass on the opportunity to present themselves among other schools.

In the first few months, universities will be provided their accounts free of charge, as part of an initial pilot program. However, in order to sustain the application financially, monthly fees will eventually be required in order to continue promoting themselves and engaging with students.

3) The Audience

The target users of this application are mainly high school students, specifically those in grade eleven or twelve or those who have recently graduated, as they are the largest group concerned with career decisions and prospects for the future. It also might be used by parents or teachers who take part in the decision of choosing a major with their children or students. University students are also partly targeted as they can share their experiences with the next generation of students. The application is of course free of charge for users.

Conclusion

If neglected the issue of educational mismatch can harm individuals, firms, and even countries. Cambodia, as a developing nation, has begun to face this problem. To address this issue, this paper proposes the creation of a software application to provide essential information to high school students as they plan for the next steps in their academic journey. This will increase the likelihood that students will choose an appropriate university major, reducing the prevalence of educational mismatch.

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Chapter 13| Food Science in Cambodia

Kosal NITH

Executive Summary

People who live in rural areas rely on agriculture, but every year, the value of agricultural produce drops or lacks buyers, causing some farmers not to harvest their crops. Development of the food industry is essential to solve this problem. This paper examines how the development of food science, the role of R&D in the promotion, and development of the food industry could positively impact the agricultural sector.

Introduction

Agriculture has contributed significantly to Cambodia's economic growth since the fall of the Khmer Rouge regime. While its contribution to GDP has declined over time, it remains a crucial component of Cambodia's economy, accounting for about 33.5% of GDP in 2009, decreasing to 28.9% in 2014, and declining further to 22.5% in 2018 (Figure 1). However, agricultural income relative to GDP has increased overtime from 14,420 billion riels in 2009 to 20,985.7 billion riels in 2017 and 21,912.6 billion riels in 2018.

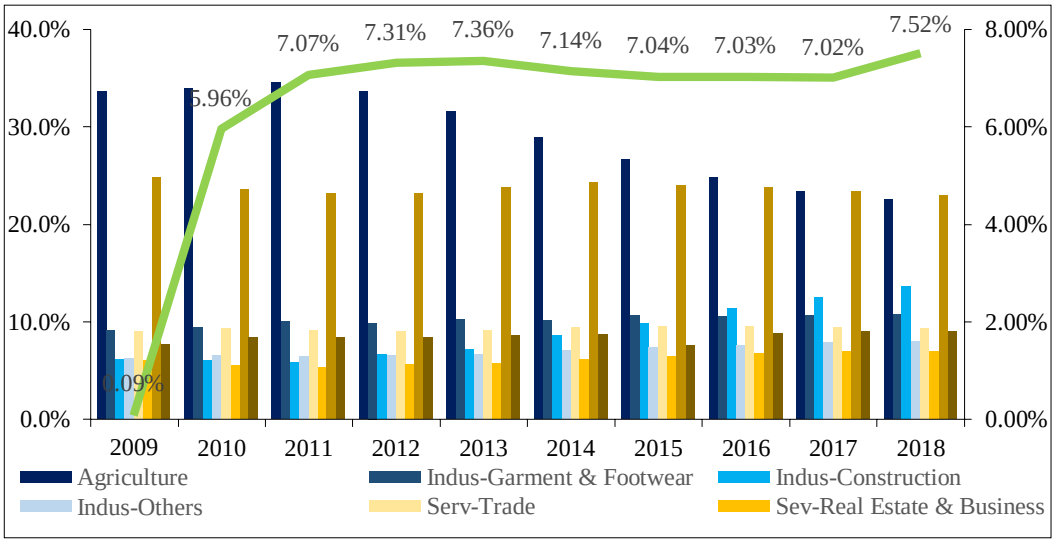
The agricultural sector continues to contribute to Cambodia's economic development and the products of this sector are increasing year after year. However, some farmers experience a lack of demand for their product, leading to products either rotting away after not being bought or being purchased at low prices that make profit nearly impossible (Bundet, 2019; Cheivy, 2019; RFA, 2019). In response to this, government officials continually blame farmers' ignorance of market demand, yet fail to provide a practical solution (Cheivy, 2019; Tum, 2019).

This problem has persisted without any sign of a practical solution. Should the government continue to maintain the situation or make steps towards change?

