KONRAD ADENAUER STIFTUNG

12|2019

E-GOVERNANCE IN CAMBODIA

Edited by
Christopher Perera
Robert Hör

DIGITAL INSIGHTS

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Konrad-Adenauer-Stiftung, Cambodia
House No 4, Street 462, Khan Chamkar Mon,
P.O. Box 944, Phnom Penh, Kingdom of Cambodia,
Telephone : +855 23 966 176
Email : Office.PhnomPenh@kas.de
Website : www.kas.de/cambodia
Facebook : www.facebook.com/kaskambodscha

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FOREWORD

The digital economy is already impacting the Kingdom of Cambodia in a variety of ways. New business models, new sectors and new capabilities have developed over the last two decades. And even if not all Cambodians are digital natives, many are at least Facebook and smartphone natives with a mobile subscription rate of 117% and more than 9 million Facebook users. However, Cambodia is still at the beginning of developing a comprehensive approach to deal with challenges related to the mega trend digitalization.

One of these challenges is the government adaption of ICTs and the digital transformation towards a more sustainable, open and inclusive government. That does not happen by itself as digital transformation is a human pioneered and empowered process. Fundamental changes regarding the way we cooperate and communicate, organize government services, lead staff, develop existing skills and give new ones to officials, set priorities and strategies as well as create a new cultural mindset are paramount factors in that transformation. Ultimately, it is about cultivating new connections, encouraging exploration, enabling potential and championing the shift.

This publication brought together authors from all walks of life in order to explore and mature thoughts, ideas and knowledge about decisive e-government topics, which include cyber security, the role of data and trust, Facebook and service provision tailored to citizens and business needs. The great insight and conclusion is that significantly more research has to be done in order to provide scientific and thoroughly thought through ideas to key stakeholders of the government´s digital journey, which involves the citizens, society and even culture more than some might think.

All contributors to this publication demonstrate that e-government can have an impact in many ways. It is also evident that when the Royal Government wants to materialize its vision of becoming a digital society and high income country by 2050, the development of the digital government has to go hand in hand with the development of digital infrastructure, digital business, digital capabilities and digital trustworthiness.

We hope this publication will get you involved in the topic and encourage you to not just read, but also to provide us with critical feedback and ideas in order to grow the research community!

Have a good read and keep on learning, exploring and sharing!

Robert Hör

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DISCLAIMER

The designated contributions do not necessarily reflect the opinions and views of the editorial team and the Konrad-Adenauer-Stiftung. Hence, assumptions made in the articles are not reflective of any other entity other than the author(s) – and, since we are critically-thinking human beings, these views are always subject to change, revision and rethinking.

Reading time: 05 minutes

Lead in: E-governance in Cambodia

Ann-Cathrin Klöckner[1] and Robert Hör[2]

1 Ann-Cathrin Klöckner is currently a researcher at the Konrad-Adenauer-Stiftung in Cambodia. She studies Politics and Public Administration with a focus on International Relations. Her research centers around conflict studies and the political and social contexts. As part of her education, Ann-Cathrin Klöckner has studied at the University of Konstanz, Germany, and the University of Durham, England.

2 Robert Hör is currently program manager for digitalization at Konrad-Adenauer-Stiftung Cambodia. He is a political scientist by training and is in charge of several research projects and dialog formats between Cambodian, regional and German experts His current research focus lies on the implementation of digitalization projects within SMEs and organizational development. Having always been fascinated by the social-political impact and potential of new technologies and what they mean for enterprise, he started studying the online M.Sc. program digital transformation and management. His major fields of study are digital strategy development, political economy and business informatics.

Photo credits: Image by allPhoto Bangkok from Pixabay

Introduction

E-government, in its ideal state, aims to solve a variety of governance challenges in developing and developed countries. It would not just be easier and much faster to get new documents, but also improve life in more basic aspects regarding survival and livelihood. For instance, the article by Seanghak Khin and Piseth Kim for this publication is devoted to the topic of "how e-learning can improve water, sanitation and hygiene practices in rural Cambodia" and Riccardo Corrado and Patchanee Tungjan explore the massive relevance of MOOCs for the education system. Both cases clearly show the possibilities e-governance offers in aiding rural citizen's health and education.

The advantages are two-fold, as both the government and the citizens profit from digitized systems, when they are well implemented. Cambodia is still at the very beginning of its way to a well-working e-government system but the potential in the future is enormous and encompasses digital infrastructure and digital government, which includes the digitalization of services and data driven governance.

This is why the Royal Government of Cambodia made this topic a top priority in its rectangular strategy. In fact, the first e-government project was already launched in the early 2000s.[3]

Today, the government's vision for Cambodia is to become a high income country by 2050 with and through a digital and innovative society.[4] For the next 5 years, the focus will be the establishment of digital infrastructure and to develop needed skill sets in order to enable the journey towards this goal in the near future.[5] A step in this direction is, for example, 5G, which is expected to be rolled out by 2020.[6]

So What Exactly is E-government and Which Role Does It Play in Cambodia?

There are a variety of definitions provided by researchers as well as international organizations. The United Nations define e-government as the use of Information and Communications Technologies (ICTs) in order to improve government services and citizen's access to these.[7] The World Bank defines "Electronic government (e-government) [...] broadly [...] as the use of ICTs by government to enhance the range and quality of government information and services provide to clients in an efficient, cost-effective and convenient manner, while making government processes more accountable, responsive and transparent".[8] ICTs in this context are digital tools to empower citizens, improve productivity and the skills of a population.[9] Digital tools include

3 Nguonly, T. (2019). MSMEs in Cambodia Digital Economy. Phnom Penh, 6.

4 Ibid., 9.

5 Ibid., 11.

6 Ibid., 6.

7 United Nations. (2019). publicadministration.un.org. Retrieved from https://publicadministration.un.org/egovkb/en-us/About/UNeGovDD-Framework

8 Sudan, R. (2005). The Basic Building Blocks of e-Government. In The World Bank Group, e-development from excitement to effectiveness (pp. 79-99). Washington DC: The International Bank for Reconstruction and Development/The World Bank, 79.

9 Schware, R. (2005). E-Development: From Excitement to Effectiveness. In T. W. Group, e-development from excitement to effectiveness (pp. xiii-xxi). Washington DC: The International Bank for Reconstruction and Development/The World Bank.

data analysis, communication and collaboration as well as transaction systems.

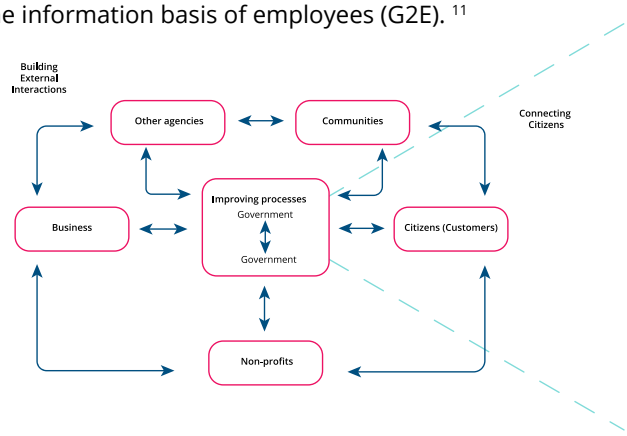
As it has become apparent, an interactive nature of the concept of e-government can be observed: When citizens benefit, so does the government.

Client-government relations are a process which can be represented in a simplified manner:

Source: Heeks 2008

The client - in case of the government for example a citizen or business needs a government service and puts in a request. This triggers a process in the government. The quality of the output, namely the fulfillment of the request, is dependent on what happens in the second step and what the government does with it. The more efficient and effective the process in between, the better the output will be most likely. It can be expected that all parties have an interest in the productivity of the process. A simplified process for business registrations could be reached through a single online registration portal. The entrepreneur enters their data into the system (=Input) and the ministries and government agencies working on the case all have access to the data that is relevant for them to fulfill the request (=Process). In order to predict the output better, the entrepreneur will be able to check the status of their application until the registration is issued electronically (=Output).[10]

Different kinds of government - clientele relationships include government services to citizens (G2C), government to businesses (G2B), integration and cooperation between government agencies (G2G) and the information basis of employees (G2E). [11]



Source: Heeks 2008[12]

10 Nguonly, T. (2019). MSMEs in Cambodia Digital Economy. Phnom Penh, 36.

11 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 93

12 Heeks, R. (2008, October 19). Success and Failure in eGovernment Projects. Retrieved from eGovernment for Development: httpwww.egov4dev.orgsuccessdefinitions.shtml#definition

A Digital Government for Digital Cambodians? New Lifestyles Need Citizen Centricity

Digital tools are not new to Cambodians and when the society as a whole is changing, the government has to follow suit. The internet has become a central part in most people's lives. The dominance of Facebook is just one indicator underlying this argument. Currently, there are almost nine million Facebook users in Cambodia.[13] Facebook is used to keep in touch with people but also increasingly to make business and influence the government. At the same time, more and more local fintech companies are entering the market, new delivery services are developed and mobility is changing thanks to Apps like PassApp.

All these are indicators that the Cambodian digital ecosystem is undergoing rapid and fundamental changes, which impact the society as a whole. Makara Vorn and You Y Ly looked at how governance could be promoted through the use of Facebook – the most prominent social network with Cambodians. In the article "Promoting Better Governance Through Facebook: A Pilot Study and Analysis", they underline the importance of Facebook as a means for citizens to get in contact with the government and get involved in the government process. A paradigm shift from government to citizen centricity has to be made in order to address the needs, problems and challenges in the most suitable manner. This includes a change of management styles, objective systems and a turn to economic methods and tools to improve the user experience of citizens.

Following our word that e-government should be client-centered, the biggest group that will benefit are the citizens. In short, the benefits can be summarized in a few but important keywords: Transparency, user friendliness, accessibility and integration. Simply put, the government is a service provider and caters to a variety of sectors. This implies a mindset shift from top down and a push from traditional government actions to citizen centered government actions. In order to do so, it first needs to be aware of the citizen's needs, problems and behaviors. The citizens thereby become the center and purpose of all government activity and government services are supposed to cater exactly to what clients need and want.[14] This includes feedback on services and progress, complaints about wrong doings and ideas to improve the process.[15]

> ***After all, the government works for the citizens.***

E-government is thereby not just a service of the government for their clients, it is also a joint effort of the two parties that reaps benefits for both sides. There is a theory that establishes a 80/20 ratio, claiming that 20% of the information are used by 80% of the clients.[16] The clients themselves know which services and information they need so in order to establish the most relevant aspects, the government needs the clients to express their needs. Therefore, governments need their citizens and businesses in order to reach ideal standards.

13 Ang, C. (2019, July 16). Cambodia's 2019 Social Media & Digital Statistics. Retrieved from geeksincambodia.com: http://geeksincambodia.com/cambodias-2019-social-media-digital-statistics/

14 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 93.

15 Ibid., 88.

16 Ibid., 103.

Let's elaborate more on the advantages promised by e-government. To make the essence of e-government more understandable, an example will illustrate the characteristics. In Cambodia, registering a business is, currently, expensive and time consuming. The current business registration process is riddled with silos, redundancies and integrity issues. The entrepreneur will have to go to multiple ministries and give the same personal data multiple times. If some data then changes, these changes are not carried into a system but have to be changed by the entrepreneur at each ministry. To register a business, it thus takes 50-70 days and can cost anywhere between 2 and 5 million KHR. By fixing the currently inefficient characteristics, connecting the ministry portals and making workflows transparent, time and cost could be capped significantly.[17] To read more specifically on the relation between e-government and businesses in Cambodia, read "Digital 'Government-to-Business' Services in Cambodia: Overview and Challenges" by Maria Yang and Darapich Sovann, which is included in this publication.

Characteristics of e-government services

Source: Own Graph

Accountability. Accountability describes "the obligation of an individual or organization to account for its activities, accept responsibility for them, and to disclose the results in a transparent

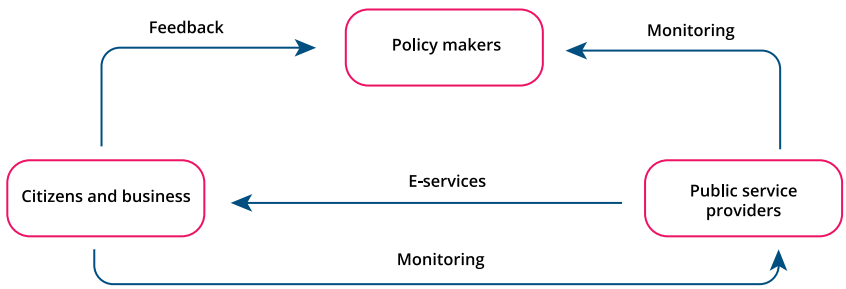
17 Nguonly, T. (2019). MSMEs in Cambodia Digital Economy. Phnom Penh, 33.

manner".[18] The World Bank has long declared that accountability and transparency are essential for sustained growth and poverty reduction.[19] Easier access to information fosters information culture and thereby transparency and accountability.[20] Not having full information to answer any requests can seriously impact accountability and therefore hinder the government to respond sufficiently and entirely to entrepreneurs and citizens request.[21]

Cost and Corruption. Government services which are hard to access and expensive, even if just in opportunity costs, foster corruption and bribery. This, in return, decreases government efficiency, trust and effectiveness.[22] Digital tools on the other side enable a complete and transparent tracking of activities and workflows, which reduces the opportunities for corruption and bribery. Furthermore, the limitation and automation of face-to-face contact and touchpoints further limits chances and risks of illegal activities.

Cooperation. E-government ideally enables efficient and large scale cooperation.[23] Access to unified data and information increases the potential for cooperation and innovation. [24]Currently missing unified information systems between ministries, the government agencies do not have access to relevant documents or data. This impacts the quality and possibility of the government to respond to requests.[25] A central information sharing system would dispose of any doubling information that might need to be submitted to a variety of agencies and give government agencies a better overview over the request and how to respond, saving time and effort on both sides of the request and process.[26]

Framework for accountability for public services



Source: Hannah 2010

18 Business Dictionary. (2019). Business Dictionary. Retrieved from businessdictionary.com: http://www.businessdictionary.com/definition/accountability.html

19 World Bank. (2002). Social Funds: Assessing Effectiveness. Washington DC: World Bank.

20 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 33.

21 Yang, M., & Sovann, D. (2019). Digital "Government to Business Services in Cambodia: Overview and Challenges. Digital Insights, 173.

22 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 69.

23 Ibid., 12.

24 Ibid., 14.

25 Yang, M., & Sovann, D. (2019). Digital "Government to Business Services in Cambodia: Overview and Challenges. Digital Insights, 171.

26 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 12.

Development. E-government is a cost-effective way to deliver assistance needed to remote areas in order to assimilate different regions.[27] The goal is to use existing technologies to improve the situation for poor communities.[28] Poor citizens can be provided with easier access to markets and educational opportunities, thereby improving their chances for a better income.[29] If one lives on the country side, there might be long distances and bad roads standing between the client and all the departments required to be visited. Many might not have the financial possibility or time to travel the distances multiple times. The submission of the documents online will approximate rural and urban areas by making the distance to government services equal for everyone: Namely, just the reach to their phone or computer.

Effectiveness and Efficiency. E-government is meant to make the government more effective, meaning that it is doing "the right thing".[30] This can lead to an increase in the size and scope of the economy. But effectiveness can also mean decentralization in order to ensure an improved provision of resources and information.[31] Efficiency, on the other hand, means "doing the thing right", measured on the basis of the consumption of resources in respect to how they could be used for an ideal outcome. [32]Some more important steps are allocating resources more efficiently as well as continually adjusting programs and policies as necessary.[33] The local level can be made more efficient and more responsive to local needs in the population.[34] Fulfilling these requirements will be especially challenging in light of personalized situations which have no pre-set solutions. The government will have to share information across departments and with the private sector in order to find answers to these individual requests.[35] The ready availability of necessary information and the time saved by not having to use human resources on person-to-person interactions makes it probable that a significant amount of days can be shaved off the total.

Mobile. E-government is compatible with mobile devices, thereby especially suitable for developing countries like Cambodia where desktops were skipped and the mobile phone is widespread.[36] This goes back to the vision that everyone, everywhere in Cambodia has access to government services.

Going Down the Road to E-governance

Taking a successful country as a role model, which already reaps most of the mentioned benefits, the article "E-Government: What Can Cambodia Learn from E-Estonia?" goes further into challenges that Cambodia has faced and is still facing as well as the potential development illustrated on the successful example of Estonia.

27 Ibid., 47.

28 Ibid., 15.

29 Ibid., 39.

30 Business Dictionary. (2019). Business Dictionary. Retrieved from businessdictionary.com: http://www.businessdictionary.com/definition/accountability.html

31 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 51.

32 Business Dictionary. (2019). Business Dictionary. Retrieved from businessdictionary.com: http://www.businessdictionary.com/definition/accountability.html

33 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 38.

34 Ibid., 42.

35 Ibid., 14.

36 Lallana, E. (2008, October 19). mGovernment. Retrieved from eGovernment for Development: http://www.egov4dev.org/mgovernment/

The United Nations measures their e-government development index, in which Cambodia currently ranks 145th in the world, by the means of three hard necessities: "the provision of online services, telecommunication connectivity and human capacity".[37] This shows, that in the end, even though soft infrastructure enables e-government, hard infrastructure defines it and is key for a viable economy which increases competitiveness and transformation. Though digital development has increased in recent years with good technological and internet coverage, the skipping of computers and laptops and instead reliance on mobile phones continues to pose a problem for the implementation of e-government services in Cambodia because many web services are not fully available in the mobile version.[38]

Cambodia has committed to objectives in regards to digitalization and e-government development multiple times in the past and is aiming to move ahead in the development. ICTs will enable information communication between the government, its departments and the citizens in both directions,[39] laying a foundation that is necessary in order to establish a useful e-government system. In order to foster the development and emergence of a real e-government, more Cambodians need to become literate in ICT related skills.[40]

The government also aims "to build a sizable digital economy to be one of the growth drivers, continuously innovate, and facilitate the transformation of Cambodia into a digital society".[41] The transformation towards a digital society implies the change of values. There needs to be a comprehensive change in leadership, organization structures, processes, culture and innovation management. The government and the society have to adopt new values that allow progress and change. Innovation in this context is made possible by breaking routines and habits, fostering experiment, setting up needed cooperation networks and empowering people to take risks and reducing their fear of failure. Values will have to be based more on the individual in order to allow for change towards a system based on personal user experience of a client.[42] In the future, teamwork, creativity, complex and critical thinking will be of high value for an e-governed society and one that is aiming to get there.[43]

The article "Do Cambodians Trust E-government Services? A Survey" by Sokhan et al. in this publication shows missing trust in Cambodia's general population. Only 34% of the questioned Cambodians feel that the internet is a safe mean for interaction with their government and only 27% of respondents trust e-government services.[44] Maybe most representative of the lack of trust in e-government is that while 39% trust state government agencies, only 13% would feel safe using e-government services for their business.[45] Another

37 United Nations. (2019). E-Government Development Index (EGDI). Retrieved from publicadministration.un.org: https://publicadministration.un.org/egovkb/en-us/About/Overview/-E-Government-Development-Index

38 Kim, S., & Weiß, R. (2019). E-Government: What Can Cambodia Learn From E-Estonia? Digital Insights, 58.

39 Ibid., 173.

40 Ibid., 175

41 Nguonly, T. (2019). MSMEs in Cambodia Digital Economy. Phnom Penh, 9.

42 Hanna, N. K. (2010). Transforming Government and Building the Information Society. Springer, 13.

43 Ibid., 115.

44 Sokhan, S., Raing, C., & Rin, C. (2019). Do Cambodians Trust E-Government Services? A Survey. Digital Insights, 69.

45 Abdullah, A., Kang, K., & Hawryszkiewycz, I. (2015). The influence of trust and subject norms on citizens intentions to engage in E-participation on E-government Websites. Adelaide, Australasian Conference on Information System, 8

problem in regards to trust is that the government needs the citizen's data to personalize and idealize e-government services.[46] To receive citizen's data, it needs their trust, which prerequisites a culture of trust in the government in general. In order to process the data and keep it secure hard and soft infrastructure is required in highest standards. The publication's article "How Data-Driven Technology Can Upgrade Cambodia's E-Government" explicates the role of data in e-government. In the article "Cambodia vs Hackers: Balancing Security and Liberty in Cybercrime Law", Somaly Ngoun and Sopheak Srun go into depth about the problems associated with digitalization and the collection of data.

Cambodia will have to follow market trends and continuously work on infrastructure in order to ensure success in the future. In line with this, decisions will have to be data- rather than just leader-driven. New ideas and concepts will have to be developed. Silos have to be broken up. An e-government innovation lab, data embassy, research and development centers to push own inventiveness and other organizational reforms would help setting a framework and keeping the standards up according to the contemporary needs. Incentives for staff to engage in the process could trigger innovative ideas and outsourcing services to other providers could bring in new perspectives and solutions as well as external tech assessments and less biased market analysis systems. More cross-department and ministry cooperation should be promoted in order to ensure a comprehensive development of the government as a whole.

E-government can have an impact in many ways, which is demonstrated by all contributors to this publication. In the long run, there are several important aims for e-government which go beyond just convenience. It can be noted that not just technology and systems need to be changed, but so does the way humans think.

46 Vor, S. (2019). How Data-Driven Technology Can Upgrade Cambodia's E-Government. Digital Insights, 148.

Photo credits: Image by Freepik

Reading time: 11 minutes

How Digital Tech Can Help Fix Cambodia's Broken Education and Healthcare Systems

Riccardo Corrado[1] and Patchanee Tungjan[2]

1 Riccardo Corrado, Ph.D., information engineering, is an assistant professor of information engineering and the head of the Management of Information Systems department at Paragon International University. His research interests lay in wireless ad hoc networking and the usage of ICT in higher education. He is currently involved in a research project regarding the implementation of MOOCs in Cambodian higher education.

2 Patchanee Tungjan, B.Sc., is a certified occupational therapist. Currently, Miss Patchanee is pursuing her master's degree in Occupational Therapy at Chiang Mai University, Chiang Mai, Thailand. Her current research interest is the usage of ICT in cognitive assessment and intervention.

Abstract

It is widely recognized that education plays the most important role in the social development of a nation and for this reason it has also been described as one of the best elements for nurturing the basic needs for human development and escaping poverty. With the advent of the Fourth Industrial Revolution, new technology solutions and opportunities have emerged, mostly for those countries focused on the development process. The Prime Minister of Cambodia, Hun Sen, aims for year 2050 to be the target date for Cambodia to become a developed country. In order to achieve this target, the first step must be to improve education. The percentage of the Cambodian GDP expenditure in education is still very low compared to other ASEAN countries, and standards for professional development are still partially or completely missing in many sectors. Another fundamental sector for a country is the healthcare system. In fact, education and healthcare are two fundamental variables of any society and Cambodia is still lagging behind in both of them. How can ICT step up and offer solutions for Cambodia? Is there a powerful digital technology solution that could address these problems? Online courses, more specifically, Massive Open Online Courses (MOOCs), have attracted the interest of many higher education institutions and educational firms around the world. Cambodia is approaching this only now, and the Minister of Education, Youth and Sport is urging universities to explore this solution. Improving education starts with teacher preparation. Improving healthcare starts with providing an appropriate preparation to its professionals, too. This paper wants to provide an overview of how MOOCs could benefit Cambodia in practice, in particular by enhancing the professional development of those who are most directly involved in providing education and healthcare.

Introduction

On April 30, 1999, Cambodia became the last member to access the Association of Southeast Asian Nations (ASEAN). For the last few years, the country has been experiencing exceptional growth, and this is proven by its Gross Domestic Product (GDP) with an annual increase that has never fallen below 6.9% since 2011. But the history of Cambodia is long and filled with adversities. In 1863, Cambodia's King Norodom, sought help asking France to protect his country from being swallowed up by its powerful neighbors (Thailand and Vietnam). But what started as a protectorate soon developed into a colonial relationship that the king had not foreseen.[3] France ruled over Cambodia until the kingdom declared its independence in 1953.

By the late 1960s, however, Cambodia was drawn into the Vietnam War and in 1975, the Communist forces known as the Khmer Rouge overthrew the pro-American regime led by General Lon Nol who had seized power five years earlier and who was supported by the American government. During those years, under the rule of the Khmer Rouge, almost 2 million people died. Not only were Cambodian intellectuals and professionals killed,[4] but also nearly 80% of the country's university students. The ideology of the Khmer Rouge regarding education is perfectly summarized in a statement of a Khmer Rouge cadre, who said: "Under our system, we don't need to send our young people to school. The farm is our school. The land is our paper. The plough is our pen. We will write by ploughing".[5] Cambodia was left with the peculiar scenario of having experienced a decimation of its intellectual elite, leaving a crippling and unprecedented legacy of inadequately trained, or completely untrained, management personnel.[6]

In the '90s, some time after the Khmer Rouge regime and the liberation from the Vietnamese troops, the new administration re-emphasized expansion of the education system within the country, but "again without attention to the educational quality".[7] Under peace agreements signed in Paris in 1991, Cambodia was placed under the protection of the United Nations until the election of 1993. Since then, Cambodia has been a monarchy ruled by a coalition government. Mainly through garment exports and tourism, Cambodia managed to become the sixth fastest-growing economy in the world between 1995 and 2017.[8] The poverty rate dropped from 47.8% in 2007 to 13.5% only seven years later.[9] "Despite these achievements, Cambodia still faces a number of development challenges, including the need for good quality public services, an improved business environment, better land administration, as well as natural resources management, environmental sustainability and good governance".[10] One of the areas that still lags within the country is its education

3 David Chandler, A History of Cambodia, 4th Edition, 4th edition (Boulder, Colo.: Routledge, 2007).

4 David M. Ayres, Anatomy of a Crisis: Education, Development, and the State in Cambodia, 1953-1998 (University of Hawai'i Press, 2000), https://www.jstor.org/stable/j.ctt6wr08t.

5 Jan B. Y. Berkvens, "Developing Effective Professional Learning in Cambodia" (University of Twente, 2009), https://ris.utwente.nl/ws/portalfiles/portal/6081395/thesis_J_Berkvens.pdf.

6 Evan R. Gottesman, Cambodia After the Khmer Rouge: Inside the Politics of Nation Building (New Haven, Conn.; London: Yale University Press, 2004).

7 Berkvens, "Developing Effective Professional Learning in Cambodia."

8 The World Bank, "The World Bank in Cambodia: Overview," Text/HTML, World Bank, 2018, http://www.worldbank.org/en/country/cambodia/overview.

9 Ibid.

10 Ibid.

system. Cambodia's education system, in fact, is far behind compared to its ASEAN neighbor countries (Tan, 2007). This situation is explained by multiple factors, but for sure one of them is the preparation of the teachers. In Cambodia the preparation of high school teachers, mainly in the provinces, is very poor (Sem & Hem, 2016) and this is a result of the difficult years that Cambodia had to experience, with the consequence that teachers no longer belong to the intellectual elite and hold little status in the contemporary society (Kalyanpur, 2011). In 2005, primary school (up to grade 6) enrollment was at 92%, but this figure drastically drops when the secondary levels are reached (grades between 7 and 9).[11] "Girls become increasingly underrepresented further up in the education system", wrote Berkvens. "The Cambodian teacher pool is characterized by its great differences in the educational level". Berkvens continues writing that "in the early stages after the Khmer Rouge era, it was impossible to assign qualified and well-educated teachers to schools, simply because there were not many left". The new teacher candidates were simply those who had the ability to read and write.

Still, today, even if the situation improved after years of work by the Ministry of Education, Youth and Sport (MoEYS), the problem of educational quality still exists today.[12] As a result, the MoEYS set four education strategy plans from 2000 until 2018:

"First, the education strategic plan for 2000-2005 focused on enrolment in primary school by 1. starting to cancel enrolment payments; 2. providing school funding using a formula that gave particular support to rural schools in poor areas, and 3. building primary schools across the whole country. Second, the education strategy strategic for 2006–2010 shifted the focus to improving education in secondary schools by 1. building lower secondary schools in all communes and secondary schools in all districts, and 2. giving scholarships to poor students to enable them to complete grade 9. Third, the education strategy strategic for 2009–2013 put a focus on improving internal efficiency by 1. Reducing repetition and dropout rates; and 2. Strengthening institutions for decentralization. Fourth, the education strategic plan for 2014–2018 focused on 1. equality and the quality of education; 2. the response of education to the needs of the economy; and 3. effective management of MoEYS staff".[13]

It is undeniable that Cambodia has improved in the last decade. The real rapid growth in the country occurred during the period 1998–2007 when the per capita GDP doubled.[14] However, Cambodia is still suffering from many problems and in fact "thirty-five% of Cambodians are still living in poverty, with the rural population making up the majority, according to estimates from the 2018 global Multidimensional Poverty Index (MPI) ".[15] In the country, 13% of women and 6% of men

11 Berkvens, "Developing Effective Professional Learning in Cambodia."

12 Riccardo Corrado, Robert E. Flinn, and Patchanee Tungjan, "Can ICT Help Cambodian Students Become the Solution for Improving Education in the Country?," Journal of Management, Economics, and Industrial Organization 3, no. 2 (May 1, 2019): 1–15, https://doi.org/10.31039/jomeino.2019.3.2.1.

13 Ren Sem and Kosal Hem, "Education Reform in Cambodia: Progress and Challenges in Basic Education," Regional Research Paper (Parliamentary Institute of Cambodia, 2016), https://www.pic.org.kh/images/2017Research/20170523%20Education_Reform_Cambodia_Eng.pdf.

14 Hal Hill and Jayant Menon, "Cambodia: Rapid Growth with Weak Institutions: Cambodia's Rapid Economic Growth," Asian Economic Policy Review 8, no. 1 (June 2013): 46–65, https://doi.org/10.1111/aepr.12003.

15 Dara Voun, "UNDP Report Finds 35% of Cambodians Still Mired in Poverty," Text, Phnom Penh Post, September 26, 2018, https://www.phnompenhpost.com/national/undp-report-finds-35-cambodians-still-mired-poverty.

between the ages of 15 and 49 have no education, with four on ten women and a bit more than half of the men have a secondary or higher education.[16] In addition to this, it is still common for girls to marry very soon in Cambodia. The legal age for marriage without parental consent is 18 and the legal age for marriage with parental consent is 16 for both males and females. However, the traditional practice of marrying off children before they are 18 is still widely practiced especially among ethnic groups.[17] "Marrying at a very early age is equated with girls having value and being 'beautiful', 'good' and 'modern'. The community often discriminates against older girls and unmarried women and men tend to view girls over the age of 18 as being too old to marry".[18] Half of the Cambodian women are married by age 18 and the median age at first marriage is around 21 years. Children born to mothers with no education are more than twice as likely to die before their fifth birthday than children born to mothers with secondary or higher education.[19] Furthermore, women need to be empowered through education, employment opportunities, legal literacy, and the right to inheritance.[20] In Cambodia, half of the women and slightly more than 25% of men between the ages of 15 and 49 still agree that a husband is justified in beating his wife for at least one of the following reasons: burning food, arguing with him, going out without informing him, refusing to have sex with him or asking him to use a condom during intercourse.[21] Nearly everyone agrees that beating a wife is justified in the case of neglecting the children. In this scenario, less than half (43%) of children age 13–18 attend secondary school.[22] The effect of providing people with an education does not merely improve their knowledge acquisition, but changes their neurological structure and cognitive skills.[23] During an interview with an illiterate person in Ghana, Professor David Baker asked him if one can get HIV from a blood transfusion. The man's answer was "not if you wear a condom". This shows that the man could not put together a working theory of that disease,[24] and how the absence of education can affect a person's way of thinking and understanding of basic concepts. From a study conducted by the Royal University of Phnom Penh (RUPP) in 2016, it was found that there is a correlation in Cambodian students between the probability of dropping out of school and: (1) how much they like going to school, (2) the degree of their educational aspiration and also that of their parents, and (3) the participation in a preschool experience, like kindergarten.[25] In addition to this, research revealed that guidance from parents, both in tutoring and counseling, represented important elements for lowering the dropout rate between the young Cambodian.[26] The study performed by RUPP

16 NIS - National Institute of Statistics, "Cambodia - 2014 Demographic and Health Survey," 2014, https://dhsprogram.com/pubs/pdf/sr226/sr226.pdf.

17 Unicef, "UNICEF Cambodia: Girls Not Brides – Ending Child Marriage in Cambodia," UNICEF Cambodia (blog), March 10, 2017, http://unicefcambodia.blogspot.com/2017/03/by-chan-kanha-and-ream-rin-romas-is.html.

18 Ibid.

19 Fatemeh Noughani and Jamileh Mohtashami, "Effect of Education on Prevention of Domestic Violence against Women," Iranian Journal of Psychiatry 6, no. 2 (2011): 80–83.

20 Fatemeh Noughani and Jamileh Mohtashami, "Effect of Education on Prevention of Domestic Violence against Women," Iranian Journal of Psychiatry 6, no. 2 (2011): 80–83.

21 NIS - National Institute of Statistics, "Cambodia - 2014 Demographic and Health Survey."

22 Ibid.

23 David Baker, The Education Revolution, and Our Global Future, Video, TEDx Talks, 2014, https://www.youtube.com/watch?v=sv3CLr84UJU.

24 Ibid

25 Heng Kreng, Soth Sok, and Fata No, "A Case Study of Phnom Penh and Kampong Speu," http://www.koicacambodia.org, 2016, http://www.koicacambodia.org/wp-content/uploads/2016/09/Report-of-School-Dropout-Survey.pdf.

26 Ibid.

pointed out that "in rural areas [of Cambodia], peer pressure, lack of value for education among parents, low literacy among parents and youth, little job opportunities, and debt due to the repeated marriage of their children all represented as the pullout factors relating to school dropout.[27]

In a similar way to the education system, a lack of preparation for professionals in the medical field, together with a lack of resources, is also heavily affecting the healthcare system in the Kingdom.[28] [29] Cambodia has a "pluralistic health system in which the main health infrastructure and public health care are delivered through the Ministry of Health (MOH), while the disparate private sector provides most outpatient curative care".[30] In Cambodia, the healthcare system (HS) is organized into three different levels, which are central, provincial and operational district.[31] In order to support a failing healthcare system, a strong preparation, national standards, and continuous professional development are fundamental for professionals operating in the medical field. And MOOCs can represent a very useful tool to support professional development in this field.

27 David Sen, "Medical School Entrance Exam Conditions Change," Khmer Times, October 2, 2017, https://www.khmertimeskh.com/84031/medical-school-entrance-exam-conditions-change/.

28 Cristina Maza, "Failing Medical Students Ask Hun Sen for Help, National, Phnom Penh Post," Phnom Penh Post, 2016, https://www.phnompenhpost.com/national/failing-medical-students-ask-hun-sen-help.

29 David Sen, "Medical School Entrance Exam Conditions Change," Khmer Times, October 2, 2017, https://www.khmertimeskh.com/84031/medical-school-entrance-exam-conditions-change/.

30 DPHI, "Health Information System Master Plan," Master Plan (Phnom Penh, Cambodia: Department of Planning and Health Information (DPHI), 2017), http://hismohcambodia.org/public/fileupload/carousel/HIS-MasterPlan-Nov2017.pdf.

31 Ibid.

Cambodia is on the right path towards improvement but there are still so many problems to address and resolve. Education represents a key factor for moving in the right direction. Improving education starts with teacher preparation, and this is what we are going to discuss in the following sections of this paper.

Teachers in Cambodia: An Overview

It is widely recognized that education plays the most important role in the social development of a nation.[32] Sivakumar and Sarvalingam described education as one of the best elements for nurturing the basic needs for human development and to escape from poverty.[33] In Cambodia, the education system is still behind and in fact, a 2010 comparison study between the South East Asia countries, showed that Cambodia spent the equivalent of only 2.6% of its GDP on education, lower than Laos (2.8%), Indonesia (2.8%), Thailand (3.8%) and Vietnam (6.3%) (Figure 1). In 2017, only around 18,000 teachers in Cambodia were found to be university graduates, 51,820 teachers were upper secondary graduates, 19,267 lower secondary school graduates and finally, 1,779 teachers have only attended primary school.[34] Furthermore, the average salary for teachers is very low in Cambodia, affecting the motivation of teachers or even the interest in becoming a teacher. In October

32 Lay Sovanak and Lim Vouchsieng, "The Challenges of Higher Education for Rural Students in Urban Universities in Cambodia," University of Cambodia, 2018, 13.

33 Dr. M Sivakumar and Chikkaiah Naicker College, "Human Deprivation Index: A Measure of Multidimensional Poverty BY," Munich Personal RePEc Archive, 2010, 55.

34 Riccardo Corrado, Robert Flinn, and Patchanee Tungjan, "Can ICT Help Cambodian Students Become the Solution for Improving Education in the Country?," in Proceedings of the International Conference on Management, Economics, Business and Social Sciences (ICMEBSS 2018, Phnom Penh: Zaman University, Cambodia, 2018), 248.

2016, the Prime Minister of the Kingdom of Cambodia Dr. Hun Sen announced that the minimum wage for teachers would be increased. [35] Thus, all teachers should have more motivation in performing their job to the best of their abilities (Ros 2016). It is undeniable that low salary affects the motivation of teachers and thus the quality of their activity is affected. While pay is not offered as a significant motivating factor for wanting to become a teacher, it would be a mistake

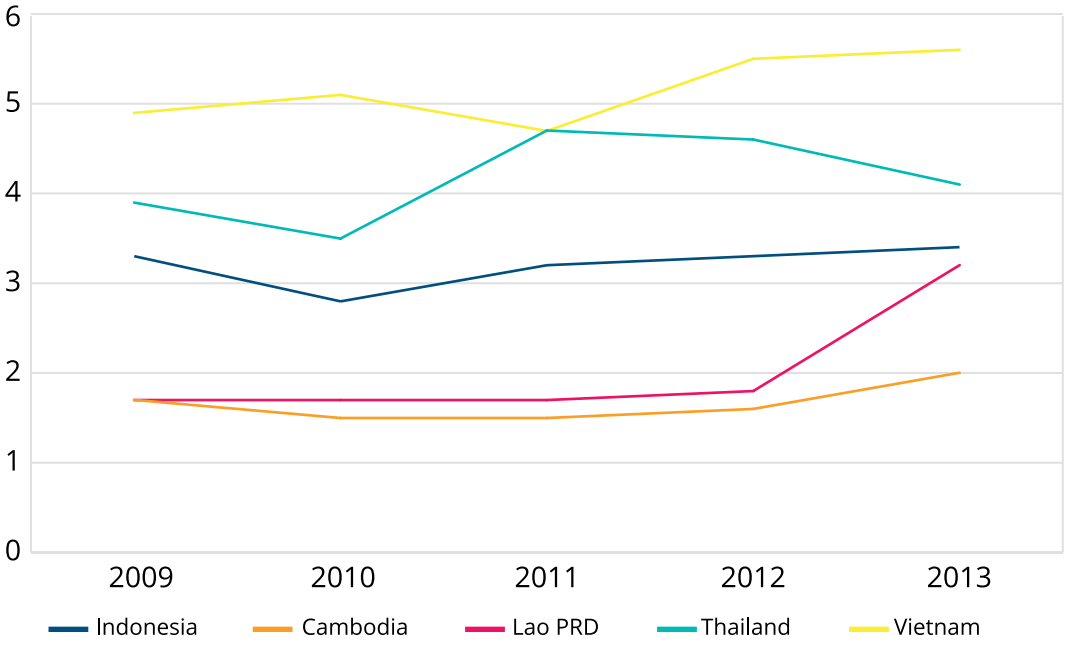


Figure 1: Percent of the GDP Expenditure on Education

to overlook the importance of any regular salary for educators[36]. As a consequence of the history of inadequate salaries of educators, Cambodia has experienced a spread of informal school fees, which refers to "the payments given by families to some teachers for services ranging from the sale of snacks and bike parking to extra tuition and the return of study records".[37] In 2007 the situation in Cambodia was embarrassing. Teachers earned, on average, between $30 and $60 per month, in accordance with qualifications, number of shifts and experience[38] and with wages at their current levels, teachers really struggle to survive. On the other side, students, when families could afford it, turned to shadow-education. Even now, qualified teacher scarcity is a core problem, with an average student-teacher ratio of 51:1 in primary school. Thus, placing teachers in remote areas remains a challenge and affects the most disadvantaged students.[39] In

35 Sotheary Pech, "Minimum Wage for Teachers to Be $230 by April," Khmer Times (blog), October 3, 2016, https://www.khmertimeskh.com/news/30315/minimum-wage-for-teachers-to-be--230-by-april/.

36 VSO, "Teaching Matters: A Policy Report on the Morale of Teachers in Cambodia" (VSO, 2008), https://www.vsointernational.org/sites/default/files/valuing_teachers_cambodia__teaching_matters_tcm76-22690.pdf.

37 Ibid.

38 Ibid.

39 Luis Benveniste, Jeffrey Marshall, and M. Caridad Araujo, "Teaching in Cambodia" (Ministry of Education, Youth and Sport Royal Government of Cambodia, 2008), http://documents.worldbank.org/curated/en/161351468020945260/

2016 the Education Minister Dr. Hang Chuon Naron confirmed that "for primary school teachers, the monthly salary will increase to at least $200, and [for] high school teachers, salaries will increase to at least $250. University teachers will see increases up to $300 this year, all of which represent minimum wages".[40] The situation is improving but it is still not enough.

While analyzing teachers in Malawi, Zambia, and Papua New Guinea, for example, Fry found that teacher's performance in contributing to learning is strongly influenced by teacher motivation, which is fragile and declining.[41] Furthermore, Fry discovered that even if there is a strong link between teacher motivation and performance and education quality, teacher motivation is a critically ignored factor in education management and policy formulation at all levels.[42] Policymakers and stakeholders, even if aware of the connection between teacher motivation and quality of the teaching activity and thus, of the learning experience for the students, are not addressing the problem and do not take action in order to meet the needs and requests of the teachers.

"The whole art of teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterward", said the poet Anatole France. But if the teacher is not motivated, the results of his art will lack in quality. Sambonin and Liu (2017) within the sphere of extrinsic motivation for Cambodian teachers, listed four factors: incentive factors, family support factors, academic support factors, and school environment factors. Incentives are mainly based on remuneration, promotions, and awards. A correct balance between these factors can positively benefit and boost the motivation of teachers. Family support is viewed as the capability of the teacher to support her/his family and at the same time, to support the education of her/his children. This attention to the education of the children is somehow a logical consequence of the role of educators who are teachers-parents. A third important component of the teacher's motivation lies in the school environment. Sambonin and Liu (2017) list in this category the management and leadership, physical environment, working hours and academic support. The most important element of this last category is professional development (PD). Effective professional development enables educators to develop the knowledge and skills needed to address students' learning challenges." To be effective, PD requires thoughtful planning followed by a careful implementation with feedback to ensure it responds to educators' learning needs.[43] "Teacher learning and development is a complex process that brings together a host of different elements and is marked by an equally important set of factors, and teachers continue to be both the subjects and objects of learning and development".[44] Unmotivated and unprepared teachers are the problems to be addressed and solved if Cambodia wants to close the gap with the more

pdf/448500WP0Box3210KH0Teachers11Final1.pdf.

40 Chanveasna Ros, "Public School Salaries Set to Increase," Khmer Times (blog), January 11, 2016, https://www.khmertimeskh.com/news/19814/public-school-salaries-set-to-increase/.

41 VSO, "What Makes Teachers Tick: A Policy Research Report on Teachers' Motivation in Developing Countries" (London, UK: VSO, 2002), http://www.bibalex.org/Search4Dev/files/288470/119513.pdf.

42 Ibid.

43 Hayes Mizell, Why Professional Development Matters., 2010, https://learningforward.org/docs/default-source/pdf/why_pd_matters_web.pdf.

44 Beatrice Avalos, "Teacher Professional Development in Teaching and Teacher Education over Ten Years," Open Journal of Social Sciences 5, no. 2 (January 1, 2011): 10–20, https://doi.org/10.1016/j.tate.2010.08.007.

Riding Online Courses Destination: A Bright Future

Online courses, more specifically Massive Open Online Courses (MOOCS) have attracted the attention of universities and policy makers around the world, with the promise of democratizing education. Cambodia could use this opportunity, driving the implementation of MOOCs in formal and informal education with ad hoc policies, to support and improve the education and healthcare sectors.

Benefits of MOOCs highest among healthcare professionals in developing countries.

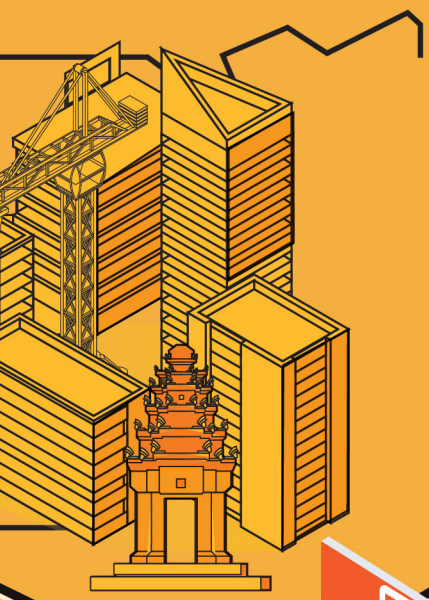
900 Universities around the world offer 11400 MOOCs.

Problems on the road to MOOCs

- Most MOOCs are in English, French or Spanish
- Most MOOCs offered by developed countries
- Ensure adequate technology for access
- Slow internet connections

DIGITAL INSIGHTS

KONRAD ADENAUER STIFTUNG



Why MOOCs?

- Professional development for teachers and health care professionals.
- Online courses and FREE.
- Life-Long Learning: Improves skills and teacher quality.
- Quality education even in rural areas.
- Improve capabilities of workers in the healthcare system.
- Follow up and assessment of patients that live too far away to visit the doctor.

Almost 14million mobile internet connections in 2019.

117% mobile subscription in Cambodia.

What are we facing without MOOCs?

- Lack of preparation of teachers and healthcare professionals.
- Only 2.6% of GDP spent on education.
- Absence of standard and quality control frameworks.
- Bad health care, especially in rural areas.

Content and Storyline: Riccardo Corrado, Ph.D. & Patchanee Tungjan
Infographic Designer: Singhtararith Chea
Editors: Robert Hör & Ann-Cathrin Klöckner

developed countries and reach the goal that Prime Minister Hun Sen set for the Kingdom: becoming a developed country by 2050.[45].

Facing the beginning of a new era, called the Fourth Industrial Revolution (4IR), the role of information communication technology (ICT) is more important than ever, and it can provide an important means for motivating the teachers and, at the same time, supporting their PD. "ICT applied to education are all those technologies, including the computer, Internet, broadcasting technologies and any others that can facilitate the delivery of instruction and the learning process itself and at the same time promote international collaboration and networking in education and professional development".[46] Learners who do not have access to technology and are unable to make use of technological resources are at a clear disadvantage.[47] Why not use CT as a powerful tool for the education of educators?

Professional Development for Teachers Using Massive Open Online Courses (MOOCs)

In the Universal Declaration of Human Rights adopted in 1948 it is written: 'Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms.' Lifelong learning is an important factor for modern economies[48] and PD for teachers is a fundamental element for assuring a continuous and everlasting quality of the education. A Status Report on Teacher Development in the United States and abroad showed that rigorous training for teachers could positively affect the performance and outcomes of students.[49] "The use of ICT as a tool for responding to the challenges is one of the most sought-after topics regarding teacher training needs"[50] and indeed, teachers already make up a significant share of MITx MOOC participants,[51] the MOOCs platform provided by The Massachusetts Institute of Technology (MIT). Ensuring good quality teaching, and a good learning outcome requires a new teaching methodology that teachers need to conduct in order to understand the learning process and pedagogy. Furthermore, teachers should be able to "respond to the needs of their students and the demands of their disciplines", and be able to "develop strong connections between students' experiences and the goals of the curriculum".[52] "Efforts to improve student achievement can succeed only by building the capacity of teachers to improve their instructional practice and the capacity of school systems to promote teach-

45 Seangly Phak, "'Developed' by 2050: PM," Text, Phnom Penh Post, June 7, 2013, https://www.phnompenhpost.com/national/%E2%80%98developed%E2%80%99-2050-pm.

46 Corrado, Flinn, and Tungjan, "Can ICT Help Cambodian Students Become the Solution for Improving Education in the Country?," 2018.

47 Glenda Barlow-Jones and Duan van der Westhuizen, "Digital Literacy in the 21st Century: Fact or Fiction?," in Proceedings of EdMedia + Innovate Learning, (EdMedia + Innovate Learning, Association for the Advancement of Computing in Education (AACE), 2013), 12–17, https://www.learntechlib.org/primary/p/111925/.

48 Norman Longworth, Lifelong Learning in Action : Transforming Education in the 21st Century (Routledge, 2003), https://doi.org/10.4324/9780203465684.

49 Linda Darling-Hammond et al., Professional Learning in the Learning Profession: A Status Report on Teacher Development in the United States and Abroad (National Staff Development Council, 2009).

50 Jonatan Castaño-Muñoz et al., "Who Is Taking MOOCs for Teachers' Professional Development on the Use of ICT? A Cross-Sectional Study from Spain," Technology, Pedagogy and Education, October 19, 2018, 1–18, https://doi.org/10.1080/1475939X.2018.1528997.

51 Daniel Seaton et al., "Teacher Enrollment in MITx MOOCs: Are We Educating Educators?," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, October 27, 2014), https://papers.ssrn.com/abstract=2515385.

52 Darling-Hammond et al., Professional Learning in the Learning Profession.

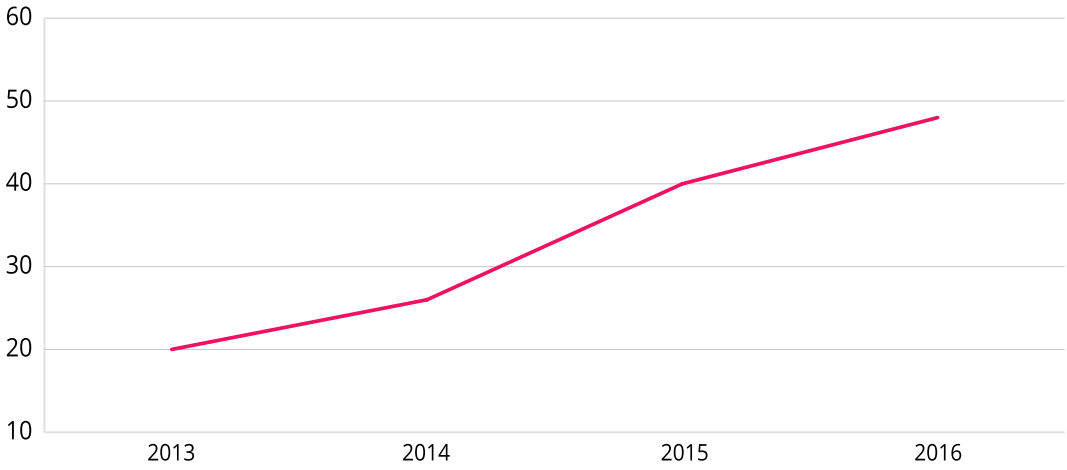


Figure 2: Percentage of Cambodian Who Own at least One Smartphone

er learning".[53] MOOCs have become an interesting channel for teachers' professional development as they have the ability to remove participation barriers[54] by, for example, giving teachers the opportunity to attend a training course that may not conform to what they expect to learn without wasting time or money,[55] or a course that is held at a place or time not accessible to the teacher. Nowadays teachers are extremely busy with work commitments and with their personal life, and thus, little time remains for them to dedicate to professional development. Having online resources to use anytime, anywhere, can represent the key for facilitating PD.

"The increasing amount of insights about digital consumption and infrastructure provide an intrinsic outlook of ICT development and capacity for digital economic activities in Cambodia". [56]The penetration of smartphones and the Internet in Cambodia is overall positive. The percentage of Cambodians who own at least one smartphone is 48% (Figure 2), up almost 140% from 2013, when 60% of urban residents had at least one smartphone, whereas the figure for rural residents was only 42%. In 2017 there were 8.5 million Internet users and 19 million mobile subscribers, in a country with a population that barely surpasses 16 million inhabitants.[57] Furthermore, the ownership of smartphones increases in accordance with the education level, from 27% of those with no formal education to 82% of university students and graduates (Phong, Srou, and Solá 2016).

In July 2018, Mr. Vutha, spokesman for the Telecommunication Regulator Cambodia (an independent public legal entity which performs its functions and duties by autonomous administration and regulation) said that "we want [internet coverage] nationwide by 2020

53 Ibid.

54 Castaño-Muñoz et al., "Who Is Taking MOOCs for Teachers' Professional Development on the Use of ICT?"

55 Patricia Gómez Hernández, Carlos Monge López, and Alba García Barrera, "Challenges about MOOCs in Teacher Training: Differences between On-Site and Open University Students," in Macro-Level Learning Through Massive Online Open Courses (MOOCs) (IGI Global - Disseminator of Knowledge, 2016), 306, https://doi.org/10.4018/978-1-4666-8632-8.ch069.

