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The *Cambodian Journal for International Studies* is a new initiative by The University of Cambodia, a private university which was opened in 2003. Papers will be published in English. One volume will appear each year, with two numbers at six monthly intervals. It is primarily an electronic journal, freely accessible to all through The University of Cambodia's web-site to as a wide audience as possible; a limited edition of each issue will be printed for special occasions.

Initially, the Editorial Board comprises academics from The University of Cambodia, with the advice from outside referees on various paper submissions as appropriate. Once it has become established as a platform for the publication of such studies, the Board will be expanded accordingly.

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Health Insurance for Urban Migrant Workers in China and Cambodia

A Case of Work-Related Injuries

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Abstract

This study focused on work-related injury insurance schemes in Cambodia and China; the argument is based on secondary data related to both countries. The conclusion found both good practices and challenges when comparing with international standards. One must look at the good practices of other countries to improve the existing regulations. This study also found some critical challenges and looks at the causes of these challenges in the two societies for further consideration. Generally, work-related injury insurance was mainly concerned with coverage and funds, sustainability, regional diversity, challenges, efficiency, rate of contribution and international context comparison.

I. Introduction

Health insurance has served as a fundamental aspect of the overall development of individuals, and it links closely to the wellbeing of every person (China Development Research Foundation, 2012). Basically, it has usually included in laws, regulation at national and international levels. As urbanization and development are rapidly growing, many people have started to migrate into the city for employment and other related purposes; because they hold the expectation of greater opportunities and income earning. Media and social networks (technologies for communication) are likely causes of the increase of the flow of labor into cities because people, especially youth, were unable to reach information about city life and opportunities from such media before. They now explore new opportunities in the urban areas. Discussing national trends only, the most popular destination is from rural areas to urban ones; as the migrants believe that urban life is the best choice for multiple reasons including employment, income generation, and other related services.

Further explanation of the trend to move from rural areas to urban ones is the expectation of income. In 2009, the comparison between family income in rural and urban households of China was significant: RMB 38,394 (about USD 6,399) for urban areas and only RMB 32,750

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(about USD 5,458) for rural families (Lu *et al.*, 2013). Likewise, in 2011 in Cambodia, it was 4,015,000 Riel (about USD 1,004) per capita in urban areas and 2,665,000 Riel (about USD 666) in rural ones (Tong *et al.*, 2013). In addition, in 2014, the average income gap per capita, between rural areas and urban ones (Phnom Penh) was around 2.8 times (National Social Security Fund, 2014).

In China, after two years of the overall social welfare system, a basic health care insurance program was formally established in 1999. Additionally, a national social security fund has also been established, its purpose is to promote the wellbeing of Chinese people (Lu *et al.*, 2013). In Cambodia, officially established regulations were set up in 2002 with the Provision of Labour Law. In 2008, it became fully functional and physical public institutions began operations (National Social Security Fund, 2014). It is similar between Cambodia and China; they both provide health care services in conjunction with public health services.

The number of migrants was becoming a factor of concern and required a specific set of policies and services provided to the group as the population has been increasing year-to-year. For example, in 2013 alone, the number of migrant workers who left the countryside in search for jobs in cities reached 163.36 million, accounting for 12.6 percent of China's total population (Lam *et al.*, 2015). While, in Cambodia about half of rural out-migration was to Phnom Penh, based on the result of a survey in 2012 (Asian Development Bank, 2014); the garment factory sector is accountable for up to 650,000 workers, and the majority of them are from rural areas; however the majority of factories are located in urban cities and outskirts (National Social Security Fund, 2014).

The paper looks specifically at the current implementation of the work-related injury insurance in both countries, drawing on both good practices and some challenges to propose possible ways to further improve by comparing with other countries in the region and to international standards. The paper also further considers how to move forward in work-related injury insurance for both countries in order to align with international trends and directions in the future.

II. The Current Implications and Phenomena

1. The Contribution Rate and Efficiency

The rate of contribution on the employer side was an average of 1.5 percent of each employee's salary, ranging from 0.2–1.9 percent in China for working injuries. In some cases, employees are required to make contributions to these funds, in accordance with rates determined by local

authorities (Baker and McKenzie, 2013). Cambodia requires 1.6–2.3 per cent of insurable wages from the employer side (ILO, 2012). Due to the global economic crisis, the government gradually decreased the required contribution percentage of the employer from 0.8 to 0.5 over the period of 2009 and 2010 (National Social Security Fund, 2014).

For one good practice in Cambodia is that the employers of 20 garment factories have launched health clinics to provide prevention and education health services covering reproductive health care, overall awareness of health issues (Dasgupta *et al.*, 2011), plus this extends social protection to the poor and vulnerable, which is in alignment with the National Social Protection Strategy. They conducted the pilot phase from 2011–2015, before rolling out for next steps.

Another example is related to the new public institutions that have been launched to handle the social insurance program in Cambodia; shortly after the launch, the National Social Security Fund could cover up to around 600 enterprises from three provinces in Cambodia, covering a total of 23.5 percent of workers (400,000 people) - this represents only 3 percent of the total population covered. This is illustrative of the rapid development of the scheme, which would also benefit of an extension to all provinces in the future (Adélio *et al.*, 2009).

The social health insurance expansion was fully implemented in China, and coverage reached 90.6 percent. The budget for urban social health insurance was RMB 353.81 billion in 2010; more than four times compared to the 2004 level. In 2004, only 34.4 percent of the population was covered by social health insurance (Xian, 2014). Gradually, more and more Chinese people have been covered by social health insurance. The system then has gradually shifted from a lack of health insurance coverage to inequity of health insurance benefits and now, is moving toward universal coverage. This shift was first introduced in 2009 when the central government announced a comprehensive health reform with the primary goal of making healthcare accessible and affordable to all people.

For example, in Guangdong and many other developed regions where a large population of rural migrant workers were grouped together, and the local governments pushed and encouraged them to participate in the social insurance programs (Guan, 2008). For working related injury insurance, it usually is handled by public health services; from a policy perspective, it should be considered as comprehensive and standardised, as dozen of policies and regulations have been placed and enforced to ensure the rural migrants could access at least basic health coverage. The Houku system was also simplified and modernised, with rooms available for migrants to possibly change their existing Houku status.

Remarkably, social welfare in China has been changing significantly over time (Lin, 2009; Han, 2011; Zhao, 2012); for example, from 1989 to 2009; subsidies have decreased while incomes from social insurances have substantially increased (Lu *et al.*, 2013). In addition, the integration of rural migrants into cities has important implications for society and economic development. Successful integration could be a factor in reducing social tension and non-consistency, and it could enable them to develop long-term plans in the city, and could motivate their urban consumption, benefitting both the domestic market and social order (Wang and Fan, 2012; Gu *et al.*, 2008).

2. Coverage and Funding

Work related injury insurance in Cambodia was offered nationwide, up to 6,107 enterprises with a total of 852,240 participants at the end of 2013, and there were over 50,000 beneficiaries who had claimed their work related injury from National Social Security Fund (National Social Security Fund, 2014). This was a compulsory scheme for private enterprises, which required employers to pay on behalf of employees in the amount of 0.8 percent each month. It was expanded nationwide in 2013 to cover up to 6,107 enterprises across the country (National Social Security Fund, 2014).

In Cambodia, we would refer to the Social Protection Strategies for persons which are defined by the Provisions of the Labour Law 2014-2018. According to Enterprise Census conducted by Ministry of Planning in 2011, there were 505,143 enterprises who employed up to 1,676,263 workers (National Social Security Fund, 2014). However, the annual report by the institution for year of 2014 also noted that only 7,041 enterprises by end of 2014 have registered and were covered for work-related injuries, but the participants were up to 1,021,588 (National Social Security Fund, 2014). Due to the Global Financial Crisis in 2008, the Cambodian government decreased the contributory rate in period of 2009 and 2010 from 0.8 to 0.5 percent for the factory sector, while the government subsidised the remaining percentage—it was costing around 8.72 billion Riel (about 2.18 million USD).

Basically, Chinese migrant moving from rural to urban could be covered under the National Social Security Fund for medical insurance (Ngan and Chan, 2013). In accordance with Regulations on Employment Injury Insurance by the State Council, employing units should provide all types of employment injury insurance for their staff.

For instance, at the end of 2008, China was able to cover more than 1.13 billion people (Blaxland *et al.*, 2014) and its health system is presently undergoing important changes. For

example in 2009, the public share of the total expenditure on health has risen sharply, from 40.7 percent in 2006 to 50.1 percent (World Bank, 2011 cited by London, 2014). The same study also remarked that the budget expenses, including the public expenditures on medical services, was up from just 0.8 percent in 2007 to 1.4 percent in 2011, while the overall expenditure on social welfare increased from 7.4 percent up to 10.4 percent during the same period.

However, referred to a study of the Ministry of Agriculture of China in 2005, the participating insurance rate of employment injury insurance for migrant workers was only 12.9 percent. By the end of June 2006, 16.2 million migrant workers had participated in the employment injury insurance, which accounted for only 8.1 percent of 200 million migrant workers (Zheng, 2007, cited by Zhang *et al.*, 2010). Similarly, another study also found only about 20 percent of migrant workers had health insurance (Li, 2014).

3. Work Related Injury Benefits Program

The discussion concerning work related injuries is referred to the Law on the Social Security Schemes for Persons which are defined by the Provisions of the Labor Law. The benefit for occupational risks includes:

- a). medical care services for occupational risks caused by an employment injury or commuting accident or occupational disease, whether the accident interrupted the work or not;
- b). providing a daily allowance for an employment injury or commuting accident or occupational disease causing temporary disability;
- c). providing disabled pension or allowance for employment injury or commuting accident or occupational disease causing permanent disability; and
- d). providing funeral benefits and survivors' pension (Royal Government of Cambodia, 2002, p. 7).

In 2014 alone in Cambodia, the National Social Security Fund received 16,600 cases of work injury reports from enterprises/establishments with 19,425 workers nationwide (National Social Security Fund, 2014, pp. 10–11). However, they accounted for 10,103 victims equal to 16,621 documents comprising medical treatment and care benefits, temporary disability benefits, funeral allowances, and other benefits (National Social Security Fund, 2014).

For China, the regulation was last revised in 2011 and covers survival benefits payments of medical costs, subsidies for workers with low incomes and workplace welfare facilities

provision for life, from the cradle to the grave as of July 2011. Those injured in occupational accidents were entitled to medical treatment costs for recovery and, if necessary, a disability pension. In the case of China, work-related injury insurance covered around 45.75 million people in 2012 but dramatically increased to 188.24 million people, an increase of almost four times, in 2013 (Yi, 2014).

III. Challenges and Policy Solutions and Discussion

1. The Regional Diversity

As work-related injury insurance schemes have just started and it is new for the Cambodian context, employers have not recorded the information of payment into digital form, and the payment for injury insurance was not able to cover small enterprises. There was no consistency of implementation for both employers and employees, and it was not effective because the injury reporting and process of claiming were incredibly slow. Additionally, the capacity of the staff was also a challenge, since the process was new (National Social Security Fund, 2014).

As it was the first phase and just came into implementation, law enforcement with the employers' and workers' participation, hospitals' medical service provision, and the National Social Security Fund's internal problems encountered many challenges. Even though it provided national coverage, the majority of implementation of the National Social Security Fund was in Phnom Penh. According to the National Social Security Fund in 2014, more than half of health insurance law was adopted in Phnom Penh alone while the provinces' coverage was minor.

Also, it reported that up to 391 enterprises consisting of 30,605 workers stopped their work in 2014, though it was not clear whether the workers would pursue another employment or were unemployed temporarily or simply moved to other locations or positions. They were high-risk since they had no job and could not access health services if they needed to for any reason.

The current health insurance coverage in Cambodia and services are very low due to many factors and reasons. This implies that the third channel that we identified as "prepayment and insurance schemes" is still only of marginal importance in the overall picture of health financing; thus, even though the fund can be aligned well with the public health sector in Cambodia, the quality of services was considerably very low (Adélio, 2009, p. 10).