However, what can be done to address the surplus market and non-quality products other than the sale of raw agricultural materials to local and international markets? Usually, the deal of raw materials is cheaper than the purchase of semi-finished products or finished products. To increase Cambodian farmers' profits, agricultural raw materials should be transformed into semi-finished products and finished products (i.e. processed foods). The development of processed foods requires the use of food science and creative innovation. Food science is the basic and applied science of food. Its scope starts at the overlap with agricultural science and nutrition and continues through the scientific aspects of food safety and food processing, informing the development of food technology (Floros et al., 2010; Potter & Hotchkiss, 2012).

Should the government consider promoting food science? Yes. Applying food science techniques in Cambodia and developing a processed food industry will increase the economic viability and resilience of the agricultural sector. To achieve this, more significant support for food science projects and research from the government and donors will be crucial.

Figure 1: Percentage Contribution of Leading Sectors to Cambodia's GDP in 2009-2018



Source: Ministry of Economy and Finance, 2018

Background to the Problem

Why Food Sciences?

There are many reasons why food science is fundamental in the Cambodian context. Finished products are more profitable than intermediate products and raw materials. Prices within agricultural production are twice as low as prices within the global food industry (Urban, 2014). On the supply side, agricultural production has increased over time (MAFF, 2018) but prices remain a severe challenge for farmers. In fact, in the case of Bavel district, Battambang province, farmers let cucumbers rot due to extremely low prices (RFA, 2019). In the case of rubber, while prices increased from 2012 to 2016, the have been falling since the end of 2017 (Bundet, 2019). Additionally, the markets for Cambodian farmers are not well established. For example, each April mangoes ripen all at once across Cambodia, skyrocketing past a demand that is already consistently met by imports from Vietnam and Thailand (Cheivy, 2019). Improving food science is essential to create a new demand for agricultural products combatting their trend of decline.

Many farmworkers have moved into other sectors, creating a noticeable reduction in the agricultural labour force. In 2009, agricultural employment made up 57.6% of the total labour force. Since then, agriculture's contribution to the total labour force has only consistently decreased. In 2010, it dropped to 52.4%, in 2013 48.7%, in 2016 36.4%, and by 2019 it had fallen to only 30% of the total labour force. Meanwhile, the labour force in the industrial sector was only 16.9% in 2011 but increased to 19.9% in 2013, reaching 26% by 2019. The service sector workforce was only 37% in 2016 but rose to 42% by 2019 (ILO, 2019). Migration from rural to urban and overseas areas has only increased due to the decreasing economic viability of agricultural pursuits. The promotion of food science is way to reverse this pattern by creating more financially viable jobs for farmers.

On the demand side, humans need food security. Access to sufficient amounts of safe and nutritious food is critical to maintain and promote good health. Health needs have led people to prefer organic foods that are consistently available, reasonably priced, fresh, and taste and look good (Shafie & Rennie, 2012). Unsafe food containing harmful bacteria, viruses, parasites or chemical

substances can cause more than 200 different diseases—ranging from diarrhea to cancer. Around the world, an estimated 600 million people—almost 1 in 10 people—fall ill after eating contaminated food each year, resulting in 420,000 deaths and the loss of 33 million healthy life years (WHO, 2019). Evidently, food security is significant for humanity. Improving food science with food safety and quality in mind can ensure food security.

The Cambodian agro-processing sector is still underdeveloped, and there are therefore many investment opportunities ranging from research and development to transport and marketing. Currently, the industry is dominated by micro, small and medium enterprises (MSMEs), which hold an 80% market share.

The Consequences of Not Developing Food Sciences in Cambodia

Long-term economic growth and sustainable development depends on an increasing demand for manufactured products (Acevedo, Mold, & Perez Caldentey, 2009). Therefore, development of the food sector may be a favourable solution for the agricultural demand and supply issues in Cambodia. Many researchers in the food processing industry have highlighted the strategic role of food processing may play in the export markets developing countries in the context of globalisation (Wilkinson, 2012). The demand and supply of food products are contributing to an ever-increasing level of competitiveness (Sarkar & Costa, 2008).

The effects of economies of scale, the new competitive environment, minimum quality and non-traditional perspectives are the opportunities and challenges faced by SMEs in food processing and related activities. At the same time, the integration of new businesses and new players in existing SMEs, through technical and technological advancements, boosts food production (Wilkinson, 2012). Many researchers believe that the future of the agricultural system and food science will be mainly affected by the trajectory of population and demography, the accessibility and type of energy resources, and the effect of climate on available land, water, and air quality (Malik et al., 2009).