56 Kanika Montha, "Cambodia's Journey to Become a Digital Economy: The Current Landscape," in Economic Transformation in Cambodia and Abroad, Digital Insights 1 (Phnom Penh, Cambodia: Konrad-Adenauer-Stiftung, Cambodia, 2018).

57 Ibid.

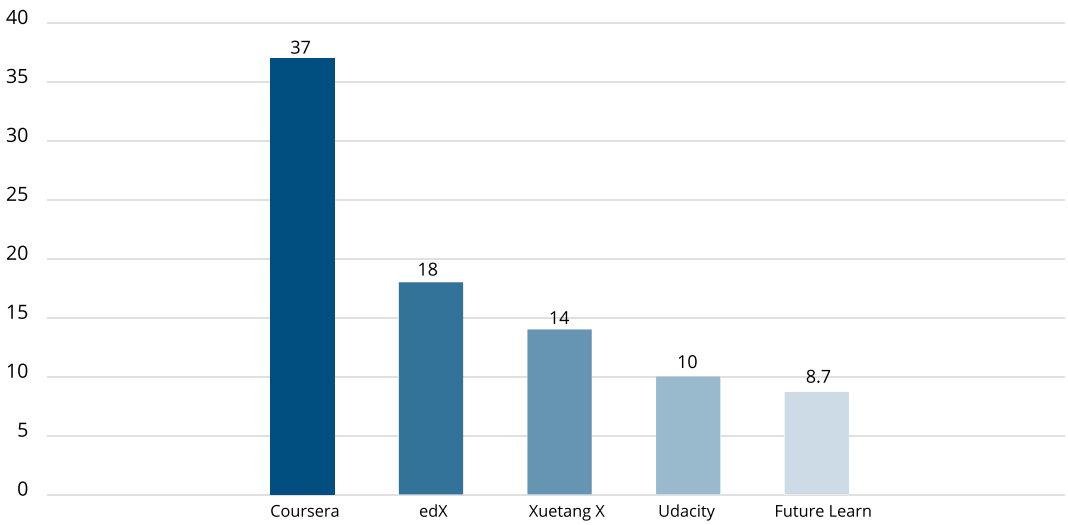


Figure 3: Numbers of users (in millions) in 2018 per platform (data taken from www.class-central.com)

to 2023". In 2016 the Ministry of Posts and Telecommunications (MPTC) confirmed that the telecommunications backbone has been extended to over 26 thousand kilometers,[58] a remarkable achievement for a country the size of Cambodia. If connections continue to spread to rural areas, there will be more users connected to the Internet" (Chan 2018). In fact, while only one in four rural farmers own smartphones, that number is much higher among younger people, that represents around 80% of the smartphone owners. And, although phone usage in Cambodia is lower than the global average, the use of social media through smartphones is higher than the global average.[59]

What has been described above underpins the idea that ICT and online courses could be used to address the problem of teacher PD, even for teachers located in the rural areas, and this could represent the right path to follow for the Kingdom of Cambodia. "Nationwide Internet coverage is not enough to become a digital economy" and "facilitating the growth of new tech-savvy entrepreneurs and tech companies"[60] is fundamental for Cambodia. This needs to start with creating tech-savvy teachers. MOOCs seem to provide the perfect solution to meet these needs. The hype around MOOCs has increased in the last few years. Brown (2016) wrote: "The current language of crisis, disruption, democratization, and re-imagination in the age of the MOOCs reflects a kaleidoscope of competing and co-existing perspectives with different images of the past, present, and future". "MOOCs have drastically changed the way we learn as well as how we teach. The main aim of MOOCs is to provide new opportunities to a massive number of learners to attend free online courses from anywhere all over the world. MOOCs

58 Ibid.

59 Desyre Foo, "GROWTH IN CAMBODIA'S MOBILE PENETRATION CHANGING TO HOW...," Geeks in Cambodia (blog), June 25, 2018, http://geeksincambodia.com/growth-in-cambodias-mobile-penetration-changing-to-how-countrys-farmers-get-information/.

60 Montha, "Cambodia's Journey to Become a Digital Economy: The Current Landscape."

have unique features that make it an effective technology-enhanced learning model in higher education and beyond.[61] Many online platforms already exist that provide access to thousands of MOOCs (Figure 3).

In recent years, we experienced an overall growth of users in the major MOOCs platforms (Figure 4). By the end of 2018, over 900 universities around the world had announced or launched 11,400 MOOCs, with around 2,000 new courses added to the list in the last twelve months.[62] On top of the growth in the usage of online courses, MOOCs are already seen as a good way to widen access to teacher PD for those instructors who have difficulties in accessing traditional teacher PD.[63] There is a sense conveyed that MOOCs herald a new type of innovative pedagogy, which fundamentally challenges centuries-old teaching methods".[64]

MOOCs can be used not only for teacher PD but also for the PD in other central areas of the country, such as the healthcare system, which is lagging behind compared to the majority of Cambodia's neighboring countries. Among the four countries in the Mekong region, Thailand has the best living and work conditions, followed by Vietnam, the Lao PDR, and only at the last position we find Cambodia.[65] It is important to deeply consider all the possibilities that ICT can offer to Cambodia in order to be able to investigate how to use specific technologies to support the growth of the country.

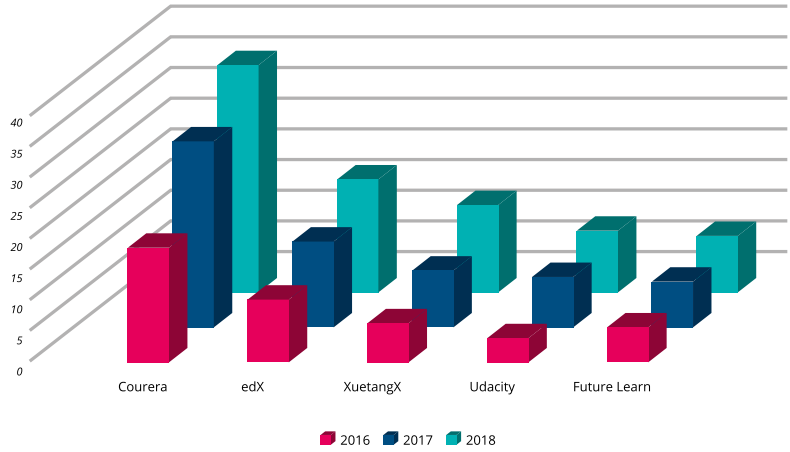


Figure 4: Grow of the number of users (in millions) per platform during the three years period 2016 – 2018 (data taken from www.class-central.com)

61 Ahmed Mohamed Fahmy Yousef et al., "A Review of the State-of-the-Art," in Proceedings of the 6th International Conference on Computer Supported Education (6th International Conference on Computer Supported Education, Barcelona, Spain, 2014), 12, https://pdfs.semanticscholar.org/be7a/158fc6355c6999cb1d77d760c8ddb4ab9120.pdf.

62 CLASS CENTRAL, "Year of MOOC-Based Degrees: A Review of MOOC Stats and Trends in 2018 — Class Central," Class Central's MOOC Report, January 7, 2019, https://www.class-central.com/report/moocs-stats-and-trends-2018/.

63 Castaño-Muñoz et al., "Who Is Taking MOOCs for Teachers' Professional Development on the Use of ICT?"

64 Mark Brown, MOOCs as Social Practice: A Kaleidoscope of Perspectives, Wenner-Gren International Series (London: Portland Press, 2015).

65 Kanjanee Phanphairoj and Ritzmond Loa, "Comparison of the Determinants of the Health Service System and the Health Status of the People in the Greater Mekong Subregion (GMS)," Current Psychiatry Reviews 13, no. 4 (December 2017): 246–51, https://doi.org/10.2174/1573400513666170720145042.

A New Opportunity for Professional Development and for Supporting the Healthcare System

There is a vast series of public health technical research documents developed by the Panamerican Health Organization which found a strong correlation between economic growth and regional health.[66] In recent years, health financing policy in Cambodia has focused on reducing the barriers to utilizing services, particularly amongst the most vulnerable Cambodians.[67] "Based on positive evaluations of early programs, the Cambodian government has emphasized the need for sustained and expanded participation of the community in health care".[68] Health expenditure per capita is defined as "the amount that each country spends on health, for both individual and collective services, and how this changes over time can be the result of a wide array of social and economic factors, as well as the financing and organizational structures of a country's health system".[69] Cambodia is still lagging behind compared to the majority of its neighboring countries and as a matter of fact the poor conditions of hospitals and the limited number of licensed healthcare professionals force many people to seek medical treatment abroad.[70]

In addition to this, a large share of the population in Asian countries still use traditional medicine.[71] Traditional medicine is defined as "the sum total of the knowledge, skill, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness".[72] The majority of the rural population in Laos, for example, relies on local medicinal shopkeepers and informally trained health workers that the shops support, commonly used because they are a cheaper available resource compared to treatment at urban centers.[73] Also in Cambodia, traditional Cambodian medical practices are widely used. "They share with Chinese medicine three explanatory models of disease: supernaturalistic theory, naturalistic theory, and maintenance of 'hot/cold' ('yin/yang') balance.[74] Four forms of therapy are delivered by medical and 'para'-medical personnel: spirit offerings, dermabrasion, main-

66 Andres Aguayo-Rico, Iris Guerra-Turrubiates, and Ricardo Montes de Oca-Hernández, "Empirical Evidence of the Impact of Health On Economic Growth," Issues in Political Economy 14 (2005): 17.

67 Tim Ensor et al., "Impact of Health Financing Policies in Cambodia: A 20 Year Experience," Social Science & Medicine 177 (March 1, 2017): 118–26, https://doi.org/10.1016/j.socscimed.2017.01.034.

68 Marco Liverani et al., "Improving Access to Health Care amongst Vulnerable Populations: A Qualitative Study of Village Malaria Workers in Kampot, Cambodia," BMC Health Services Research 17, no. 1 (May 8, 2017): 335, https://doi.org/10.1186/s12913-017-2282-4.

69 OECD, "Health Expenditure per Capita," November 4, 2015, 164–65, https://doi.org/10.1787/health_glance-2015-59-en.

70 World Health Organization, The Kingdom of Cambodia Health System Review, vol. 2, 5 vols., Health Systems in Transition (Manila : WHO Regional Office for the Western Pacific, 2015), http://iris.wpro.who.int/handle/10665.1/11356.

71 Karl Peltzer et al., "The Utilization of Traditional, Complementary and Alternative Medicine for Non-Communicable Diseases and Mental Disorders in Health Care Patients in Cambodia, Thailand and Vietnam," BMC Complementary and Alternative Medicine 16, no. 1 (March 8, 2016): 92, https://doi.org/10.1186/s12906-016-1078-0.

72 Mark J Richman et al., "Traditional Medicine" (World Health Organization, January 12, 2010), https://www.degruyter.com/view/j/jcim.2010.7.1/jcim.2010.7.1.1194/jcim.2010.7.1.1194.xml.

73 Sadia Ali, "Healthcare in the Remote Developing World: Why Healthcare Is Inaccessible and Strategies towards Improving Current Healthcare Models," Harvard Health Policy Review 16, no. 1 (2016), http://www.hhpronline.org/articles/2016/11/10/healthcare-in-the-remote-developing-world-why-healthcare-is-inaccessible-and-strategies-towards-improving-current-healthcare-models.

74 Richman et al., "Traditional Medicine."

taining 'hot/cold' balance, and herbal medicines".[75] Furthermore, older people are left out from medical care. In order to make healthcare more suitable for them, efforts need to be directed towards rural areas. "Interventions should include improving management of non-communicable diseases at the primary care level, together with a reconfiguration of social health protection schemes to increase the inclusion of older people" (Jacobs, de Groot, and Antunes 2016).

Over the years, improved access to healthcare services for the poor and disadvantaged groups of Cambodia helped reduce inequities in health. "Delivery at home by unskilled birth attendants is classically predominant among women without an education, who are farmers, or who live in the rural areas or outside the capital city".[76] "Initiatives that offer active disease management strategies and promote patients and community participation appear more successful in increasing treatment adherence and decreasing the risk of financial hardship".[77]

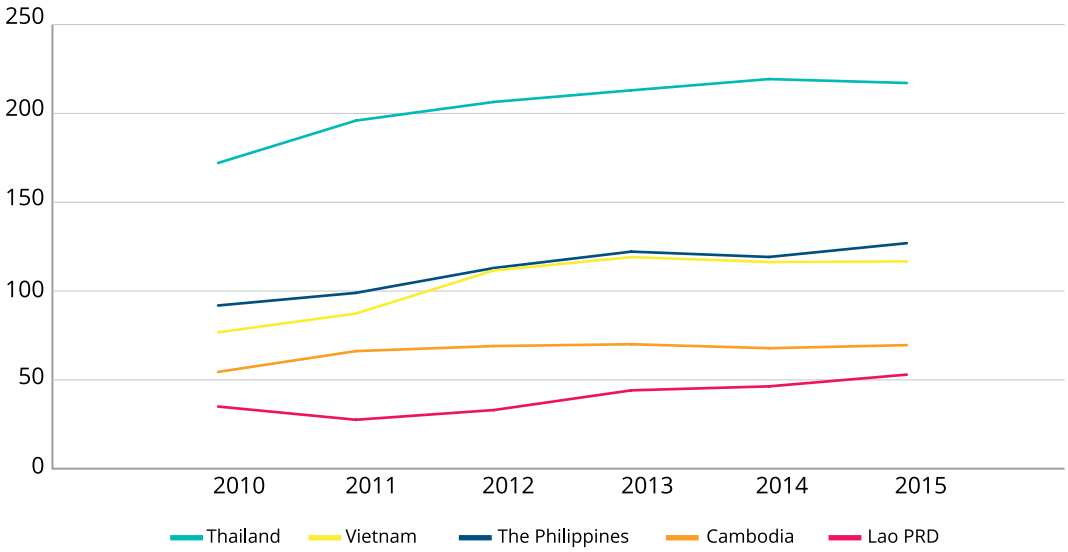


Figure 5: Health Expenditure Per Capita (in US$) - Data retrieved from The World Bank

For instance, ICT can be used in many ways in order to address the need for improving this scenario. Medical information and technology (MIT) is a great means to help increase the capacity of health services and improve the health service system and health status of the people within a country.[78] ICT can be considered a tool to deliver information, which can be seen as "a message to inform people which is sent from a sender to a receiver in the form of documents or audible

75 Ibid.

76 Rathavuth Hong and Rathnita Them, "Inequality in Access to Health Care in Cambodia: Socioeconomically Disadvantaged Women Giving Birth at Home Assisted by Unskilled Birth Attendants," Asia Pacific Journal of Public Health 27, no. 2 (March 1, 2015): NP1039–49, https://doi.org/10.1177/1010539511428351.

77 Maryam Bigdeli et al., "Access to Treatment for Diabetes and Hypertension in Rural Cambodia: Performance of Existing Social Health Protection Schemes," PLOS ONE 11, no. 1 (January 27, 2016): e0146147, https://doi.org/10.1371/journal.pone.0146147.

78 Phanphairoj and Loa, "Comparison of the Determinants of the Health Service System and the Health Status of the People in the Greater Mekong Subregion (GMS)."

or visible communications to change the way the recipient perceives something or to have an impact on his judgment and behavior".[79] Improving cost-effectiveness, supporting access to information, bridging cultural gaps between different groups and increasing educational accessibility are only some of the numerous advantages that ICT can offer to the national healthcare system, but in this chapter we are going to focus mainly on one of them: what ICT, or more specifically, MOOCs, can do to support the professional development of informal and formal medical staff and thereby support overall the healthcare services within Cambodia.

Research proves that MOOCs can effectively improve the capability of workers involved in healthcare systems and support their professional development. In Wewer Albrechtsen et al.[80] the authors investigated the benefits for medical staff involved with patients affected by diabetes. The authors investigated the development in professionals, that followed and completed an online diabetes MOOC titled "Diabetes – a Global Challenge". This online course is characterized by instructor-guided lessons combined with quizzes and assignments, as well as the possibility to obtain an official certification of completion. The participants were encouraged to join online discussions in forums together with peers and instructors in order to be able to exchange comments, opinions, and knowledge. The medical staff involved in this research included healthcare professionals such as medical doctors, researchers, nurses, and medical students. The results showed that over 80% of the health care participants reported some educational benefits, such as improved knowledge about prevention and treatment therapies for diabetes and improved capacity in professional practice. Additionally, this research showed that among the almost 30 thousand participants, those coming from developing regions, such as Africa, the Caribbean, Central America, South America, Asia (excluding Japan) and Oceania (excluding Australia and New Zealand), gained more impact on their clinical practice compared to health care professionals from DEVELOPED countries regions. This is an example of how MOOCs may be considered really useful for developing countries like Cambodia, that still need more knowledge on prevention and treatment techniques, in order to improve clinical practice in their health care ecosystems. In one study performed among medical undergraduates in Egypt, students who actively participated in learning through MOOCs "showed a positive attitude towards the experience",[81] highlighting the requirement for better time-management skills and faster Internet connection speeds. World Health Organization Hinari identifies countries with an average income below 12 thousand US Dollars, and "has created a network of publishers and institutions that make their medical teaching and journals freely available to those countries".[82]

It should be said that even though MOOCs can be very useful for developing countries, there

79 Jahid Hossain Panir, "Role of ICTs in the Health Sector in Developing Countries: A Critical Review of Literature," Journal of Health Informatics in Developing Countries 5, no. 1 (2011): 12.

80 Nicolai J. Wewer Albrechtsen et al., "Health Care Professionals from Developing Countries Report Educational Benefits after an Online Diabetes Course," BMC Medical Education 17, no. 1 (May 31, 2017): 97, https://doi.org/10.1186/s12909-017-0935-y.

81 Omar A. Aboshady et al., "Perception and Use of Massive Open Online Courses among Medical Students in a Developing Country: Multicentre Cross-Sectional Study," BMJ Open 5, no. 1 (January 1, 2015): e006804, https://doi.org/10.1136/bmjopen-2014-006804.

82 Kieran Murphy and Peter L. Munk, "Continuing Medical Education: MOOCs (Massive Open Online Courses) and Their Implications for Radiology Learning," Canadian Association of Radiologists Journal 64, no. 3 (August 2013): 165, https://doi.org/10.1016/j.carj.2013.06.001.

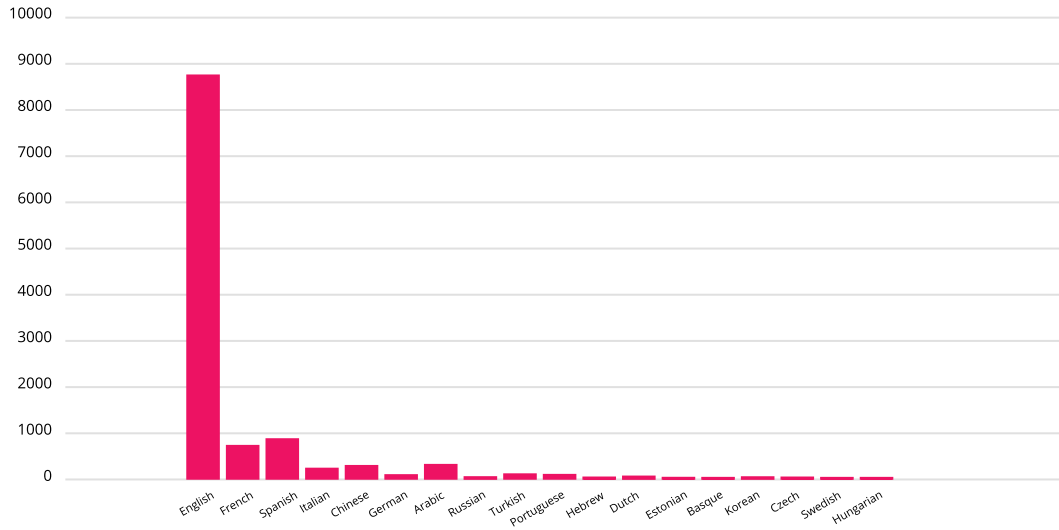


Figure 6: MOOCs by Language (data retrieved from CLASS CENTRAL)

are some serious limitations on their implementation in the countries that need them the most. One of them, for example, is the language barrier. In fact, the majority of MOOCs are provided in English, French or Spanish (Figure 4). In a world where, as estimated in 2009, two billion people worldwide are trying to learn English, Cambodia is gradually integrating itself into the regional and global economy,[83] but many Cambodians, mainly in the rural areas, are unable to follow MOOCs in English.

Furthermore, as far as MOOCs in healthcare and medicine are concerned, the majority of courses are offered by developed countries like the United States, United Kingdom or Australia, and only a few MOOCs were offered by developing countries such as China, the West Indies and Saudi Arabia.[84] This language barrier could present an even harder limitation on non-professional workers in developing countries, such as caregivers, helpers, and even families of patients, who want to access useful information regarding health conditions by using MOOCs.

In addition to using MOOCs for professional development and for the knowledge improvement of informal caregivers, they can also be adopted in healthcare to assess patients. For instance, in Muñoz et al.[85] the authors showed how these online courses can be used as a tool to perform follow-ups and assessments of patients and participants of specific medical treatments. Following the course and completing specific assessments, as part of MOOCs, allows professionals to evaluate the effectiveness of the interventions on their patients. This solution addresses the problem of those participants who can't or don't want

83 Bun Tharum, "The Importance of Speaking English," Newspaper, Phnom Penh Post, February 10, 2010, https://www.phnompenhpost.com/lift/importance-speaking-english.

84 Liyanagunawardena Tharindu Rekha and Shirley Ann Williams, "Massive Open Online Courses on Health and Medicine: Review | Liyanagunawardena | Internet Research," Journal of Medical Internet Research 16, no. 8 (2014), https://www.jmir.org/2014/8/e191/.

85 R. F. Muñoz et al., "The Impact of Phone Calls on Follow-up Rates in an Online Depression Prevention Study," Internet Interventions 8 (June 1, 2017): 10–14, https://doi.org/10.1016/j.invent.2017.02.001.

to take part in official follow-up assessment sessions in clinics, due to problems such as long distances between their house and the medical facilities, the cost for transportation or simply lack of time. These present common issues for patients in developing countries, therefore professionals could use technology to obtain measures of clinical outcome at every visit to the intervention site so that they can at least report the last assessment score obtained from the participant.

MOOCs are an easily adoptable solution for professionals in the healthcare sector for assessing and following up with their patients, and could benefit both patients and care providers, especially in developing countries like Cambodia. There are some difficulties in implementing it, but there are strategies that can be used to help combat these challenges, including "developing access hubs at strategic central locations to provide the required technology and internet access" and "developing offline content delivery platforms to overcome slow internet connectivity".[86]

Conclusions

At the dawn of the Fourth Industrial Revolution, Cambodia needs to adapt to a rapidly changing world, especially if it is to meet the plan of Prime Minister Hun Sen for the Kingdom to become an upper-middle income country by 2030, and a high-income one by 2050.[87] The healthcare and education systems are still lagging behind. Families that can afford it send their sons and daughters to study at universities abroad due to the lack of trust in Cambodian higher education. And the same happens with medical care. Those who can afford it travel to Singapore, Thailand or Vietnam[88] because the medical care within Cambodia is untrustworthy.[89] Cambodia must address these issues by building good education and healthcare systems. Heavy investments are required in these two fundamental sectors, and most importantly everything must start from providing high quality training to the new generation of professionals. Furthermore, professional development needs to support the continuous growth of educators and professionals involved in the healthcare sector in order to facilitate their lifelong development. To address this requirement, MOOCs offer the perfect digital technology driven solution. Institutionalizing PD for professionals through MOOCs as a requirement for their profession can be a feasible solution to support PD, as they are easy to access and relatively low cost. Changes in the regulations to include MOOCs among recognized forms of

86 Tharindu Rekha and Williams, "Massive Open Online Courses on Health and Medicine: Review | Liyanagunawardena | Internet Research."

87 Xinhua, "Cambodia Aims to Become 'Developed Country' by 2050," Xinhuanet, 2018, http://www.xinhuanet.com/english/2018-03/15/c_137041624.htm.

88 Thmeythmey, "Why Do Cambodians Still Go Abroad for Medical Care?," ThmeyThmey.com, accessed June 23, 2019, https://thmeythmey.com/event/?page=detail&id=40530.

89 "Building Trust in Local Doctors and Healthcare," Khmer Times (blog), August 21, 2016, https://www.khmertimeskh.com/27012/building-trust-in-local-doctors-and-healthcare/.

PD could make MOOCs more widely accepted for TPD[90] and their usage among teachers could become a normal approach to the PD of the teachers in Cambodia, whose role is to trigger curiosity and provide an effective and positive learning experience to the younger Cambodian generations. "It is the supreme art of the teacher to awaken joy in creative expression and knowledge" said Albert Einstein, and we need to do our best in order to support those actors directly involved in the process.

To conclude, though MOOCs present a great opportunity for Cambodia, it is also true that "open online courses are neither useless nor the salvation of higher-education"[91] and of PD in general, both for teachers and professionals involved in the healthcare sector. Thus, the adoption of MOOCs can't and must not be seen as a panacea to all the problems in these areas. Major investments and structural changes are needed in both sectors, from the introduction of board exams and standards, which can help ensure minimum quality requirements, to other aspects such as boosting extrinsic motivation in the jobs through financial incentives to said professionals, as well as rural area development policies. But MOOCs are certainly a perfect digital technology driven solution to support constant PD and to facilitate the growth of high caliber professionals in the Kingdom of Cambodia.

90 Castaño-Muñoz et al., "Who Is Taking MOOCs for Teachers' Professional Development on the Use of ICT?"

91 Andrew Ho et al., "HarvardX and MITx: The First Year of Open Online Courses, Fall 2012-Summer 2013," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, January 21, 2014), https://papers.ssrn.com/abstract=2381263.

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E-government: What Can Cambodia Learn From E-Estonia?

Sun Kim[1] and Dr. Raimund Weiß[2]

1 Sun Kim is currently a lecturer for the Faculty of Social Sciences and International Relations (SSIR), Paññāsāstra University of Cambodia (PUC). Kim is a visiting lecturer for the Philipps-University of Marburg, Marburg in Germany. Additionally, Kim is an adjunct researcher for Center for Asia Pacific, Tallinn University of Technology (TUT) in Tallinn, Estonia, and research fellow for Cambodian Institute for Cooperation and Peace (CICP) in Phnom Penh, Cambodia. Kim's areas of research are US-China relations in Asia-Pacific/Indo-Pacific region, especially in Southeast Asia; US-Cambodia relations; China-Cambodia relations; Cambodia-Vietnam relations; and ASEAN affairs. Kim earned his BA in international relations at PUC and joint MA programs between PUC in Cambodia, Osaka University in Japan, and Tallinn University of Technology in Estonia.

2 Raimund Weiß is Associate Dean and Professor of the Faculty of Social Sciences and International Relations, Pannasastra University of Cambodia in Phnom Penh. He holds a Ph.D. in Political Science from the Leopold-Franzens University Innsbruck/Austria (2005). He has been engaged in research studies on Cambodia for his Ph.D. dissertation, 'Political Culture and Conflict in Cambodia', and has published numerous journal articles on varied-thematic issues in international relations, comparative politics, development, and peace and conflict studies.

Abstract

Estonia is an EU country where '99% of the public services are available online 24/7'[3] . This article aims to analyse whether Cambodia can develop its own e-government by learning from the Estonian model. To achieve this, the paper first defines and clarifies some key terminologies and phrases vis-à-vis e-government and e-governance. Second, the history of e-Estonia is outlined and its innovations for e-government examined. This includes among others e-cabinet, e-public services and e-democracy. After discussing the development of e-Estonia, the study moves to exploring the digital transformation of Cambodia and explaining the evolution of its e-government. The article also summarises what Cambodia has done already and what it hasn't, including achievements and challenges in terms of digital infrastructure and digital human capital (digital literacy, skills, knowledge and experiences). The study concludes that Cambodia is undergoing a digital transformation towards e-government. And despite significant differences to the development path of Estonia, it can learn from e-Estonia because both countries share a common vision, that is, utilizing digital technologies to improve government-society relations.

3 E-estonia.com government website: https://e-estonia.com/solutions/e-governance/ (July 2019)

Introduction

The global digital revolution is reshaping the relationship between societies and governments. New policies and practices for e-government are emerging and various experiments are performed to test the utility of new digital technologies, including e-commerce, i-voting, e-citizenship, and various e-public services. The digital revolution has transformed governments worldwide. The United Nations Department of Economic and Social Affairs (UN DESA) observed over the past two decades a positive trend towards higher levels of e-government development. UN DESA measures the level of e-government development with the e-Government Development Index (EGDI). The EGDI is composed of the open service index (quantifying the scope and quality of government online services), the telecommunication infrastructure index (quantifying access to the internet), and the human capital index (quantifying the scope and quality of digital literacy among citizens). According to the latest EGDI from 2018, 58% of the 193 UN member states are highly developed in e-government. Among the top twenty countries in e-government, most are located in Europe (Denmark, UK, Sweden, Finland, Estonia, France, Germany, Netherlands, Norway, Switzerland, Spain, Luxemburg, Iceland, Austria), some in Asia (South Korea, Singapore, Japan), and one each in Oceania (Australia) and the Americas (United States). In Southeast Asia, Singapore and Malaysia are at the forefront, followed by Brunei Darussalam, Indonesia, Philippines, Thailand, and Vietnam. Laos, Myanmar and Cambodia are the least developed in e-government compared to other ASEAN members.[4]

UN data shows that the digital revolution and its impact on government is a global, but uneven, process that is often called the "digital divide". Some states and societies are coping more effectively with new digital technologies, and have developed sound digital concepts and practices of e-government. Others, however, are just beginning to cope with the new challenges. Cambodia is among the latter. Against this background, this study aims to examine which innovations from countries with a very high development of e-government can be useful for Cambodia, and if they can support Cambodia's own transformation towards e-government. Estonia has been selected as a representative case study because it carries powerful learning points for developing and post-conflict countries like Cambodia. The study begins with an explanation of the comparative-analytical framework applied to assess the Estonian and Cambodian e-government. The study then proceeds to investigate the historical development of digitalization of Estonia's government as well as its e-government innovations such as X-Road, e-identity, e-cabinet, data embassy and e-democracy. This follows an analysis of the state of e-government in Cambodia by tracing its history, achievements and shortcomings. The study concludes with an assessment of the innovation potential of e-Estonia's learning points for Cambodia's e-government and provides policy recommendations.

Comparative-Analytical Framework: Definition and Transformation Phases of E-government

This study defines e-government as the use of digital technologies for government institutions and processes, including e-administration, e-public services, e-democracy, and

4 UN Department of Economic and Social Affairs (UN DESA), UN E-Government Survey 2018, (New York, 2018), 86.

e-diplomacy. Digital technologies are used to improve inter-governmental, intra-governmental and state-society relations. This definition is based on definitions of e-government from the World Bank and the UN DESA. The World Bank defines e-government: '...as the government's use and application of [digital technologies leading to] a better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, and [/or] a more efficient government'.[5] UN DESA defines e-government '...as the use and application of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people'.[6] As underlined in these definitions, e-government is not only a means to improve efficiency of government services, but also to empower citizens.

Accordingly, the comparative analysis of Estonia and Cambodia especially focuses on e-administration, e-public services and e-democracy. E-administration is defined as a means to improve intragovernmental relations among different units of public administration that can lead to more accountability, transparency and efficiency. E-public services are systems that can improve public services for citizens. E-democracy is defined as ways to enhance citizen's participation in political processes that can lead to more inclusive policy-decision making processes and increase public trust in government. To provide a contextual understanding of the transformation towards e-government in Estonia and Cambodia, this study applies a concept developed by the US-based Center for Democracy and Technology in its publication 'E-Government Handbook for Developing Countries'.[7] The handbook distinguishes three phases of transformation towards e-government. In the first phase, called 'publishing', simple digital technologies are introduced by governments to provide citizens access to information through webpages. They inform and update citizens about government activities, policies, and laws, and might also provide advisory services to support citizens to make informed decisions on legal matters, employment, business, education, and health, among others. In the second phase called 'interaction', more interactive digital technologies are applied to provide a platform for direct communication between citizens and government. Through e-mail correspondence and online forums, citizens can directly reach public officials. Citizens can express their opinions, make inquiries and provide feedback to the government about public services. In this way, digital technologies give governments a channel to communicate with citizens, for example to get policy input and feedback that can lead to improved public services and more inclusive policy-decision making processes. In the third and final phase called 'transaction', even more advanced digital technologies are used to enable the exchange of data, documents, votes and finances between citizens and government. Citizens might be given a digital identity to declare and pay their taxes online, vote online in elections, download, and exchange various documents with government officials, apply online for business and driver licenses, and gain online access to personal insurance data like unemployment and health.

5 World Bank Definition quoted in UN DESA 2018, 220.

6 UN Department of Economic and Social Affairs (UN DESA), UN E-Government Survey 2014: E-Government for the Future we want (New York, 2014), 2.

7 Center for Democracy and Technology, The E-Government Handbook for Developing Countries, (Washington, World Bank, 2002), 3-4.

The History and Innovations of Estonia's E-government

In the 1990s, the Republic of Estonia, with 1.3 million citizens, decoupled from the former Soviet Union and its successor state Russia. The country had been occupied by the Soviet Union in 1940, named the 'Estonian Socialist Soviet Republic' and forced into the Eastern bloc for 61 years. After gaining independence in 1991 the former centrally planned economy and communist party state were successfully transformed into a liberal democracy and free market economy. Estonia is today a high-income developed country and ranks high in the UN Human Development Index.[8] Estonia proved to be exceptionally innovative during its political and economic transformation. By 2012 Estonia succeeded to become one of the worldwide leading e-government nations.[9] This makes it interesting for countries like Cambodia to ask: How has Estonia managed to become a leading e-government nation? What was the impact of digital reform on government services and citizen empowerment?

To answer these questions, one needs to look back at Estonia's digital transformation process in the 1990s. Digitalization became one of the Estonian government's main objectives at a very early stage. The first President of independent Estonia, Lennart Meri, formulated Estonia's digital vision in the catchphrase "What is our Nokia? ".[10] There was a broad consensus among all political parties in Estonia to commit to the digitalization of government. 'e-Estonia' was to become a defining symbol of Estonia's national identity and international image which had been neglected during Soviet occupation. To succeed in digital transformation, Estonia did not rely on large-scale investments in digital technologies and products from Western companies but on the development of its own digital solutions and products. This was to be achieved through innovations and the use of open source software.[11] The Estonian government relied on well-educated academics in the computer technology field coming from the Tallinn University of Technology (in the capital of Estonia) and the Estonian Academic Science's Institute of Cybernetics. Also, the geographical proximity to the Nordic countries who led the global mobile phone market in the 1990s was helpful. Private-public joint ventures with Swedish and Finnish counterparts named Eesti Mobiiltelefon and Eesti Telefon helped modernize the digital infrastructure. Estonian academics built the first internet connections with the West through Swedish colleagues.[12] Networks were built between government, the private sector and academia to develop what was framed as a 'general-purpose information and communication technology'.[13] An Informatics Fund was established in the early 1990s as an advisory body to the government, the Ministry of Communication was reorganised and two state-owned companies Eesti Post and Eesti Telecom formed. The Estonian Academic Science's Institute of Cybernetics founded its own company 'Cybernetica AG' which innovated and developed Estonia's digital infrastructure. CEOs of domestic infor-

8 United Nations Development Program (UNDP), Human Development Index 2018. Briefing Note on the Statistical Update 2018 – Estonia, (New York, 2018), 2.

9 Joachim, Aström, et. al. (Eds.), Citizen centric e-participation: A trilateral collaboration for democratic innovation. Case studies on e-participation policy: Sweden, Estonia, and Iceland, (Tallinn, Praxis Center for Policy Studies, 2013), 21-22

10 Cited from Rainer, Kattel, and Ines, Mergel, Estonia's Digital Transformation: Mission mystique and the hiding hand, Working Paper (London, Institute for Innovation and Public Purpose, 2018), 4.

11 Ibid., 4.

12 Ibid., 6.

13 Cited from Ibid., 4.

mation and communication technology firms became chief advisors to the Estonian government, thereby enhancing close policy coordination between the private and public sector from an early stage on.[14]

Estonia's government was indeed quite visionary in formulating its objective to turn the country into a e-government nation. In the 1990s, Estonia had no nationwide digital infrastructure for mobile or fixed broadband. By 2000, only one third of Estonians were using the internet or had digital literacy, and few understood the benefits of e-government. To overcome low internet penetration and the low levels of digital literacy among Estonians, close cooperation between the private and public sector played a game-changing role. To make the internet available for all Estonians, public-private joint ventures with domestic and international companies helped build nationwide coverage with mobile broadband networks of a high quality (3G and 4G) within one decade (2004), and in 2011, fixed broadband coverage reached 94% of the Estonian population.[15]

Beginning in the early 2000s, the banking and telecommunication sector were essential to improve digital literacy and increase public trust in the new technologies through education campaigns in partnership with the Estonian government and the introduction of digital education in Estonia's general education curriculum. The Tiger Leap project brought digital technologies and education to all Estonian schools by 2000. The Look@World Project trained 100,000 individuals (around 10% of Estonian adult population) in digital technologies and increased the number of public internet access points from 200 in 2001 to 700 in 2004.[16] To foster advanced digital literacy, coding as a subject was also introduced to the general education curriculum.[17] Today all Estonian schools and local governments have computers and access to the internet is available in most public places in Estonia as free wireless internet access is provided. As a result, today 99% of Estonians, aged 16-74 years uses the internet, and 83% of households are digitally literate.[18]

Simultaneously to creating the digital infrastructure and improving digital literacy, the Estonian government established an early electronic system of identification, authentication, and digital signatures. Electronic ID (eID) cards were introduced in 1998 and are compulsory for all Estonian citizens. Electronic IDs enable Estonian citizens to identify themselves in both the digital and physical world, to authenticate with pin codes online and to provide digital signatures. eIDs enables citizens to receive personalized e-services and information, to interact with the government by providing comments and opinions, and to transact with the government for tax payments, certificates, and other e-services. Estonian citizens can also travel in most of Europe with the eID card. Since 2002, 1.24 million eID cards were issued. In 2007 also mobile eIDs were introduced. By the end of 2014, eID cards and mobile IDs were used around 315 million times for personal identification and 157 million times as digital signatures. In av-

14 Estonian Ministry of Economics and Communication, Digital Agenda 2020 for Estonia, (Tallinn, 2015), 6.

15 E-Governance Academy Foundation, e-Estonia: e-Governance in Practice, 2nd Ed., (Tallinn, 2017), 38.; Estonian Ministry of Economics and Communication 2015, 7.

16 Kristian, Vassil, Estonian e-Government Ecosystem: Foundation, Applications, Outcomes in World Development Report 2016. Background Paper Digital Dividends, (Estonia, University of Tartu, 2016), 9.

17 World Bank, Digital Dividends -World Development Report 2016, (Washington, World Bank, 2016), 268.

18 E-Governance Academy Foundation 2017, 38.

erage, between 2003 and 2014, the eID cards and mobile IDs were used 7.4 million times for personal identification and 3.5 million for digital signatures per year.[19]

Also, of interest is Estonia's development of a three-layer government platform. The so-called X-Road, consisting of a system of registries and data exchange between public departments and private agencies, has received wide international attention. Data such as the e-population registry, e-land registry and e-business registry is stored in it and can be used as a platform to develop new ICT applications by allowing private companies to connect to the X-Road. By 2015 more than 1,600 institutions had joined X-Road and 500 million queries were made daily through the multilayer network.[20] X-Road proved to be a success despite a major crisis of the system in 2007 when Estonia experienced as first nation worldwide a coordinated Distributed Denial of Service (DDoS) cyber-attack. Although no data was lost, 58 Estonian webpages were shut down, including those of the government, most newspapers and many banks. To protect X-Road from future cyber-attacks, as well as possible physical attacks during warfare or from damages caused by natural catastrophes, Estonia decided to secure its data by storing them in so-called 'data embassies' in other countries. In 2017, Estonia opened the worldwide first 'data embassy' in Luxembourg. The data embassy is recognized by Luxembourg as a 'sovereign embassy in foreign data centers'[21] and enjoys the same immunities and protection as traditional embassies.

First reforms towards establishing an e-government were made in 2000, when an e-cabinet was introduced. E-cabinet is a digitalized information system of government including a multi-user database and scheduler with relevant and updated information and items under discussion. Ministers are informed before the cabinet meeting about the agenda and items to be discussed and can provide comments. Items which were not objected online are not debated in the cabinet meeting but put directly to vote. Documents are signed by the Prime Minister and Ministers with digital signatures. With e-Cabinet, the meeting time of each session could be reduced from four to five hours to between 30 and 90 minutes. Ministers don't need to always be physically present for cabinet meetings but can participate via video-conferencing. E-Cabinet also allowed eliminating the weekly print and delivery of thousands of pages of documents for the meetings.[22]

Following the establishment of e-government, e-public services were extensively enhanced over two decades. Today, 99% of Estonia's public services are available online 24 hours/day per week. The most important public service layer is the official Estonian Government Information Portal 'eesti.ee' providing citizen access to more than 800 services.[23] Examples of services include those in the fields of law and order (e-law, e-notary, e-justice, e-police), healthcare (e-health records, e-ambulance, e-prescription), public transport (e-ticket, m-parking), business and finance (e-tax, e-banking, e-business register), land management (e-geoportal), and education (Education

19 Vassil 2016, 7

20 Estonian Briefing Centre 2019, https://e-estonia.com/solutions/interoperability-services/x-road; Vassil 2016, 15.

21 E-Estonia Briefing Centre 2017, https://e-estonia.com/estonia-to-open-the-worlds-first-data-embassy-in-luxembourg/

22 e-Estonian Briefing Centre 2019, https://e-estonia.com/solutions/e-governance/e-cabinet/

23 Helen, Margetts, and Andre Naumann, Government as a Platform: What Can Estonia Show the World? Research Paper, (Oxford University, Department of Politics and International Relations, 2017), 5.

Information Systems eKool and Studium, e-schoolbag, and other e-school solutions). Estonia's e-public e-services are popular and widely used. For example, 98% of firms in Estonia are founded via the e-business registry. 99% of banking transactions and 95% of tax declarations are made by Estonians online. 99% of prescriptions are digitalized with annually 500,000 queries by doctors and 300,000 queries by patients.[24] Being a liberal parliamentary democracy, the digitalization of government has also led to reforms towards 'e-democracy'. Estonia is well-known worldwide for being one of the countries that allow citizens to use internet voting (i-voting) for general elections since 2005.[25,26] Estonians can cast their vote either from home, from their office or from abroad. Estonians can choose if they want to vote at polling stations or via the internet. When they vote online, they can vote during a pre-voting period and re-cast their vote during the designated online voting period. The ballots, with the voter identity removed, are then sent to the polling stations for counting. I-voters cannot recast their vote on Election Day. The first i-voting in Estonia took place for the 2005 local elections when 2% of eligible voters cast their vote online. In the past ten elections, including local, parliamentary and European Parliament elections since 2005, the number of i-votes increased to an average of 30% and reached an all-time high in the 2019 parliamentary elections with 44%.[27] I-voting is especially popular among Estonians living abroad. In the 2015 parliamentary elections, expatriate Estonians cast i-votes from total of 116 countries.[28]

Besides i-voting, also systems of e-participation were introduced. In 2001, the first participation portal of Estonia called 'TOM' (Today I Decide) was setup for direct communication between government and citizens. The portal allows citizens and interest groups to engage online in legislative and policy-making processes. Over six years TOM attracted only 1,000 users. 1,025 proposals were made of which 90% received an answer from civil servants. Citizens can make proposals for new legislation or amendments to existing law. Another early reform was the Public Information Act adopted in 2000. It requires all public institutions 'to keep webpages and provide extensive content of public interest, including drafts of policy documents and legislative acts'.[29] The portal TOM was integrated in 2007 to the central consultation-participation portal 'osale.ee' ('osale' means 'participate' in Estonian). On average, 25 public consultations are held annually. The platform has 3,000 users. Because the participation in both portals had been relatively low, some studies questioned the utility of those e-projects. They found that top-down approaches through government-initiated e-participatory platforms were less popular among citizens who stated that they lacked either the interest or the skills to use them.[30]

Conversely, e-participation platforms that were initiated bottom-up by Estonian citizens appeared to have been more popular and did increase participation in e-participatory

24 e-Estonia Briefing Centre 2019, https://e-estonia.com/solutions/e-governance/

25 Voting and Election Results Riigikogu [Estonian Parliament] elections 2019, https://rk2019.valimised.ee/en/voting-result/voting-result-main.html

26 National Democratic Institute (NDI). December 17, 2013. https://www.ndi.org/e-voting-guide/internet-voting

27 Voting and Election Results Riigikogu [Estonian Parliament] elections 2019, https://rk2019.valimised.ee/en/voting-result/voting-result-main.html

28 e-Governance Academy Foundation 2017, 18.

29 Joachim, Aström (2013), 23.

30 Ibid., 20-21

projects. In 2010, an online petition platform was established by a non-governmental organization which led 18,210 Estonians to sign an online petition to establish an online people's assembly. In the first three weeks since the opening of the online people's assembly, the website received 2,000 proposals from citizens. The top 15 were presented to the Estonian parliament and seven of them became new laws or amended existing laws. This was followed, in 2013, by the introduction of a participatory budgeting portal for local government that allows citizens to follow the budgeting process and make proposals. Another platform, also founded in 2013, allows public initiatives. Public initiatives in Estonia need 1,000 signatures to be discussed in Estonia's parliament.[31]

An Overview of Cambodia's E-government

Just as Estonia gained independence from the Soviet Union, Cambodia was able to end a decade-long civil war caused by the constellations of conflict of the Cold War. Unlike Estonia, Cambodia had to recover from the damage of two proxy civil wars and the atrocities of the Khmer Rouge Regime that cost the lives of up to 25% of the population. Cambodia's government soon recognized the potential of new digital technologies to innovate and improve government-society relations. In 2000, Cambodia's government formulated the vision 'to bring the government closer to the citizens and vice versa through the computerization of government'.[32] It implied that the Cambodian government intended to transform itself from physical government to e-government. To reach this goal, the government set up policies and strategies, created institutions and established programs and approaches to develop digital capacities for government officials, civil servants, and people in general.

In 2000, the National ICT Development Authority (NiDA) was established and is chaired by the Prime Minister of Cambodia. NIDA's aim was to develop e-government projects, including the Government Administration Information System (GAIS) and Provincial Administration Information System (PAIS). Both systems are meant to digitalize administration of the central and provincial governments, including an electoral approval system to exchange data within the government on the national and provincial level, and the development of a digital system for the registration of residents, vehicles and real estate. NIDA cooperated for this purpose with the US-based company Cisco to develop a networking academic program with the Royal University of Phnom Penh (RUPP).[33] Phu Leewood, NiDA Secretary General, said, "This is a master map for us to walk together in the right direction for all government and private institutions to get up to speed with the global ICT sector".[34] hree years later, in 2013, NIDA was merged with the Ministry of Post and Telecommuni-

31 Ibid., 80-81

32 Chea Manit, Deputy Secretary-General of NIDA quoted from Country Report Cambodia for Sub-regional Workshop on Strengthening ICT Policies and Applications to Achieve MDGs and WSIS Goals in Southeast Asia and the Pacific, Bangkok 19-20 October 2009, https://www.unescap.org/resources/country-report-cambodia-nida

33 United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), Leveraging Investments in Broadband for National Development – The Case of Cambodia, (New York, 2017), 28.

34 Kun Makara. E-government guidelines released. Phnom Penh Post. August 25, 2009. Accessed May 12, 2019. https://www.phnompenhpost.com/business/e-government-guidelines-released.

cations (MPTC), and a working committee for the digitalization of the economy was established. This committee includes the Ministry of Economics and Finance (MEF), the Ministry of Posts and Telecommunication (MPTC), the Ministry of Information (MOI), the Ministry of Commerce and the Council for Development of Cambodia (CDC). They developed a new ICT Masterplan named 'ICTopia Cambodia' 2014-2020. The masterplan outlines four main objectives for Cambodia's digitalization: (1) to empower people with human resource development and raising e-awareness, (2) to ensure connectivity with a national ICT infrastructure, a legal framework, and cybersecurity, (3) to enhance capabilities in the ICT industry, develop standards, enhance research and development, and (4) to enrich e-government services.[35] New institutions were established in 2012 and 2014 to achieve these objectives. Cambodia's government established the National Institute of Posts, Telecommunications and ICT (NIPTICT) to provide ICT training and research, the Telecommunication Regulator of Cambodia (TRC) to provide regulation and licensing of telecommunication networks and services, and also a Computer Emergency Response Team (CamCERT) to provide for cybersecurity.[36] Up to this point, the government was one step ahead in the development of e-government. The Ministry of Commerce allowed private companies to register licences online. In 2016, Prime Minister Hun Sen said that his government was moving to 'e-government' and that same year he applauded his former Minister of Commerce Sun Chanthol for transforming physical commerce into e-commerce. Both local and foreign companies can apply to the Ministry of Commerce for licences online.[37]

Due to the positive developments above, in 2016, the Cambodian government came up with the Policy on Telecom/ICT Development for 2020. Through this policy, the government planned to achieve three key objectives by 2020. First, improving and expanding Telecommunication infrastructure and usage. With the first objective, the government has committed to provide 100% broadband coverage in urban areas, 80% broadband coverage in rural area, 100% mobile penetration, 80% internet penetration, 50% broadband penetration, 20% household internet penetration, and 10% internet of things penetration. The second objective is developing ICT human capacity, by providing ICT literacy and skills to key stakeholders, including national government officers (with a target of 95% ICT literacy rate), subnational government officers (75% ICT literacy rate), and basic ICT skills to 100% of high school graduates, 15% human resources in ICT, 30 per million people of ICT R&D experts rate, and 10 per million of ICT researchers. The third and last objective is to diversify the ICT industry and to promote ICT use at 65% of Telecom/ICT registered companies, a 100% usage rate of e-mail in the government, and have a website for 100% of the state's institutions.[38]

This commitment has already shown some

35 Korea International Cooperation Agency (KICA), Summary on Cambodian ICT Masterplan 2014-2020 (Phnom Penh, 2014), 6.

36 UN-OHRLLS 2017, 8.

37 Chheang Vannarith. Cambodia Embarks on E-Government. Khmer Times. February 25, 2016. Accessed May 11, 2019. https://www.khmertimeskh.com/36107/cambodia-embarks-on-e-government/.

38 Heng, Pheakdey. "Embracing the Digital Economy: Policy Consideration for Cambodia." In Economic Transformation in Cambodia and Abroad, 18-31. Phnom Penh: Konrad Adenauer Stiftung Cambodia, 2018, p. 27.

results. According to the Ministry of Posts and Telecommunications (MPTC), in 2016, over 26,000 kilometres were covered by the telecom's backbone. The same year, three telecom operators (Cambodia Fiber Optic Cable Network: CFOCN, Telecom Cambodia, and Viettel (Cambodia) Pte Ltd) cooperated with each other to provide the total length of the fiber optic backbone with 26,411 kilometres. [39]In 2017, the three telecom operators provided a total 27,100 kilometres of fiber optic backbone in Cambodia.[40] Kan Chanmeta, the Secretary of State of MPTC said, "Data users are increasing remarkably so if there is no strong infrastructure then data speeds will not answer to the needs of the people".[41] That same year an ICT Innovation Center (IIC) was opened that is financed by a public research and development fund.[42] In addition to the increasing broadband coverage, the number of Cambodian people engaging in the digital environment is also growing. According to Im Vutha, spokesman of the Telecommunication Regulator of Cambodia (TRC), in Cambodia, the number of internet users was 12.5 million in 2018 compared to 10.8 million in 2017. Meanwhile, also Facebook's presence in Cambodia has increased; in 2018 there were 7 million compared to 4.7 million in 2017. The number of mobile users in Cambodia also rose to 19.16 million in 2018 compared to 18.57 million in 2017.[43] Finally, in 2018 99% of Cambodia's population could access 2G technology; 65.8% could use 3G and 57% could use 4G networks which cover 12.7% of the country.[44] By 2020, 80% of the total population is expected to have internet access.[45]

Based on the statistics above, it is believed that the government's commitment to e-service is progressing. Ironically, most of Cambodian public institutions have started transforming from physical service to e-environment.[46] Some of them are addressed as follow. The Ministry of Foreign Affairs and International Cooperation (MFAIC) offers an 'e-visa' service. If foreigners wish to travel to Cambodia, they can apply for their visa online. The MFAIC also makes available online information for visitors, other consular services and information about doing business in Cambodia.[47] MFAIC uses Facebook to communicate, including sharing and receiving information.[48] The Ministry of Commerce provides online access to 'trade services, trade promotion, trade information, and foreign direct investment infor-

39 Kanika Montha. "Cambodia's Journey to Become a Digital Economy; The Current landscape." In Economic Transormation in Cambodia and Abroad: Digital Insights, 6-16. Phnom Penh: Konrad Adenauer Stiftung, 2018, p. 9.

40 Heng, Pheakdey. "Embracing the Digital Economy: Policy Consideration for Cambodia." In Economic Transformation in Cambodia and Abroad, 18-31. Phnom Penh: Konrad Adenauer Stiftung Cambodia, 2018, p. 22.