There are also some donor-funded programs but they are not yet embedded in the nation under Cambodian law. As a consequence, the existing level of benefits and qualifying criteria for accessing benefits are subject to change from one year to another, depending on the donor's

budget allocations or government policy (Schmitt and Chadwick, 2014). For example, MoSVY's 5-year strategic plan 2014–2018, noted that on 2011–2013, the NGO sector had contributed \$57.44 million USD annually in social affairs sector to relieve the burden of the national budget and it would forecast that NGO contributions in the current plan was around \$287.18 million USD for upcoming years.

In China, the state currently has tried to improve the legal protection of migrant workers. In 2007, the National People's Congress adopted a new Labour Contract Law requiring that all employment contracts be put in writing and fully inform the workers about conditions, compensation and responsibility; however, the reality of effectiveness has been questionable (Cui, 2010, cited by Lucille and Kam, 2013). At the policy level, a divide between rural and urban Hukous still exists. Even though internal migrants are entitled to the same national social insurance, they often do not access the same treatments, and it has been the main barrier of accessing social security program equally among urban and rural people; especially to those who have been migrated from original of Hukou registration (Jutta, 2003; Tao and Xu, 2007; Guan, 2008; Zhang and Wang, 2010; Wei *et al.*, 2010; Wei and Hou, 2010; Yan and Wu, 2010; Fan, 2011; Mason, 2012; Wang and Fan, 2012; Ngan and Chan, 2013; Blaxland *et al.*, 2014; Guo and Shen, 2014; Yan Li, 2014; Chow and Lou, 2015).

Ironically, the migrants had low coverage including employment injury insurance but they were mostly engaged in high-intensity, high-risk jobs; for example in the deaths of coal mine safety accidents, and 80 percent were migrant workers; 90 percent of the victims in construction safety accidents were migrant workers (Zheng, 2007 cited by Zhang *et al.*, 2010; and Gao, *et al.*, 2013). In addition, the distribution of expanded social health insurance benefits has been highly fragmented and uneven, reflecting and reinforcing existing inequalities or cleavages in society (Xian, 2014). The percentage of employees among total beneficiaries of social health insurance declined from 2007 to 2010 by 4 percent—only in Beijing, Shanghai and Tianjin were more than half.

The lack of access to financial help and proper treatment has forced migrants to adopt a variety of unhealthy reactions to falling ill and only when the illness became unendurable, they would then visit hospitals, but the high cost of treatment caused many of them to visit illegal private clinics (Li, 2014; Yan and Wu, 2010). It was rural–urban migrants, who were considered particularly vulnerable to health risks due to their poor working and living conditions—the main difficulties in accessing health services are not merely because of their shortage of health awareness, and the lack of social contacts with the urban society (Yan and Wu, 2010). At the

policy level, the redistribution of rural social benefits was consistently regressive during the 1988–2002 period (Qin, 2010, p. 11).

2. Sustainability

Cambodia strongly agrees that its universal schemes are affordable for the country (Schmitt and Chadwick, 2014), and it responded to the study by UN SPF team's recommended policies and regulations plus framework for Cambodia, say it was in a considerably adequate and good position, as it would be covered all people. The MoLVT and MoSVY 5-Year Strategic Plan 2014–2018 envisioned universal and mandatory access for all people. The National Social Security Fund listed a series of laws and regulations in order to support and ensure an effective implementation.

The Strategic Plan 2014–2018 expands the coverage areas for work-related injuries to ensure all people under the provisions stated are able to get benefits that respond to their needs; It also improves and develops the schemes more effectively and meets the international standards and responds to the increasing memberships. It also aims to conduct awareness to minimise injuries through all means and modes and provide habilitation services to the people's needs (National Social Security Fund, 2014, pp. 30–31). Also, the number of enterprises and workers have increased in 2013 compared to 2014; it increased 10 percent for enterprises and more than 13 percent for workers. At the same time, the budget was increased, as well as the number of injury claimed; it was good sign for the work-related injury insurance in Cambodia for further steps.

Since the 2000s, some changes in China related to Hukou migration to small towns were permitted; while rural population in some outskirts of cities potentially was given urban Hukou status, mainly in exchange for giving up the individuals' rural land use rights (Kam, 2009, p. 212). Also, Lin (2012) agreed with the study above that being Hukou was a factor that barred people from accessing the old-age pension scheme. It would be required to reform or even abolish the system, seeing that people would rather greatly participate in and consider the model of state-society model than keep the state-led model in delivering the public services. Due to some flexibility in Hukou, a study by Deng (2014) estimated that up to 107 million persons has changed their Houku status from rural to urban ones, citing their reasons were linked to high human and social capital.

The state has created a very comprehensive social insurance program for its citizens (Lucille and Kam, 2013), with some highlights including:

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In 2003, Instructional Advice on Basic Medical insurance for Residents with Flexible Employment was issued by the Ministry of Labor. It was a kind of transitional policies used to solve the medical problems of migrant workers. In 2004 and 2006, Opinion on the Promotion of Medical Insurance of Employees in Mixed-ownership Enterprises and Non-public Economic Sectors and Notice on Starting Special Expansion Action of Medical Insurance for Migrant Workers were issued, which have played a guiding role in the solution to medical insurance for major diseases of migrant workers (Liu, 2006, cited by Zhang *et al.*, 2010, p. 8).

Currently, some local governments across China have relaxed and removed some criteria as barriers for migrants; where they can apply and change their Hukou from rural to small urban towns and this was a positive sign and view to allow and include rural migrants to get social benefits and to add coverage by the public service for the residents where they are settling around their work place. It can be a way to promote production and industrial phenomena in the local context (Lucille and Kam, 2013).

Furthermore, it can be believed that the current system of social security in China was not considered as inclusive and not ready to apply full coverage yet. Thus, for the long term, social policy should be based on results-based research and assessments as well as a response to the needs of recipients and beneficiaries, where it would address the reality and social imbalances. Practically, the central and local governments must work cooperatively and closely together in order to improve and upgrade the social sector; especially social welfare, provisions, regulations, and well-being of people, including migrants.

For instance in 2011, for the first time in Chinese history, more people were ably registered as urban residents than rural. The change also means that more people who used to have rural registration had the right to enjoy public services provided by the state (Blaxland *et al.*, 2014, p. 515).

Based on the study by Guan (2008) some further action should be done–

“...provide rural migrant workers a better opportunity to be integrated in the urban sector and make institutional adjustments to accommodate the rural migrant workers; promote social actions for fostering integration of rural migrant workers in local urban communities; and facilitate the welfare system in rural areas should not be overlooked” (pp. 158–159).

IV. Policy Solutions in the International Context

Firstly, both countries would seriously consider the fundamental of international labour standards for occupational safety and health, and they should be applied to and reassure the local policies and regulations be aligned, including the Implementation of the Occupational Safety and Health Convention, 1981 (No. 155), its accompanying Recommendation (No. 164) and the 2002 Protocol and the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187) (ILO, 2011, p. 25–26). Further we should be thinking and reviewing the existing regulations and laws, whether they are aligned with the foundation of universal coverage in health in international labour standards including the Medical Care Recommendation, 1944 (No. 69); Social Protection Floor Recommendations, 2012 (No. 202) with an emphasis on the length of health coverage and guaranteed access as well other related international standards and regulations to ensure workers could be covered and treated fairly and equally based on their fundamental rights and obligations of the states.

Secondly, the universal health coverage implication in Japan, for example, as services called “Services, Not Cash” was attractive in some ways—of course, offering services requires the development of infrastructure, such as institutions like nursing homes and community-based services (Ikegami, 2014, p. 61). Another recommendation from Japan about eligibility is by “Social Insurance Criteria, Not Case by Case”; therefore, a national standardized instrument, associated with a social insurance approach, should be established and used for determination and not have one based on people as it would be subjected of preferred treatment and unfairly.

Thirdly, the suggestion by the World Bank for social fund intervention for insurance should be covered for the information sector to support community risk management arrangements and related activities as required and needed by the community (Holzmann, 2009).

V. Conclusions

In principle, the two countries have various policies and regulations that should cover work-related injuries, and they have used the public health services as a partnership in delivery services to the people. The contribution was at a similar percentage between Cambodia and China. China has taken a long history of insurance and has already revised it several times to respond to the number of migrants from rural areas, while Cambodia was just starting the insurance schemes.

China encountered two main challenges for providing access to rural migrants; first concerns Houku, which separated the people between rural and urban and acted as a main barrier and obstacle for people. Second was the management and practices by related actors including the local government and public health services sector, which have also made other difficulties for migrants in terms of procedures, legal papers requirement and routine follow ups with employers to ensure a smooth and well-adhered implementation. Cambodia was just in the starting phase, with no diverse mechanism and broad network to ensure the processes run well. Coverage areas and the number of participants were still low if comparing to the actual target groups -- plus the informal sector workers have been excluded. Furthermore, it was the same as China related to management processes and collaboration, especially with public health services sector in Cambodia, while the overall public health services in Cambodia was much lower. However, the offer to beneficiaries under the work-injury insurance was considerably lower than the general ones or lower than the general standards due to the novelty in the Cambodian context.

Work-related injuries in China are likely to be at universal and comprehensive and will move from a lack of services to unequal services being provided. Cambodia has had a very small proportion of total workers covered by the schemes currently, even if it has existing policies, regulations, and framework for its implementation. Even though it was designated to be implemented nationwide, it is unlikely to be workable since most of the coverage is in one part of the country, while the rest of the country is still subjected to a lack of services provided, and it is much farther behind in the global movement and international standards.

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Understanding the Law of Takings: Considerable Points for Exercising and Resolving Disputes

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Abstract

The purpose of this article is to give an overview of the law of takings, also known as 'eminent domain law' or 'expropriation law,' and noteworthy related points when exercising and resolving disputes. The law of takings is a special field that is encompassed by both public law and private law, and can be considered to be a boundary between public law and private law. In a general view, public law governs the authorization and process of taking over private property, while private law demands a balance of valid reasons, public interest/use requirements, and justified compensation for the loss and damage of the property incurred by such a taking. Therefore, when there is a taking dispute, these laws and their interrelations and components become fundamental subjects for discussion, consideration, and decision-making.

I. Introduction

The law of takings is special in the field of legal studies. Its specialty rests on two interlinked fields, namely public law and private law, or we can say that the law of takings is a boundary between public law and private law. Public law consists of constitutional law and administrative law, while private law consists of property law and economic interest.

In the law of takings, public law and private law serve different purposes. Constitutional law is the baseline norm for authorizing the taking power, and administrative law provides the due process of taking – decision and action. While property law governs substantial objects of taking – land, house, construction, ownership, and its economic interest which refers to property interest and the right to property development. When exercising the taking power, the objects of property law and its economic interest will be affected. The loss of property and damage to its economic right will occur. Therefore, private law demands the balance of compensation over the loss and damage incurred by such a taking.

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When there is a dispute over taking, all features and relevant elements of these laws are raised for discussion, consideration, and decision-making. This article will illustrate the features of the law of takings and intertwined relations and components that should be put forward for discussion, consideration, and decision-making when exercising a taking power and resolving disputes.

When thinking of taking power, there are three fundamental laws interweaved for consideration such as property law, due process of law, and expropriation law itself. The features and elements of these laws are carefully considered when deciding a taking dispute. The following article will demonstrate the features and relevant relations and components of property law, expropriation law, and due process of law for consideration when exercising or resolving a taking dispute.

1. Property Law

As mentioned above, the law on takings affects property law, especially the right to ownership and its economic interest. It will cut off the right to ownership and the economic interest of property. Owners will no longer own and develop their property for economic interest; those are taken away from property owners. However, they are paid back with just compensation caused by such a taking.

Just compensation is a justified cause to owners whose property is taken away. Just compensation is the market value of taken property at the time of taking (Brown and Williams, 2010). However, not all property owners, in practice, receive just compensation or the market value of the lost or affected property. This can vary depending on land tenure – ownership over immovable property.