Contemporary food science has contributed significantly to the success of this modern food system by integrating biology, chemistry, physics, engineering, materials science, microbiology, nutrition, toxicology, biotechnology, genomics,

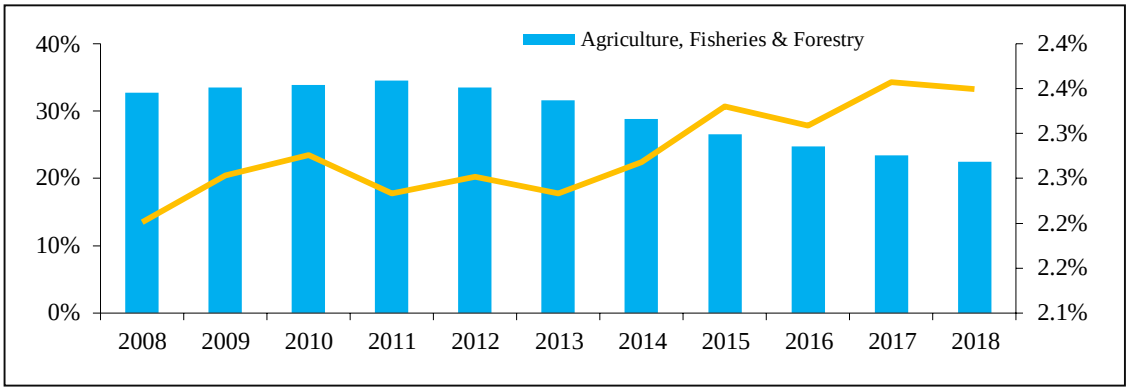
computer science, and many other disciplines to solve severe problems, such as resolving nutritional deficiencies and enhancing food safety (Burda, 2012; Floros et al., 2010; Sarkar & Costa, 2008).

The Food Industry in Cambodia

Cambodia is a rice surplus country and also exports products such as natural rubber, cassava, palm oil, maize, sugar cane and fish. It estimated that Cambodia imports 60% to 70% of its vegetables to meet domestic demand, primarily from Vietnam. While fruit, milk and dairy products, livestock and poultry are produced locally, the majority of these products consumed within Cambodia are imports from neighbouring countries. Crops, livestock and poultry, fisheries, forestry and logging are the main sub-sectors contributing to the growth of agriculture in Cambodia. At the same time, the food industry is less developed, contributing only 2.2% to the national GDP in 2008, compared to agriculture's contribution of 32.8%. In 2018 the rates remained similar: the food industry contributed 2.3% to the national GDP, while agriculture contributed 22.5% (Figure 2).

According to the National Institute of Statistics, the share of the food industry in GDP reached only 735.8 billion riels in 2013, increased to 843.4 billion riels in 2015 and continued to rise to 1026.8 billion riels in 2018 (NIS, 2018).

Figure 2: Percent Contribution to Cambodia's GDP in 2008-2018



Source: Ministry of Economy and Finance 2018

Accurate data on the number of such enterprises and their activities can sometimes be challenging to assess, as many smaller enterprises may not register with any government ministry, while more significant operations may register with multiple ministries. In 2012, the government recorded 30,600 SMEs carrying out agro-processing in the food, beverage and tobacco industry (BDLINK, 2016). However, the definition of "agro-processing" in these cases can be quite loose. For example, many MSMEs supply local markets with products such as snacks, baked goods, and fried chicken – while these are value-added products, the "processing" is relatively simple compared to a larger commercial enterprise.

The SME business industry includes rice millers and exporters, beer manufacturers, tobacco manufacturers, boutique breweries, and specialty food exporters. The Ministry of Industry, Mine and Energy, recorded 45 food enterprises, 17 beverage enterprises, and 12 tobacco factories in 2012 (BDLINK, 2016). However, this does not include enterprises registered with the Ministry of Commerce or Ministry of Tourism, such as restaurants that also produce commercial foods such as coffee or chocolates.

Thailand is the leading producer and exporter country for several processed foods including canned tuna, frozen seafood, shrimp, and chicken. The food industry accounts for about 23% of the country's GDP, allowing for more than 80% of the country's raw agricultural materials to be used in the food industry. There are 9,000 food processing companies in Thailand, over 3,000 highly-skilled food researchers, 10,000 food science students, 150 food research laboratories, 20 pilot plants and 11 factories related to Food and Agriculture at major institutions (BOI, 2017).