41 Kanika Montha. "Cambodia's Journey to Become a Digital Economy; The Current landscape." In Economic Transormation in Cambodia and Abroad: Digital Insights, 6-16. Phnom Penh: Konrad Adenauer Stiftung, 2018, p. 10.

42 Heng, Pheakdey, Preparing Cambodia's Workforce for a Digital Economy, Digital Insights (Phnom Penh, Konrad Adenauer Stiftung, 2019), 31-32.

43 Sok Chan. Number of internet users up this year. Khmer Times. December 7, 2018. Accessed May 10, 2019. https://www.khmertimeskh.com/557066/number-of-internet-users-up-this-year/.

44 Sok Chan. Number of internet users up this year. Khmer Times. December 7, 2018. Accessed May 10, 2019. https://www.khmertimeskh.com/557066/number-of-internet-users-up-this-year/.

45 Heng, Pheakdey. "Embracing the Digital Economy: Policy Consideration for Cambodia." In Economic Transformation in Cambodia and Abroad, 18-31. Phnom Penh: Konrad Adenauer Stiftung Cambodia, 2018, p. 23.

46 Accessed July 7, 2019. http://www.cambodiaembassy.ch/english/ministries.php

47 Accessed July 7, 2019. https://www.mfaic.gov.kh/

48 Accessed July 7, 2019. https://www.facebook.com/mfaic.gov.kh/

mation'.[49] It also has a Facebook page.[50] The Ministry of Education, Youth and Sport (MoEYs) is actively online. Most information concerning education is accessible online.[51] The MoEYs uses Facebook[52], Twitter[53] and Instagram[54] to exchange information, such as receiving feedback from the public and enabling communication between officers in the Ministry. The Ministry of Post and Telecommunication (MPTC) is available online in terms of information and some services.[55] It is also possible to communicate with the MPTC through Facebook.[56] The Ministry of Public Works and Transport (MPWT) allows people access to online services related to vehicle registration and driving licences. Other information of the MPWT is possible available online.[57] The MPWT uses Facebook for communication.[58] The MPWT offers an official app for the city bus which facilitates people living in Phnom Penh travel more easily.[59] Facebook appears to be more popular than other social media for information exchange in both public and private sector. Even Prime Minister Hun Sen has his own Facebook. He uses it to communicate with his cabinets, civil servants, armed forces, and Cambodian citizens, both inside and outside the country. The Prime Minister said, "Through Facebook, I have also got to know the well-being of compatriots and have received a lot requests from you and successfully solved a great deal of problems for you, nieces and nephews".[60] Currently, 11,759,449 people like his page, and 11,717,230 people follow his page.[61] Prime Minister Hun Sen also said, "I would like to thank all of you living both inside and outside the country, including all my foreign friends who love me and support me on Facebook, for helping me hit over ten million 'likes' today, and congratulations to you all".[62] Meanwhile, Prime Minister Hun Sen encouraged all states' institutions to use social media, especially setting up Facebook page, to communicate or deal with their customers.[63]

The achievements above wouldn't have been possible without foreign investments of more digitally advanced states like Vietnam, Malaysia, South Korea and China over the past two decades, combined with joint initiatives of the government and private sector. Cambodia developed a mobile phone market as an alternative to fixed telephone lines in the late 1990s. This provided an important foundation for the development of today's digital infrastructure. Today Cambodia has six active mobile cellular

49 Accessed July 7, 2019. https://www.moc.gov.kh/en-us/

50 Accessed July 7, 2019. https://www.facebook.com/moc.gov.kh

51 Accessed July 7, 2019. http://www.moeys.gov.kh/index.php/kh/

52 Accessed July 7, 2019. https://www.facebook.com/moeys.gov.kh

53 Accessed July 7, 2019. https://twitter.com/moeyscambodia

54 Accessed July 7, 2019. https://www.instagram.com/moeyscambodia/

55 Accessed July 7, 2019. https://www.mptc.gov.kh/

56 Accessed July 7, 2019. https://www.facebook.com/officialmptc/

57 Accessed July 7, 2019. http://www.mpwt.gov.kh/kh/home

58 Accessed July 7, 2019. https://www.facebook.com/mpwt.gov.kh/posts/1150078731843132

59 Accessed July 7, 2019. https://apps.apple.com/kh/app/city-bus-official/id1447942721

60 Sen David. Premier says that facebook allows him to help citizens. Khmer Times. May 22, 2018. Accessed July 7, 2019. https://www.khmertimeskh.com/492135/premier-says-facebook-allows-him-to-help-citizens/

61 Accessed July 7, 2019.. https://www.facebook.com/hunsencambodia/?__tn__=%2CdkC-R&eid=ARD13AaSr0C1U_RM64Kqs9PZrE5PLaNkDfVZwYJSpGatHOeQitgV_jMYreiMPPcSRFUbAahJ8vQ8R93m&hc_ref=ARR-EayZ3ZpbKmqYCpSFPZITaVkK1n0bTz-IdL_hHbyPPA-q0zyRxSqp0cYhjnyYUbg

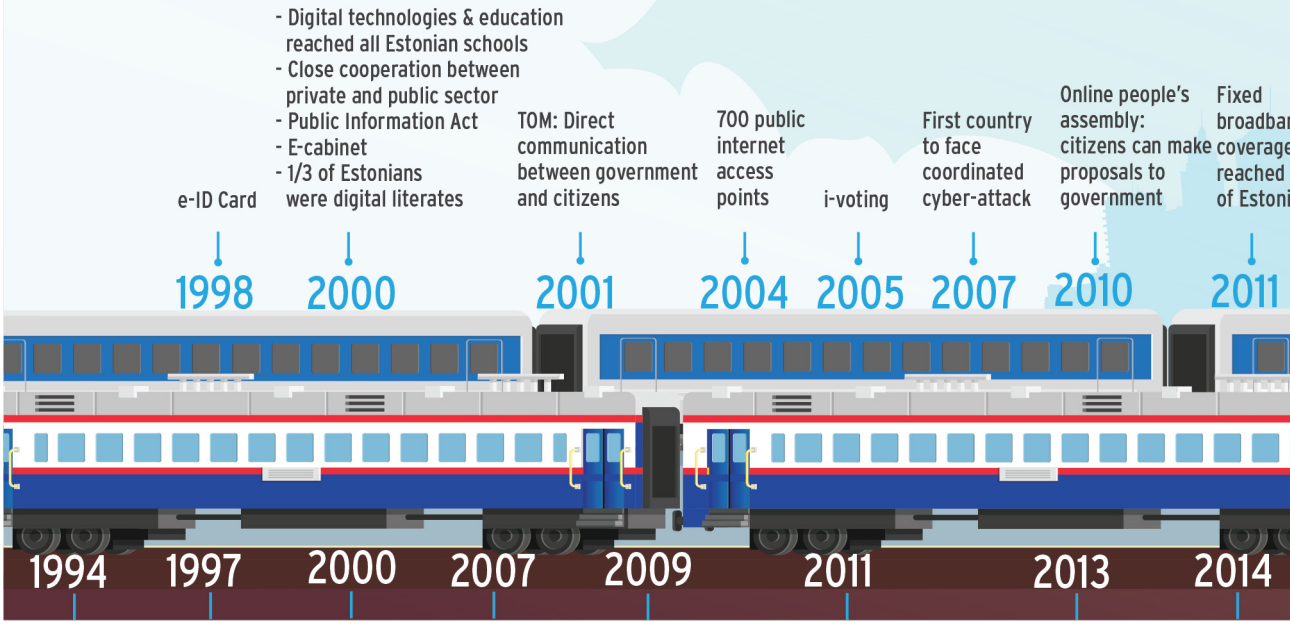
62 Sen David. Premier says that facebook allows him to help citizens. Khmer Times. May 22, 2018. Accessed July 7, 2019. https://www.khmertimeskh.com/492135/premier-says-facebook-allows-him-to-help-citizens/

63 Chheang Vannarith. Cambodia Embarks on E-Government. Khmer Times. February 25, 2016. Accessed May 11, 2019. https://www.khmertimeskh.com/36107/cambodia-embarks-on-e-government/.

Speeding Towards E-governance: Learning from Estonia

Digitalization of governance in Estonia and Cambodia

Cambodia is undergoing a digital transformation towards e-government. Despite significant differences to the development path of Estonia, it can learn from e-Estonia because both countries share a common vision that is utilizing digital technologies to improve government-society relations.



What needs to be done?

Improve digital education and literacy

Digital literacy in Cambodia is improving through the national education curriculum whic incorporates digital education, e-school and distance e-learning projects, joint campaign of the government and the private sector like the Cambodian ICT award, and the emerge of a new class of Cambodian tech entrepreneurs popularizing digital technologies in Cam

Build more digital infrastructure

Some of the e-public services can already be provided for all citizens through mobile bro Once the digital infrastructure is at a stage where all citizens can access the internet eq fixed broadband and computers, those services could further improve government-socie

DIGITAL INSIGHTS

KONRAD ADENAUER STIFTUNG

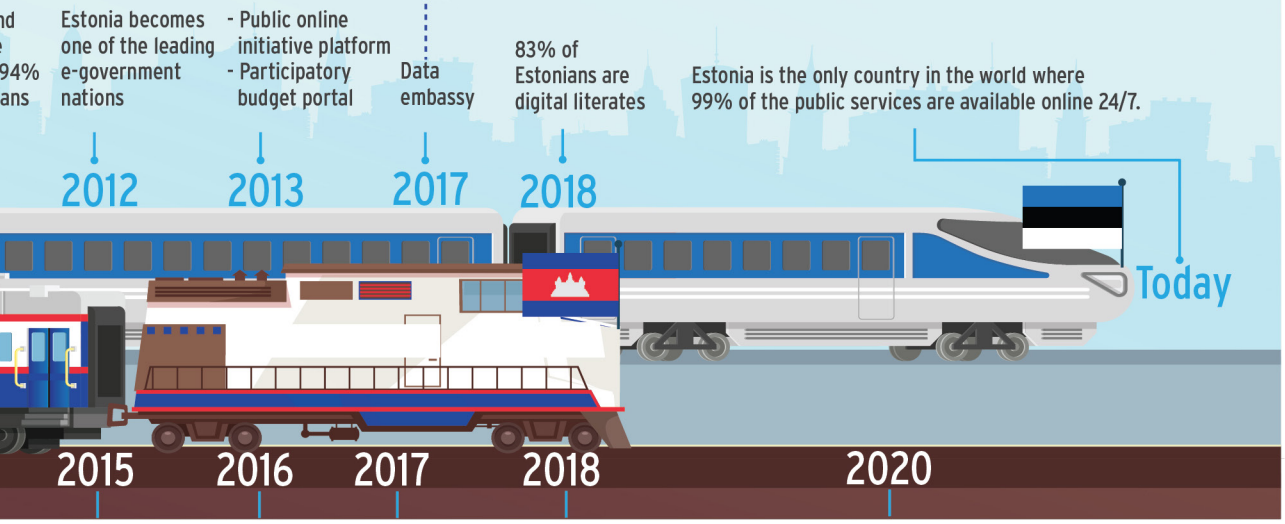
What can Cambodia learn from Estonia?

X-Road initiative
X-Road is a "centrally managed distributed Data Exchange Layer between information systems".

Data embassy
Data embassy is an extension in the cloud of the Estonian government, which means the state owns server resources outside its territorial boundaries.

Innovative e-public services
The Estonian government has decided to boost the paperless society and make sure all public services involve as little repetitive bureaucracy as possible.

E-cabinet
The Information System for Government Sessions, better known as e-cabinet, is a powerful tool that the Estonian government uses to streamline its decision-making process.



National curriculum for digital education

- 98% mobile broadband subscription
- E-commerce

27,100 km fiber cable optic network

- Pilot digital school project
- Distance e-learning
- 99% of Cambodia could access 2G
- 12,7% could access 4G

- Improved & extensive telecommunucation infrastructure
- ICT literacy & skills for key stakeholders
- 100% usage of e-mail in the government
- Websites for all state insitutions

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Extend e-public services

It is important that e-participatory platforms are initiated not only by the government but also by citizens. In Cambodia, it will be important to think about how to make such platforms more inclusive, as many citizens don't have full access to the internet yet or lack the skills or interest to get the best out of it.

Build public trust in e-government

Cambodia's government doesn't have any advanced standards for cybersecurity yet, nor has it adopted any law to protect data or privacy, and, finally, it would need substantial technical support to develop data embassies.

Content and Storyline: Sun Kim & Dr. Raimund Weiß
Infographic Designer: Singhtararith Chea
Editors: Robert Hör & Ann-Cathrin Klöckner

operators, up from three in 2000. Since 2011, GSM coverage has reached 99% of the population and mobile subscription has surpassed 100%. By 2007 Cambodia had its first 3G mobile broadband, and in 2014, the mobile operator SMART launched the first 4G mobile broadband. According to the Broadband Commission for Sustainable Development, Cambodia has one of the most competitive broadband markets in the world attracting foreign investments with 100% foreign ownership and limited regulatory fees. Currently, there are over thirty Internet Service Providers (ISPs), including mobile internet operators. The top ten ISPs have a market share of 98%. The World Bank found that Cambodia has the cheapest broadband fees worldwide today[64] By 2016, 48% of Cambodia's population of 16.5 million people had smartphones that provide access to the internet through mobile broadband. In 2018, 52 of 100 inhabitants in Cambodia had an active mobile broadband subscription.[65] Cambodia's mobile broadband network quality is good and internet speed faster for mobile than fixed broadband networks. Only 1% of the population uses fixed broadband (117,049 subscribers in 2017). In 2016, Cambodia had the highest rate of mobile data usage among Least Developed Countries and occupied the third place just behind Latvia and Norway. The high mobile data usage has been attributed by the UN to price promotions in Cambodia's highly competitive mobile phone and internet market.[66]

Additionally, the government's vision does not focus purely on ICT connection inside the country but also beyond. In 2017, the Cambodian MPTC and CFOCN signed a 25 year-project to build the 'main high-speed data conduits linking Asian, African and European countries'.[67] Mr. Vutha said, "Cambodia has more than 37,441 kilometres of fiber cable optic network and two marine cable optic connections in operation, the Malaysia-Cambodia-Thailand (MCT) and the Asia-Africa-Europe 1 (AAE-1) links".[68] TELCOTECH, CFOCN, and CHUAN WEI were granted submarine cable licenses. TELCOTECH has started operating its submarine cable since March 2017, and this cable was to link Cambodia, Malaysia, and Thailand directly to the Asia-America Gateway (AAG). For CFOCN, its submarine cable has begun operating in November 2017 in the submarine network to connect Cambodia to the Asia-Africa-Europe-1 (AAE-1).[69] Based on the statistics above, it can be said that Cambodia is building the foundations for e-government and/or e-economy.

Therefore, in 2018, the Cambodian government announced that Cambodia committed to transform its current economic system to an e-economy in 2023.[70]

64 Broadband Commission for Sustainable Development, Working Group on Broadband for the most vulnerable countries. Broadband for national development in four LDCs: Cambodia, Rwanda, Senegal and Vanatu (Paris, UNESCO, 2018), 8; World Bank, Benefiting from the Digital Economy – Cambodian Policy Note (Washington, 2018), 11.

65 World Bank 2018, 9.

66 UN-OHRLLS 2017, 20.

67 Kanika Montha. "Cambodia's Journey to Become a Digital Economy; The Current landscape." In Economic Transormation in Cambodia and Abroad: Digital Insights, 6-16. Phnom Penh: Konrad Adenauer Stiftung, 2018, p. 10.

68 Sok Chan. Number of internet users up this year. Khmer Times. December 7, 2018. Accessed May 10, 2019. https://www.khmertimeskh.com/557066/number-of-internet-users-up-this-year/.

69 Heng, Pheakdey. "Embracing the Digital Economy: Policy Consideration for Cambodia." In Economic Transformation in Cambodia and Abroad, 18-31. Phnom Penh: Konrad Adenauer Stiftung Cambodia, 2018, p. 24.

70 Heng, Pheakdey. "Embracing the Digital Economy: Policy Consideration for Cambodia." In Economic Transformation in Cambodia and Abroad, 18-31. Phnom Penh: Konrad Adenauer Stiftung Cambodia, 2018, p. 20.

Progress was also made around improving digital literacy. In 2009, the Cambodian Ministry of Education, Youth and Sports (MoEYs) developed an ICT Education Masterplan 2009-2013 that formulated the objectives: *'ICT should be expanded as a teaching and learning tool, as a means to improve education service productivity and management through improved information sharing, communication, and knowledge management, and to expand distance learning opportunities especially for disadvantaged groups in remote areas'.*[71] In 2015, the MoEYs published a national curriculum framework for digital education and e-learning methods, introducing ICTs as a mandatory subject in the national education curriculum.[72] To improve digital literacy, the MoEYs cooperate with the private digital sector. In 2009, MoEYs signed a Memorandum of Understanding with the second largest private telecom broadband operator Metfone (Viettel Vietnam), which holds 26% of the internet market share in Cambodia. Through the MoU, Metfone provided internet access, worth USD 5 million, to 500 schools. The MoU between the two sides was renewed in 2016 with an ambitious plan to digitalize 5000 schools.[73]

In addition to working with the private digital sector, the MoEYs cooperated with the Cambodian Research and Education Network (CamREN), an organization which is affiliated with the Cambodian Institute of Technology, to develop online education platforms. The MoEYs 'Open Educational Resources' platform provides online learning materials for classrooms, reference documents for teachers and interactive multimedia sorted by primary, secondary and tertiary education.[74] CamREN connects five higher public and private education institutions in Cambodia offering online learning material in English and Khmer, as well as access to an online library. CamREN is also connected to the Trans-Eurasia Information Network (TEIN) for international research and education.[75] In 2018 Cambodia's government started pilot digital school projects with distance e-learning through a public-private joint venture between Telecom Korea (KT) and Telecom Cambodia (an MPTC supervised government service provider). Telecom Korea developed a smart education application 'K-Box' allowing teachers to hold classes online and communicate with 2,000 students via video-conferencing in rural areas. Also, WIFI internet connections were installed to provide free internet in public places of Phnom Penh.[76]

To improve digital literacy, Cambodia might also benefit from the projects of the ASEAN Smart Cities Network (ASCN). In 2018, Singapore, ASEAN chair at the time, established the ASCN to promote ASEAN connectivity. The ASCN concept paper stated, "*The ASCN is envisaged as a collaborative platform where up to three cities from each ASEAN Member State, including capitals – with room for expansion when it matures – work towards the common goal of smart and sustainable urban development. […] Its primary goal will be to improve the lives of ASEAN citizens, using technology as an ena-*

71 Quoted from ICT Masterplan 2009-2013 in: UN-OHRLLS 2017, 29.

72 Heng, Pheakdey 2019, 30

73 Seavmeng, Samoeurt, Internet to be introduced in 5,000 schools (Phnom Penh, Cambodia Daily, 6 July 2016)

74 See webpage from MoEYS, http://krou.moeys.gov.kh/en/

75 See webpage of Cambodian Institute of Technology, http://itc.edu.kh/itserv/index.php/81-general/78-noc-of-research-center

76 Broadband Commission for Sustainable Development, The State of Broadband: Broadband catalysing sustainable development (Paris, UNESCO, 2018), 44-45.

bler".[77] 25 cities in member states were chosen for a pilot project, among them Phnom Penh, Siem Reap and Battambang .

In spite of the above progressive developments, there are four key challenges for Cambodia's digital transformation. The first one is the persistence of digital illiteracy despite the wide use of mobile internet. A survey of the United Nations on digital literacy in 2016 found that most Cambodians using the mobile internet have very basic digital literacy. That includes citizens with no formal education (21%) with a primary education (20%) and a lower secondary education (39%). Only those with a higher secondary education (12%) or university education (8%) have advanced digital skills. Moreover, 74% of Cambodian internet users stated in the survey to use the internet only for entertainment purposes, including listening to music, watching films and photos and chatting via social media. Only 33% stated that they use the internet to obtain news, and only 30% stated to use it to access information for education.[78]

The second key challenge remains the development of the digital infrastructure. Although Cambodia has made significant progress in regard to mobile internet access as outlined earlier, fixed broadband internet is still not widely available. Particularly, many parts of the countryside are still isolated from fixed broadband internet. During an interview with Khmer Times in 2016, a Cambodian scholar, Dr. Chheang Vannarith found that it is a big challenge for the government to develop ICT for over 70% of Cambodians living in rural areas.[79]

Third to mention is the challenge of rapid globalization of new digital technologies. As a developing country, it is crucial for Cambodia to benefit from new digital technologies. However it is complicated to make full use of them. There are many new products every day. From IoT to AI, from 4G to 5G, and from iPhones to Huawei. Which ones should Cambodia use? Certainly, Cambodia does not have enough resources or capability to test all these technologies. Alhough there are many ways to transform Cambodia into an international tech hub, 'Cambodia needs to narrow down its focus if it wants to become a centre for technology innovation.' as William A. Heidt, the former US Ambassador to Cambodia, said.[80]

Last but not least, also the legal framework is currently not entirely ready for a the digital transformation of Cambodia's government. Cambodia has yet to pass laws and regulations that ensure security and privacy of internet use. As of 2019, a law of e-commerce and a cyber law are in discussion, but have not yet been adopted by the Cambodian parliament. The draft law of e-commerce with 12 chapters consists of 90 articles divided into different topics including e-commerce, e-signature, e-government, personal data protection, unsolicited messages, penalties, e-evidence and e-payment. A cyber law plans the establish-

77 Poon King Wang. "Seeding a Smarter ASEAN." Edited by Tang Siew Mun, Hoang Thi Ha, Cheryl Tech, Moe Thuzar, Sanchita Basu Das, Termsak Chalermpalanupap, Nur Aziemah Aziz and Pham Thi Phuong Thao Choi Shing Kwok. ASEAN Focus (ASEAN Studies Centre at ISEAS-Yusof Ishak Institute) 23, no. 4 (July 2018): 1-40, pp. 18-20.

78 UN-OHRLLS 2017, 23-24.

79 Vannarith, Chheang. Cambodia Embarks on E-Government. Khmer Times. February 25, 2016. Accessed May 11, 2019. https://www.khmertimeskh.com/36107/cambodia-embarks-on-e-government/.

80 Kanika, Montha. "Cambodia's Journey to Become a Digital Economy; The Current landscape." In Economic Transormation in Cambodia and Abroad: Digital Insights, 6-16. Phnom Penh: Konrad Adenauer Stiftung, 2018, p. 15.

ment of a 'National Anti-Cybercrime Committee (NACC)' which is chaired by the Prime Minister.[81]

The Potential for Cambodia to Learn from E-Estonia

The above analysis of Estonia's digital transformation has shown that the Estonian government faced a number of challenges on its path to building e-Estonia, including at the development of a digital infrastructure, the spread of digital literacy as well as the promotion of e-government and e-public services. It was essential to have a vision and a strong cross-political party commitment to ensure the success of the initiatives taken to tackle them. Making e-Estonia part of the country's national identity provided the government a distinctive advantage.

Cambodia's government also developed an early vision and commitment to forming e-government. Like in Estonia, Cambodia's market for digital technologies flourished and made Cambodia a leader among Least Developed Countries in terms of digital infrastructure and internet penetration. In both countries it was essential for the government and private sector to work closely together. It was mainly through public-private joint ventures in both Estonia and Cambodia that the digital infrastructure could be developed alongside a highly competitive market for broadband services. However, unlike Estonia, Cambodia's government still faces some challenges with its digital infrastructure. Although internet penetration is very high, internet access remains limited because of the overreliance of most Cambodians on mobile broadband and their limited purchasing power to obtain laptops, tablets and PC desktops to make full use of the internet.

Unlike Estonia, Cambodia also continues to face challenges in terms of improving digital literacy. This has been less difficult for Estonia considering the country could rely on a well-educated population, despite the fact that the Soviet occupation politically and economically disadvantaged Estonians. Also, its geographical proximity to the digitally advanced Scandinavian countries has been beneficial. Through e-schooling, the majority of Estonians today are better prepared to make full use of the innovations of digital technologies than most Cambodians. Digital literacy in Cambodia is improving through the national education curriculum which incorporates digital education, through e-school and distanced e-learning projects, through joint campaigns of the government and the private sector like the Cambodian ICT award, and through the emergence of a new class of Cambodian tech entrepreneurs popularizing digital technologies in Cambodia.

In terms of e-government, several of e-Estonia's digital services could be successful if adopted in Cambodia. Estonia's e-civic registration system, which provides eIDs and digital signatures, is an inclusive system of e-government as it provides all citizens with equal access to e-public services and also protects their right to privacy and personal data protection. I-voting would allow all citizens to participate in the political process digitally. In Cambodia, i-voting could also provide a means to extend the voting rights to citizens living abroad and help them reconnect with their home country. Also, Estonia's e-participatory platforms are an important innovation

81 Heng, Pheakdey. "Embracing the Digital Economy: Policy Consideration for Cambodia." In Economic Transformation in Cambodia and Abroad, 18-31. Phnom Penh: Konrad Adenauer Stiftung Cambodia, 2018, p. 28.

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which could help improve government-society relations by allowing citizens to provide input in policymaking and policy decision making. As the Estonian examples discussed in this study have revealed, it is important that e-participatory platforms are initiated not only by the government but also by citizens. In Cambodia, it will be important to think about how to make such platforms more inclusive, as many citizens don't have full access to the internet yet or lack the skills or interest to get the best out of it.

Perhaps the most viable digital services that could be implemented today in Cambodia's e-government are the innovations from Estonia's e-public services; e-tax, e-land register and e-business register provide a more convenient and efficient way for citizens to meet their obligations towards the state. They can increase transparency and improve the accountability of state administrative procedures, as well as support the protection of citizen rights. Cambodians would also benefit from those digital services economically thanks to the time and transportation costs saved. Some of the e-public services can already be provided for all citizens through mobile broadband. Once the digital infrastructure is at a stage where all citizens can access the internet equally through fixed broadband and computers, those services could further improve government-society relations.

The Estonian case has also revealed that a government needs to build public trust in e-government and e-public services. Cybersecurity is essential in this regard. Estonia experienced how even a digitally and technologically advanced country can fall victim to cybersecurity attacks, but it has been able to overcome the crisis thanks to enhancements of its digital infrastructure and the introduction of innovative e-embassies. It should be said that cybersecurity is a challenging task, and even though e-embassies may appear to provide a solution for Estonia, it might be more difficult to think about how such a solution could be implemented for Cambodia. Cambodia's government doesn't have any advanced standards for cybersecurity yet, nor has it adopted any law to protect data or privacy, and, finally, it would need substantial technical support to develop data-embassies. It will also be important to carefully think about which country would host such Cambodian e-embassy, e.g. an ASEAN country.

To conclude, there are significant differences between Cambodia's and Estonia's development of e-government. This study showed that unlike Cambodia, Estonia could rely on academic experts in the computer technology field at an early stage, whereas Cambodia had to first build these capacities. Also, Estonia didn't have to cope with the political, economic and social legacies of three decades of civil war that blocked and postponed digital transformation. Despite these differences, the Estonian e-government innovations cannot be overlooked by Cambodia. Cambodia is already on the digital track. The current e-government framework already includes 'e-visa', e-registration (company registration), e-registration (vehicle-registration and registration for driving licence) and the city bus app among other innovations from the private sector, as well as the use of Facebook by many public institutions and Cambodian citizens. Estonia's innovations might inspire Cambodia's government and even lead to cooperation with Estonia. After all, both share a common vision, that is, using digital technologies to improve government-society relations.

Photo credits: Image by Freepik

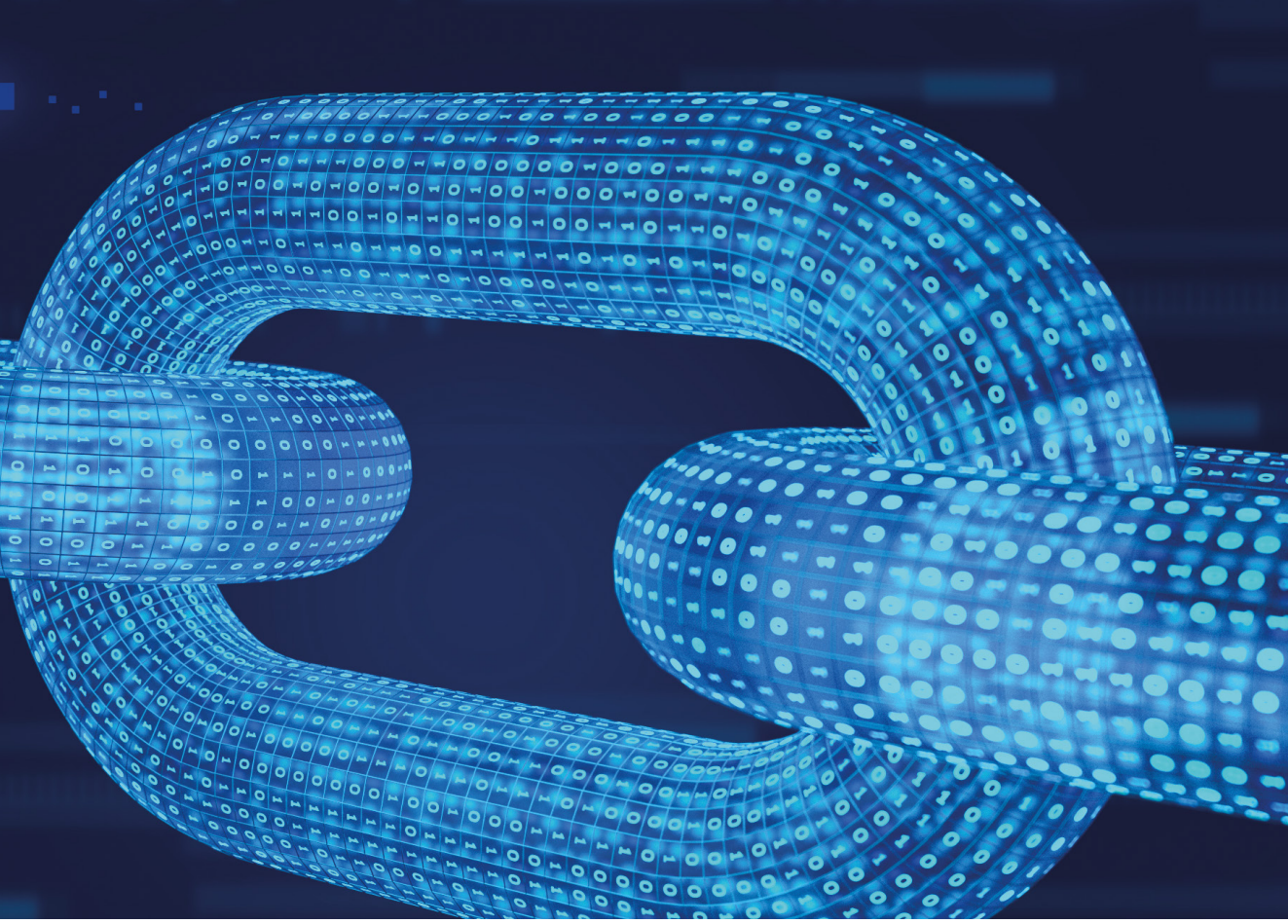
Reading time: 06 minutes

Do Cambodians Trust E-government Services? A Survey

Sereyvisith Sokhan[1] , Chandary Raing[2] , Channara Rin[3]

1 Sereyvisith Sokhan is working for FHI360 as ICT technical advisor responsible for leveraging ICT utilization in HIV program implementation such as facilitating implementation of tablet-based risk screening for key populations, patient satisfactory feedback (PSF) at antiretroviral therapy (ART) clinics, and online registration for HIV self-testing study. Besides that, Sereyvisith has years of work experiences in Network Operation Center at Camgsm (cellcard), and Cadcomms (qb), and as freelance software developer for various projects including loan management system and Point of Sale. Sereyvisith obtains a bachelor's degree in Computer Science, Norton University, Cambodia, and a master's degree in informatics, Örebro University, Sweden. He has developed interests in digital economic, e-government, tech startup, e-agriculture, and user research. He is member of Board of Engineers Cambodia (BEC), ICT4DNetwork Cambodia, and Sweden Alumni Network of Cambodia.

2 Chandary Raing is working at FHI360 as Strategic Information (SI)-Technical Officer, responsible for provide the supporting for SI related program activities that under the LINKAGES' project Moreover, support NCHADS in data collection, analysis and use to improve program implementation and other program related SI issues and also responsible for supporting the monitoring and evaluation of the project itself. In addition, he responds to conduct the data collection tools design on KoboToolBox, ODK and other. And he needs to conduct the data analysis by using STATA application. Moreover, Chandary had more than eight years of experience in project evaluation, research and data management of public health, reproductive health, community development, clinical research, operational research, and market survey. In addition, I am very strong in data management and analysis in both qualitative and quantitative. Moreover, I am full of capacity to develop the data collect tools on some open sources such as; KoboToolBox, ODK, REDCap, Survey CTO, Google Form and some other existing online and office data collection tools. Further, I am using some data analysis application included STATA, SPSS, EpiData, Excel, ArcGIS. Chandary obtains the bachelor's degree in Gegorgraphy (RUPP), diploma of Earth and Environment Science (NIE), and master degree of Studies Development (RUPP).



Abstract

Lack of user trust is a major reason why e-government projects fail. To align efforts for the successful implementation of e-government in Cambodia, the government focuses on platform development, integration between government agencies and other technical considerations. However, there is no proper discussion about how to enhance citizen trust in e-government services. This study explores user perceptions and trust around e-government in Cambodia by surveying 256 participants recruited through online platforms. The result of this study indicates that among well-educated and regular internet users in Cambodia, the knowledge of e-government is significantly low and that most are still neutral about whether it can be trusted or not. We have suggested several methods and approaches the government could consider in order to boost citizens' knowledge and trust, which in turn could potentially influence user adoption of e-government.

3 Channara Rin has been successfully completed master's degree of Information Technology and as GIS lecturer of bachelor's degree at Norton University, and he is working at Ministry of Land Management, Urban Planning and Construction (MLMUPC) as Technical support staff for Rice-SDP Project under ADB Funds. This project supports the implementation of the Policy on the promotion of paddy production and Rice Export of the Royal Government of Cambodia. And the main task part of MLMUPC is to develop comprehensive tools like online M&E system and online land use management system. Besides that, Channara has experience consultant on data scraping with WHO, Cambodia to extract all data of malaria into new online dhis2 system, and he also experienced working with FHI360, Cambodia more than four years as GIS/HMIS Technical Officer to develop online prevention database system under Flagship Projects. He is interested in e-commerce, e-government, data science, and tech startup.

Introduction

Cambodia doesn't have a unified national government portal but approximately 60 separate websites, each built independently without reference to any standards for user interface, look-and-feel, development approach, technical platform or security. The current state of digital government of Cambodia is largely fragmented, with a few online services available to citizens and businesses, for example, the online business registration at the Ministry of Ecommerce and the e-Visa platform for visitors. Both systems allow users to complete the entire process online, including payment.[4] Besides lacking standardization, Cambodia's framework for e-transactions is incomplete, which also hurts consumer trust in digital services.[5]

There are many factors that influence user adoption of e-government[6] and their intention to use them, such as perceived risk, perceived control, internet connectivity, perceived usefulness, perceived ease of use and service quality which lead to user satisfaction. However, numerous studies show that lack of user trust is the main factor that causes failure in many e-government projects. For instance, a study focused on developing a fully functional e-government using a four-stage model shows that privacy and confidentiality issues and citizen-focused change must be considered throughout e-government development.[7] The citizen's concern on privacy and confidentiality is considered a critical obstacle to realizing e-government. Another study investigating the acceptance of e-democracy from a developing nation's perspective reveals that lack of trust in government to fulfill its promises may limit citizens' e-democracy adoption.[8] Similarly, a recent study on e-participation on an e-government website in Saudi Arabia shows that user trust can positively affect the user intention to use e-government.[9]

Since 2000, Cambodia has been embracing the adoption of Information and Communication Technologies (ICT) as an enabler of its administrative reform efforts by forming the National ICT Development Authority (NiDA). Many policy documents related to digital development have been issued since, and the Cambodia ICT master plan for 2020 called "ICTopia Cambodia" was introduced. It consists of four pillars: Empowering People, Ensuring Connectivity, Enhancing Capabilities, and Enriching e-services. The objective of ICTopia is to build Cambodia as a nation with intelligent people, intelligent society and intelligent government by ICT.[10]

To align efforts towards successful implemen-

4 Beschorner, Natasha, James Neumann, Martin Sanchez, and Eduardo Miguel, Benefiting from the Digital Economy, Cambodia policy note, (Washington, D.C , World Bank Group, 2018), 5

5 ibid., 12.

6 Kumar, Vinod, Bhasker Mukerji, Irfan Butt, and Ajax Persaud, Factors for successful e-government adoption: A conceptual framework, (Electronic Journal of E-government, 2007), 72-73.

7 Layne, Karen, and Jungwoo Lee, Developing fully functional E-government: A four stage model, (Government information quarterly, 2001), 135.

8 Ayo, Charles K., Victor W. Mbarika, and Aderonke A. Oni, The influence of trust and risk on intention to use e-democracy in Nigeria, (Rome, Mediterranean journal of social sciences 6, 2015), 484.

9 Alharbi, Abdullah, Kyeong Kang, and Igor Hawryszkiewycz, The influence of trust and subjective norms on citizens intentions to engage in E-participation on E-government Websites, (Adelaide, Australasian Conference on Information Systems, 2015), 8--9

10 KOICA, Cambodia ICT Masterplan 2020, (Phnom Penh, Korea Information Society Development, 2014), 5.

tation of e-government, a policy area has been identified; however, this policy area focuses more on platform development, the integration between government agencies and other technical considerations. There is no discussion about how to enhance citizen trust in e-government services.

Since user trust is found to be the main influence factor in e-government adoption but little attention has been paid to it by the relevant stakeholders in Cambodia, this would like to explore the perception of its citizens towards e-government services, in particular their level of trust. The research question is simple: how much the Cambodian people trust e-government services?

Methodologies

A survey was created to collect data from respondents online using Google Forms. The conceptual framework discussed below is used for the formulation of the questionnaire and as a basis for the data analysis.

Conceptual Framework

This research uses the model of trust and risk in e-government adoption by Belanger and Carter[11] to construct the questionnaire and guide the resulting data analysis. In this framework, there are four components that considered to influence user intention to use technologies, three of which focus on user trust: Disposition to Trust, Trust of the Internet, Trust of the Government. The remaining component is how users perceive risk. Figure 1 shows the hypothesis of trust and risk in e-government adoption.

(Source: Bélanger & Carter, 2008)

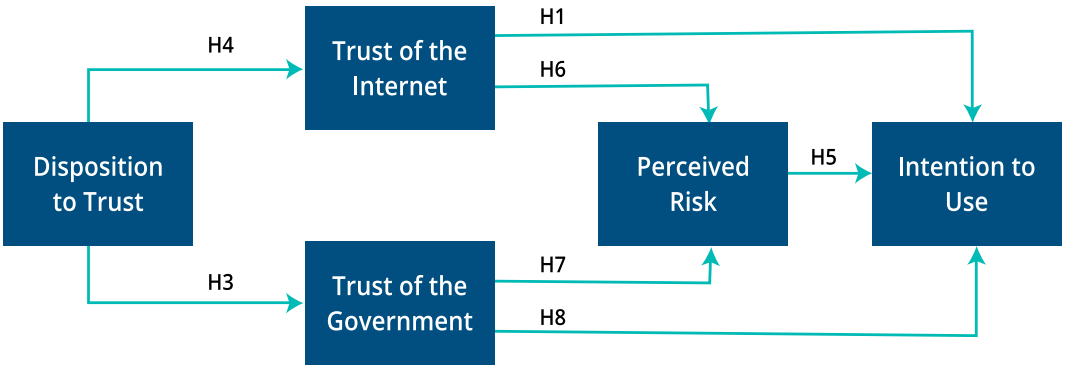


Figure 1: Trust and risk in E-government adoption

11 Bélanger, France, and Lemuria Carter, Trust and risk in e-government adoption, (The Journal of Strategic Information Systems, 2008), 165-176.

Below is a summary of each component:

Disposition to Trust

Disposition to Trust refers to an individual's inclination towards trust. It consists of two subconstructs, Faith in humanity and Trusting Stance. Faith in humanity focuses on an individual's confidence to believe that others are generally care enough to help. Trusting Stance refers to the personal choice or strategy to trust others. It is assumed that disposition to trust is a generalized reaction of individual's life experiences with other people which alter their belief that others can be trustworthy.[12]

Trust of the Internet

Trust of the Internet focuses on the individual's perception towards the internet, whether it is a reliable channel that can provide accurate information and secured interaction.[13]

Trust of the Government

Trust of the Government focuses on the citizens' approval of their government. It is assumed that if the citizens have low faith in government, it may affect the efficacy of the policies that the government attempts to implement.[14]

Perceived Risk

Perceived risk focuses on individual's perception of uncertainties associated with specific an activity. It consists of several types of risk: financial, performance, physical, psychological, and social risk. It is assumed that when perceived risk is present, trust is mandatory for technology adoption.[15]

Sample and Data Collection

In this study, we use convenience sampling to recruit participants who are easily available through social media. A structured questionnaire on Google Forms is shared to individuals and/or groups via social media like Facebook and other common communication tools in Cambodia such as Telegram or simply Email.

Data Analysis

Online data collection was carried out on Google Forms. Descriptive data analysis on the same tool helped identifies key variables. Frequency tables and graphs for key p variables were generated for the report. The STATA application was used for the data management and analysis.

Result

Demographic Information

There are 256 participants in this study's sample. Males and females are nearly equally represented. Most of the participants are between 25 and 48 old; only one is younger than 18 and six are older than 48. The majority of the respondents holds a bachelor's degree. 25% are working for private companies, 21% are students, 18% are working for NGO, 16% are government officials – the rest business owners or have various other professions. Table 1 shows a list of socio-demographics of participants.

12 Ibid, 167

13 Ibid, 166

14 Ibid, 166

15 Ibid, 168

Table 1: Socio-Demographics of participants

Measure	Item	Freq	Per
Gender	Male	127	49.61%
	Female	129	50.39%
Age	< 18	1	1%
	18 – 25	104	40%
	26 – 48	145	57%
	49+	6	2%
Education	None	2	1%
	Bachelor	183	71%
	High School	17	7%
	Master	23	9%
	Primary	11	4%
	Vocational Education	20	8%
Occupation	Private Company	63	25%
	Business owner	30	12%
	Government	42	16%
	NGO	45	18%
	Other	23	9%
	Students	53	21%

This table shows that the majority of participants are well-educated and working in various sectors that present a small degree of diversity.

Knowledge of Internet Technology and E-Government

The results indicate that the participants are very familiar with the internet. Most of them (55%) started using it in the 2010s, others even back in 1995. This result is similar to a previous study[16] which shows that people aged between 15 and 39 are the main internet users. Figure 2 shows the number of participants by the year they started using the internet.

16 Phong, Kimchhoy, and Javier Sola, Mobile phones and Internet in Cambodia 2015, (Phnom Penh, Development Innovations, 2015), 22.

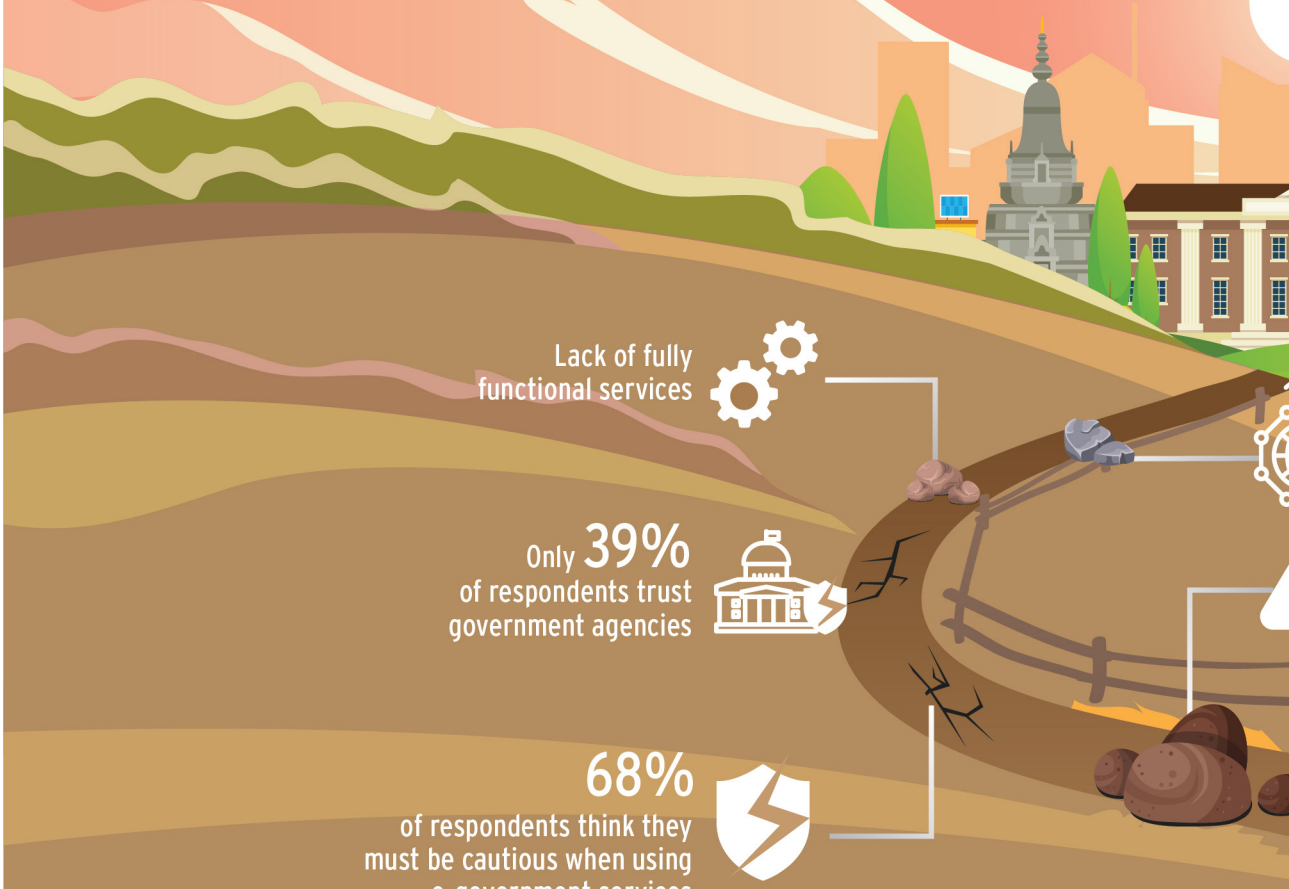
Building E-government Trust

User trust is the main factor that causes failure in many e-government projects. Therefore, it is important to promote trust among citizens, especially at the very first stage of any e-government initiatives.

Important steps towards e-government

- Use social networks like Facebook to promote e-government
- Transparency: Educate people about what the government does and how it serves the people

of respondent
e-goverr



Lack of fully functional services

Only **39%** of respondents trust government agencies

68% of respondents think they must be cautious when using e-government services

72% of respondents did not know what e-government is

Content and Storyline: Sereyvisith Sokhan, Chandary Raing, Channara Rin
Infographic Designer: Singhtararith Chea
Editors: Robert Hör & Ann-Cathrin Klöckner

DIGITAL INSIGHTS

KONRAD ADENAUER STIFTUNG

Recommendations:

- Interact and cooporate with public.
- Adopt International Standard ISO/IEC 29100 to ensure a high-level framework for the protection of personal information.
- Interoperability between different agencies and departments.
- Improve quality of services to increase user satisfaction and trust.
- Customer Relationship Management (CRM): Government becomes more responsive to the public and thus boosts its reputation.

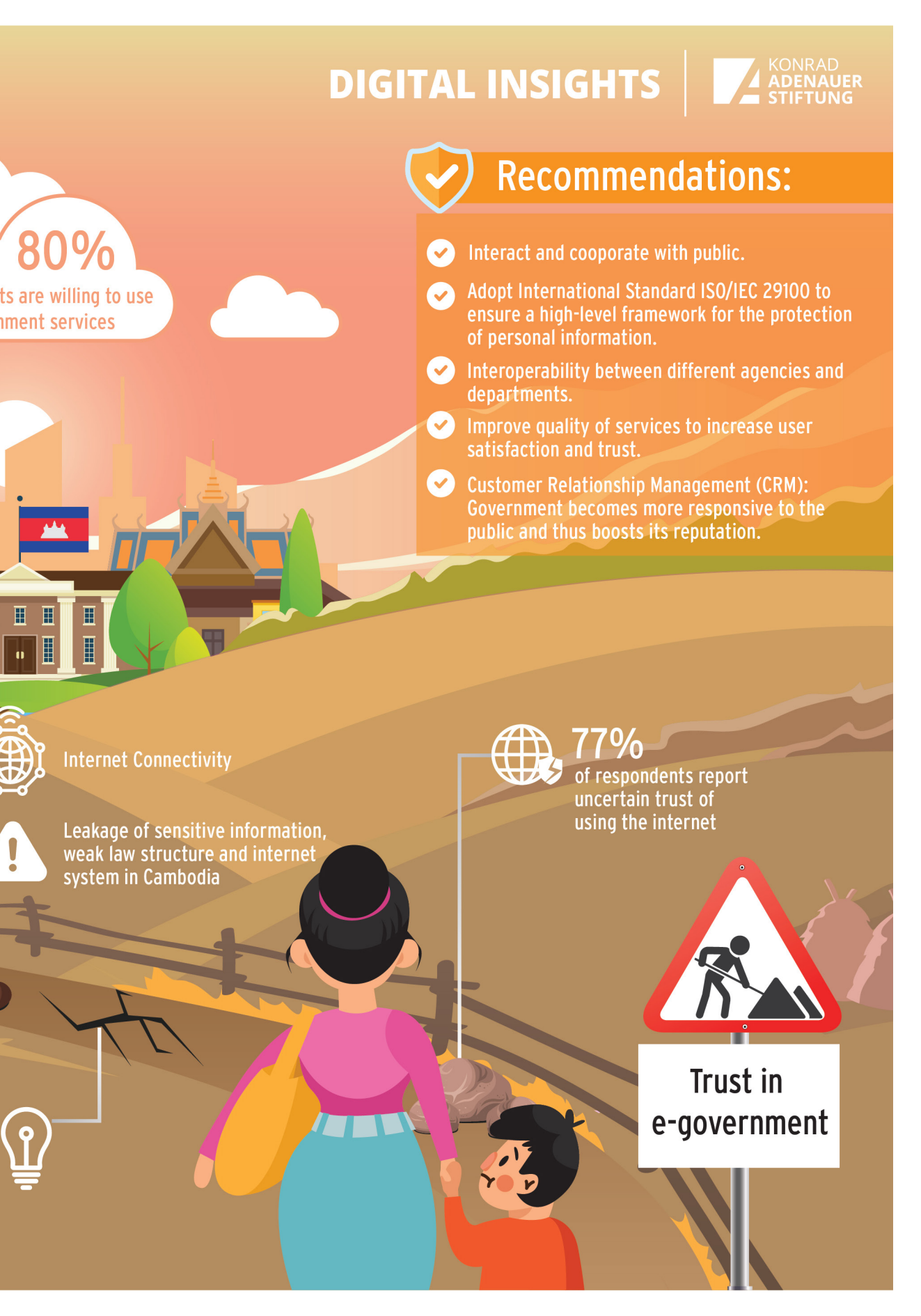
80%

ts are willing to use
nment services

Internet Connectivity

Leakage of sensitive information, weak law structure and internet system in Cambodia

77%
of respondents report uncertain trust of using the internet



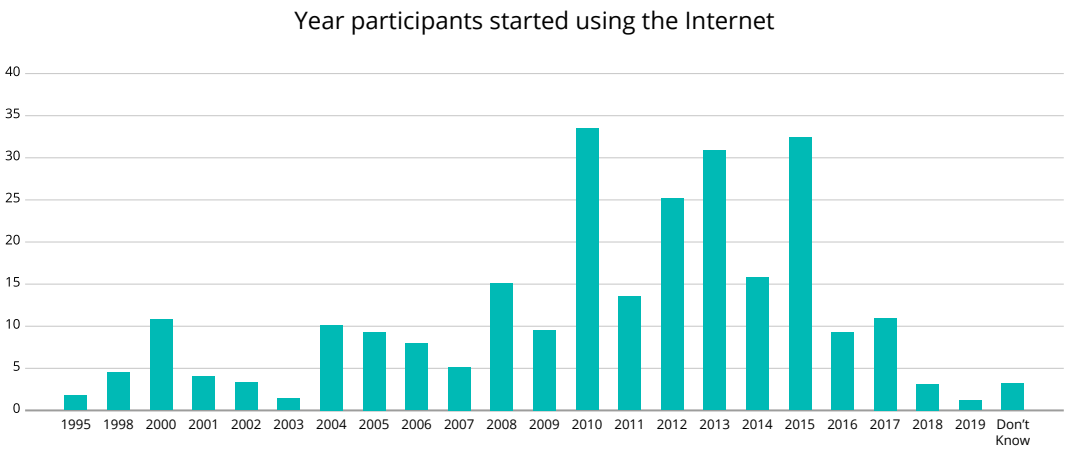


Figure 2: Year participants started using the Internet

Most of the participants use the internet every day. This should indicate that technology adoption should not be a barrier to the participants.