Unclear ownership over land can lead to underestimated just compensation when exercising a taking. This happens a lot in developing countries where a majority of land tenure remain unregistered. However, understanding the concepts and criteria of land ownership, either registered or unregistered, is critical for protecting oneself against the underestimation of compensation and arbitrary taking. This section will cover the legal means of ownership acquisition in contemporary practice.

a. Means of Ownership Acquisition In property law, ownership acquisition of an immovable property is essential to receive various rights related to that property and be protected by law. Immovable property refers to the land, construction, and other improvements affixed to that land and construction. In property theory, there are three main means to legally acquire ownership over an immovable property: (1) possession, (2) adverse possession, and (3) legal acquisition (Powell, 2006).

Possession is a primary principle to acquire ownership of an immovable property. This principle is applied to land where is not registered yet, which is regarded as the first possession. This concept dates back to the seventeenth and eighteenth centuries during the era of the Enlightenment, when John Locke raised this conception for discussion (Posner, 2000; Mossoff, 2003; Fraley, 2011). According to Locke's concept, a possessor could acquire ownership over an immovable property by occupation and labor (Christman, 1986). In this context, if a man occupied an immovable property and worked on it, he would become the owner of that occupied property within a fixed period of time determined by law. In this sense, occupation and labor on an immovable property led a man to ownership acquisition of such an occupied immovable property (Mossoff, 2009).

In contrast to the principle of possession, ownership acquisition of an immovable property can be made by the principle of adverse possession. Adverse possession has a similar means as possession; namely, the occupation over an immovable property (Clapacs, 1994). However, adverse possession is applied to registered immovable property and benefits the latter possessors against the registered property owner (Hogg, 1915; Clarke, 2005; Williams, 2009). Under a typical rule of adverse possession, if a landless man occupies a registered property in good faith within a fixed period of time by law, he would acquire ownership over such an occupied immovable property when the prescribed period was completed (Williams, 2009; Davis, 2011; Cherek, 2012).

Besides these principles, ownership acquisition over an immovable property is made by legal acquisition. Legal acquisition refers to the legal means of immovable transaction from one owner to another by purchase, gift, will, or exchange of property (Nozick, 1974; Posner, 2000; Reed, 2004). For instance, if one wants to acquire ownership of an occupied land, one must negotiate and buy it from the previous land occupant via a purchase agreement and register this land. Then, one will become the legal owner of that purchased land.

Today, among the three ownership acquisitive means, ownership acquisition by possession and adverse possession remains relatively less in developed countries where the land is registered, if comparing to the developing countries where the majority of the land is not yet registered. Most developing countries have largely applied ownership acquisition through land possession and adverse possession within a fixed period. Cambodia, for example, has largely applied ownership acquisition through land possession within a fixed period of five years under the 2001 Land Law (Article 30). The 2001 Land Law does not authorize adverse possession over registered land (Article 35). However, this principle is authorized under the new Civil Code of 2007, which authorizes the adverse possession over registered immovable property to be made within ten or twenty years based on the integrity of land possessors (Civil Code of Cambodia, 2007, Article 162).

In sum, if one follows any pattern of ownership acquisition as mentioned above, he or she will become the legal possessor or owner of that property. Their possession or ownership will be protected by law against arbitrary taking, and he or she has a bundle of rights over that property. The next section will illustrate the bundle of property rights when one acquires ownership over an immovable property.

b. Bundle of Property Rights When one becomes a possessor or owner of an immovable property, he or she is equipped with a bundle of property rights (Veseth, 1982; Lametti, 2003; Meyer, 2009; Baron, 2013). The bundle of rights refers to various rights related to immovable property. The bundle of property rights can be divided into two forms: (1) the right to own property and (2) the right to use the property for economic development.

First, the right to own property is a principal right when one becomes a possessor or owner of an immovable property. In property theory, one has an exclusive right to that property when he or she owns it. These rights include the right to management and disposal of his or her property at will (Gould, 1980; Clark, 1982; Christman, 1986; Penner, 1996). He or she can develop or improve his or her property and transfer it to others. Second, the right to use property for economic development is secondary right after the right to own it. Normally, an owner can use his or her property for an economic gain such as a lease or mortgage (Sax, 1971.) Besides these, he or she can sell the whole property for monetary exchange for livelihoods (Kirk, 1988; Frank, 1993; Cole and Grossman, 2002). These are economic rights stemming from property rights.

All those rights are also stipulated under Cambodian property laws. However, the protection of those rights depends on the actual status of land tenure. Land tenure is divided into two

forms – possession and ownership under Cambodian law. Possession refers to an occupation of land less than five years with or without possession certificate, while ownership refers to an occupation of land more than five years with or without ownership title.¹ In practice, the status of ownership is stronger protection than that of possession, especially in the exercise of expropriation law, and owners are entitled to more compensation than possessors (Hem, 2015).

Despite the different status and protection of land tenure under Cambodian property laws, there is a remarkable common point between both. Possessors and owners have equal rights to use their property for economic interest and development. Under the Cambodian property laws, both possessors and owners can transact their immovable property freely (2001 Land Law, Article 39).

In short, property law authorizes a possessor to occupy an immovable property within a statute of limitation and if he or she satisfies the legal requirements, he or she can acquire ownership over such a possessed land. Possessors or owners of a land have a bundle of rights related to their properties which is protected by law. They can use their properties and related rights for economic interest and development.

II. The Law of Takings

In property law, a property owner presumptively has an exclusive right over his or her property. However, the use of his or her property must be complied with law. Furthermore, his or her property can be taken for social development under the law of takings if public interest is required. As a result, the concept of the exclusive right no longer exists for property owners. This section will demonstrate the features of the law of takings.

1. Background on the Law of Takings

Exercise of property taking has a long history (Bauer, 2003; Sturtevant, 2006; Jackson, 2010). Historically, the power to take property was in the hand of the sovereign (Ely, 1992; Bauer, 2003; Sandefur, 2006). The sovereign long enjoyed this privilege in appropriating property from people for its own use without the consent of property owners (Jackson, 2010 and Bauer, 2003).

However, such an exercise attracted academic attention through the work of Hugo Grotius, the Dutch jurist, in 1625 (Tresolini, 1954; Mossoff, 2003; Boyce, 2007). Grotius wrote a treatise,

¹ See: Circular on Procedural Implementation of Establishing Cadastral Index Map and Land Register, 2002; Circular on Procedural Implementation of Sporadic Land Registration, 2004; 2001 Land Law, art. 30.

De Jure Belli et Pacis, in which he named the exercise of property taking by the sovereign as the power of eminent domain, (*dominium eminens*) (Cormack, 1931; Tresolini, 1954; Boyce, 2007; Jackson, 2010; Hockett, 2012; Salvas, 2012). According to Grotius, the exercise of eminent domain was only for public benefit while an affected property owner was entitled to compensation (Lenhoff, 1942; Tresolini, 1954; Harrington, 2002; Goho, 2008; Manfredo, 2008).

Since the inception of eminent domain power, this concept has been widespread to various nation-states. Most nation-states have adopted this concept into their legislations, mostly with the constitutional backing (for example, the US, Japanese, or Cambodian constitutions). Various terms are coined to refer to the power of eminent domain. Most popular terms are used in most jurisdictions such as expropriation, appropriation, compulsory purchase, compulsory acquisition, or condemnation, while the simple one is taking (Knetsch and Borcharding, 1979).

For instance, Cambodia also adopted the power of eminent domain in its post-war Constitution in 1993 (hereinafter called the 1993 Constitution). Article 44 of the 1993 Constitution provides [t]he expropriation of ownership from any individual shall be exercised only if the public interest is required as prescribed by law and pay fair and just compensation in advance. (Cambodian Constitution, Article 44). This clause is fundamentally enshrined in the 1993 Constitution and authorizes to take private properties for public use, while affected property owners are entitled to just compensation accordingly.

2. Restriction of the Law of Takings

Although a variety of terms is used for the eminent domain power in various jurisdictions, the concept of eminent domain is relatively uniform. A constitution confers eminent domain power to government to take property for social interest and development. However, the constitution typically constrains government exercise of this power (Merrill, 2000; Turnbull, 2002; Nadler and Diamond, 2008). A constitution typically authorizes a government to be able to take property only if it serves public use, while affected property owners are provided with due process of law and paid with just compensation. (Nadler and Diamond, 2008).

These restrictions are to protect the property owner from arbitrary takings and to control rent-seeking by developers and others (Scheiber, 1973; Walston, 2001; Cavazos, 2011). The government, together with an authorized private developer, could invade private property rights arbitrarily if there are no such restrictions (Kelly, 2006). Therefore, the constitutional taking

clauses are seen to protect private property rights from arbitrary takings rather than allowing government to exercise such a power (Fawcett, 1986; Hart, 1999; Block, 2001).

Likewise, the Cambodian 1993 Constitution follows this pattern and imposes restrictions on exercising the taking power. The 1993 Constitution authorizes the taking of private property only if it serves public use and follows procedures stated by law, while property owners must be paid fair and just compensation in advance.²

In short, the law of takings authorizes the taking power. The exercise of taking power is allowed and justified when public interest or public use is required, and property owners are paid with just compensation for the loss and damage to their property and its economic rights. Under the theory of the law of takings, if the public interest or public use is not required, the exercise of taking power is not authorized.

III. Due Process in the Law of Takings

Apart from the constraints of public use and just compensation requirements, the constitution obliges the government to respect the due process of law for affected property owners (Haley, 1979). The constitutional due process clause provides that no taking of private rights is made without prior notice and a hearing for affected citizens (Emerson and Wise, 1997; Hudson, 2010).

The constitutional due process clause has minimal requirements that limit the government's law, regulations, decisions, or actions, and they must not be unnecessary, unreasonable, capricious, or arbitrary, which lead to the taking of private rights (Stoebuck, 1980; Cunningham, 1981; Easterbrook, 1982; Kelso, 1984). These requirements are the foundations for the judiciary to review the governmental decision or action that does not comply with constitutional clauses of due process, just compensation, and public use requirement (Haley, 1979; Mandelker, 2000; Byrne, 2007).

Due process of the law of takings undergoes two administrative stages. The first stage is the procedure before dispute occurs, which is referred to in this article as the pre-dispute mechanism. The second stage is the procedure for maintaining due process and fair treatment between parties when disputes occur, which is called the post-dispute mechanism.

² In this sense, the 1993 Constitution requires to have a separate procedural law governing land expropriation. See: Constitution of Kingdom of Cambodia, Article 44.

The due process of the law of takings, by its nature, requires the government to guarantee and provide both administrative stages to affected property owners prior to the forced exercise of expropriation and relocation. The following section will demonstrate a number of procedural aspects and protections in each administrative stage.

1. Pre-Dispute Mechanisms

The first due process of expropriation law is a pre-dispute mechanism. A pre-dispute mechanism is a procedure to prevent disputes from happening and appearing in later redress forum. The pre-dispute stage refers to the implementing stage of expropriating authority or a delegated developer. In this sense, the expropriating authority or delegated developer is the responsible body for maintaining due process with the affected citizens in the pre-dispute stage.

Land taking results in relocation and the loss of property rights, leading to dissatisfaction and frequently, to protests. The law of takings requires the expropriating authority or delegated developer to provide some safeguard aspects to affected property owners that expropriators must follow to avert disputes (Hudson, 2010).

Pre-dispute safeguards in most jurisdictions are roughly as follows: First, the government must announce and notify about the necessity and development project, which causes the taking of private property, to affected landowners in advance (Emerson and Wise, 1997). Second, the expropriating authority or delegated developer must conduct a social and environmental impact assessment of development project and affected citizens (Westbrook, 1999). Third, the expropriating authority or delegated developer must appraise the value of affected property on market price base (Turnbull, 2002; Powell, 2006; Epstein, 2012). Fourth, the expropriating authority or delegated developer must negotiate the appraised price with affected landowners on market value between willing buyer and seller without duress (Chang, 2010).