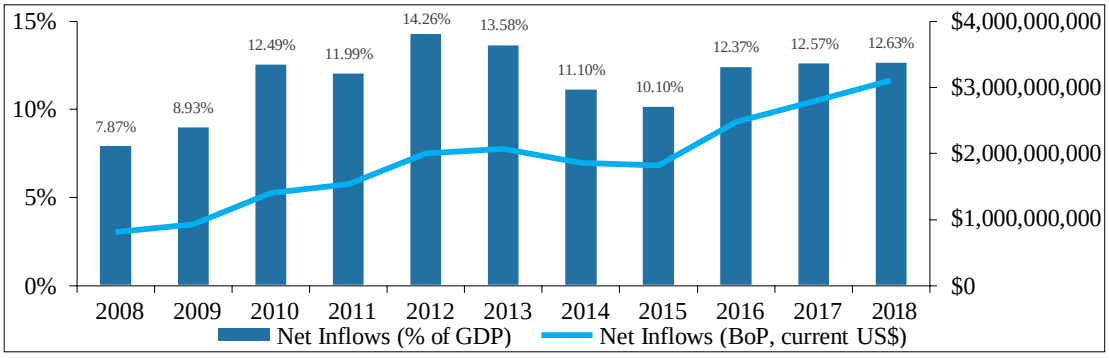
Cambodia exports a large number of unprocessed crops such as paddy rice, cassava, and cashew nuts to Thailand and Vietnam, who often process these raw materials into value-added products that are re-exported to Cambodia. However, the Cambodian government looks forward to promoting the development of manufacturing and agro-processing by encouraging FDI and domestic investment, strengthening the capacity of domestic and foreign SMEs to stimulate their production of goods for both import substitution and export (RGC, 2015).

In May 2016, a survey conducted by BDLINK (2016) among agro-processing companies and importers of agricultural inputs identified a lack of market information, a weak market information system, corruption, the absence of a reliable market, a lack of supportive policies and encouragement from the government, and high electricity costs as the top constraints to the agro-processing sector. However, other constraints of agro-processing also included irregular and insufficient supply of the raw materials, high cost of transportation, lack of skilled laborers for maintenance and operation of the processing machinery, poor road connections from farm to factory, competition from imported products perceived to be higher quality than local products, advanced technology that needs to be imported, and exporting procedures which are costly and require significant paperwork (BDLINK, 2016).

Investment in the Food Industry in Cambodia

FDI inflows to Cambodia have increased exponentially in recent years due to sound macroeconomic policies, political stability, regional economic growth and an open investment market, reaching USD 3.1 billion or 12.63% of GDP in 2018, up from USD 2.7 billion or 12.57% to GDP in 2017 (Figure 3).

Figure 3: Foreign Direct Investment, Net Inflow in 2008-2018



Source: Cambodia Economic Update (World Bank, 2019a, 2019b).

The total stock of FDI stood at USD 23.7 billion in 2018, representing around 96.8% of the country's GDP. Foreign direct investment is critical for developing and emerging market countries. The central investor countries are China (Chinese FDI alone surpassed all other sources of combined FDI), Hong Kong, the US and the Netherlands. The construction industry attracts the largest share of foreign investors, followed by infrastructure, industry (primarily textiles),

agriculture and tourism (World Bank, 2019a, 2019b). While it is difficult to obtain precise data on the amount of FDI in the food industry in Cambodia, FDI in the food sector is generally considered to be relatively low.

Cambodian Food Science in Education

In Cambodia, three public institutes provide courses in the food science field. The first is the Faculty of Chemical and Food Engineering of the Institute of Technology of Cambodia (ITC), the second is the Faculty of Agro-Industry of the Royal University of Agriculture (RUA) and the last one is the Chemistry Department of the Royal University of Phnom Penh (RUPP). The faculty of ITC and RUA aim to produce the qualified human resources, manage agricultural products by reducing losses and increasing the efficiency of the post-production, promote technology in agro-industry and process products for the local and international market (ITC, 2019; RUA, 2019).

In general, in ITC and RUA, there are only 100 to 120 student admissions annually to study food sciences (Sivcheng et al., 2019). This number is deficient compared to students studying other subjects, like law and economics. The main reasons for this are that there is less knowledge of this field among students and that it has a reputation for less demanding work.