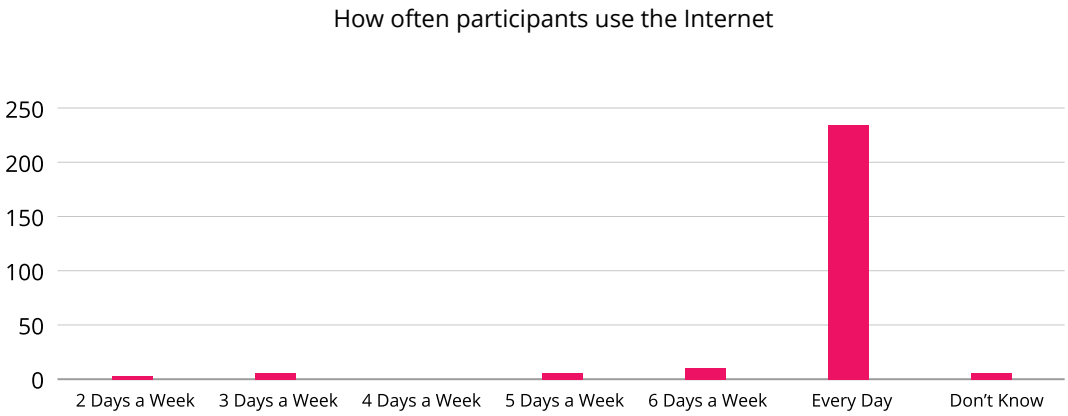


Figure 3: How often participants use the Internet

However, when asked about their knowledge and experience with e-government, most of the participants (72%) responded that they don't know what e-government is. Although a vast amount of this well-educated sample group is digitally native, their exposure to e-government is limited. Among 28% who claimed to know what e-government is gave different definitions, when asked whether they have actual experience using e-government services, the majority said that they did.

Among 197 participants who responded to a question about whether they have experience using any websites or mobile apps belonging to the government, 76% said "never" and 24% said "yes". Those who said they had experience using e-government were asked to list the names of the websites and mobile apps they used. Table 3 shows a list of sites and apps believed to belong

E-government Definitions	Freq	Per
Online Services	12	17%
ICT Services provided by government	13	18%
ICT Services for public and other services	47	65%

Table 2: E-government definitions given by participants

to government by the number of times they have been mentioned by the respondents. Although specific ministry websites were mentioned they are categorized into one bucket. The category "website" means that no specific website given. Where social media and other platforms are counted, these mean the pages of different government departments.

It would appear that social media, especially Facebook, is overwhelmingly the most popular property to grab the attention of the audience. Based on a report by geeksincambodia[17] Facebook is very popular in the country; in 2018, there were over 6.8 million local users on Facebook. The Facebook page with largest fan base is the prime minister's Facebook page[18] with more than 11 million followers.

Items	Freq
Google	1
Voterlist website	1
Traffic Law App	1
Website	1
Electricity and water	2
Phone	2
Email	2
Telegram	3
Don't Know	3
Chat	5
Salary Tax App	5
Driving Rules App	6
Social Media	9
YouTube	17
Ministry Websites	19
Facebook	37

Table 3: Websites and mobile apps mentioned by participants perceived to belong to the government

Trust of the Internet

Although the majority of respondents notice the government presence on social media, when asked how they trust social media in sharing the information, most respondents (77%) are unsure. Only 16% said they trust it and 6% said they don't trust the social media. Security is found to be the main reason why people don't trust sharing information on the internet. Only 34% feel safe to use the internet as a means to interact with the government, 13% don't feel secure and 52% are neutral to the idea.

The most frequently mentioned security concern is the leakage of sensitive information.

17 Samantha, Fuentes, geeksincambodia. Accessed 07 01, 2019. http://geeksincambodia.com/cambodias-2018-social-media-digital-statistics/.

18 Socialbakers. Accessed 07 01, 2019. https://www.socialbakers.com/statistics/facebook/pages/total/cambodia/.

This is the fear that personal information on the internet can be hacked or used by unauthorized people. Only 24% of respondents believe that the existing technology can control and manage the internet in safe way. Most of them (67%) are unsure and 9% do not trust the existing technology.

Trust of Government

Several questions were asked about participant's trust in the government. Approximately 39% of respondents reported that, in general, they trust government agencies, although only 13%

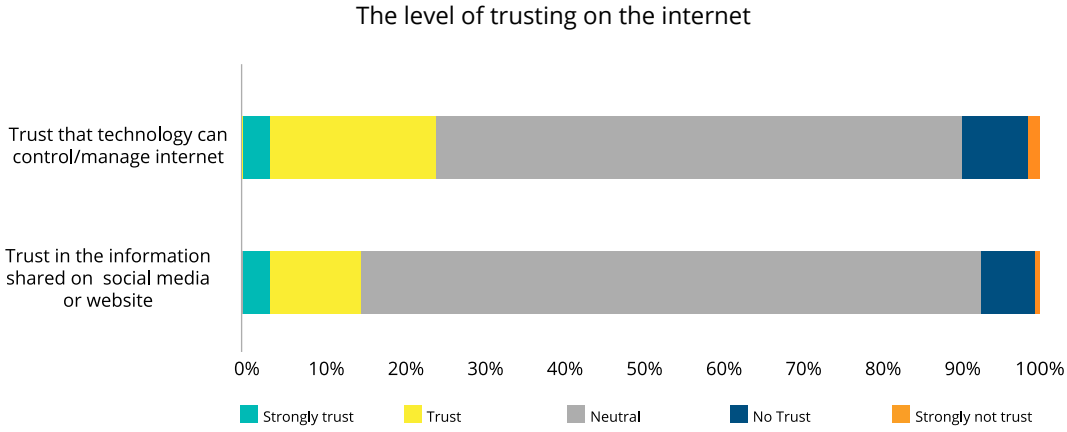


Figure 4: The level of trusting on the internet

feel safe interacting with government agencies to support their business by using internet services. A good 57% of respondents reported that they did trust the existing law and structure system can protect them from risk on the internet. Furthermore, 53% of respondents did not provide any decision making to question do you think state government agencies can be trusted to carry out online transaction.

Consistent with the low trust in government agencies, 27% of respondents believe that e-government service is trustworthy, while almost 65% stay neutral, and 9% did not believed on e-government services.

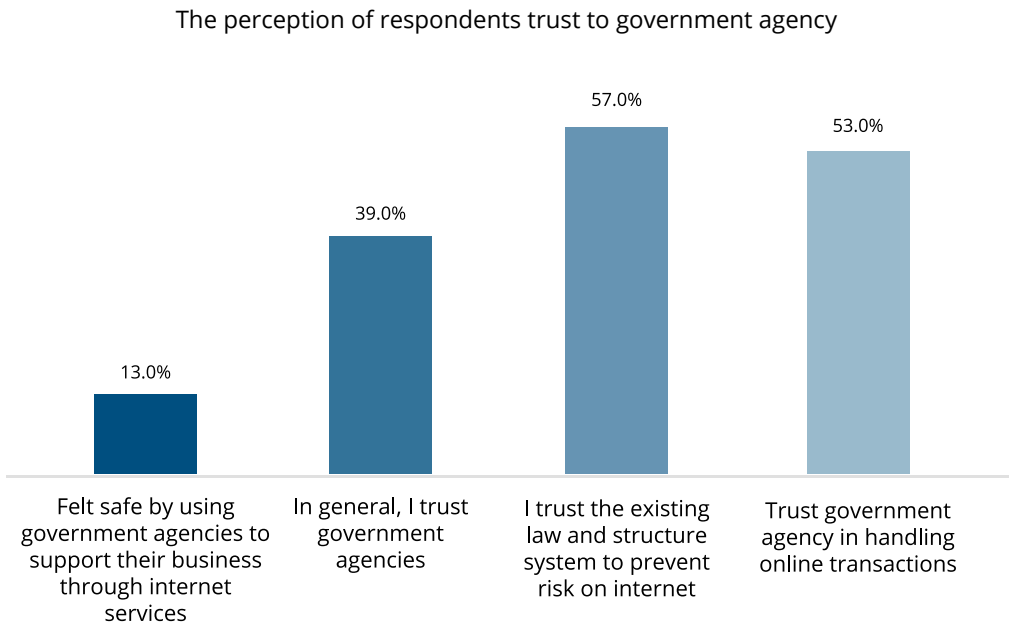


Figure 5: Trust of government agency

Moreover, 68% of respondents reported that they must be cautious when they are using the e-government service and 59% felt hesitant to provide information to a government website.

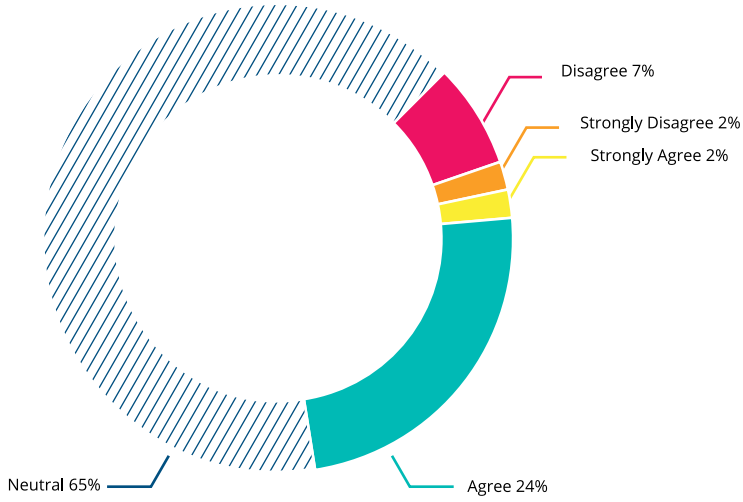


Figure 6: E-government services are trustworthy

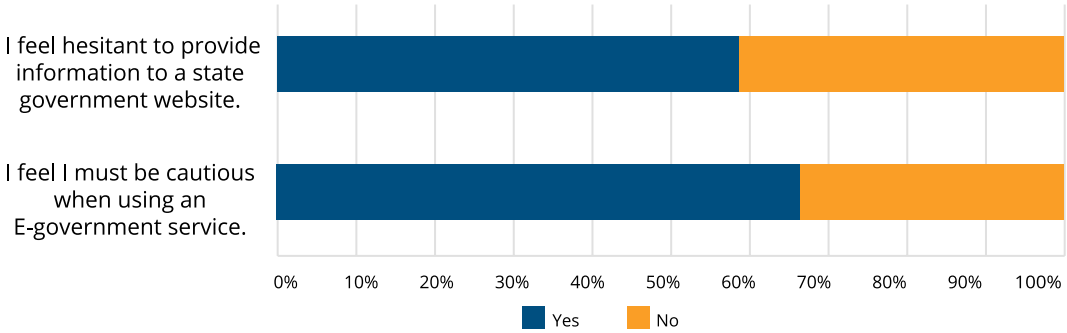


Figure 7: Trust to use e-government

Perceived Risk

The figure below describes several aspects of perceived risk around e-government. On the one hand the numbers indicate that it is relatively high.

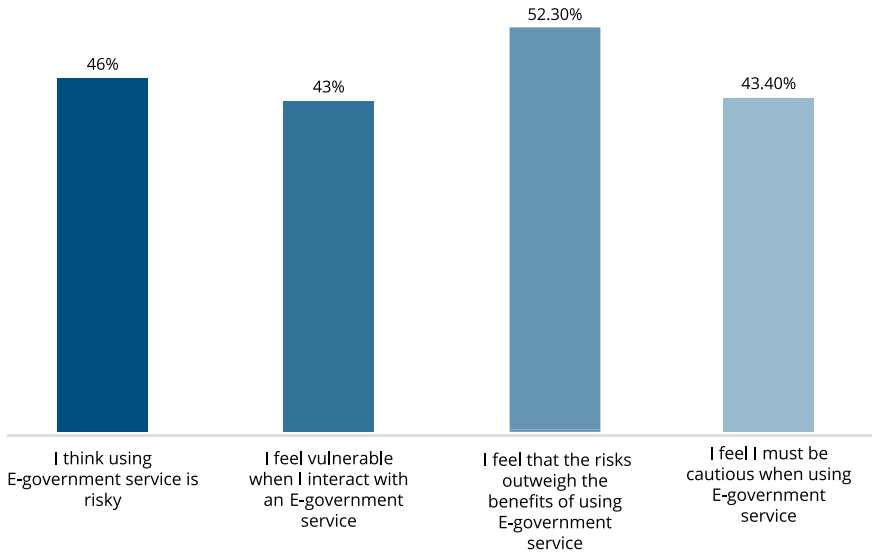


Figure 8: Perceived risk of e-government

On the other hand, almost 30% of respondents believed that e-government services will not harms to user, and 12% believed that e-government service will harms to users. 60% are neutral.

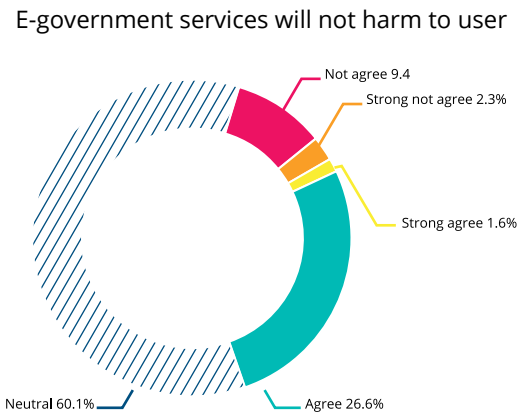


Figure 9: Believed e-government services will not harm user

Intent to Use

Despite the above, in total, almost 80% of the respondents are willing to use the e-government services. Those who aren't fear for their personal security or feel unsafe to share personal information on the internet. Some think the law structure and internet system in Cambodia is still weak, and others just find it hard to access the e-government service. E-government also seem too new for some users.

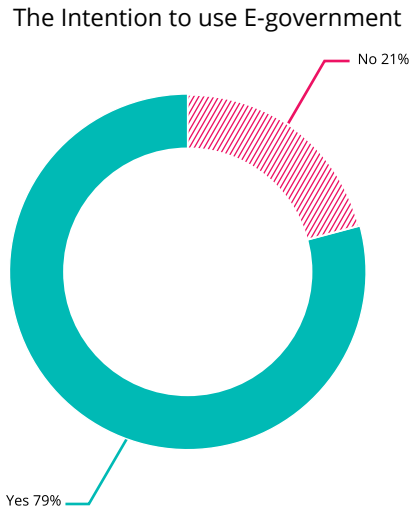


Figure 10: Intention to use e-government

Conclusion and Recommendations

The survey results indicate that most educated Cambodians are very familiar with internet usage. While it is hard to say how tech-savvy they are, it is clear that technology is not a barrier. Nevertheless, knowledge about e-government is notably low, and the perceived risk of using e-government services is substantially high. Generally, social media is perceived to be an important channel for e-government. This may simply be due to the fact social media has evolved from entertainment into a political platform.[19] Although social media, especially Facebook, is perceived as a powerful tool to raise public awareness,[20] those who have negative perceptions of e-government initiatives do not effectively adopt it.[21]

Having said that, the government should recognize that social media alone cannot be seen as a fully functional e-government platform. Having a digital presence is just a first step in e-government development.[22] A fully functional e-government involves public interaction, data collection, a working database to support online transactions and interoperability between different agencies and departments in order to be able to deliver convenient services. Additionally, social media is always associated with privacy and confidenti-

19 Fountain Megan, Social Media and its Effects in Politics: The Factors that Influence Social Media use for Political News and Social Media use Influencing Political Participation, (PhD diss., The Ohio State University, 2017), 11-12.

20 Department of Media and Communication. Cambodia Communication Institute. Cambodian Communication Review 2014. Phnom Penh, Royal University of Phnom Penh, 2014, 61-62.

21 Feeney, Mary K., and Eric W. Welch, Technology–task coupling: Exploring social media use and managerial perceptions of e-government, (The American Review of Public Administration, 2016), 12.

22 Layne, Developing fully functional, 124.

ality concerns.[23] This study confirms that such concerns are significantly high among educated Cambodian users, especially because they are afraid that their sensitive personal information could be hacked or used by unauthorized people, and because they believe that the existing system structure and legal framework cannot protect from risk on the internet.

To address these privacy and confidentiality concerns in general, the leadership responsible for implementing e-government initiatives should adopt international standards such as the ISO/IEC 29100, which provides a high-level framework for the protection of personally identifiable information.[24] This privacy framework is intended to help organizations define their privacy safeguarding requirements within an ICT environment. It can also be used to evaluate existing e-government services and measure their level of privacy and confidentiality. By complying with international standard like these, user trust in e-government can be enhanced.

The principles of this framework include:

1. Consent and choice
2. Purpose legitimacy and specification
3. Collection limitation
4. Data minimization
5. Use, retention and disclosure limitation
6. Accuracy and quality
7. Openness, transparency and notice
8. Individual participation and access
9. Accountability
10. Information security
11. Privacy compliance

Despite participants' concerns, however, most are neutral as to whether the internet and government are trustworthy or not. This may simply be because, as found earlier, participant knowledge about the e-government is low, and their exposure to e-government is limited. This could be an opportunity for the government to create more positive perceptions. Consequently, it is up to government agencies to build their reputation among citizens and increase their trust in e-government. This can be influenced by a government agency's reputation[25] and previous experiences.

Government reputation can be boosted by adopting the customer relationship management (CRM) approach and becoming more responsive to the public.[26] CRM is a holistic management approach which, enabled by technology, can help start, maintain and optimize relationships with customers and increase their satisfaction and loyalty.[27] The use of CRM in Egypt solved various issues related to e-government implementation.[28] Although there are many different government CRM frameworks, the Egyptian case study identifies the "point solution model" as one of the most appropriate ones for developing countries with relatively scarce resources. This model focuses on specific departments or agencies providing a limited scope of services. Therefore, it should be explored in the context of

23 Mohammadi Azin, Analyzing Tools and Algorithms for Privacy Protection and Data Security in Social Networks, (International Journal of Engineering, 2018), 1271.

24 ISO/IEC 29100. Accessed 07 03,2019. https://www.sis.se/api/document/preview/914169/

25 Alzahrani, Latifa, Wafi Al-Karaghouli, and Vishanth Weerakkody, Analysing the critical factors influencing trust in e-government adoption from citizens' perspective: A systematic review and a conceptual framework, (International business review, 2017), 8.

26 Da Silva, Rui, and Luciano Batista, Boosting government reputation through CRM, (International journal of public sector management, 2007), 604.

27 Schellong, Alexander, CRM in the public sector: towards a conceptual research framework, (Atlanta, International Conference on Digital Government Research, 2005), 5.

28 Azab, Nahed, Maged Ali, and George Dafoulas, Incorporating CRM in e-government: Case of Egypt, (IADIS International Conference E-Commerce, 2006), 251-253.

Cambodia's e-government initiatives as well.

Government reputation can also be improved by better explaining what the government is doing and how it serves the interest of the public.[29]

In term of trust in internet, participants were found to be neutral. However, one study finds that the "transfer effect" of trust in the internet is smaller than that of trust in the public administration. This suggests that the delivery channel is relatively less important than the actual entity which provides the service when citizens evaluate an e-service's trustworthiness.[30] And because trust in a specific technology depends on users' knowledge of how it responds under different circumstances,[31] improving citizens' knowledge should remain a priority in any e-government initiative.

Generally speaking, there are other variables that contribute to the trust of the system, such as system quality, information quality and service quality.[32] These should all be carefully considered while planning and operating e-government services.

To conclude, the government must consider citizen perceptions in order to make the most of e-government and increase its adoption. It is arguable that the results of this study cannot be generalized because of a relatively small sample size with well-educated Cambodians from the urban area, which may not represent the perceptions of those who further away and who are less educated. Future studies should include more participants from different areas, rural ones in particular, and more demographic groups such as different education and income levels.

Yet the major implication of this study for stakeholders in the development of e-government in Cambodia is that focusing on the creation of e-government services and making them available to citizens is not enough. It is equally important to promote trust among citizens, especially at the very first stages of any e-government initiative. Adhering to the international standards of ICT development could be helpful. Educating citizens about e-government is very important.

All in all, the Cambodian government can take advantage of the positive opportunities it has to realize its digital transformation ambitions. Only a small fraction of citizens appear to have negative views towards e-government services. Most of them are already noticing the government's presence on social media, hence communicating with them and informing them about e-government projects should be easy. Despite people's concerns over privacy and confidentiality, most appear to be willing to use e-government services.

It is up to the government to ensure that their citizens' first encounter with e-government services will be a positive experience. If the citizens are satisfied and keep using the e-government service again it can be considered a successful implementation of e-government.

29 Rui, Boosting government, 593.

30 Belanche, Daniel, Luis V. Casaló, Carlos Flavián, and Jeroen Schepers, Trust transfer in the continued usage of public e-services, (Information & Management, 2014), 637.

31 Mcknight, D. Harrison, Michelle Carter, Jason Bennett Thatcher, and Paul F. Clay, Trust in a specific technology: An investigation of its components and measures, (Transactions on Management Information Systems, 2011), 12.

32 Thielsch, Meinald T., Sarah M. Meeßen, and Guido Hertel, Trust and distrust in information systems at the workplace, (PeerJ, 2018), 15.

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Cambodia v. Hackers: Balancing Security and Liberty in Cybercrime Law

Somaly Nguon[1] and Dr. Sopheak Srun[2]

1 Somaly Nguon is a Researcher in the field of Laws and Technologies. She is a researcher at Tallinn Law School, Tallinn University of Technology (TTU), Estonia and Research Fellow at Center for the Study of Humanitarian Law, Royal University of Law and Economics (RULE), Cambodia. She is a Co-founder and Legal Consultant at Lawtitude Tech OÜ in Tallinn, Estonia. Somaly holds Master in Law and Technology from Tallinn University of Technology in Estonia and Master in International Human Rights from Pañ̃ñāsāstra University of Cambodia (PUC). She is a lecturer in ICT Law and Cybersecurity course. She conducts extensive legal research and publications in the area of Cybersecurity law and e-Governance. Somaly also represented Cambodia and Tallinn Law School in the framework of Export Academy at Estonian House of Commerce.

2 Dr. Sopheak Srun is a Researcher in the field of Economics and International Trade. For more than seven years, he has been involved in working and managing many projects for both national and international NGOs, public and private sectors, and for foreign embassy. He is familiar with project design and project cycle management as well as in feasibility study and marketing research and evaluation. He holds a PhD degree in Economics from the University of Toulon and a Master degree of Business and Economic from the University of Lumière Lyon 2, both are in France. He is a lecturer in Project Management at the Royal University of Law and Economics (RULE) and lecturer in Business Strategic, Marketing research, and Statistics at French Cooperation Programs at RULE.

Abstract

Cybercrime is a well-known, yet poorly understood issue in Cambodia, and the country's existing legal framework is vague and unclear compared to international standards. Government websites have been subject to cyberattacks since 2002. Targets have included those of the Ministry of Foreign Affairs, the National Election Committee, the National Police, the military and the Supreme Court; thousands of official documents were leaked online by the hacktivist collective "Anonymous". There are also reports of malicious local hackers, but most go unnoticed and unpunished. As a developing country, Cambodia lacks good technology practices and legislation because of poverty, poor infrastructure, weak institutions, low literacy and low ICT awareness. This paper outlines the cybersecurity threats it faces and analyzes existing legal measures such as the Criminal Code and the new draft Cybercrime Law, also looking at how these laws could be interpreted too broadly and thereby potentially restrict fundamental rights. Cybersecurity practices in China, Japan and Singapore are briefly explored, followed by recommendations on making cybersecurity law in Cambodia more robust, specific and proportionate, in line with international treaties like the Council of Europe's Convention on Cybercrime.

Cambodia Under Attack

In 2012, the Cambodian government announced that it was in the process of drafting a Cybercrime Law which sparked fears that it could extend traditional media restraint to the online world.[3] After the announcement, a hacker group called NullCrew launched a campaign named "Operation The Pirate Bay (OpTPB)" to attack Cambodian websites to protest against internet censorship and the arrest of Gottfrid Svartholm Warg, the 27-years-old co-founder of torrent sharing site The Pirate Bay. OpTPB targeted several websites of Cambodian businesses and government organizations, including the armed forces. As result, the operation leaked highly confidential information and posted a number of passwords for other hacktivist groups to use. Another hacktivist collective, Anonymous, caused over 5,000 documents to be stolen and leaked from Cambodia's Ministry of Foreign Affairs.[4] Following the above incidents, the Cambodian government announced a new law requiring surveillance cameras in internet cafes and telephone centers, and to retain footage for at least three months.[5]

Article 28 of the draft law regulates user content and websites. People who "establish contents deemed to hinder the sovereignty and integrity of the country or government agencies and ministries, incite or instigate, generate insecurity and political [incohesion], and damage the moral and cultural values, etc. are punishable from one to three years imprisonment and fine from five hundred U.S. dollars to one thousand and five hundred U.S. dollars ($500-1500)".[6] Before Cambodia's 2018 general election, a Chinese hacking group called TEMP.Periscope had shown extensive interest in the country's politics, causing active compromises of multiple Cambodian entities related to the Country's electoral system such as Cambodia's National Election Committee, foreign affairs, interior and ministry of finance and senate. FireEye said it had been tracking the group's activities since 2013 and believed that hackers were acting on behalf of the Chinese government in order to provide the Chinese government with widespread visibility into Cambodian elections and government operations. However, China denied supporting hacking attacks and said that they would not allow any individual to use any resources to commit cyber attacks.[7] ICT development in Cambodia is still at a sensitive stage compared to other countries in the region, and thus the country may be less prepared than others in terms of cybersecurity. The National Cambodia Computer Emergency Response Team (CamCERT) was established in December 2007 in order to deal with cybersecurity and cybercrime matters. There is also a Cybercrime Unit in the National Police department in charge of telecommunication crime. However, the country scores poorly in various categories of cybersecurity according to the Cyber-wellness profile published by the International

3 Freedom on the Net: Cambodia, (Washington, D.C., Freedom House, 2013), 8-9. Available at: https://freedomhouse.org/sites/default/files/resources/FOTN%202013_Cambodia.pdf

4 Security: How can we enhance cybersecurity in ASEAN?, (YMAC, 2016), 2. Available at: http://www.sp.edu.sg/ymac/documents/securitycybersecurity.pdf

5 Mong Palatino, Cambodia: Mandatory internet Surveillance Cameras, (Amsterdam, Global Voice, 2012). Available at: https://globalvoices.org/2012/09/09/cambodia-mandatory-internet-surveillance-cameras/

6 Article 19, Cybercrime Law, Draft V.1, unofficial translation to English, Art.28. Available at: https://www.article19.org/data/files/medialibrary/37516/Draft-Law-On-CyberCrime_Englishv1.pdf

7 John Reed, Chinese hackers target Cambodia opposition ahead of election, (UK, Financial Times, July 11, 2018). Available at: https://www.ft.com/content/4d4482e6-84a0-11e8-96dd-fa565ec55929

Telecommunication Union (ITU) in 2014.[8] Cyber-wellness in Cambodia has been discussed in a small circle among scholars because it seems to be a new topic in the country.

This research looks at Cambodia's efforts in combating cybercrime, specifically trying to answer two questions: What are the main components of Cambodia's cybersecurity policy and how was it developed? Does the draft law on cybercrime address cybersecurity issues in Cambodia, and is it balanced and in line with international cybersecurity standards? This research also aims to propose international good practices and concrete steps that the government of Cambodia may consider implementing.

Understanding Cybersecurity

Cybersecurity and Law

The term "cybersecurity" was first used by computer scientists in the early 1990s in the context of networked computers. The term gained more widespread use, beyond a mere technical conception, when threats started to arise in the digital cyberspace.[9] Cybersecurity has been defined by the ITU as *"the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, action, training, best practices, assurance and technologies that can be used to protect the cyber environment and organization and user's assets"*[10] or as *"the prevention of damage to, unauthorized use of, exploitation of, and the restoration of electronic information and communication systems, and the information they contain, in order to strengthen the confidentiality, integrity and availability of these systems".*[11] New technologies give rise to new trends in cyberspace crime. Their economic loss is estimated to exceed that of global drug trafficking. Some now consider global cybercrime the biggest underworld industry causing US$1 trillion loss worldwide annually.[12]

In light of these developments, the gap between law and technology has widened. Traditional legal systems have failed to keep pace with new technology and ICTs that have made the impossible possible.[13] The evolution of computers and information systems has given rise to new controversies regarding the boundaries and obligations, intellectual property rights, privacy rights, diplomatic relations and military affairs, critical infrastructure and, finally, public welfare. Cybercrime is one of the most serious threats to economic and national security around the world. The volume of data breaches, mostly caused by hacking and malware, is at the highest level ever. Highly confidential information is stolen and leaked causing significant legal and ethical concerns.[14] Cybercrime can be defined as *"any illegal behavior directed by means of electronic*

8 Global Cybersecurity Index & Cyberwellness Profiles, (Geneva, ITU 2015), 117-118. Available at: http://www.itu.int/dms_pub/itu-d/opb/str/D-STR-SECU-2015-PDF-E.pdf

9 Lene Hansen, Helen Nissenbaum, Digital Disaster: Cyber Security, and the Copenhagen School, (Oxford, International Study Quarterly, 53, 2009), 1155. Doi:10.1111/j.1468-2478.2009.00572.x

10 Overview of Cybersecurity, Recommendation ITU-T X. 1205, (Geneva, ITU, 2008), 2. Available at: https://www.itu.int/rec/T-REC-X.1205-200804-I

11 Report on best practice for a national approach to cybersecurity: A management framework for organizing national cybersecurity efforts, (Geneva, ITU-D secretariat draft, 2008), 5. Available at: http://www.itu.int/ITU-D/cyb/cybersecurity/docs/itu-draft-cybersecurity-framework.pdf

12 Edita Gruodyte, Mindaugas Bilus, Investigating Cybercrimes: Theoretical and Practical Issues, Kerikmäe, T. (Ed.), Regulating eTechnologies in the European Union, (Switzerland, Springer, 2014), 218.

13 Roger Brownsword, Morag Goodwin, Law and the Technology of the Twenty-first Century, (Cambridge, Cambridge University Press, 2012), 8.

14 Sean Harrington, Professional Ethics in the Digital Forensics Expert: Ultimate Tag-Team or Disastrous Duo?, (U.S., William Mitchell L. Rev. 38 (1), 2011), 2. Available at: http://open.mitchellhamline.edu/wmlr/vol38/iss1/8

operations that target the security of computer systems and the data processed by them".[15] On the other hand, the term can be described as *"computer-related acts for personal or financial gain or harm, including forms of identity-related crime and computer content-related acts".*[16]

Cybersecurity Actors

There are multiple actors perceived to be threats in the cyberspace, each with different behaviors and motivations behind their attack. According to Alexander Klimburg, cybersecurity actors are divided into three major groups includes: State Actors, Organized Non-State Actors, and Non-Organized Non-State Actors.[17] Hacking without permission and authorization is considered illegal. But people usually have misconceptions about the term "hacker", who according to Gross, *"is anybody looking to manipulate technology to do something other than its original purpose".*[18] Given the number of high profile data theft, severe compromises and stolen passwords, it is easy to see how the public forms negative opinions and assumes that all hackers have malicious intent. Nevertheless, there are some people who appreciate hackers as highly skilled computer experts who manipulate systems and expose vulnerabilities and point out flaws before really malicious actors can exploit them. Hackers' actions inspire computer programmers to code their software more securely against vulnerabilities.[19] Hence, hackers are categorized into several types, too.

For example, a "Script Kiddie" is a less experienced intruder who uses relatively simple programs written by expert hackers, thus automating all the difficult steps for them. A Script Kiddie usually cannot cause much damage due to their beginner level skills.[20] A "Hacktivist" describes someone who uses computer skills to make political statements and actions. Social justice campaigners can deploy a range of hacktivist strategies to further their cause.[21] Famous examples of hacktivists working in groups include Anonymous, LulzSec or AntiSec. "Cybercriminals" use technology to facilitate a crime, primarily to gain money and personal benefit. Their targets could be anyone, from individuals to small businesses to large enterprises and banks. Cybercriminals attack by using social engineering tricks to manipulate users into providing sensitive information, steal their banking credentials, infect organizations, health care records or credit cards with ransom ware or another form or malware, and to exploit any weakness in the network.[22] "Insiders" are hackers who are typically an employee, a former employee or a contractor who tries to steal sensitive documents or disrupt the organization's operations. Edward Snowden is a prime example of an insider who hacked his own organiza-

15 Gruodyte, Investigating Cybercrimes, 218.

16 Ibid.

17 Klimburg, A., Healey, J. Strategic Goals & Stakeholders, Klimburg, A. (Ed.), National Cyber Security Framework Manual, (Tallinn, NATO CCDCOE, 2012), 68-70.

18 Doug Gross, Mafiaboy breaks silences, paints portrait of a hacker, (U.S., CNN, 2011). Available at: http://edition.cnn.com/2011/TECH/web/08/15/mafiaboy.hacker/index.html?iref=obnetwork

19 Lalisa Long, Profiling Hackers, (Australia, SANS Institute InfoSec Reading Room, 2012), 2-3. Available at: https://www.sans.org/reading-room/whitepapers/hackers/profiling-hackers-33864

20 William A. Arbaugh, et al., Window of vulnerability: a case study analysis, (U.S., 33 (12), 2000), 52. DOI: 10.1109/2.889093

21 Matthew Eagleton-Pierce, The internet and the Seattle WTO Protests, (UK, Peace Review, 13 (3), 2001), 334. DOI: 10.1080/13668800120079027

22 Chicone, R. A Layman's Guide to Cyber Threats, Threat Actors, Attacks, and Intelligence, (U.S.,Kaplan University, 2015), 2. Available at: http://alliance.kaplan.edu/uploadedFiles/_Global_Content/Generic/Promotional_contents/Laymans%20Guide%20to%20Cyber%20Threats%20Article.pdf

tion. Employees of an organization know exactly where precious information is stored.[23] Last but not least, "state sponsored" actors are known as advanced persistent threats[24] that consist of talented, well-equipped, well-organized and resourceful cyber attackers with advanced cyberattack tools, who work for a government in order to disrupt or compromise other governments, organizations or individuals in order to gain access to valuable data or intelligence, and can create incidents that have international significance.[25]

Categories of cybercrime

Many different types of cybercrimes are committed every day on the internet, such as financial crimes, unauthorized access, theft, viruses/worms, Distributed Denial of Service (DDoS) attacks, trojan horse attacks, web jacking, cyber terrorism, cyber pornography, online gambling, IP crimes, email spoofing, cyber defamation, cyber stalking, etc.

In Cambodia, internet cafés have been an easy place for viruses to spread due to their limited cyber security measures.[26] Other common issues reported in the country are web defacement, phishing, hacking, email hijacking, telecom fraud and fraudulent money transfer.[27] The most targeted sites by hackers are government websites such those of ministries, government agencies and other high-ranking government officials. They are usually subjected to SQL injection and DDoS attacks. The Cambodian government experienced attack from groups such as Black Hats Team from Iran, Anonymous, Young Geek, Brothers Team and NullCrew, as mentioned earlier. Very few official reports are made about cyberattacks that target private companies offering online services, such as banks and telecommunication operators. The private sector and ISPs usually have better equipment and technical experts to monitor the network traffic, filter spam and defend against certain malicious acts in the cyberspace. Nevertheless, most cybercrimes and -attacks have gone unnoticed and most victims of cyber incidents are reluctant to report them. The low amount of incident reports may be either due to the low impact of the incidents or due to the limited legal procedures and enforcement.[28]

Threat Responses

According to Soafer and Goodman, a significant weakness in the current system of combating computer misuse is the inconsistency between individual states of laws and effective investigation and prosecution measures.[29] The ITU Global Cybersecurity Agenda (GCA) calls for strategies to develop cybercrime legislation that is globally applicable and interoperable with existing national and regional legislative measures, as well as to organize national cybersecurity efforts. The adoption by all countries of appropriate legislation against the misuse of ICTs for criminal or other purposes, including activities intended to affect

23 Tan Teck Boon, We, Cittizens of Smart Signapore: Data Protection in Hyper-connected Age, (Singapore, RSIS Commentaries, No. 036, 2016) 1. Available at: http://hdl.handle.net/10220/40253

24 Chicone, R. A Layman's Guide to Cyber Threats.

25 Klimburg, Strategic Goals & Stakeholders 2012, 68-69.

26 Sopheak Cheang, Sinawong Sang, State of Cybersecurity and the Roadmap to Secure Cyber Community in Cambodia, (U.S., International conference on availability, reliability and security, IEEE, 2009), 652. doi: 10.1109/ARES.2009.144

27 Phannarith Ou, Status of Cybercrime in Cambodia. Presentation at Octopus Cooperation against Cybercrime in Strasbourg, France, November 2016. Avaiable at: https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016806bdc39

28 Ibid.

29 Abraham David Sofaer, Seymour E. Goodman, The transnational dimension of cybercrime and terrorism, (California, Hoover Institution Press, 2001), 15-16.

the integrity of national critical information infrastructures, is central to achieving global cybersecurity.[30] Since cyber threats can originate anywhere around the globe, the challenges are inherently international in scope and require international cooperation, investigative assistance and common substantive and procedural provisions. Thus, it is important that countries harmonize their legal frameworks to combat cybercrime and facilitate cooperation.

However, it can take time to update national criminal law and facilitate the prosecution of new forms of online cybercrime. Indeed, some countries have not yet gone through this adjustment process.[31] Cambodia does not have any specific legislation dealing with cybercrimes yet, although the new Cybercrime Law is being drafted and the Criminal Code 2009 takes care of the cybercrime issues.

How Cambodia Defines Cybercrime

There are different names for cybercrime law in different legal systems. For example, it is called "Computer Misuse Act"[32] in Singapore. China got its "Cybersecurity Law" after The Standing Committee of China's legislature passed it in November 2016.[33] As of mid-2019 more Cambodians gain access to the internet, and the current "Cybercrime Law" is still in the drafting process. However, computer related offences were introduced for the first time in the Cambodian Criminal Code 2009 in Articles 317-320 and 427-432. The Criminal Code uses very general terms such as "Offences in information technology sector". [34] There is no specific definition of cyber offense or the specific categories of cybercrime in this legislation, so the Criminal Code alone cannot secure the nation from cyber threats and impose appropriate punishment on cyber criminals. The challenge for Cambodia's legal system is to stop the potential abuse of new technologies and make necessary amendments to the national criminal law.

Interestingly, some legal systems do not criminalize accessing another computer itself, unless the perpetrator has harmful intentions to obtain, modify, and damage the accessed data.[35] Opponents to the criminalization of access refer to situations where no dangers were created by mere intrusion, or where acts of "hacking" have led to the detection of loopholes and weakness in the security of the targeted computer systems. In order to keep pace with innovation, the Cambodian government is putting more effort into legislating this space more appropriately.

Legislating Cyberspace

This section analyzes the existing legal framework and mechanisms that address cybersecurity in Cambodia, in particular the Criminal Code 2009, the Press Law, the Telecommunications Law 2015 as well as the new draft Cybercrime law, looking at whether these laws sufficiently address cybersecurity issues or not.

30 Understanding Cybercrime: Phenomena, Challenges and Legal Response, (Geneva, ITU, 2012), 179. Available at: http://www.itu.int/ITU-D/cyb/cybersecurity/docs/Cybercrime%20legislation%20EV6.pdf

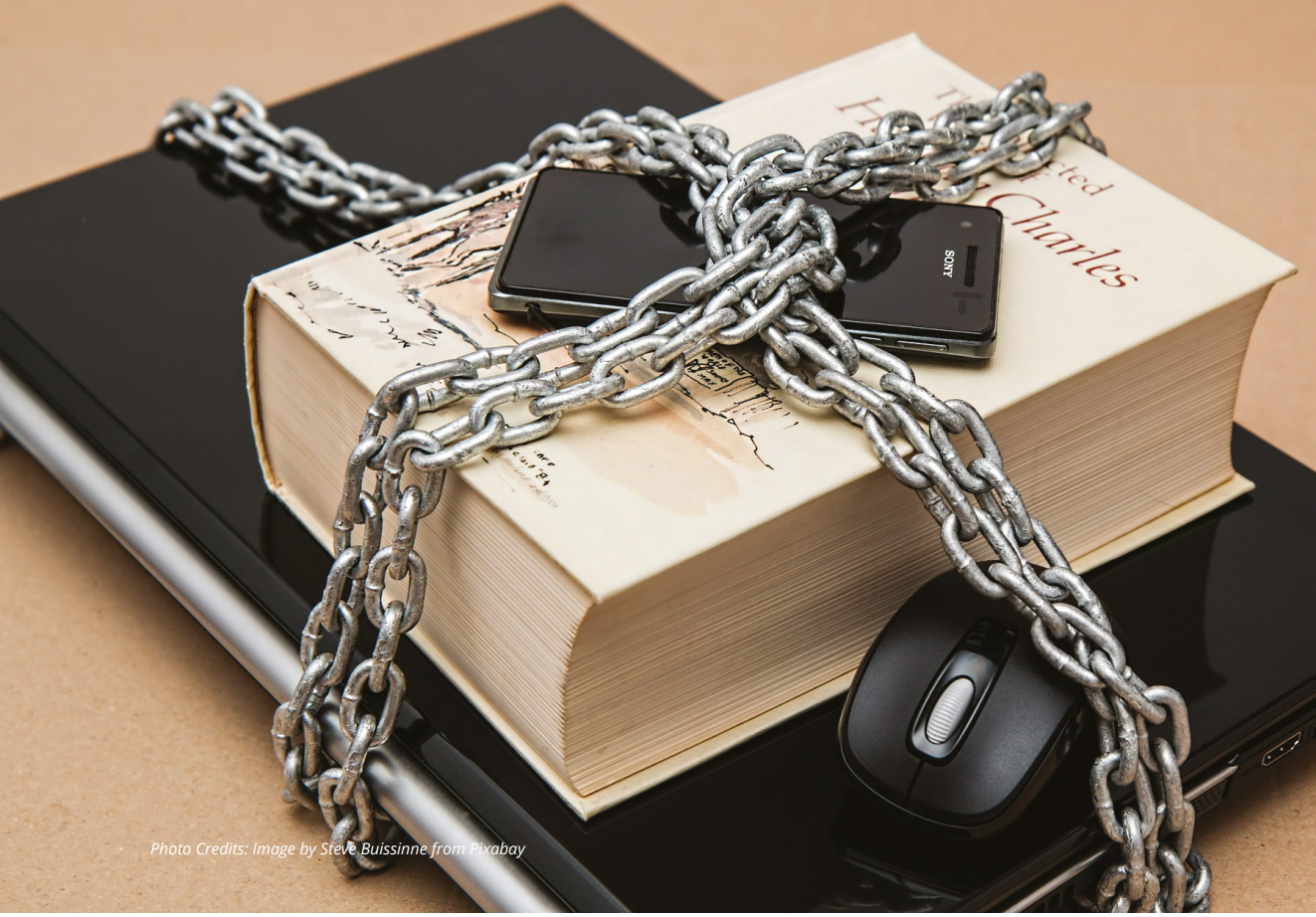
31 Ibid.

32 Tan Teck Boon, We, Cittizens of Smart Signapore: Data Protection in Hyper-connected Age, (Singapore, RSIS Commentaries, No. 036, 2016) 1. Available at: http://hdl.handle.net/10220/40253

33 Ron Cheng, "China Passes Long-Awaited Cyber Security Law", Forbes, 09.11.2016. Available at: http://www.forbes.com/sites/roncheng/2016/11/09/china-passes-long-awaited-cyber-security-law/#2653934b6868

34 Criminal Code of the Kingdom of Cambodia, No.NS/RKM/1109/09, September 30, 2009.

35 Understanding Cybercrime: Phenomena, Challenges and Legal Response, (Geneva, ITU, 2012), 179. Available at: http://www.itu.int/ITU-D/cyb/cybersecurity/docs/Cybercrime%20legislation%20EV6.pdf



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Criminal Code of the Kingdom of Cambodia (2009)

The term "cybercrime" does not exist in any specific legislation in the Kingdom yet. While the controversial Cybercrime Law is still being drafted, the Cambodian Criminal Code 2009 has jurisdiction over the current cybercrime issues. Computer related offences were introduced for the time being in the Cambodian Criminal Code 2009 in Articles 317-320 and 427-432, the crimes being called *"Infringement on the secrecy of correspondence and telecommunication"* and *"Offences in the information technology sector". "Defamation and Insult"* is considered a type of cybercrime as well, if committed via computer networks.

Infringement on the secrecy of correspondence and telecommunication – the right to correspond is an international fundamental right part of private life recognized under international human rights law and also applied to the secrecy of telecommunication. This right protects parties from any active interference; any censorship or other kind of active limitation on the free flow of communication is considered an interference and violation of the above rights.[36] According to the Cambodian Criminal Code, any act of opening, disappearing, delaying or diverting the correspondence addressed to a third party, in bad faith, is an infringement on correspondence.[37] In addition, fraudulently acquiring knowledge of the content of the correspondences addressed to a third party is categorized in the same way and is punishable by imprisonment of one to five years. Moreover, it can be fined between

36 Blanca Rodriguez Ruiz, Privacy in Telecommunications: A European and an American Approach, (Netherland, Kluwer Law International, 1997), 134-135.

37 Cambodia Criminal Code 2009, Art.317-320.

one hundred thousand and two million Riels. According Section 5 of this law, the act of listening or jamming a telephone conversation in bad faith shall be punishable in the same way.[38] There are additional penalties as well depending on the category and duration of the act, such confiscation of materials, prohibiting against pursuing a profession, posting and broadcasting the decision of the sentence.[39]

Offenses in the information technology sector – according to Article 427, the offenses refer to acts of *having access to automated data processing or maintaining access and when the act has resulted in either deletion or modification of the data contained in the system.*[40] Also the act of obstructing the operation of automated data processing systems, fraudulent introduction, deletion or modification of data, participation in a group, or agreement to prepare for the commission of offences are considered offenses in the information technology sector.[41] The phrase *"having access to automated data processing or maintaining access"* is being used in the current law without being specific as to whether it means *illegal* access, access to *unauthorized* data or *intentional* access to unauthorized data. The law also fails to specify the technical means and level of access and usage.

Defamation and insult – these are considered a type of cybercrimes as well if committed via computer network. Defamation is a concerning issue on the internet, defined as *"an intentionally false communication, either published or publicly spoken, that injures another's reputation or good name, or holds a person up to ridicule, scorn, or contempt in a respectable and considerable part of the community"*.[42] Article 305 of the Criminal Code defines defamation as *"any allegation or slanderous charge that undermines the honor or the reputation of a person or an institution".*[43] Defamation can be committed in the following ways: through speeches, announced in a public place or in a public meeting; in writing or sketches by any means whatsoever circulated in public or exposed to sight of the public; or by any means of audio-visual communication intended for the public.[44] In February 2018, the National Assembly and Senate approved amendments to the Criminal Code, introducing a new *lèse-majesté* offense (Article 437) that makes it illegal to defame, insult or threaten the king. It carries a sentence of one to five years in jail, and a fine two to ten million riel (about USD$500 to USD$2,500). In May 2018, the Ministry of Information warned media outlets of the law, saying that distributing or reposting material that insult the king, in print, online or otherwise, constitutes a *lèse-majesté* offense.[45] Defamation and insult offenses under the Criminal Code are used together with the Press Law 1995. According to Article 306 and 308 of the Criminal Code, defamation and insults committed by means of media is subjected to the provision of the press law.[46] The Press Law also restricts journalists from publishing information that harms someone's honor and dignity and may be used to punish journalists who criticize public figures.[47] It also imposes

38 Ibid.

39 Ibid.

40 Ibid.

41 Ibid., Art. 428-432.

42 Sharon K. Black, Telecommunications Law in the internet Age, (San Francisco, Academic Press, 2002), 418.

43 Cambodia Criminal Code 2009, Art. 305.

44 Ibid.

45 Freedom on the Net 2018 – Cambodia, Freedom House, 2018. Available at: https://www.refworld.org/cgi-bin/texis/vtx/rwmain?page=printdoc&docid=5be16b22c

46 Cambodia Criminal Code 2009, Art. 306,308.

47 Yumiko Yasuda, Rules, Norms and NGO Advocacy Strategies: Hydropower development on the Mekong River, (New York,

restrictions on content which *"may affect the public order by inciting directly one or more persons to commit violence"*[48] or which *"may affect national security and political stability"*[49] or which affects *"the good custom of society".*[50]

Law on Telecommunications 2015

The Law on Telecommunications was promulgated in December 2015 as a legal instrument to supervise the telecom sector in Cambodia. The objectives of this law are to define the authority of the Ministry of Post and Telecommunication (MPTC), to establish and outline the duties of the Telecom Regulator Cambodia (TRC), to classify different types of authorization, certificate and licenses, and to set the supervision on the use of infrastructure and network, the fees, the fair competition and the protection of consumers.[51] A Report of the UN Special Rapporteur Rhona Smith on the situation of human rights in Cambodia submitted at the United Nations Human Rights Council highlighted concerns over the adoption of this law. She noted that "*the law requires telecommunications companies to turn over certain data to the government upon request"*[52]. She also highlighted that the degree of compliance with international human rights law lies in the interpretation and application of the law by law enforcement and judicial official.[53]

According to Article 6 the MPTC shall have the competence to control telecommunications and ICT service data, and all telecommunication operators shall provide their service user data to the MPTC.[54] A 2015 Regulation on Cell Phone Data threatens suspensions and fines for mobile operators who do not register the identities of consumers. The regulation obliges companies to supply police with identification details of SIM card holders on request. The TRC spokesman Im Vutha said that SIM card registration would enable the government to monitor telecom operators' databases.[55] Moreover, Article 97 allows secret surveillance of communications if conducted with the approval of the "legitimate authority".[56] Article 80 states that the *"establishment, installation and utilization of equipment in the telecommunications sector, if these acts lead to national insecurity, shall be punished by sentences from seven to fifteen years imprisonment."*[57] In addition to imprisonment, the offender shall be fined from 140 to 300 million Riels.[58] This could broadly mean that any communication conducted by any electronic means could be criminalized if it is deemed to create "national insecurity".

It should be noted that in May 2018 the Cambodian government also issued an interministerial "Prakas" (or proclamation) which ordered all ISPs to install the software necessary to monitor, filter, and block "illegal" content, including social media accounts. The Prakas ordered the MPTC to "block or close" websites and social media pages containing content deemed discriminatory or posing a threat to national security or unity.[59]

Routledge), 2015.

48 Law on the Press, Art 11.

49 Ibid., Art 12

50 Ibid., Art 14.

51 The Law on Telecommunications, No.NS/RKM/1215/017 dated 17 December 2015, Art 2.

52 Report of the Special Rapporteur on the situation of human rights in Cambodia, (United Nation, A/HRC/33/62), 10.

53 Ibid.

54 The Law on Telecommunications, Art. 6.

55 Freedom on the Net 2018 – Cambodia.

56 The Law on Telecommunications, Art. 97.

57 The Law on Telecommunications, Art. 80.

58 Ibid., Art 81.

59 Freedom on the Net 2018 – Cambodia

Cambodia vs Hackers

Cybercrime is a well-known, yet poorly understood issue in Cambodia, and the country's existing legal framework is vague and unclear compared to international standards.

Types of cyber criminals

Cyber Criminals

These guys break into systems purely with negative intentions.

- Stealing credit card information
- Altering public databases

Social Media Hacker

They focus on hacking social media accounts by using various techniques.

- Stealing social media accounts

Hacktivist

They are the protesters of the internet.

- Defacing websites
- Uploading promotional materials

Script Kiddie

They are the newbies.

- Running hacking softwares
- Running pre-written scripts

Crime & Attacks

Denial of e-services:
Infomation services are not available if needed.

Data integrity breach:
Data is modified in an unauthorised manner.

Data confidential breach:
Data is available for unauthorised entities.

DIGITAL INSIGHTS

KONRAD ADENAUER STIFTUNG

Why Cyber Security?

- Government efficiency
- Economic competitiveness
- E-way of life is susceptible to hackers
- Smart solution of information society
- Rapid digital innovations

Recommendations:

- Review existing laws to ensure that they do not overlap with each other and are applicable.
- The current draft law should adress cyber security properly.
- Determine the responsible authorities.
- Establish security measures for the nation more effectively.
- Actively involve in international and regional cyber engagement and cooperation.
- Provide cyber awareness programs to government officials, citizens, and schools.
- Cambodia should consider signing and ratifying the convention on cybercrime.