Such a procedural mechanism is to prevent disputes and treat parties equally under the pre-dispute stage. However, if there is a protest against expropriation, violation of due process, or disagreement on compensation, the dispute will appear in the redress forum. This will lead to the second stage of due process protection by the redress institution under the framework of expropriation law.

2. Post-Dispute Mechanisms

The post-dispute stage refers to a hearing mechanism, which is guaranteed for affected citizens. The due process at a post-dispute mechanism requires to have a meaningful hearing, which

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consists of the rudimentary requirements such as timely and adequate notice, an opportunity to confrontation and cross-examination, the right to have counsel, and the right to an impartial decision-maker (Friedman, 1981).

Most jurisdictions arrange a hearing for a taking dispute in an administrative or judicial redress mechanism. For instance, America arranges a hearing mechanism in judicial redress, while Japan and Cambodia arrange a hearing in administrative redress first before proceeding with a judicial recourse, as the last resort (Hem, 2015).

A taking dispute comprises two types of disputes. It could be either an administrative dispute or a civil dispute, or both (Hudson, 2010). If affected citizens challenge the constitutionality of taking, violation of due process of law, or administrative decision and action; in this context, court (administrative judges) will have jurisdiction to address the issue. However, if affected landowners disagree on ownership and compensation, a jury or committee of civil, property, or financial experts will resolve this type of dispute.

With respect to land taking, an expropriating authority or delegated developer cannot receive a consensus from affected property owners to give in their properties for a development project. Some property owners will, inevitably, disagree and object to the expropriation project. Therefore, the constitution protects those property owners from the arbitrary taking of their property. In this sense, the constitution requires to have an appropriate hearing for objecting citizens (Mandelker, 2000; Lawrence, 2002). In this regard, a hearing must be made under an independent resolver, who stays far from the conflict of interest. Such a doing is to maintain due process of law for both parties and makes affected citizens able to accept the resolution (Claeys, 2006).

In the Cambodian context, the due process of expropriation law is guaranteed under the Cambodian 1993 Constitution and laws. The 1993 Constitution requires a taking to be made only if it is followed by procedures prescribed by law (Article 44). In addition to the constitutional requirement of due process protection, the 2001 Land Law further provides a strong protection for affected landowners from arbitrary forced eviction and relocation.

Article 35 of the 2001 Land Law prohibits authority from exercising arbitrary forced eviction only if it receives an eviction order from the court (Article 35). In this sense, a forced eviction cannot be made without a judicial hearing and decision in the Cambodian context. Moreover, Article 36 of the same law further protects would-be evictees that if the execution of judicial eviction order causes turbulence, such an execution must be suspended (2001 Land Law). In

this context, Cambodian laws provide safeguard protections to affected citizens from arbitrary taking and eviction.

Apart from the procedural safeguard, the 1993 Constitution confers citizens the constitutional right to challenge against a state or state authority over any breach of law and file a claim for remedy if they suffer from unfair treatment from a state authority or incumbent (Article 39). The 1993 Constitution obliges the government to thoroughly consider and resolve such complaints (Article 38). Above all, the 1993 Constitution empowers only the court to have jurisdiction to decide such a complaint (Article 39). Citizens are equal before the law and receive judicial defense through court recourse (Articles 31 and 38).

In addition to these, a new law on expropriation was adopted and promulgated in 2010 (hereinafter called '2010 Expropriation Law'). The 2010 Expropriation Law provides procedures and mechanisms for expropriation committees, compensation assessment, and grievance redress committee for exercising a taking and resolving dispute. However, none of these have not been established yet (Law on Expropriation). The process of these mechanisms is under a separate sub-decree, which is so far in a draft. In practice, an ad-hoc commission is created for project-to-project base, and there is no uniform practice in Cambodia (Hem, 2015).

In short, the exercise of land taking demands due process in the pre-and-post-dispute stages for affected property owners; otherwise, such an exercise violates the procedural law, and it is subject to judicial review. In the law of takings, the maintenance of due process at pre-dispute stage is crucial for avoiding disputes and backlogs at post-dispute stage.

IV. Conclusions

This article illustrates the considerable features for exercising the law of takings and resolving its disputes. The exercise of taking power must take the property law into consideration and follow the due process of law; otherwise, it is considered an illegitimate exercise of such power. From the perspective of private law, the possessor is authorized to occupy an immovable property within a period of time; he or she can acquire ownership over such an occupied property. A property owner receives a bundle of rights related to property and protection protected by law.

From the perspective of public law, the taking of private ownership is authorized. However, such an exercise can be made only if it is satisfied with the public use requirement, while affected citizens are paid with just compensation for the loss and damage of properties. Above

all, property owners are protected under the due process of law. In this sense, affected property owners are provided with due process at both pre-dispute and post-dispute stages. If taking does not follow this, it will violate the procedural law and fundamental rights of affected property owners protected by law, and it will be subject to court review.

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The Internet for Everyone

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I. Introduction

The founder of Facebook, Mark Zuckerberg, and the Microsoft billionaire, Bill Gates, have called for everyone in the world to be connected to the internet by 2020 (Chanthadavong, 2016). However, questions arise as to whether or not this plan is possible within the stated time frame, and also, whether or not universal access to the internet is possible at all.

Firstly, the large number of people not connected to the internet is a problem in itself. More than half of the world's population (54 per cent, or 3,424,971,737 people) is currently not connected (Internetlivestats.com, 2016). But even more significantly, this 54 per cent is largely disadvantaged, and as the following figures demonstrate, this proportion of the world is vastly more underprivileged than populations in countries with high internet penetration.

The lowest internet penetration rates coincide with areas of the poorest people on earth. For example, in 2015, the lowest internet penetration rates were in Africa (28.6 per cent), Asia (40.2 per cent) and the Middle East (52.2 per cent).

About Education reported in 2015 that the three countries with the world's lowest life expectancies were also from one of the areas identified as suffering from extreme poverty and low internet penetration (Sub-Saharan Africa). The countries with the lowest life expectancies are Swaziland (33.2 years), Botswana (33.9 years) and Lesotho (34.5 years) (Rosenberg, 2016).

The World Bank estimated that more than a billion people lived in extreme poverty in 2015. According to USAID, 96 per cent of these reside in South Asia, Sub-Saharan Africa, the West Indies, East Asia and the Pacific. Nearly half of this more than one billion live in India and China (Getting to Zero, 2013).

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Extreme poverty is defined by the World Bank as earning below the international poverty line of \$1.25/day. This measure was the equivalent to earning \$1.00 a day in 1996 US prices, hence the widely used expression, living on "less than a dollar a day." (Ravallion, *et al.*, 2008).

II. Impact of Poverty

In the most disadvantaged parts of the world, it is likely that the struggle to find food would be a higher priority than connecting to the internet. For example, according to the World Bank, hunger and poor health militate against the ability of children to stay alert and be able to learn in school. World Hunger estimates that 66 million primary school-age children attend classes hungry across the developing world, with 23 million in Africa alone (wfp.org, n.d.).

The struggle to stay alive is an even more urgent priority. According to the World Bank, babies in the developing world are much more likely to die within their first year than are those in high-income countries. This is because of lack of adequate food, poor health and unsanitary conditions (Ibid).

Areas of extreme poverty and hunger also coincide with areas in which there is a shortage of water, and in which existing water sources are frequently contaminated. Water contamination is a problem for one billion people - the equivalent of 1 in 8 people on the planet, and the world Water Project also links lack of access to clean water to extreme poverty (The Water Project, 2016).

Such water problems not only lead to poor health, but also the inability to stay in school, grow food, build housing, or continue working. The United Nations estimates that Sub-Saharan Africa alone loses 40 billion hours per year collecting water - the same amount of time as a whole year's worth of labour by France's entire workforce (Ibid.).

Finding clean water is one problem, but finding potable water at all, is a more serious problem. Bank of America Merrill Lynch BAML points out that the shortage of water caused by climate change is 'number one in terms of impact in the World Economic Forum's annual report on global risks'. According to Ferro (2015), the global water crisis is not a matter of regional drought. 'It's a secular trend that is eventually going to affect almost everyone on the planet: what we eat, how we eat, who has enough to eat, and even how our food tastes.'

III. Climate Change, Conflict and War

Climate change is further exacerbating global food shortages and hunger, threatening health and income, and leading to lower life spans. A 2014 report by the Intergovernmental Panel on

Climate Change (IPCC) warns that climate change has already cut into the global food supply and is fuelling wars and natural disasters. In addition, this Panel warns that governments are unprepared to protect those most at risk (The Water Project, 2016).

The IPCC bases its finding in part on global warming, and notes that anthropomorphic and industrial activity since the beginning of the industrial revolution has led to global warming that is ‘unequivocal’, and that since the 1950s, has also led to changes that are ‘unprecedented over decades’. These changes have led to warming of the oceans, melting of ice caps, and rising sea levels. This, in turn, is projected to undermine food security, reduce marine biodiversity and challenge sustained provision of fisheries. Crops of wheat, rice and maize will be particularly hit by temperature increases. (Ibid.)

A look into the future is not reassuring. In the coming decades, at least one-quarter of the world's wheat production will be lost to extreme weather from climate change if no remedial measures are taken, according to Tammen (2015). Wheat yields are projected to decrease by 6 percent for each degree Celsius of temperature rise, which means there will be 42 million tons less wheat produced per degree of temperature increase. To put this in perspective, this amount is equal to a quarter of the global wheat trade, which reached 147 million tons in 2013 (*ibid.*).

Climate change, water scarcity and consequent rises in food prices also exacerbate the risk of conflict, whether civil war or fights between nation states over critical resources or boundaries, according to Biello (2014). In short, ‘climate change will make remedying existing poverty that much more difficult’. (Ibid.)

The world refugee problem is also exacerbating access to food, shelter and education. World Vision notes that between 2 million and 3 million Syrian children are not attending school and the U.N. children's agency says the war has reversed 10 years of progress in education for Syrian children (World Vision, 2016).

World Vision also notes that refugee children are susceptible to malnutrition and diseases brought on by poor sanitation, and that many refugee children do not have the option of education, because they need to work to support their families. Often they labour in dangerous or demeaning circumstances (*ibid.*).

This situation is getting worse, according to the Global Peace Index. Apart from the 100,000 killed in conflict in 2014 (up from nearly 20,000 in 2008) the United Nations estimates the number of displaced people is likely to far surpass the record 60 million in 2015 (Reuters India,

2016). ‘One in every 113 people on the planet is now a refugee, asylum-seeker or internally displaced in a home country... (and) half of them are children’ (Reuters, 2016).

Also, “countries torn apart by conflict pay a huge toll in their capacity to govern” says Huguette Labelle, chairman of Transparency International. “With public institutions crippled or nonexistent, mercenary individuals help themselves to public resources, and corruption thrives” (Farrell and Moyer, 2016).

IV. Illiteracy

Illiteracy is another hurdle to overcome before being able to use the internet. According to Jenkins (2014) one in five people in the world are illiterate, and two thirds of these are women. Ninety eight percent of these illiterate people are concentrated in three key areas: South and West Asia, Sub-Saharan Africa, and the Arab States. Africa as a continent has less than a 60 per cent literacy rate.

Even assuming that this illiterate one-fifth of the world’s population could be taught to read and write within four years, and even assuming that this group could afford internet access (a big assumption), the question of digital literacy is yet another hurdle. This is because educationists consider that digital literacy is more than the combination of these two words. According to Jenkins (2009) ‘digital information is a symbolic representation of data, and literacy refers to the more complicated ability to read for knowledge, write coherently, and think critically about the written word’.

In OECD research, the term Digital Competence is preferred over literacy due to its holistic use. In 2013, the European Commission published a Digital Competence Framework (*DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe*) that not only also includes the notion of digital literacy, but goes even further by defining problem solving in digital environments as part of digital competence (Is.jrc.ec.europa.eu²⁰¹⁶).