At ITC's Faculty of Chemical and Food Engineering, laboratories play an essential role in student learning, providing hands-on application and experimentation of concepts and theories learned in the classroom (ITC, 2019).

Role of Research and Development (R&D) in Promoting Food Science

Innovation and initiative leads to economic growth in a country, which disseminates to the rest of the world and stimulates the development of the world economy (Modelski & Thompson, 1996; Porter, 1993; Reuveny & Thompson, 2001). R&D in technological innovation is essential to create new solutions in the production, packaging, and labelling of food products and in the development of new foods and conservation methods (Burda, 2012). For example, increased investment in R&D of technological innovations contribute to Thailand's strong global competitiveness in the food industry, which is characterised by low physical costs and flexible manufacturing structures (BOI, 2017).

Statistical analyses found that firms with persistent R&D commitments have a 13% higher labour productivity than non-R&D firms, and a 9% higher productivity rate than firms which occasionally make R&D efforts, controlling for differences in past labour productivity. Moreover, a steady R&D strategy corresponds to around a 2% increase in productivity (Börje & Hans, 2010). Advancements in technological infrastructure, legal policies, and technical environments are crucial to R&D activities.

Despite efforts, small and medium-sized enterprises (SMEs) are unable to distinguish fixed costs due to non-specialization, low productivity and low production quality. In contrast, large manufacturing firms have obtained a competitive advantage over small firms by reducing production costs, dropping production time and increasing productivity, increasing industry expertise, and benefitting from a stable market structure due to investments in R&D (Jung & Kwak, 2018; Kafouros, Wang, & Lodorfos, 2009; Reuveny & Thompson, 2001). Due to SMEs' limited cash flow they are unable to invest in labour, capital, or technical progress (Modelski & Thompson, 1996; Peretto, 1999). Thus, the government has an important role to play in helping food industries improve their R&D activities.

Micro-Implementations

A) Overview

Cambodia has the potential for a thriving agricultural industry. The development of the food industry is a critical if we want to tackle surpluses in agricultural products and meet the local demand for food security. To promote the food industry, the following activities should be considered.

B) Justification

The development of food science depends on the government's development policy. The following policies propose significant improvement and development in the food industry in Cambodia.

C) Implementation

1) Food Science Research and Development

The Government of Cambodia and stakeholders should contribute to the development of food science education. Universities should receive state support to develop laboratories with technical equipment that allows students to do extensive R&D. The laboratories must work together as a R&D centre to discover new technological innovations, new solutions, original production methods and develop new management techniques, policy reviews, legislation and programs to assess practices and progress in the development of the food industry. Laboratories must collaborate with development partners and domestic firms to create innovative projects. Furthermore, to promote and advance R&D in food sciences, laboratories must also partner with other institutes, universities in the country, region, and world to exchange experience and expertise.

2) Food Science Partnerships

All the technical and technological innovations found by the R&D centre experts must be applied in food industry partnerships. Experts are responsible for presenting and describing their new innovations to domestic firms and must play an essential role in controlling, monitoring and evaluating the firms' application of such new innovations. Trade facilitation and guidance firms must consult with researchers to implement their visions and meet production firms expectations.

3) Promote and Improve Financial and Fiscal Support

To achieve the long-term development objectives of the food industry, the government must fiscally support SMEs. In December 2017, the Cambodian Prime Minister launched an initiative to create a bank for SMEs in the hope of stimulating agro-firms and SMEs linked to foreign direct investment, tourism, and technology startups with an initial capital of US$100 million (Kimsay, 2019). This budget is inadequately small and the government should strategically add more from year to year. Despite this, it is hoped that the SME bank will launch at the end of 2019. The SME bank should be implemented transparently, without corruption or other irregularities in lending to SMEs. To facilitate and promote development of the food science sector, the government should issue a specific tax law for firms within the industry. At the same time, the R&D

centre's experts should help to verify tax reviews, audits, financial statements, and fiscal facilitations.

Conclusion

Improvements in the development of the food industry are essential to solving the current problems in Cambodian agriculture. I believe the three policies above will be the most effective in the improvement and promotion of the food industry in Cambodia. Food science R&D is the first thing to do in the short, medium and long-term. Collaborations between food science and commercial firms are the second thing to do in the short and medium-term in food R&D, to encourage food firms to try new products sought and developed by the R&D centre. The final priority for food R&D is the financial and fiscal support of food firms to help them in the short and medium-term.

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