Content and Storyline: Somaly Nguon & Sopheak Srun
Infographic Designer: Singhtararith Chea
Editors: Robert Hör & Ann-Cathrin Klöckner

Article 66 provides for the general prohibition of any action in the communication sector that may *"affect public order and lead to national insecurity"*.[60] Because of the unclear wording, individuals may find it hard to understand when it may apply, or when the consequences of their actions may constitute as a violation to this law, and thus incur penalties.[61]

The law also provides specific powers for the destruction of evidence. Article 76 states that, *"in case the evidence of this offense is prohibited products or dangerous, telecommunication inspection officials have the right to request the prosecutor's ruling to destroy in line with applicable procedures"*.[62] It is unclear what the terms "applicable procedures" and "prohibited or dangerous products" mean. Destruction of evidence under this article could affect the right to fair trial for those charged under this law because if a defendant is deprived of material evidence, they are deprived of the fundamental right to a fair trial because they cannot present a complete defense.[63]

The New Draft Law on Cybercrime

Cybercrime can be categorized into three main categories: (1) Acts against confidentiality, integrity and availability of computer data or systems, which include illegal access to computer systems; illegal access, interception or acquisition of computer data; illegal interference with a computer system or computer data; production, distribution or possession of computer misuse tools; breach of privacy or data protection measures; (2) Computer related acts for personal or financial gain or harm, which are computer related fraud or forgery; computer related identity offences; computer related copyright or trademark offences; sending or controlling sending of spam; computer related acts causing personal harm; computer related solicitation or 'grooming' of children and; (3) Computer content related acts uch as computer related acts involving hate speech; computer related production, distribution or possession of child pornography; and computer related acts in support of terrorism offences.[64] This section will walk through the main components of the Cambodian draft law on Cybercrime and analyze its scope, structure, definitions and mechanisms to implement this law in the future. The main questions are: How does Cambodia define cybersecurity under this draft law? Is this law proportionate and address cybersecurity itself?

Purpose, Objective and Scope

According to the Council of Ministers spokesman Ek Tha, the draft of the Cybercrime Law is designed to *"prevent any ill-willed people or bad-mood people from spreading false information and groundless information"*.[65] Article 1 of the draft law states that, *"This law has a purpose to determine education, prevention measures and combat all kind of offenses commit with computer systems"*.[66] Moreover, this law has the objective to *"ensure the implementation of law, anti-cybercrime and combating all kinds of offenses commit with computer systems"* and to

60 The Law on Telecommunications, Art. 66.

61 Licadho Cambodia's Law on Telecommunications 2016, 2.

62 The Law on Telecommunications, Art. 76.

63 Sarah M. Bernstein, Police Failure to preserve Evidence and Erosion of the Due Process Right to a Fair Trial, (U.S., Journal of Criminal Law & Criminology, 80 (4), 1990), 1274. Available at: http://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=6649&context=jclc

64 Appazov, Legal Aspects of Cybersecurity, 23-24.

65 Kevin Ponniah, "Cyber bill raises concerns", (The Phnom Penh Post 09.04.2014). Available at: http://www.phnompenhpost.com/national/cyber-bill-raises-concerns

66 Cybercrime Law, Draft V.1, Art.1.

"ensure safety and prevent all [illegitimate] interest in using and developing technology".[67]

Structure

The Draft Cybercrime Law is divided into six main chapters. Chapter 1 is the general provision that covers the purpose, objective, scope, terms and definition of this law. Chapter 2 covers the establishment of a National Anti-Cybercrime Committee (NACC), its composition, duties, officials, budget and other details. Chapter 3 provides the procedures of dealing with cybercrime offences including investigation powers. Chapter 4 covers specific types of offences such as illegal access, data espionage, illegal interception, and data interference. Chapter 5 covers the topics of mutual legal assistance, international cooperation and extradition. Chapter 6 is the final provision.

It should be noted that the NACC will be chaired by the prime minister, with the deputy prime minister also acting as deputy chairman, and include five secretaries of state from the Ministry of Interior, the Ministry of Foreign Affairs, the Ministry of Information, the Ministry of Post and Telecommunications and the Ministry of Justice. There will be one general commissioner from the National Police who will be included as member. Other members are representatives from Anti-terrorism, Council of Justice, Ecosoc, Chamber of Commerce and NiDA.[68] The NACC will have the duty to create strategies, action plans and related programs in securing the cyber and information grid. It will advise and recommend courses of action to the General Secretariat of the National Anti-Cybercrime Committee, supervise workflows and implementations of the General Secretariat. Moreover, it will also issue findings and appropriate recommendations for ministries and departments to ensure the security of the cyber and information grid of the government, provides cyber and information grid security reports of the nation to the government and perform other duties directed by the government.[69]

Offenses

Compared to the Cambodian Criminal Code 2009, new and more specific cyber offences are introduced in the draft law on Cybercrime such as *illegal access, data espionage, illegal interception, unauthorized data transfer, and system interference.*[70] The unauthorized access to a computer system, interception

made by technical means, alteration, deletion or deterioration of computer data shall carry sentences of six months to fifteen years imprisonment and fines between one million and twenty four million Riels.[71]

Article 23 of the draft law introduces the offence of "illegal interception" of computer data. Interestingly, it resembles Article 3 of the Convention on Cybercrime, the international treaty adopted by the Council of Europe. However, unlike the European version, the Cambodian draft law fails to provide discretion of the criminalization based on *"dishonest intent"* or *"in relation to a computer system that is connected to another computer system".*[72]

The same issues remain in other offences of

67 Ibid., Art. 2.

68 Ibid., Art.7

69 Ibid., Art.7.

70 Cybercrime Law, Draft V.1, Art 21-26.

71 Ibid.

72 Convention on Cybercrime, ETS 185, 23.11.2001, Art. 3.

the draft law. The offences are defined in very broad terms and fail to make reference to malicious or fraudulent intent, considering that honest mistakes over the internet are likely to be caught and penalized.[73] British charity Article 19's Executive Director, Thomas Hughes, said, *"With a version of the Draft Law released, the authorities can no longer deflect the legitimate concerns of the national and international human rights community*".[74] Cambodia's draft Cybercrime Law falls well below international standards on the rights for freedom of expression, information and privacy.[75]

Investigating Cybercrimes and Collecting Digital Evidence

Gathering evidence is one of the main challenges in fighting cybercrime.[76] Cybercrime is different from physical crime in terms of motives, intent and outcomes, but especially also in terms of evidence. As evidence arises out of an electronic discovery process, it is very important for the investigator to understand the capabilities of the cybercriminal suspects.[77] Digital evidence can be destroyed during the discovery process, as it is typically made of binary data inscribed on a mass storage device and can contain executable code objects, images or other encrypted electronic content. Therefore, only computer forensic experts should conduct such investigations.[78]

Article 17 of the daft law states that *"for the purpose of gathering evidence, the expeditious preservation of the computer data or the data referring to data traffic, subject to the danger of the destruction or alteration, can be ordered by the prosecutor".*[79] The law requires that service providers make user data available to the competent authorities under confidentiality conditions.[80] Prosecutors are given significant powers to order the preservation of computer data or traffic data under the draft law, which may cause concern if a prosecutor is subject to political influence or lacks the necessary independence to balance the different interests involved, especially the protection of the right to privacy.[81]

Therefore, it would be necessary to use the "Principle of Proportionality" and "Reasonable data management" during a cybercrime investigation, in order to guarantee that rights and safety are considered at equally.[82]

While it is extremely important for a cybercrime investigator to understand the purposes, personalities and behaviors of the cybercriminals, and to use different analytical techniques with different types of digital evidence for a more effective result,[83] policymakers and citizens should jointly discuss whether, in order to balance security and the right to privacy, 'identity' and 'behavior' should be regulated separately.[84] There could be real

73 Article 19, Cambodia: Secret Draft Cybercrime Law seeks to undermine free speech online, Article 19, Press release 09. 04. 2014. Available at: https://www.article19.org/resources.php/resource/37516/en/cambodia:-secret-draft-cybercrime-law-seeks-to-undermine-free-speech-online

74 Ibid.

75 Ibid.

76 Gruodyte, Investigating Cybercrimes, 241.

77 Okechukwu Wori, Computer crimes: Factors of Cybercriminal Activities, (Switzerland, Int'l J. IJACSIT ISSN 2320-0235, Cloud Publications, 3 (1), 2014), 53-54.

78 Ibid

79 Cybercrime Law, Draft V.1, Art. 17.

80 Ibid.

81 Article 19, Cambodia: Secret Draft Cybercrime Law.

82 Agnes Kasper, Eneli Laurits, Challenges in Collecting Digital Evidence: A Legal Perspective, Kerikmäe, T. Rull, A. (Eds.), The Future of Law and eTechnologies, (Switzerland, Springer, 2016), 201.

83 Debra Littlejohn Shinder, Michael Cross, Scense of the Cybercrime, (United State, Elsevier, 2008), 118.

84 Chris C. Demchak, Kurt D. Frenstermacher, Balancing Security and Privacy in the 21st Century, (Switzerland,

additional dangers to citizens if extensive information on both 'identity' and 'behavior' is collected, as this data could be also exposed to malicious actors. Thus it would seem better for data collection efforts to focus on 'behavior' only.[85]

Cybersecurity Laws in China, Japan and Singapore

Governance, economy and society are important factors to consider when legislating cyberspace.

In 2013 a United Nations Working Group of Government Experts concluded that the UN Charter and international law are fully applicable to the state behavior in cyberspace, which has also been adopted by NATO countries.[86] However, China does not fully agree that international law should have jurisdiction on the national cyberspace. China holds the view that each state should have the right to set its own rules. With a strong belief in "cyber sovereignty", China, together with Russia and some other Asian countries, introduced its alternative position through the Shanghai Cooperation Organization (SCO) in the UN General Assembly.[87] China has been actively participating in high level dialogues and has signed several agreements for the purpose of protecting and improving cybersecurity. Yet, several of its national policies give extensive jurisdiction to the Chinese government to control cyberspace in areas of society and economy as well. The new Chinese Cybersecurity Law continues to enforce self-censorship on content and control over personal and business data. Therefore, the principle of international law that covers cyberspace and fundamental human rights is not being fulfilled in China.

In Japan, although freedom of expression, access to information and the right to privacy are arguably still practiced in a limited way, the country is a good role model in the fight against cybersecurity issues, notably in terms of public-private partnerships and effective international cooperation.

Japan launched its new Cybersecurity Strategy Plan in September 2015. It highlights the role of industry and civil society in maintaining Japan's cybersecurity and the centrality of two-way information sharing. The Cybersecurity Strategic Headquarters functions as the command and control body to promote the plan, and the National Information Security Center (NISC) takes the lead in promoting cybersecurity policies set forth in this strategy.

Interestingly, the NISC is allowed to monitor government-affiliated agencies for the first time.[88] The Japanese government adopted the Cybersecurity Basic Act in November 2014 and amended it in April 2016 in response to the Japan Pension Service hack to give the NICS new powers to monitor and audit the security of entities created by direct government approval or laws.[89]

Japan is also a member of the Global Forum on Cyber Expertise and has been a member of two UNGGEs. The country is actively involved

Intelligence and Security Informatics (ISI), 2004), 327.

85 Ibid, 328.

86 Mikk Raud, China and Cyber: Attitudes, Strategies, Organization, (Tallinn, CCD COE Publications, 2016), 7. Available at: https://ccdcoe.org/sites/default/files/multimedia/pdf/CS_organisation_CHINA_092016.pdf

87 Ibid.

88 The Government of Japan, Cybersecurity Strategy, (Japan, NISC, 2015), 52. Available at: https://www.nisc.go.jp/eng/pdf/cs-strategy-en.pdf

89 Cyber Maturity in the Asia-Pacific Region, 43.

in high level international political dialogues and has a strong Asia-Pacific engagement program, working closely with ASEAN countries. JPCERT/CC, Japan's national Computer Emergency Response Team Coordination Center (CERT/CC), was established in 1996 in order to work with government agencies, critical infrastructure operators, security vendors and civil society. It actively promotes collaboration and monitoring across the Asia-Pacific and enhances the sharing of threat information. It is also undertakes extensive capacity building across and outside the Asia-Pacific, and works with global partners on a Cyber Green Initiative, an effort to improve the general internet ecosystem health.[90]

Singapore's government created a new Cybersecurity Strategy Plan 2018 with the aim to establish a resilient cyber environment based on a strong infrastructure, a safer cyberspace and a vibrant ecosystem with international partnerships.[91] Moreover, the Communication and Information Minister has promised to spend up to 10% of Singapore's IT budget on boosting cybersecurity.[92] In addition to this, an existing Computer Misuse and Cybersecurity Act was amended in April 2017, setting new standards for incident reporting, audits and risk assessment, such as dealing with personal information obtained via cybercrimes (e.g. hacked credit card details).[93] Singapore also engages in a strong international program to establish itself as one of the region's leading central government cybersecurity bodies. It has signed several MoUs with other ministries inside and outside the region. Singapore is active in forums such as the East Asia Summit, ASEAN cybercrime meetings and the ASEAN Regional Forum. The SingCERT, like the one in Japan, was established in 1997 and works to detect, resolve and prevent security-related incidents on the internet affecting Singaporean companies and users. SingCERT signed an MoU with India's CERT-In to enable information sharing and incident response collaboration.[94]

Conclusion and Recommendations

Classifying different aspects of cybersecurity into manageable categories facilitates the development of national and international law governing the rights and duties of individuals and nations with respect to each category of activity. Cyberattacks can be categorized into three general categories: cybercrime, cyberterrorism and cyberwarfare. Cyberespionage is another separate concern connected to either state intelligence or hacktivism. This separation helps to address the shortcomings of present national and international legal frameworks in a more effective manner.[95]

Cyberattacks largely defy the simple categorization of activity defined by existing laws, making it difficult for countries to apply the traditional definitions of crime, terrorism, warfare or espionage as understood under existing law. Traditional classifications break due to the aforementioned asymmetric na-

90 Ibid.

91 Cyber Security Agency of Singapore, Singapore's Cybersecurity Strategy, (Tallinn, CCDCOE, 2016). Available at: https://ccdcoe.org/sites/default/files/documents/SingaporeCybersecurityStrategy.pdf

92 Global Cybersecurity Index & Cyberwellness Profiles 2015, 70.

93 Kevin Kwang, "Changes to Singapore's cybercrime law passed", Channel NewsAsia, 03.04.2017. Available at: http://www.channelnewsasia.com/news/singapore/changes-to-singapore-s-cybercrime-law-passed-8712368

94 Cyber Maturity in the Asia-Pacific Region, 70.

95 Artur Appazov, Legal Aspects of Cybersecurity, (Denmark, University of Copenhagen, 2014), 14-15. Available at: http://www.justitsministeriet.dk/sites/default/files/media/Arbejdsomraader/Forskning/Forskningspuljen/Legal_Aspects_of_Cybersecurity.pdf

ture of network communication.

The legal and legislative analyses of cybersecurity issues must distinguish not only between different cyber-threat actors such as nations-states, terrorist, criminals, and malicious hackers, but also between the different targets of cyberthreats. Such targets include critical infrastructure, which could lead to loss of life or significant damage to the economy, and intellectual property, which could affect a country's long-term competitiveness.[96]

Cambodia has made steady developments in the area of cyber policy and security. In order to strengthen the area of national telecommunication legislation, its government adopted the Law on Telecommunications in 2015 and launched its Telecom/ICT Development Policy in 2016. Other legislation such as e-commerce and cybercrime is in drafting process. Cambodia's international cyber engagement is limited to engagement with ASEAN's cyber discussion and bilateral engagement with Japan, South Korea and the United States. The engagement is focused on technical capacity building, and legislative and policy development assistance.[97]

However, the existing legislation of Cambodia does not address cybersecurity well enough. Current criminal law provides a broad perspective of crime related to telecommunications without clear definitions of the types of crime. The offence of infringement on the secrecy of the correspondence and telecommunication, and offences in information technology sector are being used to address cybercrime in Cambodia during the absence of a specific Law on Cybercrime. Other legislations such as the Press Law and Ministry Prakas do not describe cybercrime appropriately. There are a number of good recommendations proposed by stakeholders and international partners that should be taken into consideration in order to improve cyber wellness in Cambodia.

The current draft law on Cybercrime needs to address cybersecurity issues based on specific classifications and characteristics of crime. The terms and definitions used in the draft law should be clear and accurate in order to prevent broad and vague interpretations or confusion among authorities, judicial bodies, law practitioners and stakeholders implementing the law. The law should at least reach the minimum international cybersecurity standard norms and practices.

For instance, the collection of digital evidence during the investigation should be handled by professional data forensics because digital data is fragile and can break easily. Moreover applying the principle of proportionality and reasonable data management during cybercrime investigation is necessary to avoid data and privacy violations.

Special training and capacity building conducted by experts is very important for effective cybercrime investigation, especially for law enforcement officials and others who work in government institutions.

Cambodia doesn't need to establish an NACC, unless it is to become an independent body overseeing cybersecurity practices in terms of technical and general implementation.

The Cambodian government should also promote open discussion between government, public, private, civil societies and international partners when adopting any national legisla-

96 Ibid.

97 Ibid., 28.

tions and policies, especially on ICTs and cybersecurity matters, because it involves multiple different aspects that are linked with long term development and competitiveness at local and international level.

In addition, the current legal framework concerning cybersecurity, such as the Criminal Code 2009, Press Law, Telecommunication Law 2015 and other relevant regulations, should be amended in terms of the provisions concerning the interpretation of crime itself and authority power, including those that provide unnecessary restriction and violations of fundamental rights. Cyber awareness programs should be implemented at all levels in order to help citizens become more aware of the potential risks and threats on the internet. The government should integrate such cyber awareness programs in school curricula because large numbers of young Cambodian are increasingly using the internet for various purposes without knowing about its dangers.

Photo Credits: Image by Oliver Peters from Pixabay

Last but not least, the government should increase its regional and international cooperation and partnerships in the field of cybersecurity. Cybercrime law will certainly play a major role in addressing cybersecurity in Cambodia, but it has to match international cybersecurity standards and comply with Cambodia's legal oblations at all levels.

One major positive step would be for Cambodia to consider signing and ratifying the Convention on Cybercrime, also known as the Budapest Convention, the first international treaty seeking to address internet and computer crime by harmonizing different national laws, improving investigation techniques, and increasing cooperation among nations.

Even though the Convention on Cybercrime was adopted by the Committee of Ministers of the Council of Europe in 2001, as of March 2019, 63 states have already ratified the convention, including the United States, Canada, Australia, Japan, Philippines and Sri Lanka.

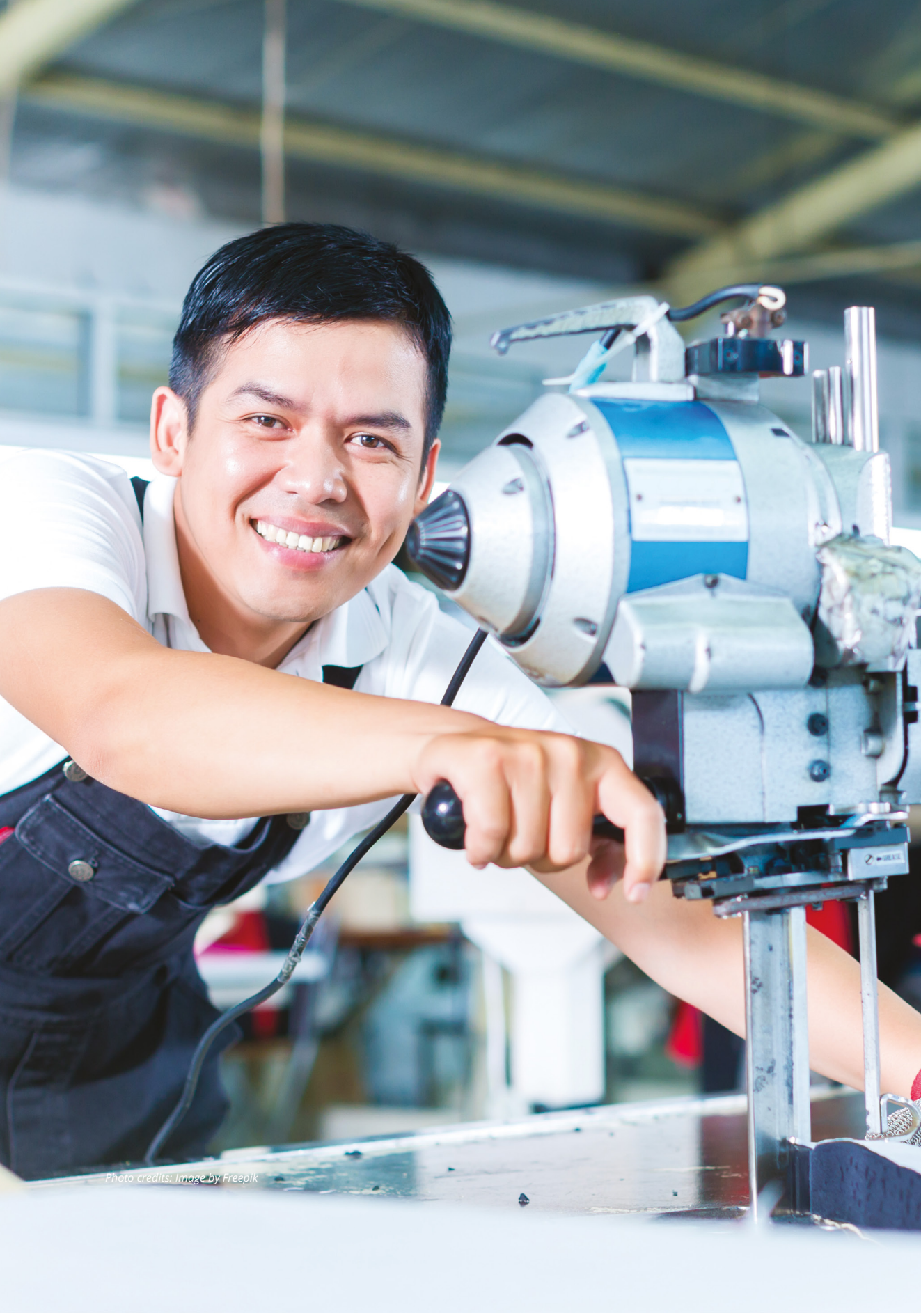
An effective, robust and balanced cybercrime law is important for Cambodia's political, social and economic development, and therefore it will be in its best interests it to integrate best practices and effective measures from around the world.

Reading time: 06 minutes

The Risks of Industry 4.0 on Cambodia's Garment Sector: Analysis and Ways Forward

Dr. Daniel Schmücking[1]

1 Dr. Daniel Schmücking was born in 1982 in Germany. He studied political science and sociology at the Friedrich Schiller University in Jena (Germany) and the Palacky University in Olomouc (Czech Republic). His professional and scientific focus is on political communication and election campaigns. He worked as a campaigner for the Christian Democratic Union (CDU). In his dissertation he devoted himself to the topic: The effect and development of negative political advertising in Germany. As part of his doctoral studies, he spent time at the University of Maryland (USA) and the University of California (USA). He was teaching at universities in Jena (Germany), Erfurt (Germany) and Budapest (Hungary). From the beginning of 2015 until the end of 2017 he headed the Konrad Adenauer Foundation's (KAS) office in Mongolia. Since the beginning of 2018 he is country director of KAS in Cambodia.



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Introduction

There are major innovations in the global economy which could change the face of industrial production forever. A term that embodies multiple new technologies in manufacturing is Industry 4.0. Highly developed countries have the necessary monetary, intellectual and industrial resources to embrace and shape this change, unlike developing countries which are still catching up economically. This is especially true when an economy is highly dependent on just one sector and its low labor costs, as is the case with Cambodia and its garment industry. The impact of digitalization on manufacturing will be significant. Low-skilled jobs could disappear on a large scale and there will be an urge to restructure. To get a better understanding of Cambodia's economy, this report asks the question: What impact does Industry 4.0 have on the garment sector in Cambodia? The first chapter will focus on global trends in manufacturing which are often described by the term Industry 4.0 and their impact on the garment sector. Afterwards, the report analyzes the risks stemming from these developments on the Cambodian economy in general and on the garment industry in particular, before finally finding and presenting approaches that policymakers could take in order to attain the most positive outcome for Cambodia.

Global Developments: Industry 4.0 and the Future of the Garment Sector

The Austrian economist Joseph Schumpeter created the term "creative destruction" in the 1940s to describe the way technological progress improves the lives of many, at the expense of a few. Creative destruction occurred during the industrial revolution when machinery and improvements to the manufacturing process such as the assembly line pushed out craft and artisan production. While the economy as a whole benefitted from such improvements, the jobs of those craftsmen never returned.[2] Innovation is a permanent trend in mankind that leads to disruption. That has always been the case. From simple early tools to today's smartphones, technology has changed what we make and how we make it. It has determined the path of economic growth, and shaped societal norms and behaviors.[3] The first industrial revolution started in the garment industry. When James Hargreaves in 1764 constructed his "Spinning Jenny" baptized invention, he initiated a movement that fundamentally changed the lives of people worldwide. The Spinning Jenny was the first industrial spinning machine in the history of technology. With up to 100 spindles working simultaneously, it replaces eight spinners and one weaver, increasing the productivity and profitability of every facility that owns a model. The technology spread quickly throughout the textile industry during the first industrial revolution. [4] Nowadays the fourth industrial revolution is approaching. Even though currently there are only few business cases in the garment sector (globally) to which the term Industry 4.0 really applies, the chances that the garment sector will feel its impact in the

2 Adam Hayes, 20 Industries Threatened by Tech Disruption, Investopedia, May 9, 2019, https://www.investopedia.com/articles/investing/020615/20-industries-threatened-tech-disruption.asp.

3 Reinventing Business through Disruptive Technologies, Sector Trends and Investment Opportunities for Firms in Emerging Markets, IFC, 2019, https://www.ifc.org/wps/wcm/connect/8c67719a-2816-4694-9187-7de2ef5075bc/Reinventing-business-through-Disruptive-Tech-v1.pdf?MOD=AJPERES.

4 Industrialisierung und Arbeiterbewegung, Zeit Online, https://blog.zeit.de/schueler/2014/01/23/industrialisierung-geschichte-revolution, Januar 23, 2014.

future are high.

It is difficult to predict how big this impact will be because it is hard to assess which specific technologies will dominate. The insurance company Deloitte foresees that almost every economic sector is affected. The question is just how fast the change will happen (short fuse vs. long fuse) and how big the impact will be (small bang vs. big bang).[5] **Manufacturing** will have a long fuse and a big bang, meaning that there is still time for countries with a big manufacturing sector to prepare. The bad news is that the impact will be huge.[6]

For the German government, who coined the term **Industry 4.0**, it refers to the intelligent networking of machines and processes for industry with the help of information and communication technology.[7] Since the 1970s, information technology has been incorporated into business. Desktop PCs, the use of office IT and the first computer-aided automation revolutionized the industry. For Industry 4.0, the core technology is not the computer, but the internet. Digitalizing production is gaining a new level of quality with global networking across corporate and national borders; the Internet of Things, Artificial Intelligence, edge computing (sensors), 5G connectivity, quantum computing power, robotics, automation, big data, machine-to-machine communication and manufacturing facilities that are becoming ever more intelligent are heralding a new era, the fourth industrial revolution.[8] Implementing Industry 4.0 is a complex project: all the processes companies digitalize must be connected. The main objective of process modelling, operational excellence and management is to reduce the amount of interfaces and to create a lean and slim management to increase efficiency. Uniform norms and standards for different industrial sectors, IT security and data protection play an equally central role as the legal framework, changes in education and jobs, the development of new business models and corresponding research.[9]

Industry 4.0 is the next step in the automation of factories, the so-called Smart Factory. Robots and machines are no longer just repeating a work step millions of times. Through the networking of all production processes they decide independently how each component should be used.[10] The factory can thus produce unique pieces, because it decides by itself which component it uses, which way it takes and which machine it works with. The factory of the future can react flexibly and quickly. Through increased efficiency, goods are produced according to real needs. After all, no one else could reschedule so quickly, process so much information from so many different sites and make also the best possible decisions.[11]

5 Digitalisierung: Assekuranz erwartet ein "big bang" April 14, 2015, https://www.cash-online.de/versicherungen/2015/digitalisierung-assekuranz-erwartet-ein-big-bang/245217.

6 Digitalisierung: Assekuranz erwartet ein "big bang" April 14, 2015, https://www.cash-online.de/versicherungen/2015/digitalisierung-assekuranz-erwartet-ein-big-bang/245217.

7 Plattform Industrie 4.0, Federal Ministry of Education and Research, https://www.plattform-i40.de/PI40/Navigation/EN/Industrie40/WhatIsIndustrie40/what-is-industrie40.html, Accessed June 18, 2019.

8 Plattform Industrie 4.0, Federal Ministry of Education and Research, https://www.plattform-i40.de/PI40/Navigation/EN/Industrie40/WhatIsIndustrie40/what-is-industrie40.html, Accessed June 18, 2019.

9 Plattform Industrie 4.0, Federal Ministry of Education and Research, https://www.plattform-i40.de/PI40/Navigation/EN/Industrie40/WhatIsIndustrie40/what-is-industrie40.html, Accessed June 18, 2019.

10 Jann Ravling, Was ist Industrie 4.0? Die Definition von Digitalisierung, September 4, 2018, https://www.wfb-bremen.de/de/page/stories/digitalisierung-industrie40/was-ist-industrie-40-eine-kurze-erklaerung.

11 Jann Ravling, Was ist Industrie 4.0? Die Definition von Digitalisierung, September 4, 2018, https://www.wfb-bremen.de/de/page/stories/digitalisierung-industrie40/was-ist-industrie-40-eine-kurze-erklaerung.

Compared to car manufacturing for instance, the garment sector is more reluctant to technical innovations because the business model still mainly relies on cheap labor. Garment factories are still at the beginning of their digitalization journey both at the procurement stage and at the end-to-end product development process.[12] But this could change dramatically as the costs for technological investments are decreasing very quickly. Predictions show that the price for industrial robots declined from 131,433 USD in 1995 to 31,312 USD in 2015 and will further decline to 10,800 USD in 2025.[13]Globally, the main technologies driving the developments in the garment sector are related to product customization technology such as additive manufacturing, body scanners and computer-aided design. Other advances impacting the sector include smart apparel, nanotechnology, automated sewing machines and robotic automation. Automated sewing and cutting machines are becoming widely available for garment manufacturing. These machines are able to automatically sew garments on a continuous basis without human operators.[14] "We used to cut by hand. Now we use machines. You needed 15 people before. Now you need only two".[15] Those two remaining people need a higher skill level. The others have to look for a new job.

In the past decades, the default approach of garment buyers facing margin erosion and price increases has typically been to shift their sourcing to lower-cost countries considered to be the next stop of the garment caravan.[16]Successful countries like China and Vietnam used the dramatic economic growth through the garment sector to invest in infrastructure, special economic zones, and, above all, human capital, which generated a high-quality labor force connected to the outside world.[17]With textile companies under pressure to step up their agility, there is also new focus on proximity sourcing and reshoring. Meanwhile, factors other than price – including strategic collaboration with suppliers and end-to-end process management – are becoming increasingly important considerations for sourcing executives.[18]

For many companies in the garment sector automation is imminent. In a survey, more than 60% of apparel companies believed that automation, and not labor cost, will be the major drive for sourcing decisions before 2025. Nearly all the others believed it would happen by 2030. Most of the sourcing executives, suppliers, and academics do not see the future as an either-or decision between automation and labor cost. Instead, both models will coexist in the medium term: labor-dependent, low-cost country sourcing will continue, while sourcing from (semi-)automated suppliers or from companies own automated factories will ramp up in parallel. This reflects the fact that adoption of automation is driven not just by technical feasibility but also by economic

12 Achim Berg et.al., The apparel sourcing caravan's next stop: Digitization, McKinsey Apparel CPO Survey 2017.

13 Sam Korus, Industrial Robot Cost Decline, ARK Invest, https://ark-invest.com/research/industrial-robot-costs, August 7, 2017.

14 Jae-Hee, Chang, Phu Huynh, Gary Rynhart, ASEAN in transformation : textiles, clothing and footwear: refashioning the future, International Labour Office, Geneva 2016.

15 Chethiya Jayakody, Chief Cxecutive of Universal Menswear, in: Mitsuru Obe, Bangladesh fights for future of its garment industry, Nikkei Asian Review, https://asia.nikkei.com/Business/Business-trends/Bangladesh-fights-for-future-of-its-garment-industry, November 04,2018

16 Achim Berg et.al., The apparel sourcing caravan's next stop: Digitization, McKinsey Apparel CPO Survey 2017.

17 World Bank. 2019. World Development Report 2019: The Changing Nature of Work. Washington, DC: World Bank.

18 Achim Berg et.al., The apparel sourcing caravan's next stop: Digitization, McKinsey Apparel CPO Survey 2017.

feasibility. So, even if the technology exists to enable automated production, its expected economic benefits may not outweigh its costs – and manual production in low cost countries may continue to be competitive. These findings suggest that automation of garment manufacturing has not yet reached the required benefits and return of investments to convince a large number of companies of its power as a trigger for re-shoring. Even pioneers in the field are skeptical, because the needed investment is still too high.[19]

Industry 4.0 will lead to Labor 4.0. Automation leads to less demand for manufacturing workers everywhere. Automation also changes the overall relationship between industrial employment and labor costs because it occurs faster in locations with high labor costs, assuming the incentive to reduce labor costs trumps other differences between locations.[20] On the one hand, increasing networking and automation is replacing jobs with robots, artificial intelligence and new machinery. On the other hand, the demands on highly qualified, i.e. the people who create and operate the automation technology and their availability on the labor markets are increasing. New jobs are created through digitalization,[21] but especially in the developing countries existing jobs are in danger. Digitally driven automation could cause up to two thirds of all jobs in developing countries to disappear.[22] With the digitalization of manufacturing developing countries lose their comparatively big advantage of cheap labor. If a product can be generated fully automatically by digitally controlled machines, there is no incentive to relocate production to low-wage countries anymore.[23] As the World Bank states: "When robots are cheaper than the existing manufacturing processes, firms become more amenable to relocating production closer to consumer markets".[24] Workers undertaking routine tasks are the most vulnerable to replacement.[25] The demand for advanced cognitive skills and socio behavioral skills is increasing, whereas the demand for narrow job-specific skills is waning. Meanwhile, skills associated with "adaptability" are increasingly in demand. This combination of specific cognitive skills (critical thinking and problem-solving) and socio behavioral skills (creativity and curiosity) is transferable across jobs. How well countries cope with the demand for changing job skills depends on how quickly the supply of skills shifts. Education systems, however, tend to resist change.[26] A significant part of the readjustment in the supply of skills is happening outside of compulsory education and formal jobs, e.g. company training or professional courses. Early childhood learning, tertiary education, and adult learning sought outside the workplace are increasingly important in building the skills that will be highly valued in future labor markets.[27]

19 Achim Berg et.al., The apparel sourcing caravan's next stop: Digitization, McKinsey Apparel CPO Survey 2017.

20 World Bank. 2019. World Development Report 2019: The Changing Nature of Work. Washington, DC: World Bank.

21 Jann Ravling, Was ist Industrie 4.0? Die Definition von Digitalisierung, September 4, 2018, https://www.wfb-bremen.de/de/page/stories/digitalisierung-industrie40/was-ist-industrie-40-eine-kurze-erklaerung.

22 Silvan Rehfeld, Digitalisierung in der EZ: Historische Chance für die Nachhaltigkeitsziele, Januar 31, 2019, http://blog.venro.org/digitalisierung-birgt-historische-chance-fuer-das-erreichen-der-nachhaltigkeitsziele.

23 Ausarbeitung Digitalisierung und Entwicklungspolitik, Deutscher Bundestag 2017, https://www.bundestag.de/resource/blob/525938/488ea79620fb0b4c452b42519f2afb37/wd-2-051-17-pdf-data.pdf.

24 World Bank. 2019. World Development Report 2019: The Changing Nature of Work. Washington, DC: World Bank.

25 Ibid.

26 Ibid.

27 Ibid.

Risks for the Cambodian Garment Sector and its Impact on the Economy

Cambodia is an emerging economy with a growing manufacturing sector, which is predominantly driven by the garment industry (textiles, clothing and footwear) and the low wages in this sector.[28] After the disaster of the Khmer Rouge and along with it the destruction of the Cambodian economy and infrastructure between 1975 and 1979 and the ensuing Civil War that lasted until 1998 the Cambodian economy had to catch up. And it did so quite successfully. Due to steady economic growth and macroeconomic stability, the GDP per capita more than tripled since 2005. Today Cambodia is a Lower Middle Income Country with a GDP per capita of 1,384.4 USD in 2017. At the moment there is a continuous economic growth of approx. 7.0% annually.[29] The industry sector, which contributed 33% of the GDP in 2017, is dominated by textile and leather. 800,000 employees generate approx. 75% of all export earnings. The garment sector also contributed indirectly to employment generation in retail, trade and transportation. The exports are totaling 8 billion USD in 2017. This strong focus on garment carries a big future risk, as vulnerable people in particular are heavily dependent on it. With the increase in the minimum wage from 80 USD (2012) to 170 USD (2018) Cambodia's competitiveness in this sector is already declining with respect to Sri Lanka, Bangladesh and Myanmar.[30]

The positive economic momentum does not carry over to the country's infrastructure which is mired in big problems. The degree of electrification is still low (60% in 2017). Cambodia already has some of the highest electricity rates in Southeast Asia, which makes industry, especially those in the electricity-dependent manufacturing sector, less competitive.[31] The system is not reliable.[32] Moreover, today's road infrastructure is still poor. Wide rural areas are barely reachable or difficult to access, especially during the rainy season. Therefore, these regions have a poor market connectivity and low development opportunities. The number of internet users per 1,000 inhabitants was 256 in the year 2016. The Population is steadily growing (1.5% in 2017). From the 16.0 million Cambodian in 2017 are 50% younger than 25 years. The Foreign Direct Investment was 2.0 billion USD in 2017, of which China has 70%. Cambodia still seems far away from the debt trap as there is a low government debt of approx. 36% of the GDP. The poor educational system leads to a lack of skilled workers.

Overall, the current Cambodian Economic Development shows a mixed picture: on the positive side are solid growth, declining absolute poverty, improved other social indicators, an economic friendly policy, the Dollar Economy, the Special Economic Zones, the macroeconomic stability and the demographic bonus. Nevertheless, there are still many problems: low level of development, weak economic infrastructure, poverty in rural areas, a high proportion of "near poor", high susceptibility to external interference especially the one-sided dependence on textile exports, and possible

28 ASEAN in Transformation, How Technology is Changing Jobs and Enterprises, Cambodia Country Brief, https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---act_emp/documents/publication/wcms_579672.pdf, April 2017.

29 World Bank, Data, https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KH&name_desc=true, Accessed June 18, 2019.

30 Jochen Saleth, Zur wirtschaftlichen Lage in Kambodscha, März 2019.

31 David Hutt, Why Hun Sen can't keep the lights on, Asia Times, April 3, 2019 https://www.asiatimes.com/2019/04/article/why-hun-sen-cant-keep-the-lights-on.

32 Ibid.

Photo credits: Image by ILO Asia-Pacific

withdrawal of trade preferences.

According to the International Labour Organization 88% of jobs in the garment sector are at high risk of being automated. This could impact almost half a million sewing machine operators who primarily perform repetitive and manual tasks.[33] The ILO estimated that 57% of all Cambodian workers (or over 4 million jobs) face a high risk of automation.[34] It is likely that specific segments of workers will significantly feel the impact including women, young workers and primary school graduates. Cambodian women are 50% more likely to be employed in an occupation at high risk of automation compared to men. Young Cambodian workers aged 15 to 24 are 10% more likely to having an occupation at high risk relative to adult Cambodian workers. Moreover, primary school graduates are 20% more likely to be in a high risk occupation than post-secondary graduates. Workers with lower education levels tend to perform manual and repetitive tasks that are automatable in nature; and just 89% of the Cambodian workforce completed primary schooling or less.[35]

For Cambodian companies it seems difficult to upgrade their own technology to catch up with the developments. Around one in four enterprises in Cambodia cited high fixed capital costs as the leading obstacle. Critically, one in five Cambodian enterprises blamed the lack of skilled workers who can operate the technology as the second largest barrier. This finding highlights significant skills gaps in Cambodia resulting from low education levels among the Cambodian workforce. Enterprises in Cambodia also reported that technology did not need to be upgraded. This could be re-

33 Jae-Hee Chang and Phu Huynh, ASEAN in transformation : the future of jobs at risk of automation, International Labour Office, Geneva 2016

34 Ibid.

35 Ibid.

lated to the fact that wage levels in Cambodia are relatively low compared to other countries in the region, and technology is perceived as being expensive. These findings, however, could change in the near future as technology costs decline while labor costs increase.[36]

Therefore, technology upgrade in the Cambodian garment sector is primarily occurring in enterprises that are connected to the global value chain, and work for big international retailers. Smaller and locally owned garment enterprises in Cambodia do not tend to engage in technology upgrade to the same extent as those fully integrated in the global value chain. Cambodia's labor productivity in the garment sector is among the lowest in ASEAN and represents only 22% of the level in Thailand's garment sector.[37] Garment production in Cambodia will be impacted by technology uptake both inside and outside Cambodia. Inside Cambodia, enterprises could automate labor-intensive production processes in order to raise labor productivity. Such increased automation will impact on more than 650,000 Cambodian workers whose jobs would be at high risk of automation. The majority of these workers would be young women with low education levels. In terms of skills requirements, growing automation would increase the demand for technicians and high-skilled workers who can operate new machinery.

Outside Cambodia, technology adoption by garment enterprises could reduce exports of the Cambodian garment sector. Main destination countries (such as the EU and the United States) and major regional competitors (including China) could increasingly incorporate automation into their most labor intensive production processes. Besides labor costs, offshoring also entails costs in terms of shipping, duty and reputational risks. If the total cost of incorporating automated sewing machines to automate labor intensive tasks proves to be more efficient than offshoring, retailers may increasingly re-shore garment production from Cambodia to destination countries. Additionally, technology adoption in garment factories in other Asian countries would result in less relocation of garment production to Cambodia, reducing the competitiveness of the garment sector.[38] This will altogether lead to a situation in which shares of manufacturing would go back to developed countries. The garment sector is additionally volatile as Cambodia is producing for international brands and almost all the owners of the factories are foreign. Just 1.4% of the factories are owned by Cambodians. The existing ownership structure and the "footloose" characteristics of the industry mean that garment factories can be relocated relatively quickly from Cambodia to more attractive countries if the sector faces a squeeze in profit margins due to rising input costs, higher taxes, less favorable preferential trade treatment or an economic slowdown of key export markets.[39]

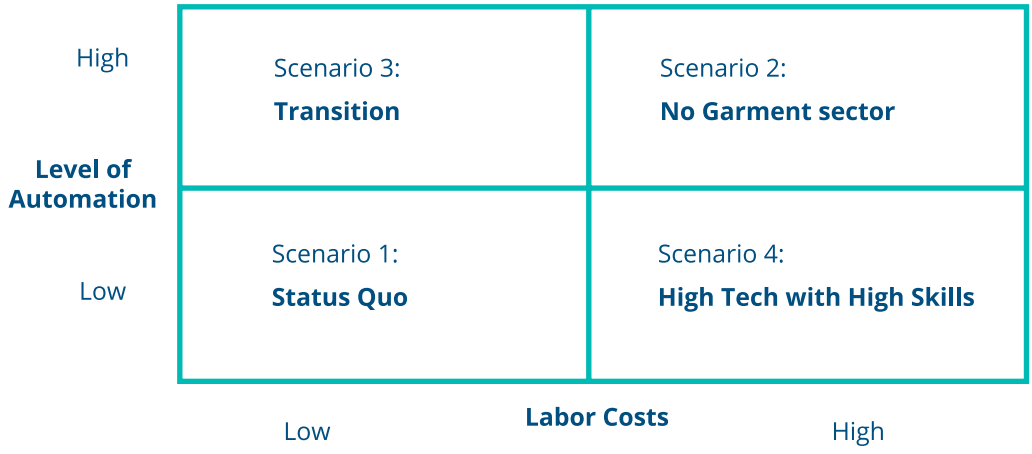
The arguments combined with the level of automation and labor costs can be used to predict the future of the garment sector in Cambodia. There are four likely scenarios for the sector as the following graph shows.

36 Ibid.

37 Ibid.

38 Ibid.

39 World Bank, Cambodia Economic Update, Enhancing Export Competitiveness: The Key to Cambodia's Future Economic Success, October 2016.



The first scenario reflects the status quo. This would imply that there is a future for the garment sector in Cambodia, thanks to the competitiveness through cheap labor. The investment in automation will be low. This would mean that wages are not getting higher in the future. Workers will keep their jobs, but without earning more money. However, because of global trends in the consumer market and on the production side of businesses this seems unrealistic. The contribution to Cambodia's wealth and growth will be limited.

In the second scenario there is a marginalized garment sector in Cambodia. Because of rising wages, a lack of automation and education, the Cambodian garment sector is losing its competitiveness and the garment production caravan is either moving to a country with cheaper labor or is fully automated and moving directly to customers in the developed countries. Just some small companies producing for local consumption will stay. There will be very limited contribution to the Cambodian GDP. The majority of the garment workers will lose their job.

The third scenario describes a crucial transition period. While wages are still comparably low, the investment in automation is already high. In this scenario the skills of the workers need to catch up quickly, because they have to be able to maintain the machines. In this scenario it is also possible that the whole sector is growing, as the competitiveness is very high.

The fourth scenario, a (fully) automated garment sector. The garment factories invest in automation as well as in the skills of their workers. The unqualified workers will lose their jobs, but the high qualified workers will have a much higher income. The contribution to the Cambodian GDP and wealth will be high. In this best case scenario there is also an opportunity for further growth, and more and better paid jobs in this sector if there is more investment in skills and infrastructure.

How to Get the Best Outcome?

As the garment sector is central to Cambodia's economy, this paper looks at it from the perspective of policymakers who have an interest to get the most positive outcome for the economy and the labor market of Cambodia. Policymakers can create the right framework for further investment and development in this sector to stop the garment production caravan from leaving the country.

Before potential ways forward are discussed another small elaboration is needed: How to answer to the pessimist's view that the garment sector is leaving Cambodia anyway as it happens in other countries, that it doesn't make sense to do anything to make them stay and instead focus on other sectors? Firstly, there is no immediate replacement for the low skilled jobs in the garment sector. Everything needs time: upgrading skills, building infrastructure, developing new business sectors. Secondly, strategic efforts to establish a (fully) automated garment sector will produce spillover effects on other sectors. The current obstacles are more or less the same for every industry in Cambodia: education, market access, infrastructure etc. Thirdly, the competitive advantage of cheap labor will not disappear overnight. Even if wages are increasing, it will take them a long time to match the high wages in developed countries. Maybe some production will be re-shored, but definitely not all of it. In the meantime, new markets, especially in ASEAN, could grow as well.

It is worth creating a competitive garment sector in Cambodia which will lead to an overall gain in the competiveness of the Cambodian economy. As the Global Competitiveness Index shows there is huge potential for further development as Cambodia ranks 110 out of 140 countries in 2019. There is room for improvement in all the measured fields.[40]

The following are the best areas which policymakers can influence to nurture a more competitive garment sector in Cambodia:

Education is the key to have a chance on the future job market. Unfortunately, the quality of Cambodian schools and universities doesn't hold up to international standards; according to a study in 2013, approximately 48% of fresh ICT graduates didn't have the skills to work effectively.[41] The Government of Cambodia seems to be aware of the need for better education, as a statement from Prime Minister Hun Sen in June 2019 shows: "The technological advancements of the Fourth Industrial Revolution will cause job losses but also create new ones. To retain their jobs, one needs to broaden technical knowledge and strengthen skills. (...) We have no choice but to boost capacity and skills in the workforce ".[42] There are several ways to achieve that. It starts with early education where the curricula have to be updated to catch up with the needed skills and more schools have to be build. Also the potential of Online Learning should be used more, especially in the rural areas.[43]

An analysis of the current situation in higher education reveals an alarming mismatch between education and employment: the most popular areas of study among Cambodian

40 Klaus Schwab, The Global Competitiveness Report 2018, World Economic Forum, http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf

41 Pheakdey Heng, Preparing Cambodia's Workforce

42 Voun Dara, PM: Workers must train for Industry 4.0, Phnom Penh Post, June 14, 2019, https://www.phnompenhpost.com/national/pm-workers-must-train-industry-40.

43 Ausarbeitung Digitalisierung und Entwicklungspolitik.

university students are social sciences and business related majors. Only a small percentage of students are studying science, engineering and agriculture, which are considered to be key skills to foster the growth of the Cambodian economy.[44] In addition, an international accreditation of the bachelor and master programs is needed. There ought to be more international exchange of students and researchers. With higher automation in the garment sector newer skills are required in the factories as the tasks are getting more demanding. More engineers and IT-experts are needed. Also further vocational training in the garment sector is crucial to upgrade the skill level of the workers. There are already initiatives from garment associations like the Cambodian Garment Training Institute which focus on skills development for e.g. garment construction experts (pattern making and adaptation); garment production engineers (manufacturing processes); apparel merchandisers (garment designers); and quality assurance specialists (quality controllers).[45] The government could boost, these initiatives to educate more workers. There is a high potential in the cooperation with Development Partners like Germany which have a high-quality vocational training system.

Universities should move from being purely teaching institutions to research institutions that drive innovation. Inventiveness is needed for modern economic development and for the garment sector.[46] Improved and more focused Research and Development will lead to more efficient processes in the factories and could create more businesses around the sector. This in turn could bring more parts of the value chain into Cambodia. Product Design could be one target for R&D to create Cambodian brands, produced in Cambodia, by Cambodian owned factories.

The biggest challenge is that Cambodia still lags behind in its ICT infrastructure within education due to the lack of trainers, network infrastructure and technological equipment. According to the Global Education Monitoring Report, only 8% of public primary and secondary schools have access to stable electricity in classrooms and only 7% were connected to the internet in 2014. Moreover, Cambodia also has a very low learner-to-computer ratio, where 500 or more secondary pupils shared one computer.[47] While higher education institutions are generally better equipped, the use of ICT tools in teaching and learning is still limited by regional standards.[48]In late 2015, the Cambodian government took its first steps in this direction when it piloted the New Generation School scheme – a program designed to advance STEM education. This initiative aims to help young Cambodian students build and improve their basic skills in relevant fields and to further prepare them for the newest waves of technology.[49]

Even if many improvements have been achieved in **infrastructure**, there still are severe problems that hinder economic growth. In today's garment sector, roads, rails and ports are crucial for exporting the goods. To

44 Pheakdey Heng, Preparing Cambodia's Workforce.

45 World Bank, Cambodia Economic Update, Enhancing Export Competitiveness: The Key to Cambodia's Future Economic Success, October 2016.

46 Silvan Rehfeld, Digitalisierung in der EZ

47 Pheakdey Heng, Preparing Cambodia's Workforce for a Digital Economy, Phnom Penh 2019, https://www.kas.de/documents/264850/264899/

48 Ibid.

49 Top Proleong, Higher education divide and Industry 4.0: A blessing or a curse for Cambodia's rural graduates?, Khmer Times, https://www.khmertimeskh.com/50620273/higher-education-divide-and-industry-4-0-a-blessing-or-a-curse-for-cambodias-rural-graduates, July 3, 2019.

Photo credits: Image by ILO Asia-Pacific

facilitate further automation and Industry 4.0, fast internet (mobile and fixed broadband) and reliable, affordable and accessible energy will become increasingly important. A solid digital infrastructure is the backbone of Industry 4.0, which requires big data from machines in the manufacturing process to communicate and work in real time with each other, with logistics and with customers.[50] With a highly competitive market, Cambodia has achieved a high rate of Internet coverage and access to the cheapest mobile Internet prices in the world. Cambodia could even roll out the 5G technology much faster than its neighboring countries.[51] However, there were just 117,049 fixed broadband subscriptions in June 2017. This is just over 1% of total Internet subscriptions in the country.[52]

Automation technology will lead to a higher **energy** demand.[53] This is a competitive disadvantage for countries with high energy costs like Cambodia. To improve the situation, the energy market should be liberalized and decentralized to give private energy providers the opportunity to feed into the grid and make the energy mix clean and sustainable. Large scale hydropower has been the focus for increasing generation capacity. However, an indefinite halt to starting construction on new hydropower projects has recently been implemented by the government due to the environmental and livelihood risks associated with large scale hydropower.[54] To use the potential of renewable energy

50 Reinventing Business through Disruptive Technologies, Sector Trends and Investment Opportunities for Firms in Emerging Markets, IFC, 2019, https://www.ifc.org/wps/wcm/connect/8c67719a-2816-4694-9187-7de2ef5075bc/Reinventing-business-through-Disruptive-Tech-v1.pdf?MOD=AJPERES.

51 Shaun Turton, Cambodia joins the 5G race despite concerns over cost and viability, Nikkei Asian Review, May 20, 2019, https://asia.nikkei.com/Spotlight/5G-networks/Cambodia-joins-the-5G-race-despite-concerns-over-cost-and-viability.