A precondition for such digital competence is a basic education. Yet UNESCO reports that in total, 121 million children and adolescents have never started school or have dropped out. This is despite the international community’s promise to achieve universal primary education by 2015. Data shows that there has been almost no progress in reducing this number since 2007 (Uis.unesco.org, 2015).

Children living in conflict, child labourers and those facing discrimination based on ethnicity, gender and disability are the most marginalised.

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According to UNESCO, if current trends continue, 25 million children – 15 million girls and 10 million boys - are likely to never set foot inside a classroom (Uis.unesco.org, 2015).

The ability to read and write, and to become digitally literate, is not something that can be accomplished quickly, although Facebook founder Mark Zuckerberg believes that “When communities are connected (to the internet), we can lift them out of poverty” (Garcia, 2016).

However, the above figures relating to poverty and illiteracy indicate that the problem is better addressed the other way around - lifting people out of poverty would need to precede internet access.

V. Case Study: One Laptop per Child

An illustrative case study involving attempts to provide laptops to children in the developing world (and to provide internet connectivity) was the One Laptop Per Child project (OLPC). This project, conceived by the Massachusetts Institute of Technology Media Lab, aimed to produce a rugged, low-cost laptop cased in weatherproof rubber, including a manual crank to recharge the batteries if there was no local power source available.

The initial aim was to manufacture such a laptop for one hundred dollars, although eventually, this cost was not able to be kept below two hundred dollars per unit (Fildes, 2010). Subsequently, the OLPC initiative became bogged down by proprietary software and hardware problems, and also technical problems (Shah, 2008).

The project was also criticized for its cultural assumptions, which included a policy of ‘walking away’ after providing the original laptop. African representatives to the World Summit on the Information Society in 2005, claimed that providing clean water and schools was more important (Smith, 2005).

Even though ambitious and well-intentioned, the OLPC project was unfavourably compared by some educators with more cost-effective measures such as the provision of classrooms, teachers, libraries and books.

For example, John Wood, founder of *Room to Read*, a NPO that provides libraries and books, pointed out that a \$2,000 library could serve 400 children, costing just \$5 a child to bring access to a wide range of books in the local languages. Also, a \$10,000 school could serve 400–500 children (\$20–\$25 a child). According to Wood, these were more appropriate solutions for education in remote areas than a two hundred dollar computer (Web.archive.org, 2016).

The OLPC project finally collapsed in 2014, when the hardware of the computer became out of date, when spare parts were hard to find, and when the OLPC organization was no longer able to provide support (Wayan, 2016).

In the analysis that followed, The OLPC organization estimated that it would have needed \$30 billion annually to reach all the children in the world, at an initial cost of \$208 per laptop. But this would have been only a beginning, as school servers, satellite and set-up costs, teams of advisors and further infrastructure would have then been necessary. This cost and infrastructure had also not taken into account the harsh conditions for computers in the developing world, ‘power fluctuations, heat, dust, floods, hurricanes, goats and insects’ (Camfield, 2006).

Finally, the OLPC project became a cautionary tale involving first world assumptions, a misplaced belief in technology as a ‘cure-all’ solution to education, and the difficulties and enormous costs involved in bridging the gap between rich and poor.

The question of technology itself, and the assumption that it is a panacea for education, has also been the subject of a number of influential studies. A meta-analysis of these studies (Trucano, 2011) concluded that there are no technology shortcuts to good education. (See also Barrera-Osorio, et al., 2009, Behar, 2010, and Toyama, 2010).

VI. Conclusion

The exponential speed of internet uptake in the developed world cannot be simply replicated in the developing world. This is because, as detailed above, there are a number of urgent problems to overcome first – including poverty, health and literacy.

Another problem is the lack of internet infrastructure, and the high cost of internet services in the developing world. According to the 2013 *Affordability Report* by the Alliance for Affordable Internet, in at least 46 countries “the cost of entry-level broadband services exceeds 40 percent of monthly income for people living under \$2/day, and in many countries exceeds 80 percent or even 100 percent of monthly income” (Anon., 2013).

There are also many variables to navigate when assessing the global digital divide, because numbers alone do not provide an adequate picture. For example, which characteristics or attributes best describe the digital divide: income, education, age, gender, geographic location, motivation, reason not to use, etc.? Also, how sophisticated is the internet usage being measured? Is connectivity defined by mere access, retrieval, interactivity, intensive and

extensive usage, innovative contributions, etc.? And how does this internet access relate to digital literacy?

An example of the complexity of measuring and monitoring the digital divide is presented by Martin (2011). Martin points out that “counting with only 3 different choices of subjects (individuals, organizations, or countries), each with 4 characteristics (age, wealth, geography, sector), distinguishing between 3 levels of digital adoption (access, actual usage and effective adoption), and 6 types of technologies (fixed phone, mobile... Internet...), already results in $3 \times 4 \times 3 \times 6 = 216$ different ways to define the digital divide. Each one of them seems equally reasonable and depends on the objective pursued by the analyst”.

The other problem to overcome in attempting to connect the rest of the world to the internet by 2020, is that internet growth is currently slowing. For example, the number of global Internet users increased only 8% in 2014, compared to 10% in 2013 and 11% in 2010 (Baig, 2016).

The goal of universal internet connectivity is a noble cause. However, it is perhaps naïve and optimistic to believe that this can be accomplished by 2020.

As the analysis presented above reveals, this goal is impractical, if not impossible, without major and sustained social, economic, health, educational and policy changes, and the political will to implement and sustain these.

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A Cambodian Perspective on Lancang-Mekong Cooperation Initiatives: Opportunities, Challenges, and Future Directions

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I. Introduction

The reign of terror that once enveloped Cambodia is over. Since 1998, the country has enjoyed peace, stability, order and buoyant economic growth. Its engagement with ASEAN, good relations with the major powers such as China, India, Japan, The EU, South Korea, Russia and The United States, and its market economy driven policies have resulted in substantial inflows of foreign direct investment.

Today Cambodia is moving towards becoming a lower middle-income nation. Given its buoyant economy, which has been expanding at an average rate in excess of 7 percent in real terms for the last 2 decades, Cambodia is, according to the Asian Development Bank, an emerging tiger economy in ASEAN with a projected growth of 7 percent to 7.5 percent in 2016, compared with the region's average of below 5 percent. This growth has been driven by the solid performances of four industries: garment manufacturing, tourism, paddy and milled rice, and construction.

The poverty rate fell from 50 percent to below 20 percent from 2007 and 2012 (Asian Development Bank, 2016). The development record shows progress toward the realization of the Royal Government of Cambodia's early aspiration: "By the end of the first decade of the 21st century, Cambodia is to reclaim a full ownership of its destiny, while becoming a real partner in region and global affairs and a nation of genuine freedom and being free from poverty" (Royal Government of Cambodia, 2013).

Cambodia is endowed with abundant natural resources including oceans, rivers, trees, mountains and good weather. Additionally, the country is absent of earthquakes and other natural disasters except seasonal storms and floods. On the manmade side, Cambodia is rich

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with national-cultural icons comprising of aged Buddhist monasteries, and ancient-ruined temples like Angkor Thom (Bayon Temple), Angkor Toch (Angkor Wat) Temple, Preah Vihear Temple on the top of Dong Rek Mountain, Banteay Srey Temples and other ruins throughout the length and breadth of the country. It is no wonder why Cambodia is increasingly known as the Kingdom of Wonder by many tourists.

I would like to present four aspects, Cambodian relation to Mekong River countries, opportunities, challenges and future directions.

II. Cambodian Relations with Mekong River Countries

Cambodia has been an active member of ASEAN since the admission in 1999, and has been actively playing an important role in realizing ASEAN core values, particularly in the efforts to establish ASEAN integration and community building. Cambodia successfully hosted the ASEAN Summit in 2012 in Phnom Penh. Cambodia has been a good friend to ASEAN member states and continues to promote stronger diplomatic relations with ASEAN member states in tackling issues of common concern within ASEAN and the world at large.

Cambodia's relations with Greater Mekong Sub-region countries, namely China, Laos, Myanmar, Vietnam and Thailand, are also very good. Cambodia has been actively engaging in bilateral and multilateral cooperation with these nations for some time. Cambodia has been supporting existing cooperation mechanisms including the current Lancang Mekong Cooperation Initiative, and has put a lot of effort in to implementing cooperative development programs in this region. It has also proposed some initiatives for facilitating and implementing cooperation in the CLMV and GMS and so on.

Good relations between China and Cambodia have led to a very high strategic partnership. China regards Cambodia as a most sincere and trusted friend. Both countries have commented on this kind of strategic, trusting relationship in several bilateral meetings between the two leaders.

1. Opportunities

Look at a brief background of Lancang River: Lancang represents the Lancang River, Mekong means the Mekong River.¹ (White, Jacobs and Owen, 2014). Originating from the Tanggula

¹ The Mekong is a trans-boundary river in Southeast Asia. It is the world's 12th-longest river and the 7th-longest in Asia. Its estimated length is 4,350 km (2,703 mi), and it drains an area of 795,000 km² (307,000 sq mi), discharging 457 km³ (110 cu mi) of water annually. From the Tibetan Plateau the river runs through China's Yunnan province, Myanmar, Laos, Thailand, Cambodia and Vietnam. In 1995, Laos, Thailand, Cambodia and Vietnam established the Mekong River Commission to assist in

Cambodian Perspective on Lancang-Mekong Cooperation

Mountains in Qinghai Province, the Lancang River flows through the Tibet Autonomous Region, Yunnan Province and cuts across alpine and gorge regions. The section that flows out of China from Xishuangbanna, is called the Mekong River. With a total length of 4,880 km, the River successively flows through Myanmar, Laos, Thailand, Cambodia and Viet Nam, before it enters the South China Sea. The Mekong links the 6 countries and serves as their natural bondage and a cradle where their people live and breed. It bred their similar, yet distinctive cultures and forged their time-honored, profound and extensive economic and humanistic connections. With abundant resources, a drainage area of 795,000 square kilometers is home to 326 million people and produces a GDP of 590 billion USD with an annual economic growth rate of 7%, the Lancang-Mekong region is now one of the most promising regions in Asia and the world at large. However, due to historical reasons, the development of the Mekong sub-region started relatively late. Its economic level lags behind that of surrounding countries and regions. The per capita GDP is only over 2800 USD and it has a long way to go to achieve industrialization, technological advancement, and agricultural modernization. In order to narrow the development gap, the Mekong River countries have set development as the top priority. Additionally, they actively participate in regional cooperation, improve their domestic investment environment, attract foreign investment, and vigorously develop infrastructure. It is clear that they all have a strong will to promote development through cooperation (Fmprc.gov.cn, 2016).

The Lancang-Mekong Cooperation Initiative, initiated by the Chinese in 2014 and endorsed by the five ASEAN member states located in the GMS (Cambodia, Laos, Myanmar, Vietnam and Thailand), will make strong geopolitical alliances and share the abundant resources available. This cooperation will create many possible opportunities for investment, trade and tourism in the region and beyond.

The Mekong River countries are expected to reap benefits from the Lancang-Mekong Cooperation (LMC) Initiative, and together with other mechanisms, the future hopes of these countries will be realized. China and the ASEAN-Mekong River countries have completed a lot of activities and increased their efforts to cooperate, including establishing and launching many cooperation mechanisms such as the Mekong Sub-Regional Cooperation between China,

the management and coordinated use of the Mekong's resources. In 1996 China and Myanmar became "dialogue partners" of the MRC and the six countries now work together within a cooperative framework. The extreme seasonal variations in flow and the presence of rapids and waterfalls in the Mekong make navigation difficult. Even so, the river is a major trade route between western China and Southeast Asia.