52 Leveraging Investments in Broadband for National Development.

53 Andreas Burkert, Wie die Digitalisierung den Stromverbrauch nach oben treibt, December 8, 2017, https://www.springerprofessional.de/energiebereitstellung/industrie-4-0/wie-die-digitalisierung-den-stromverbrauch-nach-oben-treibt/15255816

54 Pheakdey, Heng, Toward a low carbon

the grid has to be improved.[55] Unfortunately, Cambodia still lacks clear policies for the promotion and implementation of renewable energy and energy efficiency projects. The Cambodian government has acknowledged the importance of renewable energy in national development, but has yet to put in place the supportive policies needed to create the level playing field.[56]

There is a huge potential for growth if Cambodia could bring more stages of the global **value chain** into the country. Nowadays Cambodia mainly assembles imported materials and parts into finished products for exports. Cambodia's domestic supply chain and supporting industries for the garment sector are either insufficient or completely missing. The industry therefore uses raw materials, fabric and other inputs imported mainly from China. The focus on the cut-make-trim (CMT) stage of production is found to be financially and technologically undemanding and generally less profitable than other stages.[57] Cambodia needs the aforementioned improvements in skills and infrastructure plus the right fiscal, legal and political framework. The government could introduce smart policies to set capital and fiscal incentives to attract further investment. This would need a strategic alignment and law adaptations. To reduce volatility in the sector it is crucial to attract more Cambodian investments. It is likely that Cambodian owned factories are not joining the garment production caravan that fast and easily. A key for success could be, for example, to create local brands and designs in Cambodia and bring them to the market. Doing so could create a competitive edge instead of the high dependence on international brands. There should be a focus on educating designers and developing more creativity. This could lead to new market exploration and the development of new business models. This combined with the location of Cambodia in a growing region like ASEAN could also lead to new digitally enabled business models.

Access to markets and low tariffs for exports will be important as well. At the moment Cambodia is highly reliant on two markets: the USA and the EU. Therefore, Cambodia should not risk losing its trade preferences as a least developed country under the "Everything but Arms" scheme with the European Union, and even if the status will run out, in the long term perspective, as Cambodia is getting wealthier, it should already start to work on follow-up agreements, e.g. a free trade agreement like the one Vietnam signed with the EU in August 2018.[58] The impact of an EU-Vietnam FTA will be felt in Cambodia. The World Bank estimated in 2016 that the free trade deal could cost Cambodia $350 million in exports due to a "level playing field" being established between the two neighbors. The potential loss of Cambodia's own EBA deal with the EU could further impact garments, footwear and rice exports by as much as $650 million.[59] At the moment Cambodia profiteers from the "trade war" between the USA and China, because of the tariffs put on Chinese products by the

55 Bakovic, Tonci and Julia Heckmann. 2018. "IFC Thematic Brief 3: Disruption in Power." (Internal document). June. No.3, Page 3. Washington, DC: International Finance Corporation, World Bank Group.

56 Ibid.

57 World Bank, Cambodia Economic Update, Enhancing Export Competitiveness: The Key to Cambodia's Future Economic Success, October 2016.

58 European Commission, Vietnam, http://ec.europa.eu/trade/policy/countries-and-regions/countries/vietnam/, Accessed June 18, 2019.

59 Hun Sirivadh, Industries Further Jeopardized by EU-Vietnam Trade Deal,VOD, https://en.vodhotnews.com/industries-further-jeopardized-by-eu-vietnam-trade-deal, July 2, 2019.

USA. It could even further benefit as Chinese investors are looking for alternative countries for manufacturing.[60] But, like with the EBA, Cambodia should not risk its trade relations with the USA, because 38.2% of the exports go to the EU and 22.7% to the USA.[61] Political tensions between Cambodia and USA and the fact that Chinese owned garment companies are relabeling Chinese goods with "Made in Cambodia" to avoid tariffs are a potential risk.[62] There are also opportunities through the ASEAN Economic Community. Cambodia's trade increased exports to the ASEAN market to 10% in 2017. Although the percentage remains low, the ASEAN market holds great potential for Cambodian exporters since the region is booming.[63] With fast growing economies in the direct neighborhood, the potential new customers for the products of the garment sector are coming closer to Cambodia. This will also reduce transport and logistics costs.[64]

In the long run Cambodia needs **diversification** to become less dependent on one sector. The Cambodian government is aware of this and aims to diversify towards the processing industry, mainly employment-intensive light industries with export potential such as electronics and automotive parts. But the process is difficult due to, again, very high energy prices and the lack of skilled workers. Therefore, there is no short term solution other than to work in and around the garment sector. If Cambodia is successful in creating a (fully) automated garment sector, it can trigger many spillover effects on other sectors. This means making the garment sector more efficient, increasing the demand for skills and bringing more parts of the value chain into Cambodia. One factor that increases the spread of disruptive technologies is their ability to reduce costs. Many of today's disruptive technologies are not capital intensive, which lowers new firms' barriers to entry.[65]

Finally, technology itself could bring new solutions to old problems in Cambodia e.g. curb corruption and its high economic and political costs. Paying bribes to authorities could be prevented if administrative matters are performed by the citizen on the internet, via text message or app.[66] **E-government** could be used to expand the value chain in Cambodia, attract new investments, diversify, improve access to markets by making admin processes easier for garment businesses and facilitating investment processes through apps or websites. But the development of e-government has stalled.[67] Digital technologies could provide and improve the **financial services**. Financial technology (or FinTech) can allow people, businesses, and governments to pay

60 Hor Kimsay, US China trade war boosts Cambodian export products, Phnom Penh Post, November 7, 2018, https://www.phnompenhpost.com/post-depth-business/us-china-trade-war-boosts-cambodian-export-products.

61 European Commission, European Union, Trade in goods with Cambodia, https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_cambodia_en.pdf, Accessed June 18, 2019.

62 US fines firms transhipping via Cambodia to dodge Trump's China tariffs, Bangkok Post, https://www.bangkokpost.com/world/1697988/us-fines-firms-transhipping-via-cambodia-to-dodge-trumps-china-tariffs, June 19, 2019.

63 ASEAN Statistical Highlights 2018, https://www.aseanstats.org/wp-content/uploads/2018/10/ASEAN-Statistical-Highlights-2018.pdf, Accessed June 18, 2019.

64 Chheang Vannarith, After 20 Years, Cambodia Has Reaped Benefits from ASEAN. Reporting Asean, Phnom Penh, January 3, 2019, http://www.aseannews.net/20-years-cambodia-reaped-benefits-asean.

65 Reinventing Business, 2019.

66 Ibid.

67 UN E-Government Knowledge DataBase, UN-DESA, https://publicadministration.un.org/egovkb/Data-Center.

and transact digitally[68] In addition to improving access to financial services and eliminating cash-related losses, this should also lead to greater transparency ensuring corruption is no longer possible.[69]

Conclusion

The Cambodian garment sector is at high risk of disappearing in the future because of the negative side-effects of Industry 4.0. The consequences for the economy and the labor market will be severe. Many jobs will disappear in this sector. New jobs will need to be created. There is a lot of work to do, but there is no alternative. It will be crucial to focus on the improvement of the competitiveness of the garment sector and the whole economy. Luckily there is awareness of the risks to the Cambodian garment sector from technological disruption in the government. Considering that Cambodia is heavily reliant on this sector, it is important to keep the sector competitive to avoid significant setbacks in socio-economic development. Policymakers, employers and training institutions need to work together in order to improve the skills of the workforce. Promoting academic pursuits in STEM will be vital in meeting the higher skill demands required to maintain and run automated machines, particularly among young women who would be greatly impacted by technology uptake in the Cambodian garment sector.[70] Education has always been crucial for innovation and economic development, as well as infrastructure. Transport routes like roads are still important, but things like fast glass fiber internet or a 5G mobile connection are additionally required to allow connected machines which need to transfer big amounts of data just in time. Also the value of each infrastructure might change. The reliability and the price for energy are already crucial today when it comes to global competition, but automation will provide even more benefits to those economies with the lowest energy costs. Digital transformation is a chance to catch up, but the old hard ingredients for economic success like education and infrastructure are still essential. Like industrialization or globalization, digitalization is a global process that is not consistent and produces different results under different circumstances. This applies to every area of business, industry, health and governance. Digitalization must be shaped politically to avoid the negative effects of disruption. How this happens and the implications of this are issues for which there can be no unequivocal, appropriate answer.[71] If the goal is positive change, then there is no time to loose, because “in the new world it is not the big fish which eats the small fish, it’s the fast fish which eats the slow fish”.[72]

68 Reinventing Business, 2019.

69 Ibid.

70 ILO: ASEAN in transformation: Perspectives of enterprises and students on future work.

71 Ibid.

72 Ryan Clark, A Guide To Building A Serverless Platform, Forbes, October 31, 2018, https://www.forbes.com/sites/forbestechcouncil/2018/10/31/a-guide-to-building-a-serverless-platform/#5a111eb42f10.

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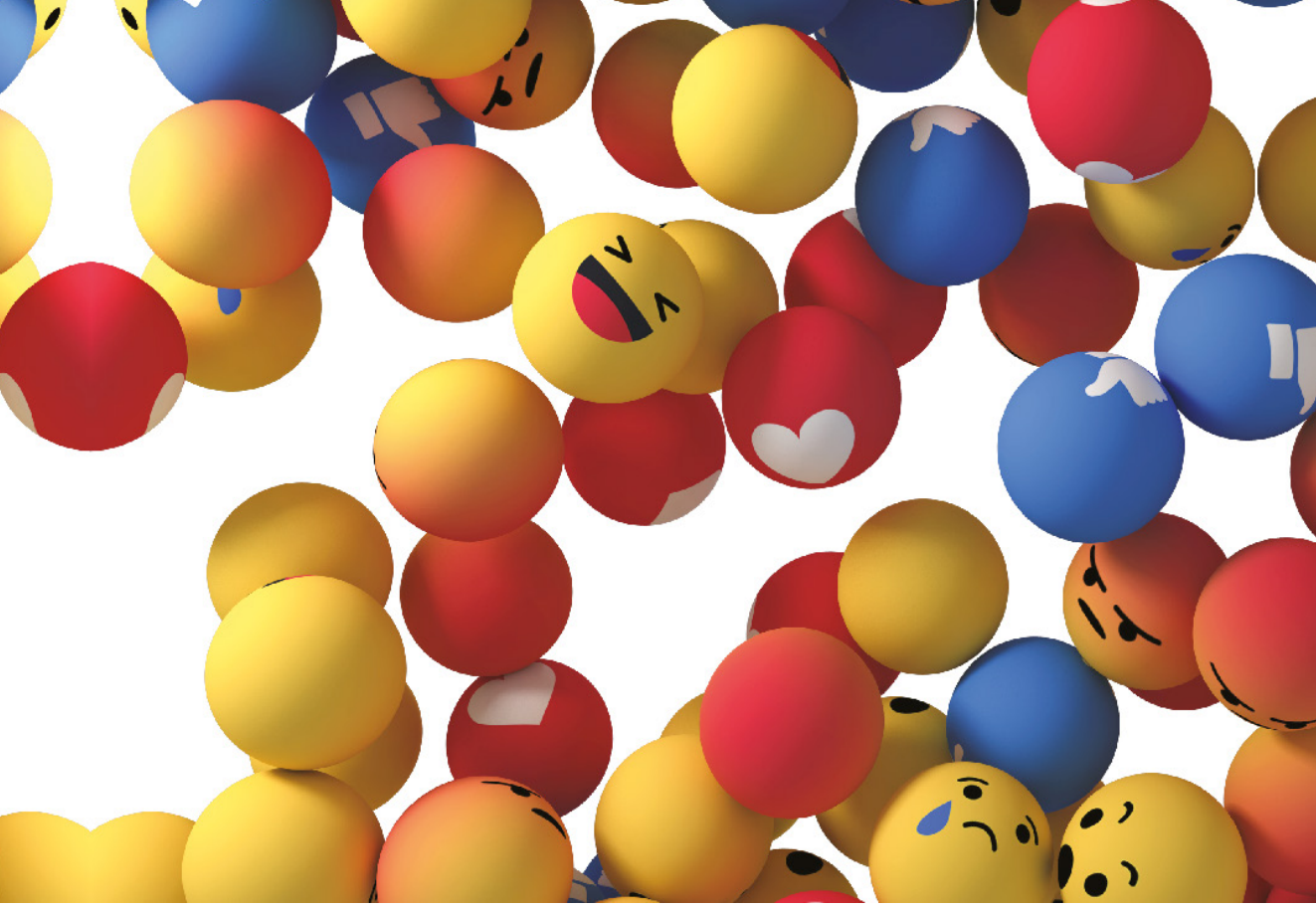
Promoting Better Governance Through Facebook: A Pilot Study and Analysis

Makara Vorn[1] and You Y Ly[2]

1 Makara Vorn studied her bachelor's degree at Department of Media and Communication (DMC), and she graduated in 2012. After her graduation, she was employed by the Australian Broadcasting Corporation (ABC) from 2012-2015 to implement the Cambodia Communication Assistance Project (CCAP) prior to her master's degree in Australia in 2016. Mid 2018, Makara graduated from RMIT University, Melbourne, Australia, specialization in media and communications. Immediately after her graduation, she was commissioned by her former workplace, ABC, to work as a media research consultant producing two Endline reports of the CCAP. Makara used to work as a National Communication consultant for UNDP to support the building an enabling environment for sustainable development project in Cambodia (BESD). Currently Makara is working for United Nations Educational, Scientific, Cultural Organization (UNESCO) implementing "Access to Information "project.

2 Prior to graduating from the University of Applied Sciences Bonn-Rhein-Sieg at the University of Bonn, Germany in 2017, You Y Ly worked as the Assistant Lecturer at the Department of Media and Communication at the Royal University of Phnom Penh for two years. After this she worked as a Radio and TV Production Lecturer and a Documentary Film Director and Producer in a local media production company. She has produced numerous documentaries focusing on social issues such as the Khmer Rouge Regime, environment, agriculture and poverty in Cambodia. Her latest academic publication is published in the book of Viability of Alternative Online News Media Organizations in Developing and Transformation Countries. Currently she works as a Communications Officer at Saorsa SEA Co., Ltd, a Microsoft partner company, in Cambodia.



Abstract

Facebook has become the most popular social media platform in Cambodia. This study collects primary data to examine how Facebook can give Cambodian users a chance to demand better governance in terms of public services, as well as how the government can solicit public feedback through the platform. A pilot survey of 150 respondents, mostly from Phnom Penh, shows how Facebook can enable communication between government and citizens. Most respondents in the sample use Facebook to consume or share news, but also to express their opinions and ask for more action from the government. To a certain degree, this can give citizens a means to hold their government to account, but the government currently appears not to be very responsive, probably due to the lack of decision-making from higher-level officials, and the lack of attention and interest. A potential solution could be to establish a dedicated governmental committee that gathers and addresses the concerns of the citizens. This pilot study can be used as the basis for a larger scale national survey.

Introduction

Facebook has become one of the most influential social media platforms[3] and number one source of information in Cambodia,[4] with 6.8 million users[5] in 2018 (considering a total population of 16 million). The vast majority of Cambodians use this platform for information consumption, staying in touch with friends and family, entertainment[6] and expressing their opinions.[7] As Facebook allows the rapid transmission of information and allows users to express their opinions freely, some Cambodians have used this social media network to criticize government actions around social issues and public service delivery, something hardly done offline, as well as to demand accountability from the government, which is crucial to better governance.

The recent case of a dirty road in Siem Reap, which was reported on Facebook and attracted many comments, sparked a public outcry questioning the provincial governors' accountability.[8] That resulted in a response from the authorities who took action to clean the road.

The Konrad Adenauer Stiftung (KAS), in a study of Uganda, has also argued that social media use can influence the processes of governance and increase the government's attention to citizens' comments.[9] However, research suggests that while social media can enhance good governance there is no concrete evidence explaining how it is done.[10] Diamond points out that Internet access allows users to scrutinize government and encourage political participation, but the government can still control their users' actions - China being a leading example.[11]

Therefore, this study aims to investigate how Facebook can help hold government officials to account, and to examine what government officials do to solicit Cambodians' comments through Facebook. The motivations of users posting concerns in relation to public service delivery will also be surveyed in this research. The paper consists of a literature review, a discussion of the methodology, the data collection and its limitations, an analysis of the findings and recommendations.

Context and Literature Review

Extensive research has been done on the links between the use of social media and better

3 Joseph Soh, "Cambodia's 2017 Social Media & Digital Statistics," Geeks in Cambodia, February 9, 2017, http://geeksincambodia.com/cambodias-2017-social-media-digital-statistics/?fbclid=IwAR2F9MuL0x50j2QaBHR3SK_eOpcZEh_KWS1tCYfDy9iDjDW5_CZCP2zHTBE (accessed on April 11, 2018).

4 Kimchhoy Phong and Javier Solá, "Mobile Phone and Internet in Cambodia 2015," (Phnom Penh, Open Institutes, Development Innovations and The Asia Foundation, November 2015), https://asiafoundation.org/resources/pdfs/MobilePhonesinCB2015.pdf?fbclid=IwAR05HdD8ChjsEQPWMgYoWGh_M9L7r75DvZIlJsY-giWuj53lMQLRmmTeXHc

5 Joseph Soh, "Cambodia's 2017 Social Media & Digital Statistics".

6 Phong and Solá, "Mobile Phone and Internet in Cambodia 2015".

7 Menghun Kaing, "What Does Facebook Reveal About Public Opinion in Cambodia?" (The Asia Foundation, January 13, 2016) https://asiafoundation.org/2016/01/13/what-does-facebook-reveal-about-public-opinion-in-cambodia/

8 Mony Koh, "Siem Reap Provincial Governor's Response to Dirty Road." Koh Santepheap, February 24, 2019, https://news.kohsantepheapdaily.com.kh/article/734612.html?fbclid=IwAR3UYwp-7onrIgRUGWGAw8QeKxkjvr2RMfsIztDKtU21V76Y4RGNFNtwdX8 (accessed May 5, 2019).

9 Mathias Kamp, ed., Reality Check: Assessing The Impact of Social Media on Political Communication and Civic Engagement in Uganda, (Kampala, Konrad Adenauer Stiftung, January 2016), https://www.kas.de/c/document_library/get_file?uuid=95eec5bf-c11c-c4eb-f504-90a4e5a4d54d&groupId=252038

10 Evie Browne, "Social media and governance," Applied Knowledge Services, January 28, 2015, https://gsdrc.org/publications/social-media-and-governance/ (accessed on May 5, 2019).

11 Larry Diamond, "Liberation Technology," Journal of Democracy 21, no. 3 (2010): 69-83.

governance around the world. Social media can potentially become a medium for users to join different kinds of participatory activities, leverage policy engagement and demand transparency and accountability from the government. The section below outlines literature that explains the role of social media in enhancing governance, examples thereof from around the world, the negative impact of social media, the concept of governance and public service delivery, including cases of Cambodians using Facebook in this regard.

Social Media and Governance Around the World

Social media is a convenient and effective tool to interact with the government and abet the process of information flow, for example in India.[12] It can also help hold the government to account through the expression of opinions.[13] It empowers users to speak and also allows anyone to access extensive information.[14] Valenzuela, Kim and de Zúniga claim that expressing opinions on public issues remains important for democratic society as it empowers political engagement.[15] Charru contends that social media has significantly impacted citizens' mobilization and leads governments to be more citizens-centric while eliminating and fostering transparent governance.[16]

Kim further claims that Facebook users who have a high level of political knowledge appear to get involved in political discussions by expressing their opinions, while those with weak and moderate knowledge are less likely to express their minority views.[17] Evie lists five ways in which social media can impact governance: through political participation, transparency and accountability enhancement, peacebuilding, private sector participation, and internal governance monitoring.[18] In Uganda, social media plays a crucial tool at enhancing free speech and freedom of expression without fears or censorship, which is a sign of improving governance in the country.[19] Noida also claims that the current emerging and modern technology has facilitated communication between government and citizens.[20] The government can have two-way interactive communications with citizens by disseminating certain information and gathering useful feedback to improve their governance and to create new initiatives.[21] Bertot et al. also point out that many countries use social media and information-communication technology (ICT) to promote government transparency and re-

12 Charru Malhotra, "Role of social media in Promoting Transparency in an Open Government Era in SAARC Countries with Special Reference to India," Improving Public Policy in the Digital World, Vol. 2 (2015), http://ojs.imodev.org/index.php/RIDDN/article/view/153/228

13 John Bertot, Paul Jaeger and Justin Grimes, "Promoting transparency and accountability through ICTs, social media, and collaborative e-government," Transforming Government: People, Process and Policy, 6(1), (2012): 78-91.

14 Jonathan Obar A. and Steve Wildman, "Social media definition and the governance challenge: An introduction to the special issue," Telecommunications Policy, 39(9), (2015):745-750.

15 Sebastián Valenzuela, Yonghwan Kim and Homero Gil De Zúñiga, "Social networks that matter: ~ Exploring the role of political discussion for online political participation," International Journal of Public Opinion Research, 24 (2012): 163e184.

16 Charru Malhotra, Vol. 2 (2015).

17 Kim Mihee, "Facebook's Spiral of Silence and Participation: The Role of Political Expression on Facebook and Partisan Strength in Political Participation." Cyberpsychology, Behavior and Social Networking 19, no. 12 (2016): 696-702.

18 Browne, "Social media and governance"

19 Maureen Agena, Donnas Ojok and Tony Achol, "Social Media, Local Governance and Development in Uganda," (Uganda and South Sudan , Konrad-Adenauer-Stiftung, January 2019).

20 Elets News Network, "Leveraging social media-generated content for better governance," (Egov, Jan 8, 2015), https://egov.eletsonline.com/2015/01/leveraging-social-media-generated-content-for-better-governance/, (accessed July 2, 2019)

21 John Bertot, Paul Jaeger and Justin Grimes, "Promoting transparency and accountability through ICTs, social media, and collaborative e-government".

duce government corruption.[22] Downey and Matthew found that social media and web technologies enable users to address problems of public service system and improve it. The study claims that more young adults use online platforms for political purposes and this can contribute to inform political decision makers. They don't just influence public policy but can also uncover hidden corruption through social media.[23] Indian citizens use social media including Facebook, Twitter and Instagram to exercise their freedom of expression and speech, to share their comments on politics and to reach out to politicians.[24] However, social media companies have the authority to delete or block any content if there is a government interruption.[25]

Drawbacks of Social Media

Despite its positive aspects discussed above, social media also has a number of drawbacks. Lui, Rui and Cui argue that expressing political opinions on Facebook attracts judgement and possibly criticism from friends, which might impose a spiral of silence.[26] Some users receive threats after expressing their views on Facebook. One Cambodian opposition activist was detained after he was accused of insulting the government.[27] This shows that Facebook can also affect people's lives in situations where governments tend to suppress the freedom of expression. This might frighten citizens who would otherwise voice their opinions in Cambodia.

Social media can also affect users' privacy, security and even their health. As a study suggests, negative consequences may include privacy abuse, cyberbullying and fake news.[28] Cyberbullying is one of the most common concerns.[29] This can possibly worsen anxiety, depression and sleep deprivation among young adults.[30] Furthermore, a report described how social media fraud has increased by 48% in 2018 on platforms like Facebook, Instagram and Whatsapp.[31] At the same time, young adults have raised concerns about personal privacy and security when using Facebook. Evidence shows that the disclosure of personal information on social media might pose a risk to users, as many strangers can identify and

22 John Bertot, Paul Jaeger and Justin Grimes, "Promoting transparency and accountability through ICTs, social media, and collaborative e-government".

23 Seyoum Mengist Ayalew, "Roles of social media for good governance and democracy: Literature review and personal observation in Horn of Africa," Foodsecuritysm, April 3, 2017, https://foodsecuritysm.wordpress.com/2017/04/03/role-of-social-media-for-good-governance-and-democracy-literature-review-and-personal-observation-in-horn-of-africa/ (accessed on May 6, 2019)

24 Dr. Guna Graciyal and Dr. Deepa Viswam, "Freedom of expression in social media: A political Perspective," International Journal of Multidisciplinary (03), (2018).

25 Downey, Ed, and Matthew A. Jones. "Public Service, Governance and Web 2.0 Technologies: Future Trends in Social Media." 1-369 (2012). doi:10.4018/978-1-4666-0071-3

26 Yu Liu, Jian Raymond Rui and Xi Cui, "Are People Willing to Share Their Political Opinions on Facebook? Exploring Roles of Self-presentational Concern in Spiral of Silence." Computers in Human Behavior 76, (2017): 294-302.

27 Joshua Lipes, "Cambodia court detains opposition activities over Facebook post," Radio Free Asia's Khmer Service, January 2, 2019, https://www.rfa.org/english/news/cambodia/detention-02012019162641.html, (accessed July 1, 2019).

28 Christian V. Baccarella, Timm F. Wagner, Jan H. Kietzmann, Ian P. McCarthy, "Social media? It is serious! Understanding the dark side of social media," European Management Journal (36), (2018)

29 Mcbride, Deborah L, "Risks and Benefits of Social Media for Children and Adolescents." Journal of Pediatric Nursing (26), (2011)

30 Levenson, Jessica C. ; Shensa, Ariel ; Sidani, Jaime E. ; Colditz, Jason B. ; Primack, Brian A. "The association between social media use and sleep disturbance among young adults," Preventive Medicine (85), (2016).

31 Indo-Asian News Service, "Social Media fraud increased 43% in 2018: Report," The Economic Times, April 29, 2019, https://cio.economictimes.indiatimes.com/news/social-media/social-media-fraud-increased-43-in-2018-report/69089585, (accessed July 1, 2019).

contact those users directly.[32] [33] In early 2019, Facebook suffered a leak of more than 540 million records of user' data[34] and the chief executive officer of Facebook, Mark Zuckerberg, is under a criminal investigation for the data breach of more than 87 million people.[35] A new study also finds that social media can strongly affect the mental health of adults as they get addicted and distracted by the multitude of online content.[36]

Finally, fake news has also been a concern, especially in the USA after the 2016 election. It is suggested that people will believe fake news by their favored political candidate.[37] Nagi points out that social media users appear to believe fake news and share it widely across their accounts, which contributes to spreading misleading information.[38]

32 Nosko, Amanda ; Wood, Eileen ; Molema, Seija, "All about me: Disclosure in online social networking profiles: The case of FACEBOOK," Computers in Human Behavior (26), (2010).

33 Taraszow, Tatjana ; Aristodemou, Elena ; Shitta, Georgina ; Laouris, Yiannis ; Arsoy, Aysu, "Disclosure of personal and contact information by young people in social networking sites: An analysis using Facebook profiles as an example," International Journal of Media and Cultural Politics (81), (2010).

34 Colin Lecher, "Facebook app developers leaked millions of user records on cloud servers, researchers say," 03 April 2019, https://www.theverge.com/2019/4/3/18293978/facebook-app-developers-leak-user-records-data-cloud-servers, (accessed 01 July, 2019).

35 Margi Murphy, "Millions of Facebook user records exposed in data breach," Telegraph, April 3, 2019, https://www.telegraph.co.uk/technology/2019/04/03/millions-facebook-user-records-exposed-data-breach/, (accessed 1 July, 201).

36 Alice G. Walton, "New studies show just how bad social media is for mental health", Forbes, 16 November 2018, https://www.forbes.com/sites/alicegwalton/2018/11/16/new-research-shows-just-how-bad-social-media-can-be-for-mental-health/#52d97d3c7af4, (accessed July 1, 2019).

37 Allcott, Hunt ; Gentzkow, Matthew, "Social Media and Fake News in the 2016 Election," Journal of Economic Perspectives (31), (2017).

38 Kuldeep Nagi, "New Social Media and Impact of Fake News on Society" (June 6, 2018). ICSSM Proceedings, July 2018, Chaing Mai, Thailand, pp. 77-96, https://ssrn.com/abstract=3258350, (accessed July 1, 2019).

Definitions of Governance

The United Nations Development Programme (UNDP) defines governance as "the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences".[39]

According to the Ministry of Interior in Cambodia, governance is "a way that governmental organizations and institutions use to manage economic social work and security to serve benefits of citizens." The eight principles of governance are participation, law, transparency, consensus, equity, effectiveness and efficiency, accountability and responsiveness.[40]These principles are taken into account every time the government implements any public activities. The purpose of good governance is to manage economic and social affairs, as well as crises in a way that maximizes the benefits to the public.

The World Bank defines governance as "the method through which power is exercised in the management of a country's political, economic and social resources for development".[41]

39 United Nations Development Programme, "Governance for sustainable human development," (New York, UNDP policy document, 1997), https://www.un.org/millenniumgoals/pdf/Think%20Pieces/7_governance.pdf, (accessed May 4, 2019).

40 Ministry of Interior, "Good Governance", (Phnom Penh, Ministry of Interior, February 2013).

41 The World Bank, "Good Governance: An Overview," International Fund for Agricultural Development, (Executive Board – Sixty-Seventh Session Rome, September 8-9, 1999), https://www.ipa.government.bg/sites/default/files/pregled-dobro_upravlenie.pdf, (accessed May 4, 2019).

Canada's Institute of Governance offers another general definition: "Governance is the process whereby societies or organizations make important decisions, determine whom they involve and how they render account".[42]

Drawing on the above literature, good governance is defined in this study as "A way that the governmental organization or officials service citizens with accountability and transparency".[43]

Public Service in Cambodia

According to the Ministry of Interior, public service refers to "all activities implemented by governmental institutions and private, civil society, or non-governmental organizations (working under government control or governmental agencies), aiming to serve citizens".[44]

There are seven types of public service:[45] (1) legal administration services, (2) social and public security, (3) justice and arbitration, (4) trade and small medium enterprises, (5) social affairs, (6) physical infrastructure, and (7) budget management. These are briefly defined below:

- Legal administration: services provided exclusively by governmental institutions or legal entity of public law.
- Social and public security: all services provided to citizens to ensure public safety including living, traveling and staying.
- Justice and arbitration: resolving disputes between citizens, or between citizens and local authorities/governmental officials, citizens and the private sector, or governmental officials and private sectors.
- Trades: small and medium enterprises, investment environment, and private sectors involving in building and maintaining infrastructure
- Social affairs: services provided to having equal access to education, equal study accessories, hygiene and health services.
- Physical infrastructure: road, bridge, water way, pot, dam, airport, public hospital, irrigation system, canal, clean water system, energy power, and so on and forth.
- Budget management: the transparent and accountable budget use for country development and also for services improvement.

This study will take into account these seven types as well as political participation and autonomous services to measure how Cambodians can promote better governance in public service delivery through Facebook.

Impacts of Facebook Use in Cambodia

Facebook is used for many different reasons: socializing, defining one's self-identity, consuming information, forming relationships[46]

42 Institute on Governance, "What is Governance?," https://iog.ca/what-is-governance/, (accessed May 3, 2019).

43 Institute on Governance, "What is Governance?".

44 Ministry of Interior, "Good Governance", 6

45 Ibid

46 Adam Joinson N., "Looking at, looking up or keeping up with people? Motives and use of Facebook, In proceedings of the SIGCHI Conference on Human Factors in Computing Systems, April 5-10, 2018, 1027–1036.

and simply discussing.[47] According to Phong & Sola, Cambodians use Facebook to consume news and information, to keep in touch with friends and family, for entertainment[48] and, finally, to express their opinions.[49]

In 2016 the Cambodian Prime Minister Hun Sen asked each government department to use Facebook pages to communicate and interact with citizens, especially to address citizens' complaints.[50] Since then, Facebook has been widely adopted by governmental organizations and the public to communicate with another.

Some Cambodians prefer using Facebook to voice their concerns regarding different problems such as poor governance, corruption, injustice, public service delivery and development issues. This is hardly ever done offline.

There have been several instances in which complaints started by Cambodian Facebook users by were addressed and resolved by the government after being brought to the public sphere, in addition to the case of the dirty road in Siem Reap mentioned earlier. A car accident that killed a motorcyclist caused an outcry on Facebook after a viral video of the incident was posted online. It resulted in the detention of the driver after Prime Minister Hun Sen ordered the urgent intervention of the police chief.[51]

After the drug bust at the Rock nightclub in early 2019, which led to the detainment of more than 300 youths, Facebook users pressured the government to detain the owner of the establishment, tycoon Kit Theang.[52]

The unprecedented tragedy in Sihanoukville in June 2019, when a seven-floor building collapsed and killed nearly 30 people, triggered serious criticism of the provincial governor, Yourn Min, with calls to resign.[53] Cambodian Facebook users condemned him, which contributed to his resignation being approved by the Prime Minister Hun Sen. However, the same story circulated across Facebook again after the government reappointed him to an even higher position at the Ministry of Interior - there is no action taken by the government.[54]

Based on these recent cases, it appears that the government's response to citizens' complaints on Facebook depends on the scale of the problems and the ability of the government to solve them. Problems linked to politics or the affairs of powerful governmental officials might not be resolved effectively.

47 O'Brien Deirdre and Torres Ann M., "Social networking and online privacy: Facebook users' perceptions," Irish Journal of Management, 31(2), (2012):63-97.

48 Phong and Solá, "Mobile Phone and Internet in Cambodia 2015".

49 Kaing, "What Does Facebook Reveal About Public Opinion in Cambodia?".

50 Ven Rathavong, "PM Says Facebook is good for Governance," Khmer Times, February 11, 2016, https://www.khmertimeskh.com/35661/pm-says-facebook-good-for-governance/, (accessed May 5, 2019).

51 Taing Vida, "PM Highlights Hit-and-Run that Kill Promising Young Student," Khmer Times, March 28, 2019, https://www.khmertimeskh.com/50591001/pm-highlights-hit-and-run-that-killed-promising-young-student/, (accessed May 5, 2019).

52 Eugene Whong, "Cambodian Authorities Arrest Business Tycoon Kith Theang After Drug Raid at His Nightclub," Radio Free Asia's Khmer Service, March 11, 2019, https://www.rfa.org/english/news/cambodia/kith-theang-arrested-03112019174512.html, (accessed May 22, 2019).

53 Sun Narin, "After Cambodia's Building Collapse, More Construction Sites Found 'Without License'," Voice of America Khmer, June 29, 2019, https://www.voacambodia.com/a/after-cambodia-s-building-collapse-more-construction-sites-found-without-license/4978044.html, (accessed June 30, 2019).

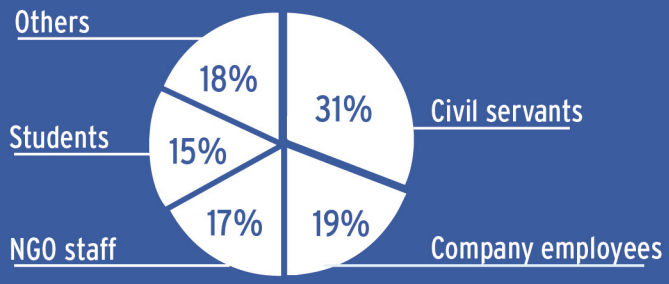
54 Joshua Lipes, "Cambodia Promotes Former Governor of Sihanoukville Who Resigned Over Fatal Building Collapse," Radio Free Asia's Khmer Service, June 27, 2019, https://www.rfa.org/english/news/cambodia/promotion-06272019170549.html, (accessed June 30, 2019).

Facebook: A Solution to Good Governance?

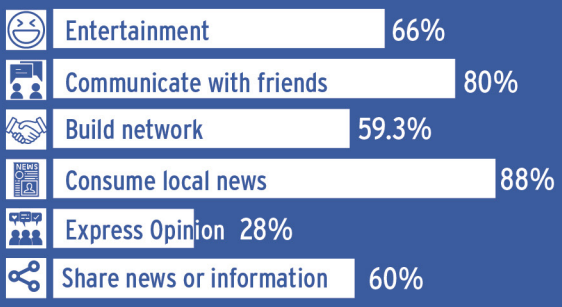
Can your voice have an impact through Facebook?

As Facebook allows the rapid transmission of information and allows users to express their opinions freely, some Cambodians have used this social media network to criticize government actions around social issues and public service delivery, something hardly done offline, as well as to demand accountability from the government, which is crucial to better governance.

Respondents background



Reasons for Facebook use



Content and Storyline: Makara Vorn & You Y Ly
Infographic Designer: Singhtararith Chea
Editors: Robert Hör & Ann-Cathrin Klöckner

Respondents acti public service del

Comment or criticize 43%

Share

Government resp

28% Received responses

6 Didn't res

Reasons why gov did not respond t

77% Beyond my capacity and responsibility

19 It's to p

Respondents beli

59% Facebook is a qui tool to spread ide

29% It's easier to voic than talking to th face-to-face.

26% Facebook makes powerful when m

DIGITAL INSIGHTS

KONRAD ADENAUER STIFTUNG

ons to improve livery

news or information
71%

Discuss with friends/family
59%

onse to respondents

3%
Receive ponse

9%
Received but not satisfied

ernment officials o citizen's comments

9%
elated olitics

45%
Issue is raised without proper evidence or is faked

eve that

ck and easy eas.

e concern over Facebook e local authorities

comments more any people see it.

Recommendations:

- Boost awareness of officials on how to use social media outlets to foster cooperation and communication.
- Optimize government's usage of digital outlets.
- Explore and cultivate new ways of communication.
- Increase transparency and develop a modern government-citizen relationship through the use of digital outlets.

facebook

73% of respondents expressed their concerns on Facebook

Methodology

In addition to reviewing global literature and recent cases in Cambodia, this study is complemented by an online survey conducted first-hand on Cambodian Facebook users. This enables researchers to gather raw data about the way Cambodians use Facebook as a medium to demand better governance and also explores how the Cambodian government officials solicit users' requests or criticisms.

Data Collection & Study Limitations

150 respondents participated in an online survey conducted from 6th May to 12th May 2019. Its 27 questions were drafted and published using SurveyMonkey. Prior to the official launch of the survey, four respondents participated in a test run to check the interface and the questions. A few questions were changed and simplified as a result of the test run. The ability to skip questions was added to all respondents who are not governmental officials. Respondents were selected through the Facebook networks of the researchers, the wider network and Facebook groups. The responses were then extracted from SurveyMonkey and analyzed using SPSS and Excel. To ensure accuracy, the data was cross-checked together with other people working in research.

The survey data is based on a relatively small sample size and it should also be noted that the majority of respondents were Facebook connections of the researchers, mostly based in Phnom Penh. Thus, the results cannot be generalized to the country and it would be useful to repeat the survey with a much larger sample size. A source of noise may be the fact that there is no proper verification of the identity and details of the Facebook users. Finally, there were no in-depth interviews of the government officials, which may limit the information on their perspectives on the matter, especially with regards to how they perceive and respond to citizens' feedback.

Survey Findings and Analysis

Respondents Demographics

Out of the 150 respondents, 63 are female and 87 are male (see Table 1). Around 55% of respondents are from age group of 15 to 30-year-old following by nearly 40% of people age between 31 and 46-year-old. While the remaining 5% are from age group below 15-year-old, 47 to 65-year-old and above 65-year-old (graphic).

Gender	Respondents	Percentage
Female	63	42%
Male	87	58%
Grand Total	150	100%

Table 1: Total Respondents and Gender Separation

Approximately 31% of the respondents are civil servants and 19% are company employees. The remaining 50% are students, freelancers or consultants, businessmen or - women and NGO staff. The majority of respondents are based in Phnom Penh while the others are from various provinces in Cambodia or Cambodians who are currently living overseas.

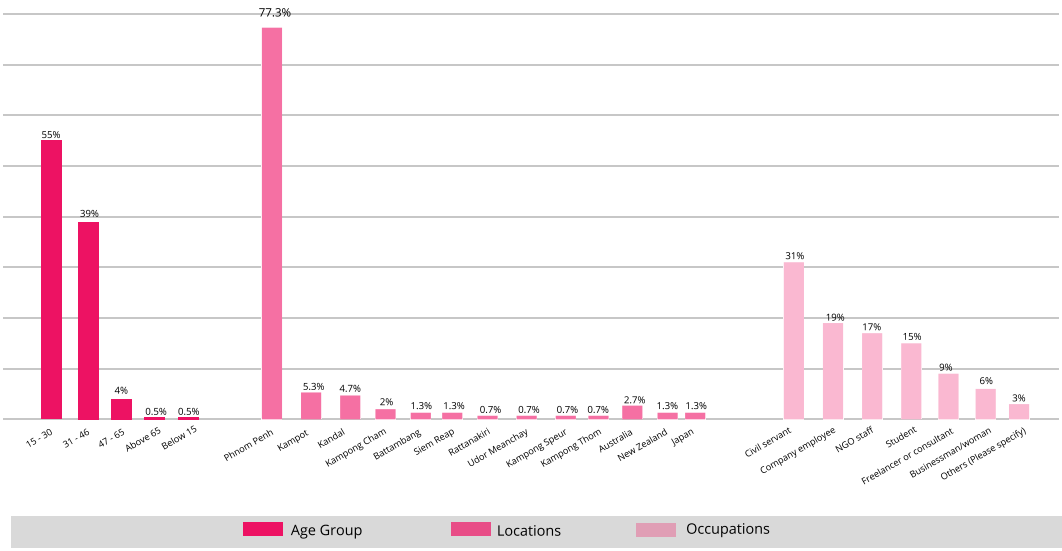


Figure 1: Age groups classification of respondents, Respondents' Locations and Respondents' Occupations

Governance and Public Service Delivery Knowledge

The majority of respondents answered correctly when asked about the definition of good governance. The figure shows that 83% of respondents answered correctly while only 17% is wrong. This seemingly reflects good knowledge in understanding the role of government in relation to good governance, but a low level of exercising citizen rights due to self-censorship or sensitive criticism.

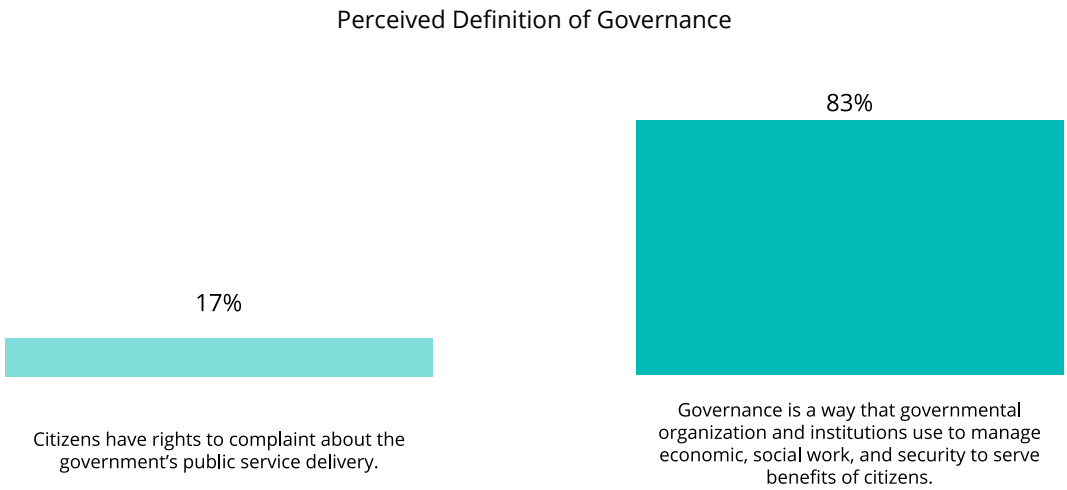


Figure 2: Perceived definition of 'Governance' by respondents

Citizens have rights to complaint about the government's public service delivery. Perceived Definition of Governance

Governance is a way that governmental organization and institutions use to manage economic, social work, and security to serve benefits of citizens.

Respondents were slightly less likely to define public service delivery correctly compared to the governance concept (only 77%). Although this is lower than governance it indicates good knowledge and understanding of public services delivery.

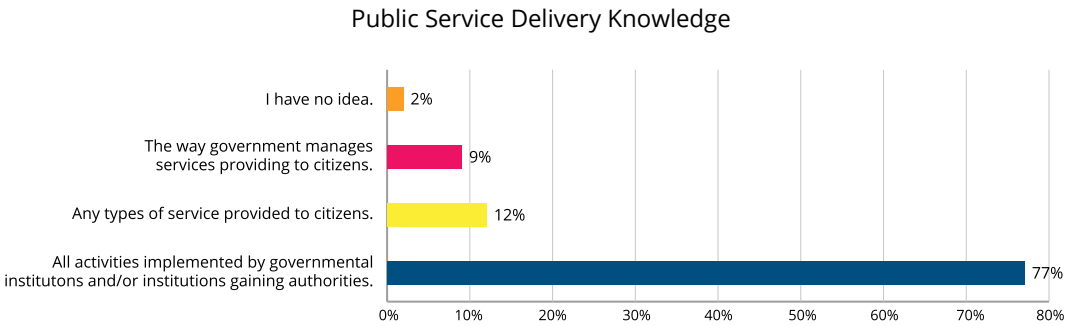


Figure 3: Perceived definition of 'Public Service Delivery' by respondents

Reasons for Using Facebook

Cambodians appear to use Facebook for various different reasons including entertainment, building family relationships, communicating with friends, building networks, sharing news and expressing their opinions. Among the selected reasons in the survey, news consumption is the leading activity for 88% of the total respondents, whereas expressing opinions and criticizing governance and demanding for better governance are each done by less than 30%.

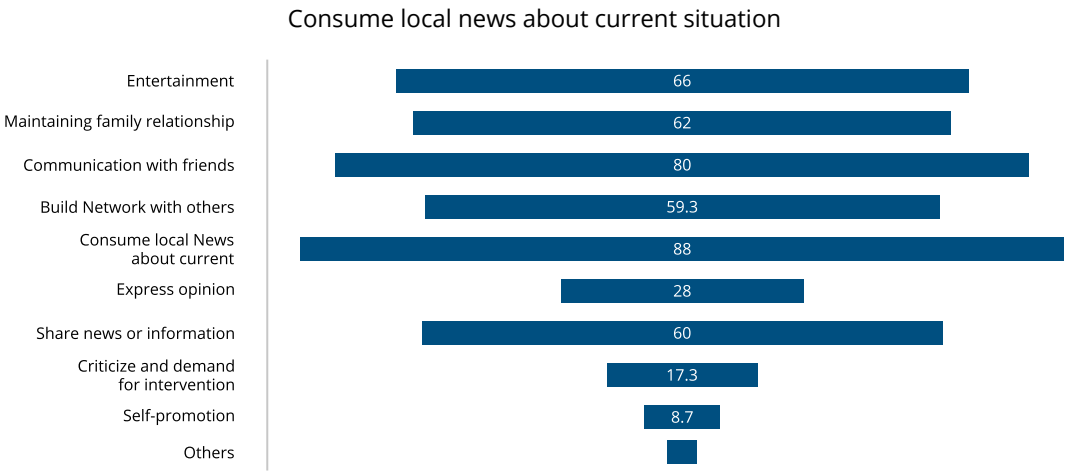


Figure 4: Consume local news about current situation

Within this sample, more than 60% of ordinary respondents are active in expressing their views on Facebook, whereas civil servants are notably less at 38%.

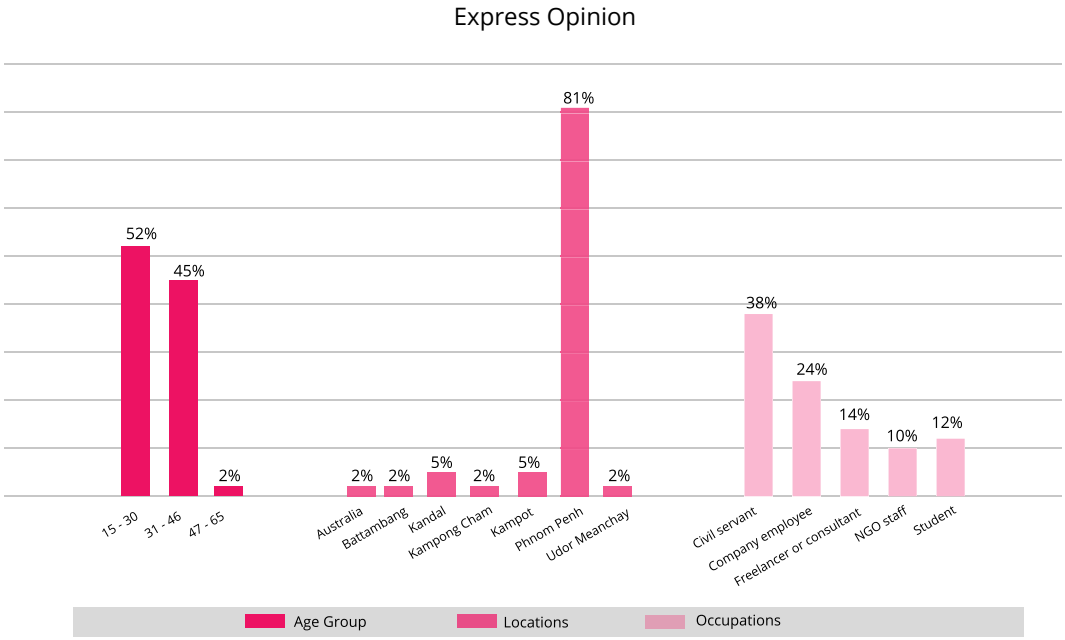


Figure 5: Demographic of Respondents who express opinion.

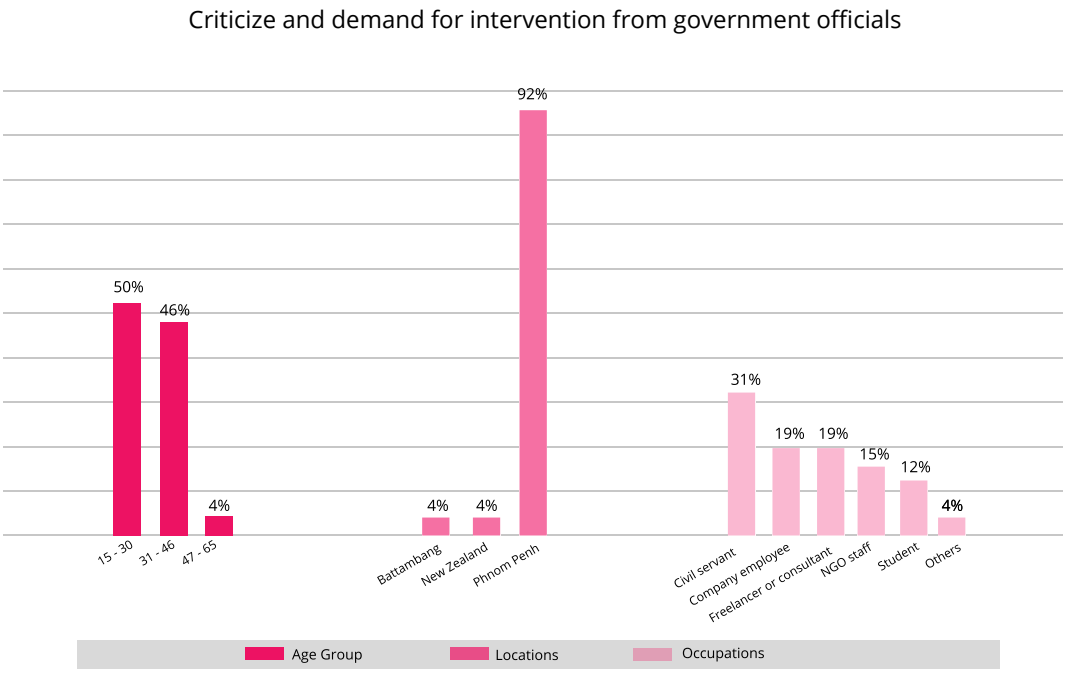


Figure 6: Respondents who criticize the government.

Reasons for Using Facebook to Express Opinions on Governance Issues

Most respondents use Facebook to voice themselves because they perceive it as a quick and easy tool to spread their ideas (59%), as well as a convenient medium for them to express concerns to local authorities (29%), or simply to share their concerns (26%).

Reasons Using Facebook to Voice	%
Facebook is a quick and easy tool to spread my ideas	59%
Facebook enable me to express my concern or opinion so it's easier than talking to the local authorities face-to-face.	29%
I want a lot of people to hear my comment on Facebook so it will make my comment even more powerful in order to pressure the government or local authorities to solve the issue.	26%
I can release stress and my unpleasant feeling on Facebook	13%
Others	6%

Table 2: Reasons to use Facebook for opinion expression

Using Facebook to Hold Government to Account on Public Service Delivery

Table 3 shows that the survey respondents appear to use Facebook to demand better public services delivery by consuming and sharing news/information on it (71%), by participating at events (44%), and by voicing their opinions to constructively criticize the governmental officials' works and request for positive changes (43%). Some respondents also discuss with friends (39%), update their status (28%) and discuss with family (20%).

These results could indicate that Cambodians use Facebook to create a lot of visibility about the mismanagement or poor public service delivery to the wider public and other governmental officials. That would empower them to exercise their right in demanding better governance and accountability.

Actions on Facebook to improve public service delivery	%
Comment or criticize	43%
Share news or information	71%
Make a discussion with friends Facebook	39%
Discuss with family	20%
Join event or program related to public service delivery	44%
Write on my own Facebook Status	28%
I have done anything	5%
Others	2%

Table 3: Respondents' activities to demand better governance on Facebook

Expressing Opinions

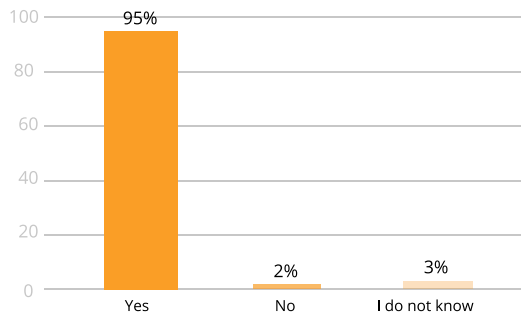
The majority of respondents underline their right to question the government and its responsibility to take into consideration their feedback. They address the importance of expressing their opinions and criticism of the government's work. They believe that citizens are the power holders and the government needs to solicit citizens' comments to improve the policy and development plan. The citizens' voice can also contribute to better decision-making because they believe that:

- Expressing opinions is a part of a democratic country's development
- Citizens hold the right to question the government and demand better services.
- Citizens' participation leads to inclusion, equality and service satisfaction
- Citizens as voters can advise the government because they are the service users

According to the survey results, 95% of respondents think that the government has to listen to its citizens' concerns and opinions, and 73% of respondents have already voiced their concerns on Facebook (see figure 4). This could imply that most Cambodians wish to see their government as a responsible institution, but also that not everyone wants to express their constructive criticism and suggestions on Facebook, perhaps due to self-censorship and security concerns.

Moreover, only 50% of respondents think that it is an effective tool for the government to solicit comments and criticism. Users still voice their concerns about any public services as it is a convenient and easy way to reach out to the wider public and the higher governmental officials.

Do you think the government should listen to citizen's concerns?



Percentage of respondents ever voiced their concerns on Facebook

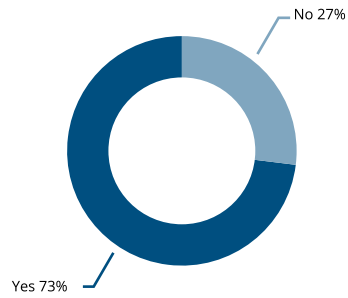


Figure 7: Expressing opinions on Facebook

Types of Public Service Issues Raised by Respondents

Public services are classified into nine categories in this study. Most respondents tend to voice their opinion on services related to social, public order, and social security (51%), followed by services related to water, electricity and waste management (47%). This data implies that the main public services that are criticized by respondents on Facebook are related to public service delivery (see table 04).

Satisfaction of the Respondents

Based on the results, most respondents rate Facebook as an effective tool to report problems or voice opinions to improve governance

Types of Public Service	N	%
Cluster Services related to social and public order and social security (Public safety, living safety (thief, robbery,) travel safety, staying safety	77	51%
Services related to Water, Electricity, and waste management…	71	47%
Cluster services related to the development of physical infrastructure	55	37%
Cluster services related to justice and arbitration: (Argument between citizens and citizens Argument between citizens and local authorities/governmental officials, Argument between citizens and private sectors, Argument between governmental officials and private sectors)	56	37%
Cluster services related to social affairs culture and women's affairs (Equal access to education, Basic right to study, Hygiene and health services, Entertainment service, Social affairs service, Disable and orphanage service, Women rights , Other services to poverty reduction)	54	36%
Service related to state sovereignty (Permission letter license wedding registration Birth registration Vehicle, cruise, plane identification card Certificate of accreditation Khmer national identification card Family book registration and legality, etc.)	45	30%
Issue related to politics (Related to each political party's policy)	41	27%
Cluster services related to promoting trade, small and medium enterprises, investment environment, and private sectors involving in building and maintaining infrastructure	32	21%
Cluster services related to revenue collection, expense and sponsor money management	32	21%
Others	9	6%

Table 4: Types of Public Service

in Cambodia (79%). This seemingly shows that Facebook allows users to report issues and voice their concerns demanding for better governance. However, the level of satisfaction remains problematic.

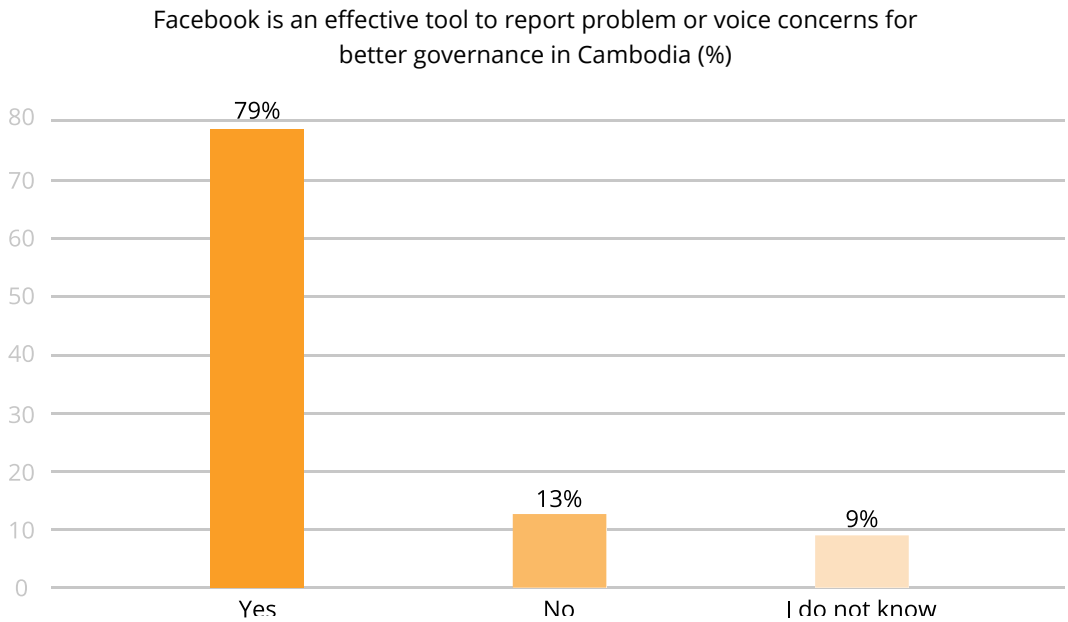


Figure 8: Perception of Respondents on the effectiveness of Facebook to voice concern for better governance

Figure 9 shows that most respondents do not get a proper response from the government. This indicates that the government may be less able or willing to respond to citizens' requests or concerns. However, the governmental officials who took this survey appear to think differently.

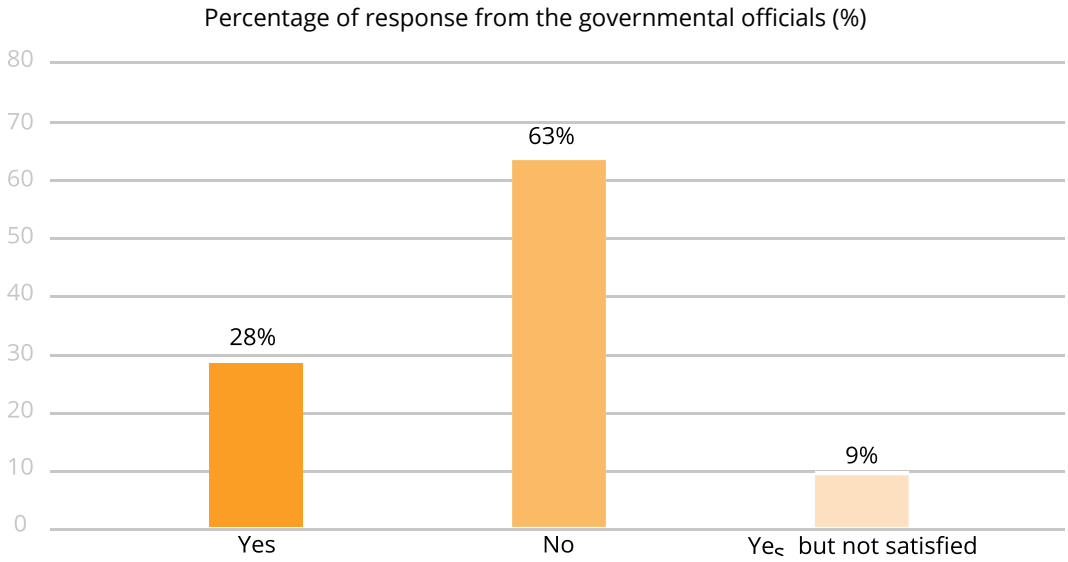


Figure 9: Percentage of responses receives from the government

When looking at the data by occupation, most survey takers are unlikely to have received a response from the government, but civil servants appear to be split, with over half of them having received a response.

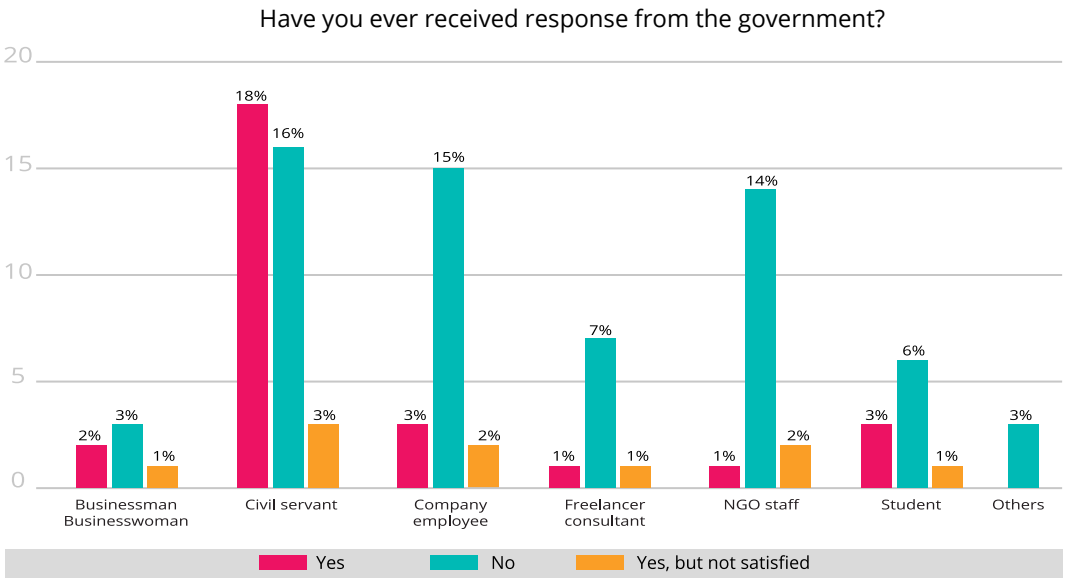


Figure 10: Demographic differences of respondents receiving responses from the government

However, the majority of respondents think that the government does not listen to their comments on Facebook and consider it as a less effective tool scoring only 5.02 out of 10. This might be due to a lack of proper responses from the government or even due to politics.

However, the majority of respondents think that the government does not listen to their comments on Facebook and consider it as a less effective tool scoring only 5.02 out of 10. This might be due to a lack of proper responses from the government or even due to politics.

Most respondents think that the government did not respond to their concerns because there is no decision from the higher-level officials, while some even think that the government even benefits from the problems raised by citizens (26%), that the government doesn't care about citizens' concern or that it is beyond the lower-level governmental officials' responsibility. This indicates that most problems raised on Facebook cannot be resolved if there is no higher-level decision maker involved.

This also backs up the answers from government officials who claim that they have not responded because the majority of the issues flagged to them are beyond their authority or responsibility. This can be a sign of weak governance to a certain extent

Respondents suggested that the following factors might encourage the government official to react positively:

Reasons why there is no response from the government	%
Beyond their responsibilities	21%
No decision from the higher-level officials	40%
They just do not care about citizens' concerns	23%
They gain benefits from the problems, so they don't care to resolve it.	26%
Facebook is not an official way of communication yet	3%
No Concrete mechanism to respond	5%
Others	9%

Table 5: Reasons that respondents think that there is no response from the government

- Focusing on giving constructive feedback rather than complaints
- Providing sufficient evidence when raising any problems with suggestions
- Each governmental institution should establish Facebook page and monitor the comments and criticism
- Creating a law or regulation to gather feedback and respond to citizens

Government Officers' Response to Facebook Users' Comments

Although 46 respondents identified themselves as civil servants, only 31 of them actually answered the additional questions meant for them alone.

Against the other respondents' perception, 26 government officials (84%) claim that they managed to act on the feedback or suggestions received via Facebook. They did so because they think that it is their responsibility, they care about their citizens, and that it can improve their organization's reputation. However, they cannot respond to everything given that it is beyond their capacity and responsibility (77%), or because there is no evidence (45%), or because it is related to politics (19%).

Discussion

Data from this pilot study shows that Facebook can empower users to demand better governance, particularly in public service delivery. However, expressing opinions and criticism is not the main thing people do on so-

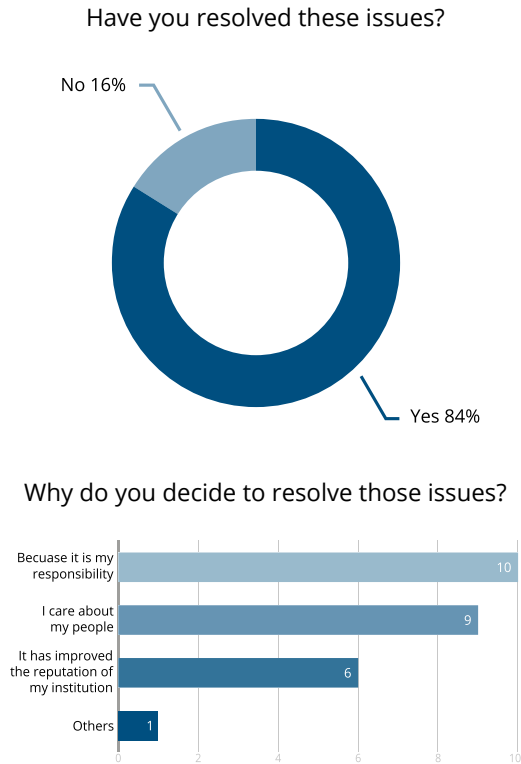


Figure 11: Positive reaction of government officials toward issues raised by public

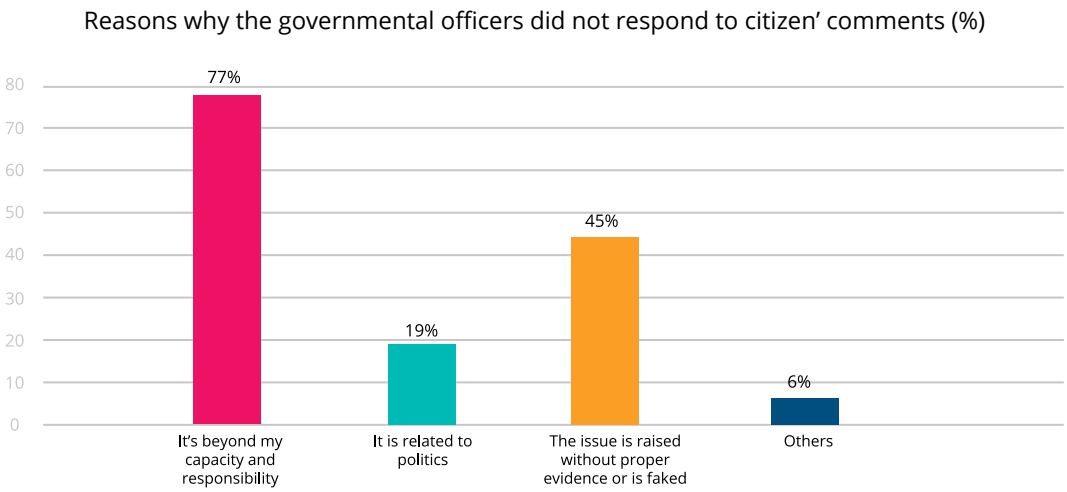


Figure 12: Reasons why the government officials did not respond to citizens' comments

cial media. Users might feel too unsure about writing about such topics in public. They might also be concerned about their safety if their views about governance are seen as insulting the government or being too political, considering that several activists in Cambodia were detained for something they posted on Facebook. The latest concerns that the Facebook platform itself is unsafe from data breaches or data leaks might also affect people's perceptions negatively, especially considering that their personal identity can be revealed by the company.

Despite these concerns, data also suggests that Facebook can be used by individuals, activists and groups to disseminate information and voice their opinions about corruption and other problems in the society. It enables Cambodian users to communicate and share their concerns with the government, creating some form of two-way communication, and it is a quick and easy way to do so – which hardly happens outside the virtual world.

Several studies argue that social media allows users to highlight their issues and pressure the government to listen to and consider their comments, which in turn enhances public transparency and accountability.[55] A plethora of studies shows the interrelation between social media usage and better governance promotion.

However, according to this pilot study, the Cambodian government's responsiveness to citizens' complaints on Facebook is still limited. Respondents believe that there's a lack of political involvement from higher-level governmental officials and a lack of attention to citizens' complaints. Most respondents see Facebook as a moderately effective tool to demand better governance, given the fact that only 28% of those surveyed received responses from the government while the rest did not.

Social media can help promote better governance only if the government takes action on the citizens' comments. The government might not consider citizens' comments because there is no forensic evidence. It might

55 Yasir Hussain, "Social Media as a Tool for Transparency and Good Governance in the Government of Gilgit-Baltistan, Pakistan", (Bonn, Crossroad Asia, October 2014) https://www.academia.edu/11935850/Social_Media_as_a_Tool_for_Transparency_and_Good_Governance_in_the_Government_of_Gilgit-Baltistan_Pakistan, (accessed April 22, 2019).

also neglect comments that are too political or beyond their authority or roles. The Prime Minister Hun Sen has already announced and encouraged all governmental institutions to use Facebook to communicate with citizens and to gather their feedback. As a result, government officials have created Facebook pages for their ministries, but the level of response to citizens' comments might be questionable and not meet the citizens' satisfactions. It may be worth study how to improve the way the government can solicit and manages citizens' comments.

Conclusion and Recommendation

To a certain extent, Facebook has the potential to enable Cambodians to demand for better governance, although the government's responses are not well recognized.

This pilot study suggests that Cambodians use Facebook for news and information consumption and sharing, which can increase their knowledge and understanding of the current developmental and public service delivery issues. Using this knowledge, Cambodians can voice their opinions or comments and demand their government's accountability with regard to those issues. They perceive Facebook as a powerful platform to quickly spread their voice to the government.

However, they are not entirely satisfied with the government's responses as they believe that there is no leadership from the higher-level governmental officials to take actions on their comments on Facebook.

Governmental officials in turn claim that they manage to respond to citizens' comments, but they also raise the fact that some comments are beyond their authority.

Facebook might be an effective tool to hold the government to account only if there is a commitment from the government to solve the problems raised on the platform. The political sensitivity of the problems may affect the level of responsiveness on the government's side. This could also lead the government to filter some sensitive issues posted on Facebook, which can hinder the effectiveness of the solution.

As this is a limited pilot study, a much broader study could reveal more detailed information, more reasons of the problems found and more reasons behinds the responses of the governmental officials.

The authors recommend that the Cambodian government establishes an official committee to receive comments from Facebook users in relation to public service delivery issues, and provide citizens with proper responses or intervention. Being a democratic country, it would be a natural requirement for e-governance to enable this kind of feedback mechanism and promote citizens' participation in decision-making.

The authors would also like to recommend conducting a larger scale study with in-depth interviews with the higher-governmental officers who are involved in the issues raised by citizens.

Photo credits: Image by Freepik

Reading time: 08 minutes

How E-learning Can Improve Water, Sanitation and Hygiene Practices in Rural Cambodia

Seanghak Khin[1] and Piseth Kim[2]

1 Seanghak Khin is a Program Coordinator on Innovation and Research at Center for Sustainable Water (CSW) where she focusses on sustainable development, Integrated Water Resource Management, Water Sanitation and Hygiene (WASH), Climate Change, gender issues and smart innovative. Seanghak hold her Master degree in Water Engineering and Management in Asian Institute of Technology (AIT) in Thailand and Bachelor degree in Water Resource Engineering and infrastructure at Institute of Techology of Cambodia. Additionally, she has attended various trainings to improve her professional skills on water both national and international. She was trained in Women leadership project fund by US embassy, social business training link to Sustainable Development Goals at Philippine, and attended WASH FUTURE conference in Australia.

2 Piseth Kim is a Program Coordinator at Center for Sustainable Water and his focus is on Smart Innovations Program. He has previously worked at Engineers Without Borders Australia, WISE – WASH in Southeast Asia and OzGREEN Australia. Hismajor achievements include winning grants to successfully lead "Project Saart" on solid waste management education and "CACB Lab" on community need assessment tools for Cambodian youth. He studied Bachelor of Water Resources Engineering and Rural Infrastructure at Institute of Technology of Cambodia, and Master degree of Environmental Engineering at Institut Teknologi Bandung in Indonesia in 2015 and since then has involved actively in Cambodian WASH sector.

Abstract

Knowledge gaps between the national and subnational departments of Cambodia's government can lead to a poor implementation of policies and practices at rural level. This research project assesses the feasibility of e-learning as a new way to close those gaps, specifically using the Water, Sanitation and Hygiene (WASH) sector as a case study. National WASH guidelines were adapted into an easy-to-use and interactive e-learning course with the aim to upgrade the skills and knowledge of the Provincial Department of Rural Development (PDRD) staff. Real-world tests were carried out with staff of the Disability Action Council (DAC), the WASH District Committee and four PDRD offices. The study analyses participant feedback on the e-learning course and platform, and seeks ways to further improve and adapt it to their environment. Results indicate that it works well in Phnom Penh, where participants are equipped with up-to-date computers and good internet access, but less so in rural areas due to out of date technology and incompatible web browsers which demotivate users. Rural participants also appear to prefer using smartphones and suggest to improve the e-learning experience by making it available on mobile devices, as well as allowing to print the study material and providing better Khmer language support. Implementing these features may well lead to a successful application of digitalization and e-governance at rural level.

Introduction

The initiative to bring e-learning to the Water, Sanitation and Hygiene (WASH) sector arose out of the perceived difficulties in the knowledge transfer of strategy documents and guidelines to rural areas in Cambodia, in particular by the Ministry of Rural Development (MRD). Although many WASH strategies, guidelines and national action plans have been developed and disseminated, it is likely that the knowledge about those policy documents at provincial departments and local NGOs is still limited. According to advocacy workshops in eleven Cambodian provinces these guidelines and national action plans are still not well understood. Those who are meant to implement them use traditional approaches[3] and face a number of challenges in adopting the right approaches stated in the guidelines.[4]

An initial e-learning research project was designed to test the feasibility of using electronic methods[5] to disseminate the National Guidelines on WASH for Persons with Disability and Older People.

With the ultimate aim of closing the knowledge gaps and improving WASH practices, the study seeks to understand the behavior of the target audience at the PDRD offices and how to best adapt the e-learning platform to their environment and needs. Pilot real world tests were conducted remotely with participants from the Disability Action Council (DAC) and the WASH District Committee, whereas field tests were conducted with participants from four PDRD offices.

All participants received an invitation to start an e-learning course module by the MRD and were then prompted to undertake the learning activities by themselves. The study tracks accurate information about how many people actually took the time to start, progress through and finish the module. After a set time, all participants were interviewed.

The interviewees of the study are considered to be a valid and representative test pool for the evaluation of how e-learning can be tailored to and implemented at the subnational government level in Cambodia in the future, including both challenges and opportunities.

The results of this study are furthermore significant in informing decentralization and deconcentration efforts, which are key areas in the government's National Strategy for Rural Water Supply, Sanitation and Hygiene 2011-2025, as well as in complementing the broader efforts of bringing digital transformation and e-governance to improve the public sector of Cambodia.

Field Research Methodology

The field research was conducted by the Center for Sustainable Water (CSW) in collaboration with the Cambodian Ministry of Rural Development (MRD) and WaterAid Cambodia. The four PDRD offices chosen for the study were those of Kampong Cham, Kampong Chhnang, Kratié and Ratanakiri. The field research looks into what barriers exist to implementing e-learning, including hardware and software limitations, the strength and reliabil-

3 Thorne, Blended learning: How to integrate online and traditional learning, (London, UK, Kogan, K. 2003)

4 Padilla-Meléndez, A, Garrido-Moreno, A & Del Aguila-Obra, Factors affecting e-collaboration technology use among management students, (Computers & Education, AR 2008), vol. 51, no. 2, pp. 609-23

5 Zhang, D & Nunamaker, Powering e-learning in the new millennium: an overview of e-learning and enabling technology, (Information Systems Frontiers, JF 2003)

ity of internet access. The National Guidelines on WASH for Persons with Disability and Older People was picked as a first module. Qualitative data was collected through semi-structured phone interview with 11 participants from the above-mentioned PDRD offices, which include leadership staff such as directors, deputy directors, chief officers of rural healthcare, chief officers of rural water supply and chief officers of planning and statistics.

Field Research Results

This field research uses the Unified Theory of Acceptance and Use of Technology (UTAUT) model[6] to analyze to what degree end-users would adopt new technology. UTAUT is a framework that was created by reviewing and combining concepts and empirical similarities of eight prominent technology acceptance frameworks into one unified model. Its key constructs and moderating factors[7] were used to provide a foundation for the interview process at the PDRD offices, thus forming a basis for its questions.

Upon the field visits to the four PDRD offices, it was soon apparent that all interviewees had at least some basic access to computers and internet. As most of the interviewees held senior positions they had been given computers by the government for use in their daily work. Two interviewees who did not have computers were either waiting for it to be repaired or weren't assigned one yet. Everyone had a smartphone and it was noted, as smartphones often had been paid for personally, that these devices were in better care and more frequently updated than the government-owned computers. It was also noted that participants preferred using smartphones as a communication and work tool whenever it was possible. Conversely, computers were positioned a bit off the side of the working desk or placed in a desk drawer, whereas smartphones were always close, being charged and monitored constantly. No tablets were seen at either PDRD office.

While internet tests performed at Kampong Cham showed good speeds, the internet at Kratié and Ratanakiri soon indicated that the size and complexity of the e-learning courses would need to be limited. Interestingly, cellular internet either matched or superseded fixed line internet everywhere except for Kampong Cham. It also had better upload speeds at all three locations. All PDRD offices relied on wireless internet to some extent. These wireless routers were often located in central buildings, but also supposed to deliver internet to outlying buildings and offices at the very edge or outside their effective range. It was also noted that PDRD offices often had older CRT-monitors accompanying their stationary computers. Most high-end CRT production had ceased by around 2010 and they can now have difficulties displaying certain newer resolutions. Another potential barrier that was noted was how the local computers were not updated with all the latest software, drivers and plugins, such as the Adobe Flash video player program, both online and offline.

Cross-Cutting Themes

When introduced to the concept of e-learning, interviewees realized that it presented an opportunity to improve their field knowledge and expertise. They perceived it as something that currently seemed to be out of reach for

6 Bell, BS & Kozlowski, Adaptive guidance: enhancing self-regulation, knowledge, and performance in technology-based training', (Personnel Psychology, SWJ 20020), vol. 55

7 Brown, Using computers to deliver training: which employees learn and why, (Personnel Psychology, KG 2001), vol. 54

many people. There were previously told that limited resources at the PDRD often resulted in only few staff members being sent to workshops and conferences outside their own province. However, the interviewees understood that e-learning would help overcome this.

Development of the E-learning Course

The first objective was to develop an e-learning module to transform the "National Guidelines on WASH for Persons with Disabilities and Older People" ("the guideline") into a more easily disseminated format. The first step was to shorten and simplify the information in the guideline while reflecting the essence of the original content. There was only one major change from the original material: the overt references to 'disabled' and 'older people' throughout the guideline were perceived as overshadowing the needs of other groups. As WASH practices are considered to be universally applicable, the term 'Marginalized Groups and Individuals' was used instead.

Another requirement was to ensure that the e-learning course would be compatible with the technology at the local PDRD offices. This sometimes meant reducing the use and quality of visual aids, animations and graphical features in order to enable better performance, as they would normally need more powerful capacity. Thus, a balance had to be struck between compelling features, loading times and performance, while also making the material as accessible and usable as possible for people with hearing and/or sight impairments. The development of the e-learning course was first and foremost a collaborative process involving not only the primary researcher but also an e-learning development team, external consultants, translators, video presenters and local experts on inclusive WASH practices.

The result was an e-learning course consisting of nine chapters on different subject matters available in both Khmer and English. This was built and operated on www.aseancu.org, a platform hosting several e-learning courses by the Institute of Technology of Cambodia (ITC).

E-learning Module Real-World Testing

After developing the e-Learning module, it was thought necessary to conduct real-world testing to set up a sustainable accreditation and monitoring system, and understand potential issues with scaling up. This step analyses the potential of e-learning as a learning tool and its ability to free up time, resources and improve participants' professional development. Also the user motivation and the usability of the ITC platform and e-learning course were assessed, in order to further understand how to properly roll it out to a wider audience. Testing was conducted both remotely and on the field.

Remote Testing

Remote testing was conducted and monitored online. The e-learning module was sent out to pre-selected participants. Feedback was then collected via phone call and input into a form for later analysis. Two target groups were selected for this, one based in the capital, and the other one in the province:

- Group A consisted of six users from the **Disability Action Council (DAC)** in Phnom Penh.
- Group B consisted of five users from the **District WASH Committee Members**

(DWASH) of Kampong Chhnang province.

The remote test had low participation rates, with nearly half of the participants not opening

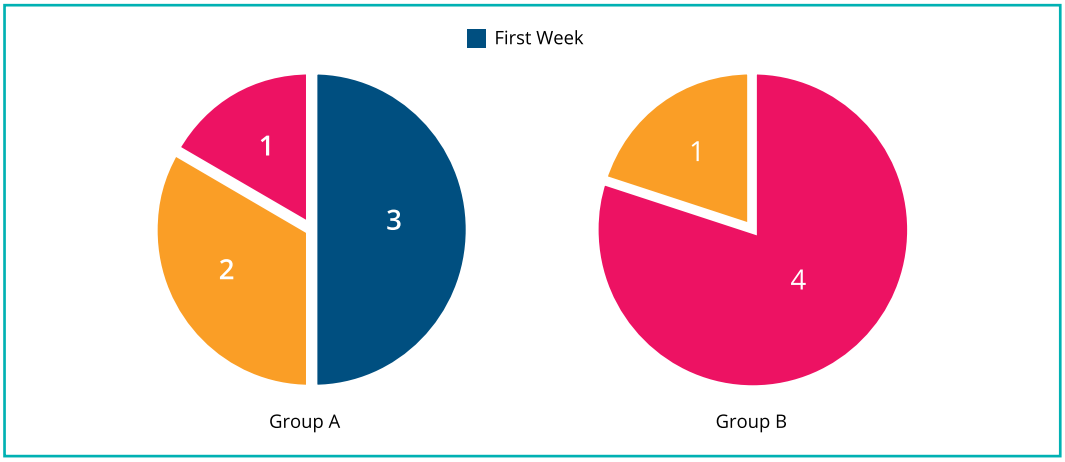


Figure 1: Result of users from remote testing of Group A and Group B

the e-learning course within the two weeks. Group A, based in Phnom Penh, had a total number of six participants of which three started the course in the first week, two in the second week and one who never logged in.

Looking at Group B, based in the Kampong Chhnang province, virtually nobody logged into the system. It is apparent that the delivery of the remote test was not well-suited to them, and despite phone calls and emails they didn't take action. Even though all participants had stated that they were both willing and had the time to participate, only one person actually accessed the material. Among other things, it was already speculated that not having the e-learning course available on mobile phone (as a mobile app or site) constituted a great barrier to their participation. To efficiently enroll Group B into an e-learning course it would seem to be necessary to alter the way the content is delivered, and to devise a system to better support them the participants through their progress.

While Group B did not finish any chapter, Group A had two separate periods of activity. Two members of Group A were both quick to enter and finish the entire e-learning course. An additional two members started their progress after the reminder date, but had not finished the course at the conclusion of the test.

Group A participants appeared to find it easier to understand how to access the e-learning course because they were familiar with and had access to computers and similar educational technologies. Given the god internet access in the capital city Phnom Penh, it is possible that Group A's participation rate and completion rate could increase even further with just a few tweaks to the e-learning system. All six participants agreed that the instructions sent out were clear and easy to understand. The two people that did not access the module encountered technical problems most likely related to the ITC platform not being accessible on all browsers and devices.

Several interviewees answered that they tried to access the material on their mobile phone despite instructions to use a computer. The remaining participants experienced no major problems during the testing period. However, they did comment that loading times of the e-learning material varied a great deal depending on the different locations they tried to access the module from. Participants actively picked locations with strong internet connectivity in order to access the module. The amount of participants in Group A who accessed the e-learning course from their home was the same as that of participants who accessed it from their workplace. Similarly, participants were split evenly between Chrome and Firefox browsers.

All participants from Group A who logged in said that they enjoyed using e-learning, found it easy to use it and felt that it could be useful in their workplace. Regardless of whether they managed to log in or not, all staff members were very positive about the potential for e-learning in their workplace. It is worthwhile to note that the subject material was particularly relevant to Group A as it is directly related to their area of work. This certainly influenced participation rates in a positive way. When asked how to best motivate future users to engage with e-learning they suggested to teach users about the benefits of e-learning and the opportunities it provides for the individual learner.

Even though only one Group B member logged into the e-learning course, the majority still felt that instructions sent out were easy to understand. When asked what best describes their reason for not starting the module, participants answers included having trouble accessing the right equipment, even though they had originally said that they have access to both a computer and internet. Most District WASH Committee Members staff don't have their own computer and depend on the office computer and internet that are too old, slow and unstable when many people access them. This technical barrier and their relatively poor familiarity with computers add up to the specific constraints of the ITC platform (the need to use the right device and the right browser). Group B participants also mentioned that they tried to access the material on their mobile phone. It may be that if the e-learning course had been available on a mobile phone there would have been a much higher participation rate. Group B had a mixed response regarding the potential for e-learning. When asked how

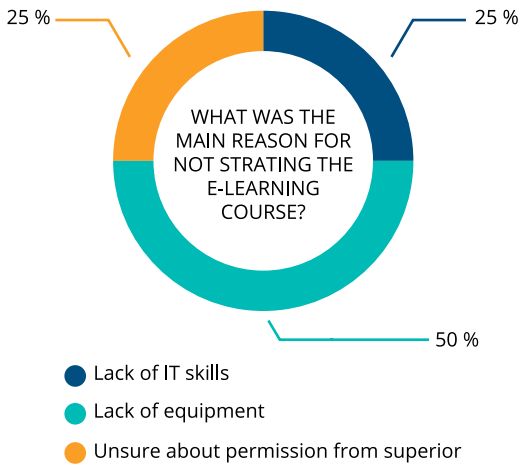


Figure 2: Reasons for not starting the e-learning course

to properly motivate people to use e-learning, most Group B participants tended to speak about creating the right support structures, having an orientation workshop, learning in groups, offering participation incentives such as a certificate and field visits for real practice.

Field Testing

Field Testing was conducted in four provincial offices of the PDRD with 24 participants - six from Kampong Chhnang, eight from Kratie, five from Kampong Cham and five from Ratanakiri. The field testing had higher participation rates, with over 85% of participants finishing the e-learning module during the two-week testing period; only one participant did not enter the test due to technical issues. Despite being helped through only the first couple of chapters, many participants finished the entire e-learning module. In the few cases where their initial response was negative, the e-learning team noticed a change in participants' perception after they had used it for the first time. When asked why they thought e-learning could be useful at the PDRD, a clear majority of participants stated that it would help improve their skills and capacity development with a minimum amount of time and resources.

The majority of participants responded positively when asked how easy it was to use the e-learning platform. However, regardless of ease of use, all participants found three barriers to participation: computer proficiency, access to the right equipment and the need to use English when accessing the platform.

E-learning appears to excite staff members at the Provincial Departments of Rural Development, and participants generally gave positive feedback after using the e-learning test platform for the first time. Together with its relatively low cost and ease of use and access, this is a good reason for rolling out e-learning as a capacity building tool.

For many participants e-learning also presented a new and easy way of sharing important material with other people. One of the requested functions was to be able to share it with anyone, without the use of login credentials.

There was no clear consensus among staff-members at the PDRD as to what accreditation method would be the most fitting. However, the most popular option was to receive a printed and signed diploma, closely followed by participants that wanted a combination of different accreditations. Answers given in interviews indicate that the format of the diploma would be important, especially who and/or what organization it was issued by. The majority of participants wanted the diploma to be signed by the MRD, and around a third mentioned that it should also be co-signed by the implementing NGO.

When asked about what could be improved on the platform, respondents wish for automatic progression between chapters, easier navigation within chapters in order to revisit knowledge from earlier sections and also improved loading times before and between chapters.

In terms of accessibility, participants stated that they wish to use the e-learning course on their smartphones, and some also want the course videos to be available as text, and for the course guidelines to be available in Khmer language.

In terms of being able to share the material, there was strong feedback on creating the ability to print material from the e-learning course. Able to print study material Course include video.

None of these suggestions are hard to implement, although the feature to print material

from the e-learning course has to be carefully considered, as printouts may not always reflect updates to the study materials.

At present, most of the critical feedback is related to functionality issues. The platform itself is getting older and doesn't offer an up-to-date mobile experience. It doesn't work very well on all newer browsers - a clean install of Firefox without any add-ons will block the e-learning content window as the browser believes it to be potential spam. It is almost impossible to use the ITC

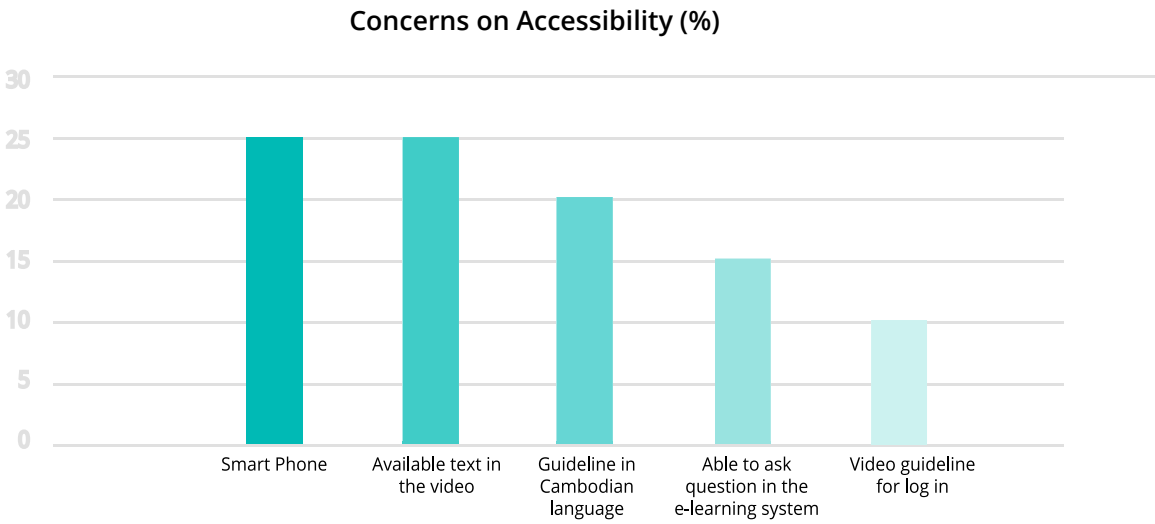


Figure 3: Percentage of participants and concerns on accessibility

e-learning platform on the Safari browser, which will make it extremely difficult to reach anyone with a Mac. First off the "dock" at the lower end of a mac screen blocks navigational buttons used to progress through the e-learning content. New content blocking features introduced ear-

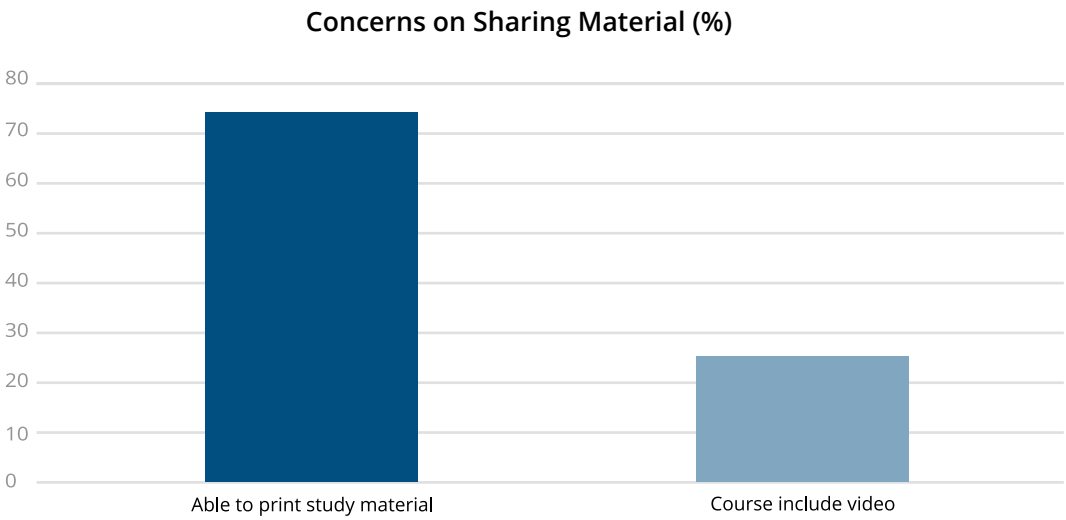


Figure 4: Percentage of participants and concerns on Sharing Materials

lier this year by Apple also impacts all media throughout the e-learning course. This means that video often does not play and that music and audio cues are missing.

For the majority of staff at the PDRD offices who are not very experienced with computers these issues may look like the platform is simply not working.

Conclusion and Recommendation

E-learning appears to have strong support among those who work at rural departments in Cambodia as they seem to understand the benefits it can offer in terms of capacity development and professional skills training. It allows workers to access information and provides interactive learning with on-demand availability, self-pacing and personalized instruction. However, the motivation shown by participants is not satisfying, likely due to limited internet access and technology in the rural area, the most commented drawbacks during the testing. Real-world testing has provided a roadmap for improving the delivery of the e-learning course.

There still are some challenges to navigate, such as the need to build a new, more advanced, e-learning platform that will directly impact the experience of its target users, for example through mobile functionality, and to formalize cooperation with the Cambodian government (with the Ministry of Rural Development, in this particular case).

As a follow-up initiative, the Center for Sustainable Water has recently also started developing a new e-learning platform using "WordPress", a popular template-based system to create websites. This is combined with plugins like "Articulate" to set up e-learning modules and "Dash" to deliver quizzes, award certificates, manage users and reports.

Given the potential value e-learning can bring to the public sector workplace it will benefit stakeholders on both sides. Aside from empowering workers, it would invariably reduce costs for the governmental department, improve tracking and monitoring, as well as streamline the delivery and standardization of content, which would serve as a successful example of e-governance at rural level.

Photo credits: Image by Freepik

Reading time: 07 minutes

How Data-Driven Technology Can Upgrade Cambodia's E-government

Sokhna Vor[1]

1 Sokhna Vor is Managing Partner at Mekong Big Data, an advanced analytics and data consultancy in Cambodia, where he also co-founded the Data Residents community. While working in New York City for a leading analytics software company, he co-authored "Trump vs. Clinton: The Surprising Results I Discovered From Social Media Data", an article featured on TechRepublic. In 2016, he left to pursue his passion for data analytics in Southeast Asia and China. His professional focus is to create value and drive operational excellence, innovation and growth from real-world applications of data management, strategy, business intelligence and machine learning. Sokhna earned an Economics and International Studies degree from the US.

Abstract

Government departments in Cambodia are increasingly embracing data-driven digitalisation initiatives in order to become more efficient, accurate and accessible to citizens. For example, the National Bank of Cambodia recently adopted blockchain technology to reduce its interbank transaction costs. The Ministry of Public Work and Transport introduced mobile payments and a QR code-enabled vehicle information database to enhance its users' experience. Also the Ministry of Health is overhauling its Data Management and National Hospital Systems to make its services more easily accessible. As the benefits of data grow, so do its risks, including data breaches. Balancing them requires proper governance and democratization of data, good data software and data skills. This article explores the current state of Cambodia's e-governance landscape with a particular focus on data-driven technologies, how they are implemented and how public awareness around data is growing thanks to local communities and organizations, as well as recommendations for better data strategies.

Introduction

It has never been easier to communicate wirelessly, and the way people interact differs dramatically from even five years ago. We can connect with anyone, anytime and anywhere with a mobile device that facilitates a flow of information and communication exceeding the speed of our thoughts. That flow spews millions of pieces of information. Individually they are meaningless but together they form a whole of something useful and valuable. These pieces of information are called "data", a representation of facts, such as numbers, text, speeches, images, audio and video.

Big data technologies, supported by increasingly cheaper hardware which store and compute data distributed across multiple locations, have enabled the exploration and implementation of many smart day-to-day applications. That changes everything; not only is there a computer in every office. In every pocket, there's a mobile device. In every device, there's an intelligent application that connects our physical selves with the digital world. These new data-driven technologies are the basis of A.I. and the trends encompassed by the term "Fourth Industrial Revolution".

Governments see this revolution as an opportunity to optimize their operations, improve their image, increase engagement with their citizens and encourage relationships between external organizations and internal agencies in a new way. They aim to build "e-government" and achieve government and public sector objectives using digital technologies, leveraging them to improve their internal and public workings for better service provision while reducing financial and operational costs of the government administration. "The framework of e-government has broadened to include the use of ICT by government for conducting a wide range of interactions with citizens and businesses as well as open government data and use of ICTs to enable innovation in governance" (United Nations on e-government 2019).[2]

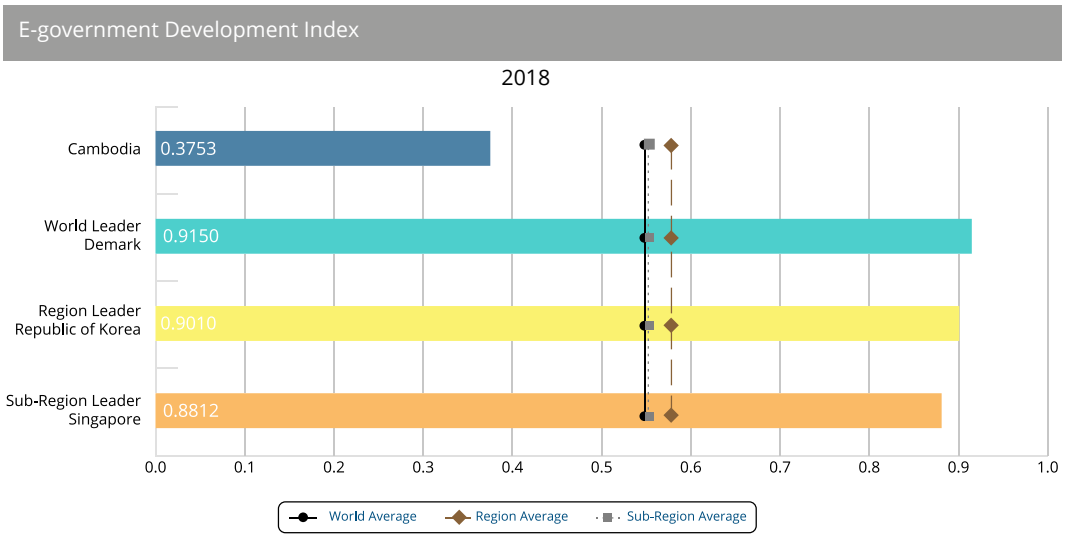
Cambodians are certainly not strangers to the digital world and enjoy both good internet and mobile penetration. If they are not on Facebook, they are on Youtube searching for videos. The younger population spends less time on traditional TV and radio. A whole generation of digital natives skips the web and moves straight to mobile, accessing the entire internet by a smartphone, powered by cloud technology. Major cloud technology providers, which allow storing and computing infrastructure online and on demand, such as Amazon Web Services (AWS), Google Cloud Platform, Microsoft Azure and others, invest millions of dollars to make the technology scalable and highly secured. They allow users, businesses, and governments to meet digital needs on a pay-as-you-use basis instead of a big upfront capital expenditure for website hosting servers.

The Cambodian government is starting to capitalize on these developments to build its own digital ecosystem of public services. Although the willingness and efforts to do so are encouraged in specific government projects and ministries, e-government in Cambodia is still in its infancy and faces many challenges.

The United Nations e-government Development Index (EDGI) measures a nation's readiness to adopt and develop e-government. With a score of 0.3753 for EGDI compared to

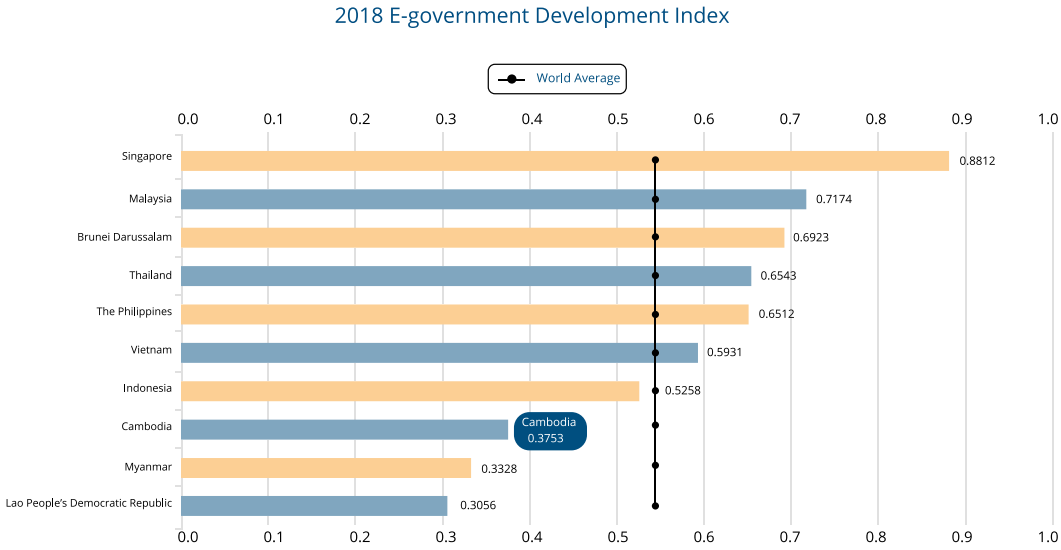
2 "E-government." United Nations. Accessed June, 2019. https://publicadministration.un.org/egovkb/en-us/About/UNeGovDD-Framework.

the Asian sub-region's average of 0.5555, it places Cambodia in the rank of 145 out of 193 participating countries.



Source: UN EDGI 2018

In other words, Cambodia scores below average, meaning it struggles to advance ahead in terms of e-government development.



Source: UN EDGI 2018

Compared to its neighborhood in Southeast Asia, Cambodia ranks in the bottom three, only slightly ahead of Myanmar and Laos. Neighbors such as Vietnam and Thailand which share similar cultural and social characteristics are above average for e-government assessment. The leader in the region is Singapore.

This indicates that despite the willingness to develop e-government in Cambodia, there are many challenges to overcome to implement it successfully, given the complexity and risks resulting from resource, budget and time constraints, mismanagement and other failures. A recent Cambodia Policy Note by the World Bank Group 2018[3] found that digital adoption in Cambodia remains low both at firm-level and government due to unclear leadership, low access to finance resources, lack of skilled IT staff and no adequate legal framework. Based on the "Follow-up Study Report on e-government Service Deployment Plan" (NiDA and JICA 2009)[4] there is low awareness of the use of ICT, no high rank officer specifically responsible for the development of ICT at the time, and low budget allocation for ICT development.

Looking more closely, one finds that there are specific challenges at the data and information management level. "Information is not distributed freely among the units. Information is rarely disseminated actively, especially within the 'Behind' ministries. This leads to a lack of resources for data collection, and creates barriers to construct centralized information systems" (NiDA and JICA 2009).[5]

In other words, data and information sources remain fragmented and not properly governed with data policies. The responsibilities across the data lifecycle, from collection, access, usage and sharing remain unclear. This is associated with increased costs in working with data. Data and information need to be properly managed, governed and democratised in order to speed up digital transformation and safeguard sensitive citizen's data.

Finally, as reported by the U.S. General Accounting Office, aside from gaining a full buy-in from a committed executive leadership, e-governance development requires "uplifting and sustaining citizen's usage of e-service, monitoring performance backed by data and metrics, and maintaining the 'value' of e-service provision to include everyone".[6]

Data is thus a crucial component both of the modern digital technologies it drives, as well as at the heart of the infrastructure of an efficient e-government. Increasing awareness of it and understanding how it can be applied in different ways to improve public services will be essential to the Cambodia's growth.

This article explores the role data can play across different levels or units of government, with some specific examples from Cambodia's current e-government landscape and abroad, and also reports on how awareness of data is growing through tech communities and other organizations in the country.