Vietnam, Laos, Myanmar and Cambodia, that agrees to launch zero tariffs in January 2015; the Greater Mekong Sub-region (GMS) Cooperation, which involves five ASEAN members (Cambodia, Laos, Myanmar, Vietnam, and Thailand) and China (the provinces of Yunnan and Guangxi); the Mekong River Commission (MRC); Cambodia, Laos, Myanmar and Vietnam (CLMV) Cooperation, ASEAN-Mekong Basin Development Cooperation (AMBDC) established in 1996; Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS); Golden Quadrangle or the Quadripartite Economic Cooperation (QEC); the Lower Mekong Initiative (LMI); the Summit Meeting between Japan and Mekong River Basin Countries; the China-Laos-Myanmar-Thailand Joint Patrol Law Enforcement and Security Cooperation on the Mekong River Basin; and the China Silk Belt Economic Road (One Belt, One Road) economic development initiative, intended to enhance connectivity with regional countries bordering China. In particular, to improve diplomatic relations and develop a higher level of understanding and trust, to promote economic and social development by improving the living conditions of people living in Mekong River countries.

The three pillars of LMC - political and security issues, economic affairs and sustainable development, and social affairs and people-to-people – are newly established mechanisms by which GMS countries will make more commitments and increase their efforts and actions to achieve their mission, The mission being to study, address and tackle issues of common concerns related to political and physical security, promoting sustainable economic cooperation, and raising the standard of living.

Other possible opportunities for benefits from these mechanisms are as follows:

- LMC would contribute to ASEAN integration and ASEAN Community building and achieve its objectives through the three pillars of cooperation, namely political and security issues, economic and sustainable development, and social, cultural and people-to-people exchanges.
- Provide great opportunities to connectivity, including people to people, government to government, experts to experts, researchers to researchers and other interested parties to better understand other nations living traditions and diverse cultures, education policies, political structures, and the economic and social development of the diverse people of the Mekong-river countries, among others.
- Production capacity: develop a greater understanding about human resource capacity in product production, including productivity, demand, and supply.

- Cross-border economic cooperation: the exchange of goods or products, investments, water resources, agriculture, poverty reduction, cultural activities, and education.

2. Challenges

The world as a whole is slowly recovering from the world economic and financial recession, and the Mekong River countries, too, are on the slow path to recovery and development. The slow economic recovery of the countries in the region means it has direct impact on the development cooperation plans and projects of the countries in the region. China is an emerging world economic power, and the current slowdown of its production and investment impact GMS countries, ASEAN, and the rest of the world directly. It is usually said that the great powers have great responsibilities, and the smaller powers have smaller responsibilities. This simply means that China should play a leading role in mitigating challenges, by helping the other cooperative partners cope with and resolve those challenges. However, in response to the world-economic and financial recession in 2008, the global community has suggested that no country, powerful or not, can resolve regional and global issues alone. Rather, all countries must join hand in hand to address the issues and resolve them together. This is based on the new 21st century philosophy of shared power and shared responsibilities; it gives value to one another.

Current and future challenges such as increasing world and regional economic competition, alleviating social poverty and social inequality, closing development gaps, water resources control and management, and non-traditional security threats namely terrorism, transnational crimes, cross-border human trafficking, natural disasters, climate change, environmental problems and pandemics. The LMC initiative needs to carefully study and monitor progress in these areas, and ensure that responsibility is shared.

To deal with the above mentioned challenges, “The LMC shall promote high-level exchanges, dialogue and cooperation to enhance mutual trust and understanding and implement the Cooperation Initiative on Poverty Reduction in East Asia,” Chinese Premier Li Keqiang said on March 23 in Sanya, in southern China’s Hainan Province (English.gov.cn, 2016). This is a realistic recommendation for the countries concerns. Continuing to promote and deepen mutual understanding and trust within these countries is necessary because many members have had unfriendly relations in the past. Thus, to bury the bad-past experiences and regain trust and understanding is said to be a first priority of action. Vital for future relations is the need to effectively develop, manage and sustain long-term development of the Mekong River’s

resources. Nature, environment, bio-diversity, native species, and culture must be protected and preserved properly. Free water flow of the river must also be ensured for the benefits of all, not just for a few. If not, we will create barriers for development, trust and mutual understanding will not be achieved, poverty will not be reduced as planned, the risk of instability in the region will rise, and cross-border and transnational crimes and human trafficking will continue to exist.

The LMC needs to deepen law enforcement and security cooperation through information exchange, capacity building, and coordination of joint operations. They will establish a center in China for LMC water resources cooperation, and strengthen cooperation against non-traditional security threats, the department said.

We hope that the Lancang Mekong Cooperation mechanisms will not only make the movement of people and goods between those concerned countries easier, but also speed up the region's development as a whole. With proper and complete implementation, LMC will promote people-to-people and state-to-state interactive connectivity, mutual understanding, dialogue, networking, communications, peace, cooperation, development and prosperity. For example, since its establishment in 2014, there has been over 70-harvest projects covering water resource management, poverty alleviation, public health, infrastructure, personal exchanges, research, and science and technology (English.gov.cn, 2016).

3. Future Directions

The Mekong River countries have experienced a lot of challenges over the years, and continue to face challenges in present day. Such experiences provide lessons for creating a future direction that can realistically achieve strategic goals, visions and missions, therefore Mekong River countries should continue do as follows:

- Use and enhance all agreed upon existing mechanisms, as mentioned above, to promote trade and investment, including specific trade and investment missions in CLMV and GMS countries.
- The promotion of peace, stability and security in the region is vital for all kinds of cooperation including the effective implementation of all agreed upon mechanisms and annual action plans. Mekong river countries must promote a philosophy of common destiny of the region. Meaning, regardless of the international and regional situation, members of Mekong River countries should continue to make all efforts to contribute to national and regional peace, stability and development.

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- Implement realistic approaches and prioritize development plans and activities. The need to create resilient development that benefits all member countries in the region. I would like to refer to the recommendation of Premier Li during the 1st Lancang-Mekong Cooperation leaders' Meeting in Sanya, China on 22-23 March 2016, that says,
“Development is the top priority project for the Lancang-Mekong cooperation, and the countries should utilize their own strengths to help others. Development principles of the countries should be coordination, complementary advantages, pragmatic and forward-looking, open and inclusive and they should also take part in cooperation with co-consulting, co-building and sharing to achieve common development. And I also support other recommendation he made during the meeting..., promote cooperation based on projects. At this stage, we should make cooperation in the fields of interconnectivity, production capacity, cross-border economy, water resources, agriculture and poverty alleviation, while carrying forward the determined LMC early harvest projects step by step, and promote openness and inclusiveness. The Lancang-Mekong Cooperation is not an exclusive mechanism”
- Promote LMC mechanisms to attract and welcome investments from other ASEAN member states and ASEAN cooperation partners, including Japan, South Korea, the European Union, and the United States.
- Undertake regular meetings among the leaders' of Mekong River countries, and experts and eminent persons, researchers, educators and think-tanks to discuss and address issues of common concern in the region, ASEAN and the world at large that have direct and indirect implications to development cooperation efforts in all Mekong River countries.
- Conduct capacity building programs, research exchanges and publication exchanges about GMS and CLMV related issues on the implementation impact of annual action plans of all existing mechanisms, scholarly exchanges, and people-to-people exchanges to deepen mutual understanding of traditions, customs, norms, religions, and culture of people who are living along the Mekong River.
- Study and review the existing mechanisms, particularly on weak areas of annual action plans and put more efforts to better them for future direction and achievements.

- Use all means of cooperation to improve and enhance mutual trust, mutual understanding, to solve problems together, and secure a peaceful and stable environment in the Lancang-Mekong sub-region and GMS region as a whole by using a win-win strategy for all countries. Avoid exploitation of the mechanisms and existing agreements because that kind of action will weaken mutual trust and thus, slowdown trade, investment and other related projects, which are mutually beneficial activities. If the leaders of Mekong River countries can maintain trust they will help to develop all of the countries' economies, raise living conditions, alleviate poverty, and so on.
- Install alarm systems and early warning systems in the region so that people who are affected by natural disasters can be protected.
- Undertake and promote information sharing among the Mekong River countries. Information sharing will benefit all members and is a good way to ensure full understanding of important issues and thus, to ensure that appropriate measures can be put in place.

III. Conclusion

In conclusion, the LMC initiative is another important mechanism for promoting and enhancing foreign relations and development cooperation among Mekong River countries as well as other ASEAN member states and the world. Mekong River countries share common heritage along one of the largest rivers in the world, the Mekong River. Capital investment and trade activities should always be promoted, and jobs and better living conditions should be continued to be developed. In particular, China should devote more investment, trade and other development projects to improve the living conditions of people who live along the river. Poverty and social inequality should always be one of the top priorities all nations' action plans. In addition to the above-mentioned in "Future Direction," I would like to give some more recommendations for the future resilient development of the region through the Lancang-Mekong Cooperation as follows:

- All people should have access to natural resources and development projects.
- Development projects and investments should not destroy the environment, traditions, customs, norms, religion or culture of people who live along the river.
- Information sharing among the concerned countries is very important. All countries of interest should be well informed about issues and situations happening in the region so that urgent responses can be made on time.

Cambodian Perspective on Lancang-Mekong Cooperation

- Undertake studies and research about the region before a project can be designed and implemented.
- Another important factor is the cooperation among the concerned countries on developing prevention mechanisms for non-traditional security threats, such as anti-terrorism, human trafficking, transnational crimes, and pandemics in the region.

I hope that the Lancang-Mekong cooperation is a fruitful mechanism, and will thus bring economic development and poverty reduction to peoples of the six countries and will be attractive places for foreign direct investment, trade and tourism.

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Cambodia, ASEAN, and the International Atomic Energy Agency (IAEA): Nuclear Energy Recommendations for Cambodia Based on ASEAN's Experience

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Abstract

This article aims to study the perspectives of ASEAN member states on nuclear power plant generation in the region and to consider the possibility of Cambodia building a nuclear power plant for further development. It examines the relationship between Association of Southeast Asia (ASEAN) and the International Atomic Energy Agency (IAEA), which has resulted in some ASEAN member states building nuclear power reactors with financial support and nuclear equipment from the IAEA and other supportive countries such as Russia and United States. With IAEA's assistance, ASEAN has created a treaty and nuclear energy network for member states which has helped to ensure the peaceful activities of nuclear energy usage and has strengthened the safety, security and safeguards in the region. The Royal Government of Cambodia is planning to generate nuclear power plants for improving for many applications in the healthcare industry, agriculture, and other sectors of the economy, but this initiative has received pushback from several groups in the country due to perceived nuclear power plants' negative impacts on the economy, society and environment. This article analyzes the opportunities and challenges inherent in the diversification of energy sources in developing countries and conclusion with research policy recommendations about Cambodia's nuclear future.

I. Introduction

The International Atomic Energy Agency (IAEA) is a global agency that assists the member states to generate nuclear energy for peaceful activities. The IAEA has a relationship with the

ASEAN Secretariat on nuclear power consideration for further development. Currently, oil and coal are the most used energy sources in ASEAN (Trajano, 2015). These types of energy sources will be depleted in the next decade and the price is going to be expensive. The ASEAN member states have considered nuclear power generation for many purposes. Vietnam and Indonesia have started to operate nuclear power plants while Thailand has delayed building nuclear power plants after the Fukushima nuclear accident in Japan. Cambodia is planning to generate nuclear power for improving the healthcare, industrial, agricultural, and other sectors of the economy (Phnom Penh Post, 2014). The Ministry of Mining and Energy in Cambodia has expressed desire to build the nuclear power plant in 2020, but the initiatives have been protested from many groups in the country.

The purpose of this paper is to discover the benefits of IAEA in supporting its member states; to study the perspectives of the ASEAN member states countries on nuclear power generation in the region as well as the relationship between IAEA and ASEAN; to consider the possibility of Cambodia of planning to generate nuclear power; and to discuss the opportunities and challenges inherent in the diversification of energy sources in developing nations; and to provide policy recommendations about Cambodia's nuclear future.

1. Background of the IAEA

The International Atomic Energy Agency (IAEA) is an international organization that was created to promote the peaceful use of nuclear power and to inhibit its use, especially for any military purpose. In the summer of 1954, the US proposed to the General Assembly to create the IAEA to reliably control the fossil material in order to prohibit the proliferation of nuclear weapons worldwide and it was eventually established in 1957 as an entity within the United Nations (IALANA, 2012). There are now 168 member countries.

2. Purpose of the IAEA The purpose of the International Atomic Energy Agency is to:

- Accelerate and enlarge the contribution of atomic energy to peace, health and prosperity over the world
- Ensure that nuclear energy is safe and is not used for any military purpose
- Coordinate the experience and research in the peaceful use of nuclear power
- Prohibit the proliferation of nuclear weapons worldwide

II. Benefits of the IAEA

The IAEA encourages its member states to generate and use nuclear power in a peaceful way. It also assists the member states by advising on the building of the nuclear centers and laboratories as well as by promoting nuclear safety (regulations, safety standards, radiation protection, radioactive waste management and safety assessments). The IAEA supports expert services, equipment and training related to nuclear energy. Moreover, financial support has been providing by the IAEA for building the nuclear energy facility. The agency supported to the member states US \$ 78.5 million in 2006 while providing US \$ 59.1 million in 2000 (IAEA, 2007). The IAEA agency has increased the availability of energy service usage, which has been generated for telecommunication, information technology and manufacturing. Nuclear energy contributes to the gender equity because in poor countries, the people required to collect wood and dung for cooking are mostly women. Another benefit is that the energy is safe and affordable. However, charcoal and wood are utilized with inadequate ventilation, which may affect human health. Moreover, nuclear energy ensures the environmental quality due to the reduction of hydropower dams and the burning of fossil fuels. These activities seriously impact global climate change, air pollution, water pollution and deforestation (Vera et al., 2005).

III. IAEA's Relationship with ASEAN

ASEAN plays a vital role for enhancing the ASEAN framework on the safe and peaceful use of nuclear energy. Nuclear safety and non-proliferation was established by ASEAN in 1995 in the treaty on the Southeast Asia Nuclear Weapon-Free Zone (Bangkok treaty), which was primarily made to prohibit member states from developing, manufacturing and possessing nuclear weapons. It contains several provisions that the member states can use nuclear energy for peaceful purposes, in particular for economic and social development. It establishes the regional framework that guides member states should they decide to pursue nuclear energy. In the treaty of the nuclear program was a safety assessment concerning the guidelines and standard recommendations by the IAEA for the protection of health and the minimization of danger to life. Moreover, the Bangkok treaty follows the IAEA safeguard in Article 5. Each country that wants to generate nuclear power must create an arrangement with the IAEA to ensure the safeguards for peaceful power within eighteen months. The safeguard agreement with the IAEA is to prevent a nuclear explosive device, radioactive waste and other radioactive matter discharged into the sea (Nuclear Threat Initiative, 2016)

The IAEA has cooperated with ASEAN on the nuclear security program. The potential targets in ASEAN countries related to the nuclear energy are research reactors and fuel fabrication plants. Enhancing this program, the IAEA offers services and instruments for nuclear security such as peer reviews on security, international physical protection advisory services and integrated nuclear security support plans (INSSP). The ASEAN Network of Regulatory Bodies on Atomic Energy was established in 2011 by the ASEAN Secretariat. IAEA has supported the network by providing several possible areas for development and nuclear security training program. Moreover, IAEA is going to support the regional activities requested by ASEAN member states and the ASEANTOM network (Nian and Chou 2014; Trajano, 2015).

IV. Prospective Nuclear Energy in ASEAN

Coal and oil currently dominate the main types of energy used in ASEAN, and they will remain popular over the new few decades (Table 1). Many are concerned that coal and oil pollute the environment (CSIS, 2010). Nuclear power is becoming a new technology for ASEAN. Southeast Asia has planned to generate 16 nuclear energy plants including four in Indonesia, two in Malaysia, four in Thailand, and six in Vietnam by 2025 (Vienna, 2012).

Table I ASEAN Electricity Generation (%)

Type of Energy	Year 2011	Year 2035
Coal	32	49
Oil	44	28
Gas	10	2
Nuclear	0	2
Renewable (hydropower, bioenergy and others)	14	19
Total	100	100

Source: International Atomic Energy Agency (2013)

The Asian Development Bank expects that the demand for electricity in Southeast Asia will increase threefold. Figure 1 shows that the electricity demand has rapidly increased from 600.6 TWh in 2010 to 1733 TWh by 2035.

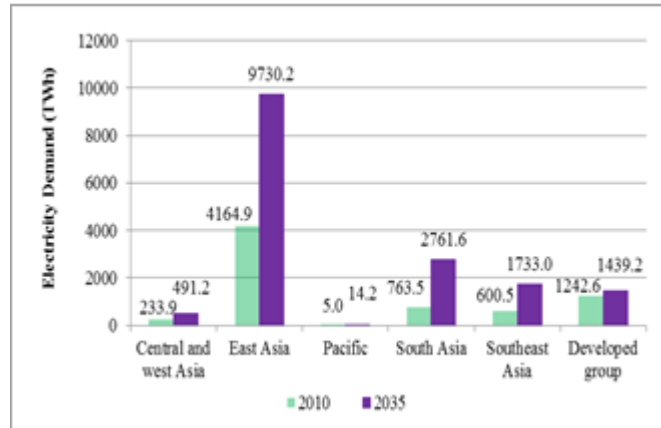


Figure 1 Electricity Demand by Region between 2010-2035. Source: ADB, 2013

1. Indonesia The two main agencies in charge of nuclear power plants development in Indonesia are the National Nuclear Energy Agency and the Nuclear Energy Regulatory Agency. Three experimental reactors have been built in Indonesia to train nuclear engineers in operating a nuclear facility and conducting industrial, educational, and medical applications of nuclear energy. There is currently a plan to build a small experimental nuclear power reactor near Jakarta. The Indonesian government has committed to generate 35,000 MW of nuclear energy by 2020 (Caballero and Tranjano, 2015).

2. Laos Laos signed an agreement with Russia in April 2016 to build two nuclear power plants with a capacity of 1000 to 1200 megawatts each. Currently, Laos has 80 new power projects mainly hydropower dams supported by China; Laos presently exports energy to Thailand, Cambodia and Vietnam (Maierbrugger, 2016).

3. Malaysia Malaysia planned for a small-scale nuclear power plant reactor in 2009, but this plan was objected by civil society groups. Currently, Malaysia has not decided to generate nuclear energy, but the government has already conducted a comprehensive feasibility study for nuclear power.

4. The Philippines The Bataan nuclear power plant (BNPP) was established by the Philippines in 1976 and planned to produce 620 megawatts of electricity. BNPP was almost completed in 1984 at a cost of \$2.3 billion. The nuclear power plant never started generating the electricity because it sits on major earthquake fault line and lies near the Pinatubo volcano. The energy secretary Alfonso Cusi mentioned in August 2016 that the old nuclear power plant in Bataan Province will be revived which will require a \$1billion investment. The nuclear power plant generation is one of the options for the Philippines to meet the electricity needs in the future. The annual power demand will be expected to grow by an average 5 percent until 2030.

However, the environmentalists are arguing against restarting the power plant because it is unsafe and expensive. Moreover, the Philippine Movement for Climate Justice stated that “We need to move away from fossil fuel like coal, but nuclear energy is not safe and will also harm the people and environment” (Janelle Retka, 2016).

5. Thailand Currently, Thailand does not have any nuclear power plants. According to the Power Development Plan (2010-2030), Thailand originally planned to construct five nuclear power plants (NPP) by 2039. The first two NPPs would be built in 2020 and 2021, the third and fourth NPPs in 2024 and 2025 and the last NPP in 2028. Because of the Fukushima nuclear accident, the Thai government considered to postpone the construction by three year. Thailand has revised the power development plan which will start the first reactor by 2023 and construct only 4 nuclear plants (Vienna, 2012).

6. Vietnam Vietnam approved plans to construct a nuclear power plant 1000 MW at Phuoc Dinh, Ninh Thuan Province in November 2009. It was expected to begin construction in 2014. Russia provided the financial support for the construction and also enhanced the capacity building by providing training to Vietnamese students in nuclear engineering courses. In fact, 344 Vietnamese undergraduate and graduate students were studying in Russian universities to prepare for the project. Moreover, Russia provided opportunities for 150 Vietnamese engineers to learn more about construction of Rostov nuclear power plant in Russia. Vietnam and Russia signed an agreement to build the first nuclear power plant in October 2010. Russia committed to provide financial support of 85% of the plant’s construction including fuel. Another agreement was that Russia gave support of US\$9 billion for exporting the credit bureau to Vietnam in November 2011 and the second agreement was that Russia provided a US\$500 million in loan to build a center for nuclear energy science and technology in Vietnam (International Trade Administration, 2016).

Vietnam and Japan signed a nuclear power agreement for a second nuclear power plant construction in Ninh Thuan province. It was proposed to start the construction in 2015 but it was delayed later on. Japan has committed to train about 1000 staff for Ninh Thuan 2. Moreover, in 2011, Vietnam created the master plan for national power development 2011-2020 which states that the country is available to start the nuclear energy operation. Vietnam expects that the nuclear power plant will be about 10.1% of total energy in 2030 (Anthony and Tranjano, 2015).

7. Other ASEAN nations Brunei does not have a nuclear power plant yet while Singapore has not committed to generate the nuclear power due to its small land area. Moreover, Myanmar has never officially announced a plan to build a nuclear power plant. Myanmar's government stated that it did not plan to build the nuclear power plant due to inadequate resources and concerns about the nuclear impact.

V. Prospective Nuclear Energy in Cambodia

Cambodia does not have a nuclear power plant yet. The Cambodia National Council for Sustainable Development (NCSD) and the State Atomic Energy Cooperation "Rosatom" of the Russian Federation signed three Memoranda of Understanding (MoU) in May 2016 namely, an MoU on Cooperation in the Use of Atomic Energy for Peaceful Purpose, an MoU on the Establishment of a Cambodia-Russia Joint Working Group (JWG) on Cooperation in the Use of Atomic Energy for Peaceful Purposes, and an MoU on the Establishment of Information Center of Nuclear Energy in Cambodia to promote public awareness on nuclear energy and technologies, especially among the youth. Cambodia plans to get nuclear power electricity by 2030 to support many applications in the healthcare, industrial, agriculture and other sectors of the economy. Moreover, Cambodia have plan to further discuss a joint research and training in the field of nuclear energy, and build human capacity in nuclear physics, nuclear and radiation safety, emergency response, radioactive waste management and radiological impact assessment. Cambodia and Russia organized the First Meeting of Cambodia-Russia Joint Working Group on Cooperation in the Use of Atomic Energy for Peaceful Purposes on 17 August 2016 to review and finalize the draft agreement, to discuss the rules of procedure of the Cambodia-Russia JWG and priority activities under the MoU on cooperation in the use of atomic energy for peaceful purposes.

Energy consumption statistics in 2015 show that Cambodia used 1,985 megawatts of electricity in which 1,569 megawatts were produced locally and while the rest was imported from Thailand (135.5 megawatts), Vietnam (277 megawatts), and Laos (4 megawatts) (The Phnom Penh Post, 2015). Figure 2 shows the energy generation in Cambodia. Currently, most of electricity is generated from hydropower dams to support the daily life consumption (EAC, 2015).

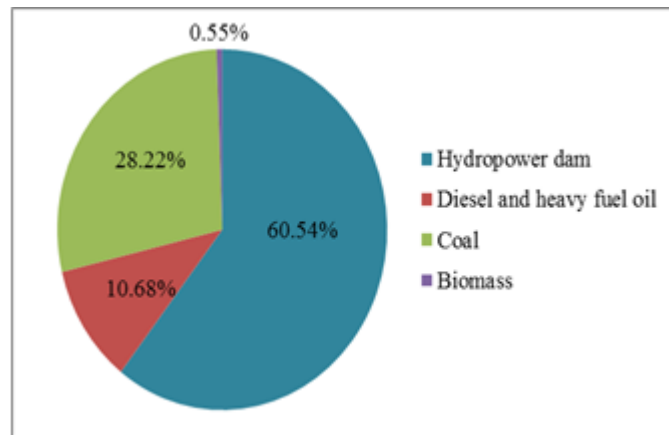


Figure 2 Energy Generation in Cambodia in 2014. Source: Electricity Authority of Cambodia, 2015

The Asian Development Bank (ADB) stated that the energy consumption in Cambodia will be increase up to 2401 megawatts between 2015 and 2025 (ADB, 2013). Cambodia will need to access more energy power by import from neighboring countries. Because of the increase in demand of energy consumption, there are institutions and government offices, especially the Ministry of Mines and Energy, which have planned to cooperate with Russia to generate nuclear power plants. The Royal Government of Cambodia and the Ministry of Mines and Energy plans to construct nuclear power plants due to depleting oil, coal and biomass sources. Cambodia cannot avoid building the nuclear energy power plant as it is the target of the Cambodian government to build the nuclear plants as they see alarm in the diminishing resources, the Minister of Mining and Energy has remarked. In addition, Hiroshi Suzuki, Chief Executive and Economist at the Business Research Institute for Cambodia, stated that nuclear energy was crucial for Cambodia and it requires strengthening human resources before constructing the nuclear power plants. It is highly risky of Cambodia to rely solely on oil, as the future price is uncertain. Cambodia needs to find another energy resource for further supply. Sat Samy and Ith Praing, Secretaries of State for the Ministry of Mines and Energy, mentioned that hydropower and coal are expected to increase in cost during the next decade. After 10 years, Cambodia will not have enough hydropower to supply its demand in the country; it is only a short-term strategy for the hydropower dam development. Therefore, nuclear energy is the best option for Cambodia. The Ministry of Mines and Energy confirmed that Cambodia expects to build the nuclear energy by 2020-2025.

Dr. Hah Chang Joo, an advisor to the rector and adjunct professor at University of Battambang, is a nuclear researcher and designer from Seoul University in South Korea and provides nuclear

education related to nuclear engineering at the University of Battambang. He argues that Cambodia will be able to generate nuclear energy in the next 10-20 years. This major is in its third generation, currently with 22 students. Improving the capacity building on nuclear power is critical for Cambodia to develop nuclear power plants in the next decade. The university now has a nuclear core simulator machine which cost about US\$50,000 sponsored by Seoul University.

Nuclear energy will be important for Cambodia in the future. However, some complaints have been raised by groups of NGOs as well as other institutions in Cambodia. Nguon Meng Tech, Director General for the Cambodia Chamber of Commerce, remarked that nuclear power plants are dangerous because Cambodia does not have enough experts to oversee the nuclear power plants. Moreover, after the plants are built, Cambodia will still face some of the same problems as now, namely poverty and political uncertainty. He argues that instead, Cambodia should focus on its necessities and other investments in the energy sector.

Nguy San, Deputy Executive Director at the NGO Forum, has stated that nuclear power is important for Cambodia but only if it ensures the safeguards. Cambodia may not be ready for building nuclear plants because Cambodia needs more experts and also needs technology to protect the discharged nuclear waste which could destroy the water quality. He added that Cambodia has invested for seven hydropower dams nationwide at a cost of US \$1.4 billion.

Mr. San Vibol, an energy researcher and lecturer at the Royal University of Phnom Penh, argued that he thinks that Cambodia should not have the nuclear power because it is dangerous. He also added that Cambodia lacks nuclear engineers and that law enforcement is still limited (Kossov, 2015)

According to the IAEA, countries aspiring to nuclear energy should meet 19 milestones: national position, nuclear safety, management, funding and financing, legislative framework, safeguard, regulatory framework, radiation protection, electrical grid, human resource development, stakeholder involvement, site and supporting facilities, environmental protection, emergency planning, security and physical protection, nuclear fuel cycle, radioactive waste, industrial involvement and procurement (Kovan, 2014). Therefore, if Cambodia truly wants to develop its nuclear energy sector, it must consult with IAEA to meet these particular milestones.

VI. The IAEA's Relationship with Cambodia

Prime Minister Hun Sen met the IAEA Director General Yukiya Amano in Cambodia in January 2014. He suggested the IAEA to help train human resources in Cambodia on how to use the nuclear technology for enhancing the agricultural and health sectors. He asked for help from the IAEA to draft a law on nuclear energy for the Ministry of Mines and Energy. Amano stated that he wants to know the purpose of Cambodia for wanting to use the nuclear technology. He mentioned that nuclear technology can improve the agricultural production and also health sector and he committed to assist Cambodia with help related to these sectors, which were later expanded in 2016 (Sokha, 2014).

VII. Challenges of Nuclear Safety in ASEAN

ASEAN plays an important role to encourage its member states to generate nuclear power. A treaty and nuclear energy network were established by ASEAN to ensure the safeguards in the region. The member states have enabled each other to share their experiences related to nuclear power plant construction during the annual ASEAN meeting in order to strengthen the knowledge related to nuclear power. The IAEA assists ASEAN member states to establish nuclear energy centers and laboratories for nuclear research programs, as well as nuclear equipment for nuclear power plant construction. Moreover, the IAEA supports ASEAN member states to create the safeguard frameworks to ensure the safety and security of the region. Cambodia will eventually be able to use nuclear power to offset its dependency on coal and oil, as well as its need to import energy, and it can work within the framework of ASEAN and the IAEA. While Cambodia may not be currently ready for nuclear energy, the government should continue to prepare for it by working with the appropriate groups and by raising awareness of the issue so that the public can be ready to at least consider alternative energy sources.

1. Scarcity of adequately human resources Human resources is important for nuclear energy development in the region. The training of those involved with nuclear power should be conducted, and they must be educated in all aspects of the infrastructure development in order to deeply understand the process of the operation. Without an educated workforce, nuclear power generation simply is not possible.

2. Terrorism The groups of Jemaah Islamiyah and Abu Sayyaf remain active in Southeast Asia. These groups have not expressed interest in nuclear energy development in the region. However, terrorist groups could in theory attempt to take nuclear and radioactive materials.

Regional actors must consider the material protection and increase their attention to the emergency preparedness and response with nuclear and radioactive materials.

3. *Weak Maritime Security* Maritime security is a major issue in Southeast Asia. Weak maritime security may have negatives effects on nuclear security by facilitating the illegal transportation of nuclear and radiological materials. The issue of maritime security is not only pertinent to the international transfer materials but also to domestic transfers. The nuclear material will pass through the Philippines, Indonesia, and Malaysia with unclear maritime borders.

VIII. Recommendations

Based on the real practice in ASEAN and the IAEA's requirements for further nuclear energy power generation, Cambodia should do as the following:

1. Cambodia should strengthen the international cooperation with sources of assistance and financial support; it should use this assistance to help build the capacity of nuclear engineers and the radioactive waste technology to ensure the safety for both local and regional facilities. Cambodia could also write an official letter to the IAEA asking for further concrete help to conduct the nuclear energy capacity building for Cambodia's nuclear engineers and the radioactive waste treatment technologies to ensure the safety, security and safeguard for both local and regional facilities. They could also suggest an exchange program for Cambodia's nuclear engineer to work at nuclear power construction in Russia, similar to Vietnam. Russia, or another country, could assist in building nuclear energy centers, laboratories for nuclear research program and financial support for nuclear power plant construction in Cambodia.
2. Learn more the experiences from the successful nuclear energy generation projects from ASEAN member states and ask about the challenges of generating the nuclear energy and other related things during the annual ASEAN meeting session, or at another designated time. These meetings should be bilateral and be in the cooperation of sharing and strengthening the community.
3. Study and deeply understand about the 19 IAEA milestones before planning to generate a nuclear power plant in Cambodia. These milestones ensure the strength of nuclear power generation and ensure the safeguards in the region. Work with the IAEA to help follow the 19 milestone, paying careful attention to the Cambodian context.

4. The government should motivate the University of Battambang which provides a Bachelor's Degree of Nuclear Engineering and assist with the financial support to keep the program healthy and attractive. The government should also encourage Cambodian students to study nuclear engineering for improving further development.

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BOOK REVIEW

The Fourth Industrial Revolution

by Klaus Schwab

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Professor Schwab (founder and chairman of the World Economic Forum) has written a powerful and provocative book titled *The Fourth Revolution*² to share his thoughts on a technological revolution that will transform the way we live, work and interact with one another in a globalized borderless world. At this early stage, we are still unclear about how it will unfold as the 21st century, now in its second decade, progresses. But one thing we do know and that is unlike three previous revolutions, the Fourth Industrial Revolution will be unlike its precursors in terms of its scale, scope and complexity and our response to it must be comprehensive and integrated, engaging stakeholders from the public and private sectors, in academia and civil society to solve global issues and challenges. It may be recalled that the First Industrial Revolution used water and steam power to mechanize production, the second tapped electricity for mass production and the third utilized electronics and information technology to automate industrial production.

Building on from the third revolution and not to be seen as a mere linear progression of it, the fourth industrial revolution, according to Professor Schwab, is about technology and digitization which will fuel momentous change through creativity and innovation. It is "unique because of the growing harmonization and integration of so many different disciplines and discoveries. Tangible innovations that result from interdependencies among different technologies are no longer science fiction".

More significantly, and to quote Professor Schwab again: "Artificial Intelligence (AI) is all around us, from self-driving cars and drones to virtual assistants and translation software. This transforming our lives. AI has made impressive progress, driven by exponential increases in computing power and by the availability of vast amounts of data, from software used to

¹ This views expressed in this article are the author's alone, and do not necessarily reflect any institution of which he is affiliated.

² Schwab, K. (2016) *The Fourth Industrial Revolution*. Geneva: World Economic Forum.

discover new drugs to algorithms that predict our cultural interests" (pp. 10-11). These changes are indeed profound ushering time of great promise and potential peril.

Professor Schwab takes pains to spell out some of those perils: accelerated inequality due to the unequal division of the spoils of technological advances and the spectre of mass unemployment; the erosion of global governance; misuse of robotics, genetic engineering, cyberwarfare; and the disruption and creative destruction of many established businesses. But in the end the Fourth Industrial Revolution is empowering the economically disadvantaged by giving them access to digital networks, increasing the efficiency of organisations, improving medical care with personalized drugs and providing a technological solution to climate change.

The reality of disruption does not mean that we as a global polity are powerless in the face of it. It is our collective responsibility to ensure that we establish a set of common values to drive policy choices and to enact the changes that will make the Fourth Industrial Revolution an opportunity for all. Only by bringing together and working in collaboration with leaders from business, government, civil society, faith institutions, academia and the young generation that it is possible to develop and implement integrated solutions to the challenges posed by technology and digitization in the Spirit of Davos.

Professor Schwab concludes that operating in an increasingly complex and disruptive environment requires the intellectual and social agility of the fox, to quote the analogy used by the renowned philosopher Isaiah Berlin of the Fox and the Hedgehog, rather than the fixed and narrow focus of the hedgehog. Stated in practical terms, we cannot afford to think in silos. In Professor Schwab's view our approach to problems, issues and challenges in the epoch of the Fourth Industrial Revolution must be holistic, flexible and adaptive, continuously integrating many diverse interests and opinions. The Fourth Industrial Revolution has the potential to "robotize humanity", but if shaped in a humanistic way, can also catalyze a new cultural renaissance and a true global civilization, uplifting "humanity into a new collective and moral consciousness based on a shared sense of destiny", that essential ingredient for peace.

The book is a useful companion for the busy executive because it is highly readable, and it is useful for all who are keenly interested in understanding what is happening in the world which is being driven by technology and digitization.

The University of Cambodia wishes to acknowledge with thanks the permission granted by Professor Klaus Schwab, the author of The Fourth Industrial Revolution and The World Economic Forum to translate the book into the Khmer Language and for granting a waiver of all royalties to be derived from the sale of the translated version of the book in Cambodia.