Data Strategies for Better E-government

According to research by Gartner, digital transformation in governments across the globe occurs in different steps, as represented by the framework below. Operations capture higher value as the level of complexity of the e-government projects

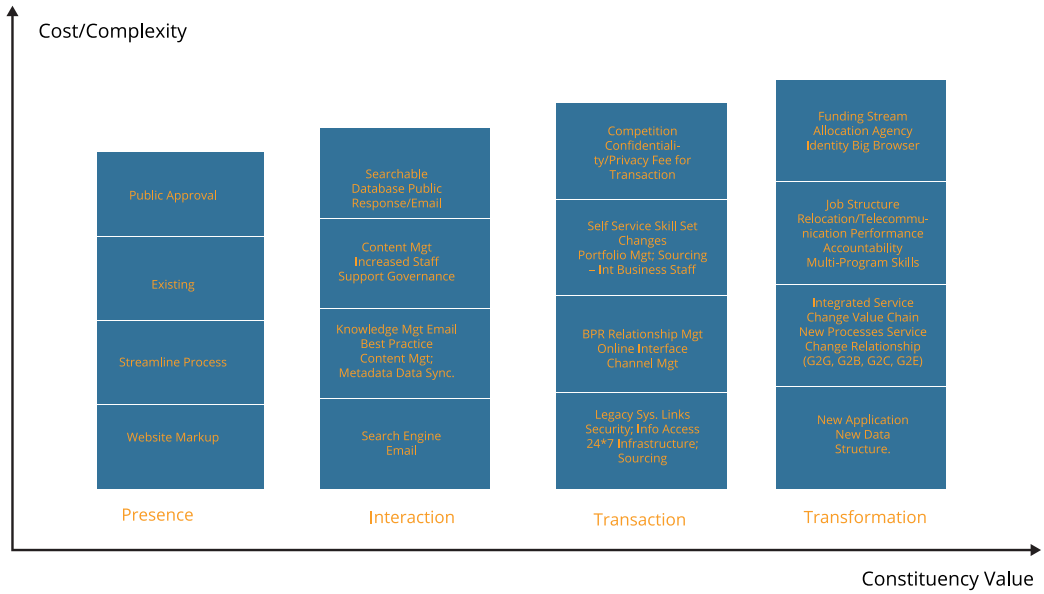
3 Beschorner, Natasha, Neumann James L., Sanchez Martin Miguel Eduardo, and Larson Bradley Robert. "Benefiting from the Digital Economy: Cambodia Policy Note (English)." (Washington D.C., World Bank, 2018). Accessed June, 2019.

4 NiDA and JICA. "The Follow-up Study Report on E-Government Service Deployment Plan for Royal Government of Cambodia." October 2009. Accessed June, 2019. https://www.jica.go.jp/project/cambodia/0609376/04/pdf/05_egov_2009_e.pdf

5 Ibid.

6 Jaeger, Paul T. and Kim M. Thompson. "E-government around the world: lessons, challenges, and future directions." (Florida, Government Information Quarterly, 2003): 389-394.

increases and thereby also its associated costs. At each stage, four key ingredients support the e-government journey: strategy/policy, process, people and technology.



At the very initial phase, the focus is to make information of ministries available through websites and downloads and provide the public with policy and governance information such as laws and regulations, reports, newsletters and events. The second stage introduces some form of interaction. Chat integrations, searchable information backed by a database and metadata, and email/messenger contact enable this. Because data and information is synchronized and content is managed, citizens and businesses can expect up-to-update information and relevant content to consume and meaningfully engage with the government. This is followed by a stage that empowers transactions. Online payments for public services, e-passport, e-business registration and e-vehicle registration are some examples. Because sensitive information of citizens becomes available, such as their finances, detailed data and governance policies are needed in order to protect their confidentiality and privacy, especially considering the growing threats from cyberattacks. A strong data infrastructure is required to support such needs. At the final stage, the transformation is complete. Government agencies are fully transparent and accountable. Budgets are prioritized to support new and well-integrated processes or services, resulting in new data structures supported by advanced technology and infrastructure.

Within this e-government development framework, one could currently place Cambodia at the beginning of the third phase, as it has already started introducing various different transactional services, but still requires solid data strategies and infrastructures to help scale them up and protect them. This leads to the question of how such data strategies can be formed in the context of Cambodian e-government projects and what can be learned from the private sector.

Many businesses from big tech companies to startups realize that their data is an enterprise asset that can be turned into a competitive advantage. Digital technologies and algorithms are increasingly open source, meaning they can be easily adapted by anyone for personal and commercial use, and popular big data technologies like Hadoop, Spark and TensorFlow are freely available to allow storing, processing and gaining insights out of huge amounts of data.

What is not open source, however, is the data itself. For example, Facebook lets a billion of people use its platform for free because that allows collecting so much user data that can be monetized through targeted advertisement services for other companies. Thus, data does not create value until it is used, turned into insights and acted on. As more and more organizations understand how to create value with data, coupled with the right talents and affordable technology, organizations will use data to increase revenues, reduce costs, improve customer experience and mitigate risks while meeting regulatory compliance.

It is the author's view that, for a government that desires to create a safe, secure and knowledgeable society, understanding "data" in a broader context - from data lifecycle to data governance, data management to data quality and data sharing to data security - will be crucial in advancing its objectives. The government should ask itself: what citizen data can be collected that can help improve and personalize public service delivery, without compromising personal privacy and safety? What data can be made public to increase its value? Where should data be stored so that it can be ingested into a centralized system for easier management and internal access and to increase the efficiency of government operations? Which data should be kept private? How can data be used to create new e-government services?

In order words, data and information management can be leveraged to accelerate the government agenda: increase public transparency, raise accountability, improve image, ensure safety and security, upgrade citizen's experience, optimize administration and operations for cost-savings and enhance tax and revenue collection.

1. Forming an institutional strategy in government is necessary to set the stage for e-government projects that drive returns and fit a timeline and budget. This should include detailed action plans and objectives about the collection, storage, access and use of data. It should be aligned with existing institutional objectives and lead to more specific questions such as: what can be done now to meet the government's data objectives in 3-5 years? How should the government deal with citizen and business privacy issues?

2. A data foundation will ensure there's a solid technical infrastructure to support upstream applications and their widespread use by the government and the public. This should include data management, data quality monitoring and security control, to ensure that information is complete, up-to-date, accurate and relevant for the purpose of government and public use, at all times. For example, if all sources of data integrated in one place, it could be accessed more securely and more easily understandable.

3. Publishing performance insights of the e-government projects will ensure that the

project or service is distributed and used optimally across all segments of society. They will enable a discovery of relevant information that generates public value and meets the knowledge needs of the public, internal agencies and external organizations. Performance measurement and monitoring can track the ongoing changes, while operational and functional insights are ready to be extracted from data to improve the administration and operations of the government. It levels up the public knowledge about business and society with a centralized database management and distribution.

Examples of Data-Driven E-government in Cambodia Today

The National Bank of Cambodia (NBC) is among the most ambitious of Cambodia's institutional bodies in terms of technology adoption, regulation and data management. It carries an immense amount of responsibility in ensuring that the flow of money into, out of and across the country is regulated, safe and also auditable for the avoidance of terrorism financing and anti-money laundering. The NBC intends to experiment with the implementation of the blockchain digital ledger technology in the second half of 2019.[7] Blockchain is a distributed database that can record and track financial information and transactions as immutable data; once recorded, the data is accepted as truth that is auditable and untampered. Blockchain technology connects citizens and businesses securely with banks, microfinance institutions or payment providers to process fast and cheap electronic payment and settlement. It is regulated by the government body to ensure financial safety and stability. It provides further value by being a decentralized network of participants that facilitate secure transfers.

According to the NBC director-general H.E. Chea Serey "the need to implement the tech is because retail savings and payment systems are fragmented in Cambodia as fund transfers between banks and payment service providers cannot be done currently."[8] She emphasized that the use of blockchain is a cost-cutting initiative in operating interbank lending, payment and settlement with digital technologies, and not to facilitate any sort of cryptocurrency such as Bitcoin or Ethereum. Therefore, this move seeks to optimize processing times and reducing operational costs while increasing financial inclusion among the unbanked population.

A World Economic Forum (WEF) white paper recognizes that "the National Bank of Cambodia will be one of the first [in the world] to use blockchain technology in its national payments systems for use by consumers and commercial banks".[9] The WEF adds that many central banks explore the use-case and implementation feasibility of the distributed ledger technology to modernize the system of financial transactions and clearing process. Examples include the Bank of Canada, the Bank of England, the Monetary Authority of Singapore (MAS), the Bank of Lithuania, the Bank

7 Kimsay, Hor. "NBC Set to Lead Blockchain Use." Phnom Penh Post. April 10, 2019. Accessed June, 2019. https://www.phnompenhpost.com/business/nbc-set-lead-blockchain-use.

8 "NBC among First Central Bank Globally to Implement Blockchain Tech." CapitalCambodia. April 29, 2019. Accessed June, 2019. https://capitalcambodia.com/nbc-among-first-central-bank-globally-to-implement-blockchain-tech/.

9 World Economic Forum. "Central Banks and Distributed Ledger Technology: How Are Central Banks Exploring Blockchain Today?" (Geneva, World Economic Forum, 2019): 160-84. doi:10.1002/9781119506515.ch5.

of Thailand, the Central Bank of Brazil and the German Central Bank (Deutsche Bundesbank) to name a few. In a more practical and advanced case, the Bank of France has already completely replaced an existing manual and time-intensive process with a decentralized, blockchain-based solution that enables automatic transactions among financial service participants using predetermined terms.[10]

Given its small population and low dependence on legacy systems, Cambodia is in a position to innovate and integrate a blockchain-based financial system without incurring too many risks. When the NBC implements and deploys blockchain technology successfully, the country's financial process will be enhanced to be more seamless, efficient and automated, and eventually solve the issue of fragmentation and save costs. This would be revolutionary in terms of improving interactions with citizens and businesses and in general for the financial lives of Cambodians.

One of the most interesting applications of data-driven e-government in Cambodia is the embedded QR code on citizens' vehicle plates to allow easy access to vehicle identity information from a mobile device. After scanning the car or motorbike plate with a QR code supporting mobile device connected to the internet, a result returns basic vehicle identity information including plate number, owner name, type of vehicle and license among others. Without this innovation, finding ownership and identity details of a vehicle takes much time and effort; one may need to reach out to the right vehicle officials, ask for information, pay for the information request and then wait in queues. It can take days, if not weeks, to get the right answer.

QR code technology reduces the time from weeks to mere seconds. Once scanned, data flows immediately in a secure protocol from a centralized database to the mobile interface. Potential benefits include a reduction in crime and stolen vehicles because of the ability to quickly track a vehicle and link it to a citizen's identity. Potential buyers of used vehicles may be able to verify and validate owner identity, and the legal tax responsibilities before making a purchase. The electronic vehicle registration also keeps record of vehicle safety inspections and tax validation.

One major potential drawback, as with other data risks, is the exposure of citizens' private data and safety. Ill-intentioned people and potential criminals may try to use the same technology to find, track and stalk potential victims. This should again raise questions about how to create better institutional strategies, policies and practices that can protect citizens. For example, personal data could be masked or turned into a code in order to ensure that only essential information is revealed.

In addition to providing quick and easy access to public vehicle information, the Ministry of Public Work and Transport (MPWT) now also accepts mobile payments from citizens who wish to pay for vehicle registration, inspection, licensing and tax fees. This is possible thanks to collaboration between government and private sector. The MPWT has partnered with local mobile payment companies like Pi Pay, Wing and DataPay to facilitate electronic payments, thereby upgrading citizens' user experience, speeding up the service provision and again removing fragmentation issues in the processes of registration, fee payment and tax collection. According to the CEO of Pi Pay "the partnership with the MPWT will make Cambodians' lives more efficient, more trans-

10 Ibid.

parent and more convenient".[11]

Given the high availability of mobile phones and cheap internet access in Cambodia, this kind of acceptance and integration of electronic transactions on top of public service provision could be further developed and rolled out to other government departments, and normalize cashless payments in the country.

Moving to examples of better data management, the Ministry of Health (MoH) built a National Health Information System (NHIS) back in 1993 to collect and store health data from routine health service activities in various provincial and local branches. This national database project was fully completed in 1995. The information is aggregated and supplied to the Ministry website for online dissemination and public access, and is also used internally by other departments.

NHIS used the Microsoft Access System, a database management system which brought several strengths and benefits to the Ministry.[12]

One centralized system which integrated nearly 20 recording and reporting tools, preventing duplication and reducing staff workload; templates and definitions standardized for ease of use and understanding; and information entry that was computerized securely for easy access and usage.

Improvements could be made as the data acquisition process in the early days remained manual.[13] For example, data was collected and compiled on paper from different health centers and referral hospitals before the hard copy was sent to the operational district health office and the provincial health department. It was then consolidated and entered into the Access System. The data was not computerized at the point of collection. As it is known today, manual paper-based processes can be fragile, prone to error, inconsistent, risky, and can result in operational inefficiency, tedious workloads and the deterioration of staff productivity.

Thanks to an initiative with USAID Better Health Services in 2010, a major change was introduced that led to the upgrade and advancement of the database management and reporting process. A new web-based database system was developed to migrate data and information from the existing one; this enabled employees to input and access data at the point of information collection. For example, a staff member could use a web-based application to read or write data to a relational MySQL database. MySQL is a high-performance open source database technology to manage structured data with records and fields both in retrieval and update. This technology integration appeared to improve the speed, reliability and accuracy of the data.

The data is collected nationwide from 990 health centers, 55 referral hospitals, 24 provincial hospitals, eight national hospitals and two NGO supported hospitals as of today using the web-based system.[14] A monthly health report is also accessible on the website with

11 Foo, Desyre. "PI PAY BRINGS CASHLESS TO GOVERNMENT SERVICES WITH MINISTRY..." Geeks in Cambodia. October 16, 2018. Accessed July, 2019. http://geeksincambodia.com/pi-pay-brings-cashless-to-government-services-with-ministry-partnership/.

12 "MOH Health Information System." Ministry of Health. Department of Planning and Health Information. Accessed June, 2019. http://www.hiscambodia.org/public/abouthis_en.php?m=c.

13 Ibid.

14 Ibid.

the data generated and aggregated for visual analysis.

More recently, the MoH formally launched the new Peth Yoeng system, an innovative web-based hospital management system.[15] The system is developed and maintained by the First Womentech Asia company to support patient information tracking, capture electronic medical records and share data across departments. The author met and interviewed Pong Limsan, Founder and CEO of the company, for a data discovery session conducted by Mekong Big Data for SmartScale, an acceleration programme for the most promising start-ups in Cambodia. Pong Limsan says that she wants to improve patient experience by providing hospitals and clinics across Cambodia with a modern hospital management system that digitalizes end-to-end operations, from computerizing test results at the doctor's office to integrating payments at the reception and managing medical inventories. The digitalisation process is efficient, cheap and fast. Limsan adds that there is an initial challenge for staff in operating the system, but after they are trained and understand the value of the technology, the staff prefers not to go back to the old ways of manually handling patient information because all information is now captured and synced in real-time.

It appears that the emphasis on people, change management, transformation of attitudes, training and communication is critical in ensuring that the technology is adopted successfully. The e-government journey of the MoH reached its current state thanks to how it started; everything that follows is continuous optimization.

An Example From Abroad: Biometric Big Data in India

The world's largest biometrics database was implemented in India by storing and authenticating identity information of a population of over a billion citizens from birth to death. "Intended as a unique identifier for Indian citizens, the aim of Aadhaar, the word roughly translated as 'base' or 'support', is to eliminate the issue of false identities and prevent resulting fraud in financial transactions".[16]

It uses the open source technology Hadoop, which originated and spun out of Google to handle petabytes of data points at a scale of Google infrastructure. Powered by a well-coordinated, massively-parallel processing servers,[17] the technology enables the cheap storage of all kinds of files and the fast computation of workloads by distributing data across many cheap hardware computers at rest or motion. This coordination of multiple computers forms a powerful force to keep and process a huge amount of data and, as a result, yields a higher performance that is more cost-effective than traditional technology. Moreover, when one computer got interrupted, it would not affect the operations of the others because of smart coordination and a distributed framework.

15 Kimmarita, Long. "Hospital System Launched, National, Phnom Penh Post." June 07, 2019. Accessed June, 2019. https://www.phnompenhpost.com/national/e-hospital-system-launched.

16 Behal, Ambika. "MapR And Big Data In The World's Largest Biometric Database Project." Forbes. November 25, 2015. Accessed June, 2019. https://www.forbes.com/sites/abehal/2015/11/25/mapr-and-big-data-in-the-worlds-largest-biometric-database-project/#5e1d003b2035.

17 Wang, Lizhe, Jie Tao, Rajiv Ranjan, Holger Marten, Achim Streit, Jingying Chen and Dan Chen. "G-Hadoop: MapReduce across distributed data centers for data-intensive computing." (Future Generation Comp. Syst., 2013): 739-750.

The registry database facilitates digital fingerprints, digital photos and text-based data for every Indian resident - each within 200 milliseconds for real-time authentication. "The amount of biometric data that is collected per person is approximately three to five megabytes per person, which maps to a total of 10-15 petabytes of data".[18]

The database is also used to monitor school attendance, issue natural gas subsidies to India's rural poor and to send wages directly to people's bank accounts. Because this citizen data is very sensitive and highly classified, much needs to be done to avoid cybercrime, security breaches and manipulation.

That being said, this unprecedented example of a data-driven e-government project proves how technology can record, store, and use information at a massive scale in order to advance the government's capabilities in identity verification, fraud prevention and security protection, while enabling the efficient and effective provision of social services.

Cambodia may also explore and experiment with this new technology as it is cost-effective, scalable and high-performing and thus can support large-scale e-government projects across a range of applications.

Data Literacy in Cambodia: Open Data and Meetup Communities

Having discussed the different opportunities that data-driven technologies present to developing e-government in Cambodia as well as some applied example in the country and abroad, this section explores what can be, and is being, done to improve data literacy and skills among Cambodians.

For example, the government could make more open data available to the public and promote increased activities of data communities in Cambodia.

Open data is defined as "non-privacy-restricted and non-confidential data which is produced with public money and is made available without any restrictions on its usage or distribution"[19] Major perceived political, social, economic, technical, and operational benefits of open data are the improvement of citizen participation and satisfaction, equal access to the right data, economic growth and stimulation of competitiveness, and optimization of administrative processes, which lead to more financial savings, more tax revenues, and more transparency and democratic accountability.[20]

Enabling open data will facilitate the transition from a traditionally closed-system to open-system society, enabling the general public to access public data and information in an easy way and without legal or copyright restrictions. Data should be catalogued and searchable in a friendly user-interface, such as a mobile or web portal. It should be understandable and have important information about the data itself, such as how the dataset is collected, its sources, its creator, the different types of details, and what each detail means. The data may be downloadable and shareable for public use in a flexible format

18 King, Rawlson. "World's Largest Biometrics Database." biometricupdate. December 1, 2015. Accessed June, 2019. https://www.biometricupdate.com/201512/worlds-largest-biometrics-database-leverages-big-data-architecture

19 Janssen, Marijn, Yannis Charalabidis and Anneke Zuiderwijk. "Benefits, Adoption Barriers and Myths of Open Data and Open Government." (IS Management, 2012): 258-268.

20 Ibid.

such as PDF, Excel or comma separated files as needed.

In Qatar, Open Government Data (OGD) is created by state institutions for public consumption and is considered to be an important component of e-government, because it encourages citizens to participate in the analysis and decision-making around public matters.[21] Because public data is openly accessible, it can improve the relationship, image and outlook of the institutions providing them as their operations appear more transparent and accountable, thus creating public value and increasing public knowledge about their society. Additionally, when government data is published, the reaction and feedback from citizens may provide new insights about the operations and the performance of the state and public institutions, which may lead to new ideas on new services or agencies to create.

In the Cambodian context, all this should be implemented thoughtfully and strategically, as data can also mean risks. A leak of highly confidential information can severely damage to the image and operations of government. Principles and best practices about opening up governmental data to the public can be leveraged, including lessons from the International Open Data Charter, to ensure the success of the e-government project.

Aside from the government, Cambodia also has several non-profit organizations and informal online and meetup communities set up by professionals who promote interest and knowledge in data as a subject, as well as provide actual open data. These communities desire to improve the development of data skills, and the knowledge and experience necessary to address the digital needs of society.

Open Development Cambodia (ODC) is a one-stop hub for online information on environmental and economic development, compiling data to give free public access without restrictions via its website after a careful vetting and verification process. It removes the barrier to public datasets about development issues that people care about. As an open data platform, it focuses on open access, usage and sharing for everyone to get value and knowledge from development data.

ODC also develops open data skills by providing capacity building trainings in the country.[22] Because it enables the exploration and discovery of development data in an easy and interactive user interface on its website portal, the public may be able to gain more general knowledge about economic development from that data. The ability to find the information in different formats including raw data may enable developers to build some data applications and improve their data skills. Civic organizations, NGOs and businesses also benefit as they use advanced capabilities such as map visualizations that can add value to their organization.[23] The information available covers a range of topics: agriculture and fishing, aid and development, disasters and emergency response, economy and commerce, energy, environment and natural resources, government and labor.

The Cambodia AI Community is an open-source AI community that seeks to develop AI skills in Cambodia. In addition to organizing

21 Al-Kubaisi, Ali Selham. "Enhancing the Adoption of E-Government Systems through Open Government and Open Government Data (OGD) Initiatives in Qatar." (2018).

22 Michael P., Canares, Andrew Young and Stefaan Verhulst. "Open Development Cambodia: Opening Information on Development Efforts." (odimpact, 2007).

23 Ibid.

community events, it focuses on the real-world application of AI as well as skills in researching, developing and applying machine learning algorithms on data to create human-like intelligence. In simple terms, machine learning is the ability to discover and predict information or patterns based on huge amounts of data or historical examples, rather than writing rules over and over again. One may also use machine learning to predict customer behavior and forecast their demand. A well-known example is Amazon's recommendation engine to personalize e-commerce shopping offers to Amazon website visitors.

One project of the Cambodia AI Community is KhmerML, a set of machine learning algorithms to help solve complex problems. KhmerML is open source based on Python general-purpose programming, which is one of the world's most popular languages in machine learning and data science.

Data Residents Cambodia is a meetup community. Its stated aim is to connect data enthusiasts and analytics professionals to share knowledge around data and its potential to improve organizations and society in Cambodia and Southeast Asia. Inspired by data science communities worldwide, the data-focused community was founded in December 2018 by data enthusiasts from Cambodia and abroad, including this article's author. It is volunteer-run, open to the public and free for participants. Many free workshop events were held with partners like Phnom Penh Facebook Developer Circle, the University of Puthisastra and the Emerald Hub coworking space.

Topics covered so far by local and international speakers includes visualizing complex data with Microsoft Power BI, AI-driven marketing on digital platforms with Google Analytics and Facebook, guidance on a data scientist's career and skill set, and data analytics for social good.

The Data Science Club was created to bring together like-minded youths in Cambodia who are interested in learning more about data science through workshops, online courses and technical applications so that they will have the technical skills and knowledge to work with data and build useful intelligent software.

Overall, meaningful communities bring valuable knowledge and connections. Government, the public sector and the private sector may assist in promoting and financing more of these activities to inspire a new generation of Cambodians.

Conclusion & Recommendations

Despite Cambodia's unique characteristics and development issues, its government appears to recognize the opportunities presented by its young, evolving and tech-savvy society, where deep mobile phone penetration, cheap internet access and high social media adoption are mostly in place, and aims to build an ecosystem of digital public services.

Applied examples of data-driven technology in e-government include the initiative to integrate blockchain technology to support the financial inclusion of unbanked Cambodians, the use of QR code technology for vehicle identification, mobile payments to enable fast, easy, and efficient service provision, the increased online presence of government ministries, and the deployment of data management systems to improve healthcare services. Moreover, data communities and the open

Photo credits: Image by Freepik

data movement are growing and aiming to increase public knowledge and engagement, while promoting and disseminating data technology skills. However, e-government in Cambodia is in its early days and has to overcome many implementation challenges.

To reach the next phase, public services that are high-value and relatively low-effort to digitally transform should be looked at first, and these often revolve around data-driven technology. Leadership roles and budgets need to be prioritized. Sound data strategies should be formed to ensure project success and ef-

ficient operations. Well-architected technical infrastructures, from cloud services to cyber-security tools, should be set up to support the new services.

Improving the technology and data skills of Cambodian citizens should be a top priority for the country. While data communities and the open data movement are ambitious citizen-led initiatives, proactive effort from state institutions to provide more public sector data and relevant education will further increase and solidify public knowledge. Government, public and private institutions should also assist through funding and support to foster more of these initiatives and thereby inspire and develop digital talent in Cambodia.

Transforming the government across local, provincial and national levels also requires ensuring that everyone takes part in order to prevent the formation of “digital divides” across different segments of society.

Finally, as new e-government services are introduced, their existence and availability needs to be repeatedly communicated to the public to ensure that they reach as many citizens as possible, because technologies are valuable only when people use and adopt them.

Reading time: 07 minutes

Digital "Government-to-Business" Services in Cambodia: Overview and Challenges

Maria Yang[1] and Darapich Sovann[2]

1 Maria Yang is an official at Ministry of Commerce, and also a part-time lecturer of Economics at International College of National University of Management. She holds a MA in Policy Economics from Williams College (United States, 2018), a Diploma in Economics and Finance from Royal School of Administration (2015), and a BA in International Studies (International Economics) from Royal University of Phnom Penh (2013). She has involved working on trade-related projects with supports from Cambodia's resident and non-resident development partners, especially WTO.

2 Darapich Sovann is an elementary school teacher at CIA First International School in Phnom Penh. He has been working in education industry for 5 years now. His interests vary but majorly are in areas of education and economics. Currently, he is doing his Master's in Entrepreneurship and Project Management at Royal University of Law and Economics. He has also earned dual degrees; Bachelor of Education in English and Bachelor of Arts in International Economics from Royal University of Phnom Penh in 2016. From there, he has engaged himself in various trainings on education and business-related.

Photo credits: Image by Freepik

Introduction

According to the UN e-government knowledgebase, e-government is a channel to strengthen the efficiency of government operations at three levels: Government to Citizen (G2C), Government to Business (G2B), and Government to Government (G2G).[3] There are a number of research papers which show how, empirically, good e-government is positively associated with fostering a good business environment. This can be measured by different variables such as the ease of starting a business, electricity, taxes, construction permits, access to credit, cross-border trade and protection of minority investors.[4] Moreover, the Fourth Industrial Revolution and the digital economy, which are built on advanced new technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), automation and cloud computing, among many others, also act as driving forces of e-government, in particular at the G2B level.

Despite the rapid growth in its digital capabilities, Cambodia is still progressing slowly in terms of Ease of Doing Business, as underlined by the country's Doing Business Rank 2019 of 132 out of 190 countries.[5] Given the leapfrogging of the ICT sector in Cambodia, it would be of particular interest to study which low-hanging fruit the government could pick to further develop e-government capabilities. This study will focus on the Government-to-Business (G2B) level, measuring the country against the UN's E-Government Development Index (EGDI) and indicators from World Bank's Doing Business Ranking. It is highly relevant to understanding how the Fourth Industrial Revolution can affect the fields of e-government (and e-governance) all over the world.

Cambodia will need to aim high to maintain its competitive advantages. Its high level development policies, such as the Rectangular Strategy (RS) and the National Strategic Development Plan (NSDP), emphasize the need to digitize the government to enable a friendly environment for both business and investment. This research will also make policy recommendations on how to improve Cambodia's Doing Business Ranking by taking advantage of the ICT sector developments.

The first section will look at the Fourth Industrial Revolution from the perspective of a few different countries and the approach taken by some in the sphere of e-government. The second section outlines current developments within the ICT infrastructure in Cambodia, as well as the legal framework surrounding it. It is followed by an overview of the challenges of doing business in Cambodia and, finally, recommended solutions and concluding thoughts.

Industry 4.0 - Global and Regional Trends

As the world keeps progressing, the involvement of technology in day-to-day life becomes more significant. The modern era has seen three major economic developments, which are dubbed as the First, Second, and Third Industrial Revolutions. These breakthroughs gave the world new and improved ways to live and to connect. As technology advancement kicks in each and every year, the processes

3 United Nations, About, (UN E-Government Knowledgebase Webpage, United Nations, 2019), Accessed July 2019. https://publicadministration.un.org/egovkb/en-us/About

4 Martins J. and Veiga L., Innovations in digital government as business facilitators: implications for Portugal, (GEE Paper. Number 97, 2018).

5 World Bank, Doing Business, (Doing Business Webpage, The World Bank, 2019), Accessed July 2019. https://www.doingbusiness.org/en/rankings?incomeGroup=lower-middle-income

are way faster and more convenient than before. As the First Industrial Revolution brought us the new steam-powered engine, it gave the world a sense that there was so much more to achieve. Soon, the second revolution started, and the world saw mass production to supply the high demand in the market. Later on, in the late 20th century, the Third Industrial Revolution began, in which the economy started being digitized with ICT technology. However, with all of these changes, human involvement in the production line and supply chains never ceased to exist. Today the situation is different. With the influx of data, high speed connectivity, and customer-centric technology, Industry 4.0 is a controversial new era requiring a reduced labor force, more artificial intelligence, automated manufacturing industries, and digitalization.[6]

The following section outlines examples of policy and implementation in Germany, the country which officially coined the term "Industry 4.0", China, one of Cambodia's main trade partners, and Thailand, an immediate neighbor with many similarities in terms of culture, society and geography.

German Industry 4.0

"Industry 4.0", a term made in Germany, has been used to support industrial growth in the country. Germany has been able to exploit new technological concepts to reduce production costs, logistical costs and quality management costs. While these aspects mostly benefit producers, consumers also enjoy a greater variety of products at a lower price.[7] Since the beginning of Industry 4.0 in 2011, Germany has seen extensive development in its industrial sectors. In 2015, Rüßmann, et al stated in their paper that the impact it has brought will help Germany succeed in four major areas: productivity, revenue growth, employment, and investment. For example, productivity in automative companies may see a 10 to 20 percent growth in the coming years.[8] Moreover, it boosts the country's growth by 1%, which is a significant number as German GDP growth rate is roughly 0.4% annually.[9]

While this seems like a success in the German economy, Erik Brynjolfsson and Andrew McAfee, economists who have studied the impact of technology on economies, have a different view. In an interview conducted by Bernstein and Raman in 2015, the two economists argued that the technological breakthrough does more harm to the economy as it decreases the labor force needed for production. As a matter of fact, the technology stage in Industry 4.0 has allowed producers to rely more heavily on automation and smart factory, while reducing labor cost to the minimum.[10]

Made in China 2025

In China we see a similar trend. "Made in China 2025" is a strategy developed by the Chinese government to tackle the changes triggered by global trends in AI-driven and smart

6 Schwab Klaus, The Fourth Industrial Revolution, (Britannica, 2019), Accessed June 01, 2019. https://www.britannica.com/topic/The-Fourth-Industrial-Revolution-2119734.

7 Rojko Andreja, Industry 4.0 Concept: Background and Overview, (International Journal of Interactive Mobile Technologies, 2017), 11 (5): 80-81.

8 Rüßmann Michael, Markus Lorenz, Philipp Gerbert, Manuela Waldner, Jan Justus, Pascal Engel, and Michael Harnisch, Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries, (Inovasyon, 2015), Accessed May 20, 2019.

9 Trading Economics, Germany GDP Growth Rate, (Germany Country Profile, Trading Economics, 2019) Accessed June 01, 2019. https://tradingeconomics.com/germany/gdp-growth.

10 Brynjolfsson, Erik, and Andrew McAfee, interview by Amy Bernstein and Anand Raman, The Great Decoupling, (Harvard Business Review, 2015).

industries. In the key findings made by Wübbeke et al. in 2016, the Chinese strategic plan uses a top-down approach in order to grow smart manufacturing industries, and its high end goal is to achieve the same technological progress as other Western powers. The technology substitution will focus on new energy vehicles, high tech components, renewable sources of energy and more, which should contribute to diversifying supply chains by 2025.[11] However, in practice this also has side effects considering that the Chinese economy is still developing. Many small and medium enterprises (SMEs) are very likely to suffer, considering that the new developments would bring strong competition in the market and will cause them to lose their customers if their business models are not strong.[12] Moreover, China has a huge labor force which could mean high labor cuts could occur in the manufacturing industry. Chinese labor cost has recently increased to about 15 USD per hour in 2015, which is an unfavorable option to businesses.[13] The same article denotes the new changes in the company Levi's supply chain, as it embedded the new laser printing technology in its production lines allowing the company to significantly reduce both materials and labor needed.

Thailand 4.0

In a similar way, the government of Thailand has also proposed to embrace changes in technology which could contribute to increasing the standard of living for Thai people. It has put together a comparable policy known as "Thailand 4.0", which gears the Thai economy toward technological development and innovation. It focuses on four main objectives: economic prosperity, social well-being, raising human values and environmental protection.[14] Furthermore, to achieve this, the Royal Thai Embassy in the US listed five important agenda points: preparing Thailand to become a first world nation; developing its technology cluster and future industries; promoting entrepreneurship and networks on innovative enterprises; strengthening the internal economy; and, finally, integrating Thailand with the ASEAN and global community. By doing so, Thailand has established and is working towards building a digital community meant to become the base of Thailand's industrial revolution. The key focus will be to digitally transform the Thai, for example by growing Thai agribusinesses and improving the automation of production. As such, the Thai government has also invested in strengthening education and ICT development.[15] To achieve the next evolution, "the Thailand 4.0 development plan is focused on 10 targeted industries, which can be divided into two segments; developing existing industrial sectors by adding value through advanced technologies for five industries: Next-Generation Automotive; Smart Electronics; High-Income Tourism and Medical Tourism; Efficient Agriculture and Biotechnology; and Food Innovation. The government has targeted five additional growth engines to accelerate Thailand's future growth:

11 Wübbeke, Jost, Mirjam Meissner, Max J. Zenglein, Jaqueline Ives, and Björn Conrad, Made in China 2025: The making of a high-tech superpower and consequences for industrial countries, (Merics: Paper on China, 2016), (02):14.

12 Müller, Julian M., and Kai-Ingo Voigt, Sustainable Industrial Value Creation in SMEs: A comparison between Industry 4.0 and Made in China 2025, (International Journal of Precision Engineering and Manufacturing-Green Technology, 2018), 5 (5): 659-670.

13 Chu, Kathy, and Bob Davis, As China's Workforce Dwindles, The World Scrambles for Alternatives, (The Wall Street Journal, 2015), Accessed May 15, 2019, https://www.wsj.com/articles/as-chinas-workforce-dwindles-the-world-scrambles-for-alternatives-1448293942?tesla=y.

14 Royal Thai Embassy, Thailand 4.0, (Royal Thai Embassy of The United States of America, 2018), Accessed June 01, 2019. https://thaiembdc.org/thailand-4-0-2/.

15 Jones, Charlie, and Paitoon Pimdee, Innovative ideas: Thailand 4.0 and the fourth industrial revolution, (Asian International Journal of Social Sciences, 2017), 17 (1): 4-35.

Automation and Robotics; Aerospace; Bio-Energy and Bio-chemicals; Digital; and Medical and Healthcare".[16]

Cambodia Today: Policies, Laws and Regulations on G2B E-government

Development of E-government in Cambodia

Also Cambodia wants to bring digitalization to its state institutions in order to provide better public services to its citizens.[17] Looking at the success stories abroad, the government aims to alleviate common problems through the help of ICT.

E-government refers not only to government services made available online, but also to the way in which it does so by exchanging information and using online platforms with citizens, business and public entities (UN e-government knowledgebase, 2019). The United Nations measures its E-Government Development Index (EGDI) by taking into account three main indicators: the provision of online services, telecommunication connectivity, and human capital index. The EGDI rank of Cambodia has remained very low over the past decade. The ranking has dropped from 138th in 2008 to 145th in 2018.[18] However, EGDI is not expressed in absolute terms. For this reason, the adverse ranking can be interpreted as a stagnated development of e-government in Cambodia or a faster pace of other countries.

It is therefore necessary to study the current developments in Cambodia's e-government by looking at the existing policies, laws and regulations, and infrastructure for supporting e-government.

Realizing the importance of Information & Communication Technology (ICT) in promoting competitiveness, social integration and quality of life, the Royal Government of Cambodia (RGC) has committed itself to develop the country's ICT capabilities and to deploy it in various sectors, especially government services since early 2000s.[19] The journey to developing its e-government commenced in 2000, when Cambodia first established the National Development Authority (NiDA), chaired by the Prime Minister, aiming to employ technologies in public administrative reforms. Since then, more ICT-related projects have been initiated, such as the Government Administrative Information System (GAIS), which is implemented along with other applications, including Electronic Approval System, Resident Registration, Real Estate Registration, Vehicle Registration, Public Administration Information System (PAIS), Financial Management Information System (FMIS) and Human Resource Management Information System (HRMIS). Such ICT initiatives have led to more links between key institutions.

At present, Cambodia has shown effort in developing its e-government capabilities to facilitate and promote a competitive business environment; the ICT development agenda is mainly embodied in the in Rectangular Strategy Phase IV (RS.IV) and National Strategic Development Plan 2014–2018 (NSDP), which seem to show a profound political will for this

16 Thailand Board of Investment, Thailand 4.0 Means Opportunity Thailand, (Thailand Investment Review, 2017), 27 (1):3

17 Royal Government of Cambodia, National Program on Public Administration Reform, (Phnom Penh, Royal Government of Cambodia, 2015).

18 World Bank, Doing Business in Cambodia, (A World Bank Group Flagship Report, Doing Business, 2019).

19 Korea International Cooperation Agency (KOICA), Summary on Cambodia ICT Master Plan 2020, (KOICA, 2014).

sector. In the RS.IV, the government has set a plan to prepare for the digital economy and the Fourth Industrial Revolution (Rectangle II: Economic Diversification and Competition strengthening) through mechanisms such as sufficient and effective laws and regulations, ICT and internet infrastructure, ICT in education and skill development, tech entrepreneurship and ecosystem, and research and development. Given RS.IV, line ministries have to mainstream it in their sectorial development policies or/and plans. Ministries or government entities whose work is mostly relevant to developing e-government to accelerate trade, investment and business environment are the Ministry of Commerce (MoC), the Ministry of Economy and Finance (MEF) and the Ministry of Posts and Telecommunications (MPTC).

G2B E-government at the Ministry of Commerce (MoC)

With a mission to promote economic growth through development of trade, the Ministry of Commerce (MoC) provides public services related to business, investment, and trade. In the context of e-government, MoC has digitalized trade information, trade services and human resource management in order to promote efficiency in service delivery. MoC has made necessary trade information available online, including but not limited to Trade Agreements, Commodity Price, Annual Reports, Trade Information Books, Bulletins, Trade Statistics, Commercial Counselors, and links to WTO, ASEAN and Cambodia's Special Economic Zones.[20] Aside from online trade information, the MoC has also transformed the three core trade services into online trade services, including the Certificate of Origin (CO), Company Registration, and Trade Mark Registration. As human resources are a key driver of efficient service delivery, the MoC has adopted the Human Resource (HR) Information System for internal HR management. Its functions include monitoring results, staff management, rewarding good performance, managing who goes in and out and storage security.[21] Laws and regulations in response to the growing online businesses in Cambodia have been drafted by the MoC and an e-commerce lawis currently under the review of the Council of Ministers; it is expected to be endorsed by the parliament by the end of this year (2019).[22] The e-commerce law draft consists of 12 chapters, covering legal framework topics specifically on E-commerce, intermediary providers, e-government, e-signature, online personal information protection, online consumer protection, e-payments, unsolicited messages and penalties.

G2B E-government at the Ministry of Economy and Finance (MEF)

The Ministry of Economy and Finance (MEF), another key player in e-government (G2B), has also been able to consolidate its work through various initiatives, such as the Public Financial Management Reform Program (PFMRP) and the Automated System for Custom Data (ASYCUDA), explained below:

Services cannot be delivered unless they are financed, and public budgeting is needed to ensure that public services are carried out to satisfy the needs of people. To do that, the

20 Ministry of Commerce, Trade Information, (Ministry of Commerce, 2019), Accessed June 2019. https://www.moc.gov.kh/en-us/trade-information.

21 Ministry of Commerce, Declaration on Internal Regulations, (Phnom Penh, Ministry Prakas on Internal Regulations, Ministry of Commerce, 2019), 04, 11

22 Export Gov, Cambodia-ecommerce, (Export Gov, 2019), 04, 27. Accessed May 2019. https://www.export.gov/article?id=Cambodia-eCommerce.

MEF has started developing PFMRP since 2004 to promote good governance and transparency in the public budget management. It works through four key platforms: budget credibility, financial accountability, budget policy linkage and performance accountability.[23] The first platform (improving budget credibility) was successfully completed. In 2008, the second platform, improving financial accountability, was launched with an establishment of Financial Management Information System (FMIS) to improve financial information through electronic systems.

Another impressive initiative to improve trade facilitation is ASYCUDA, undertaken by the General Department of Customs and Excise of the MEF. ASYCUDA is an electronic system that replaces manual custom processes with online procedures, whose main purpose is to reduce logistics costs and time and promote transparency in trade.[24]

G2B E-government at the Ministry of Posts and Telecommunications (MPTC)

The Ministry of Posts and Telecommunications (MPTC) is in charge of the telecommunications infrastructure, which is also one of the UN's e-government development indicators. Cambodia's backbone infrastructure is supplied by one state-owned enterprise, Telecom Cambodia (TC), and two private companies, Viettel and CFOCN. By 2016 they have supplied 1,600 km, 17,200 km, and 7,611 km respectively.

Table 1. Telecom Infrastructure

Phone and Internet Operators	Numbers of Operators
Cable phone operators	9
Mobile phone operators	9
Cable internet operators	33
Mobile internet operators	6
Phone and Internet Penetration	**Numbers of Users**
Mobile phone users	19,484,692 (98.79% of total phone users)
Cable phone users	238,118 (1.21% of total phone users)
Total	133% of total population
Mobile internet users	7,074,483 (98.84% of total internet users)
Cable internet users	82,926 (1.16% of total internet users)
Total	45.5% of total population
Broadband Coverage	
Urban areas	100%
Rural areas	70%

(Source: MPTC Primary Data, 2016)

23 Ministry of Economy and Finance, Public Financial Management Reform Program, (Ministry of Economy and Finance, 2019), Accessed July 2019. http://www.pfm.gov.kh/index.php/en/about-pfm/pfmbackground

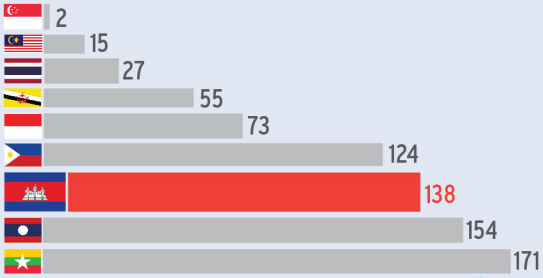
24 Ministry of Commerce, Newsletter: Cambodia Trade Sector Wide Approach, (Phnom Penh, Ministry of Commerce, 2015), 5 (5).

Cambodia: E-government to Business Se

On the road to fixing Cambodia's (e-)infrastructure

Given robust economic growth strongly driven by the private sector, efficient public services for businesses are very important. A number of researches show a significantly positive relationship between e-government services and doing business. Despite public administration reforms and ICT infrastructure development, Cambodia's ranking in the World Bank Doing Business 2019 is still low and far behind its peers in the region.

Doing Business Rank 2019 - ASEAN Countries



(Ranks out of 190 countries)

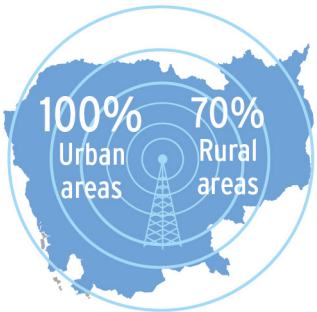
Ease of Doing Business

79	Resolving insolvency
182	Enforcing contracts
115	Trading across border
137	Paying taxes
110	Protecting minority inve
22	Getting credit
124	Registering property
141	Getting electricity
179	Dealing with constructio
185	Starting a business

(Ranks out of 190 count

Connectivity in Cambodia

85%
Internet subscription



Broadband Coverage

E-government to Busines

No centralized information system for business registration

Insufficie and regu

How to coordinate among government agencies?

How to build friendly envi

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DIGITAL INSIGHTS

KONRAD ADENAUER STIFTUNG

Government Initiatives

The Royal Government of Cambodia has been striving to develop e-government, specifically digital government-to-business, services through various initiatives, policies, laws and regulations.

- Business Registration
- Property Registration
- Taxes
- Electricity

s Rank 2019 – Cambodia

stors

n permits

ries)

Building human resources in ICT related skills

- Make use of vast distribution of phones.
- Community workshop- Raise awareness.
- Government apps through social media with instruction videos for self-learning.
- Integrate ICT skills in education.

s Services Challenges

nt laws
lations

Lack of human resources with digital or ICT related skills

a business
ironment?

How to build digital skills for HR?

Recommendations

Developing a Centralized Information System for Business Registration

E-Commerce and Business-Related Law Endorsement and Updates

Building Human Resources in ICT Related Skills

Content and Storyline: Maria Yang & Darapich Sovann
Infographic Designer: Singhtararith Chea
Editors: Robert Hör & Ann-Cathrin Klöckner

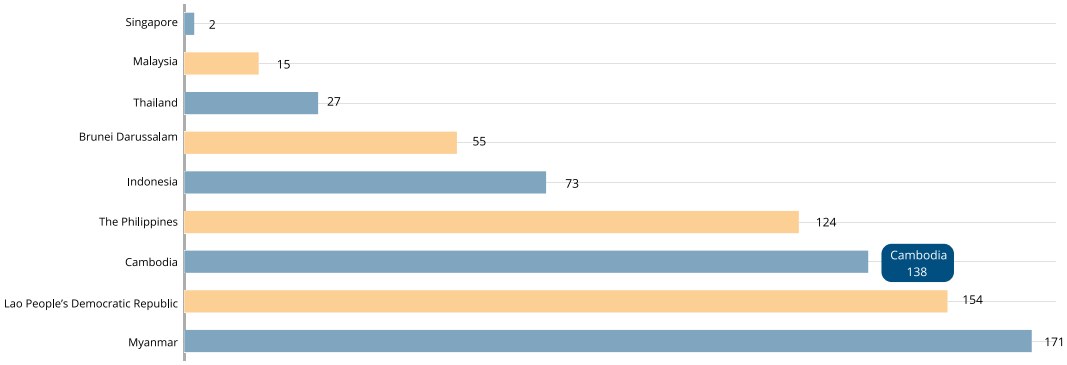
Apart from infrastructure development, the MPTC has launched a number of ICT-related policies, laws and regulations, such as the Law on Telecoms, Cambodia Telecoms and ICT Development Policy 2020, as well as the Digital Signature Sub-decree. The Law on Telecoms plays a crucial role in improving investor trust and consumer protection, collecting national revenue and ensuring fair price and competition in the telecoms market.[25] To tackle challenges in telecoms and ICT, the MPTC broadened the Telecoms and ICT Development Policy 2020 to include three main objectives, namely (1) Developing and expanding infrastructure connectivity, (2) Developing human resources, and (3). Promoting industrial development.[26] Additionally, a sub-decree on digital signature was written in early 2019 to regulate and promote the use of digital signature in a secure and efficient way.[27] According to that sub-decree, digital signature refers to data of electronic messages showing the identity of digital signatories to help verify original electronic messages. It aims to identify principles of digital signature and authorities, a digital signature license, and the obligations of license providers and recipients.

Challenges of Doing Business in Cambodia

Overview of Doing Business Ranking in Cambodia

Despite all these initiatives in developing its G2B e-government services, Cambodia's Doing Business Rank is still relatively low compared to other developing countries in the region, not to mention the developed nations. According to World Bank's DB 2019 Ease of Doing Business Score, Cambodia scored 54.8 (ranking at 138th), using 10 indicators for calculation.

Doing Business Rank 2019 - ASEAN Countries



Source: World Bank's DB 2019 Ease of Doing Business Score

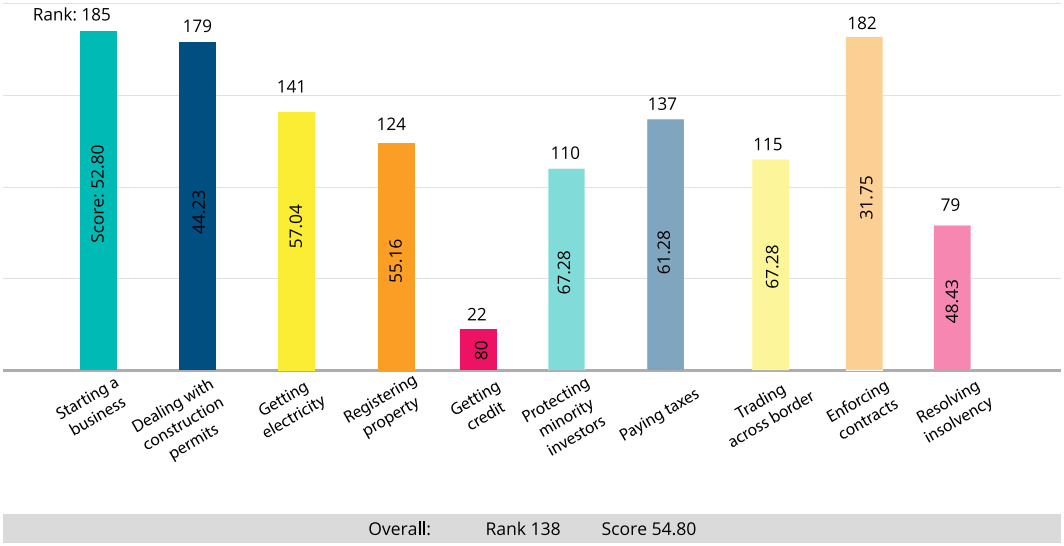
25 Royal Government of Cambodia, Law on Telecoms, (Law on Telecoms, Phnom Penh, Royal Government of Cambodia, 2015).

26 Ministry of Posts and Telecommunications, Telecom and ICT Development Policy 2020, (Phnom Penh, Ministry of Posts and Telecommunications, 2016), Accessed May 2019. https://www.mptc.gov.kh/article/2918.

27 Royal Government of Cambodia, Digital Signature Sub-Decree (Phnom Penh, Digital Signature Sub-Decree, Royal Government of Cambodia, 2017).

As depicted in the table below, Cambodia has been performing well in two indicators only, which are "Getting credit" and "Resolving insolvency". Cambodia has yet to improve on other key performing indicators like starting a business, dealing with construction permits, getting electricity, registering property, protecting minority investors, paying taxes, trading across borders and enforcing contracts.

Doing Business Rank 2019 – Cambodia



Overall:	Rank 138	Score 54.80

Source: World Bank's DB 2019 Ease of Doing Business Score

Challenges of Digital Government-to-Business

Lack of a Centralized Information System for Business Registration

Although Cambodia is a rapidly growing economy with a steady GDP growth rate, many find it hard to do business in Cambodia, especially due to the ineffectiveness of business registration, which leaves a bad impression on both local and foreign investors. According to data obtained from World Bank, Cambodia ranks 138th worldwide when it comes to the ease of doing business. Out of 190 countries, Cambodia stands at 185th in regards with starting a business.[28]

Starting a business in Cambodia is a very complicated process. Document submission and legal procedures are more expensive and time-consuming compared to other developing countries. Data from World Bank report (2019) shows that each individual has to go through nine procedures which are handled by different ministries and departments.[29] It could take up to 99 days to fully complete the whole process. Out of the nine procedures, only the ones that are run by Ministry of Commerce and the General Department

28 World Bank, Doing Business, 4

29 Ibid., 8-10

of Taxation allow individuals to submit their documents through an online platform. Moreover, documents at some departments and agencies are redundant, meaning that there is no central information hub. Information from the business registry has been stored in many different places throughout the whole procedure. An individual has to go through the Business Registration Department of the Ministry of Commerce, the Department of Taxation, Sealmaker, Bank, and the Ministry of Labor in order to run the whole procedure. This shows the inconvenience and lack of efficiency in government institutions which are poorly digitalized. Although the process is theoretically practiced throughout the country, it could have been enhanced through the involvement of ICT, particularly through the better development of E-government.

Insufficient Laws and Lack of Enforcement

Despite the fact that the Royal Government of Cambodia has developed a number of laws and policies to promote e-government (G2B), there is still a lot of work to be done, such as amending existing laws and establishing new ones that are relevant to the current social and economic context. The recent boom in online businesses creates both opportunities and threats for the market. Since the e-commerce Law has not yet been endorsed, Cambodia's e-commerce market cannot gain much confidence from investors, especially foreign investors, who have large investment capital. Without the e-commerce law, consumers and their data are not protected, which can increase the risk for fraud without proper solutions or compensation. Besides, Cambodia's investment law, which was established in 1993 and amended once in 2003, might be less relevant to investment in the current context due to the rapid rise of new business types and issues.

Lack of Human Resources with ICT-Related Skills

The Job Outlook 2018 study, conducted by the National Employment Agency of Cambodia, shows that the area of computer, information technology and multimedia is projected to have good job opportunities due to increased labor demand driven by digitalization

Table 4: Occupations at upper secondary level, whose recruitment situations are very difficult or with least competition for work (the greatest job outlook index) in 2018

Radiographers	ICT operations technicians
Translators and interpreters	Clearing and forwarding agents
ICT user support technicians	Graphic and multimedia designers
Industrial and production engineers	Mechanical engineers
Telecommunications engineers	Process control technicians
Chemical engineers	Database and network professionals
System analysts and IT architects	Electronics zengineering technicians
Software and system developers	Product and garment designers
Construction supervisors	Information technology trainers
Chefs	Computer network and systems technicians

Source: NEA, 2018

in the market.[30] However, as shown on Table 4, recruiting for many ICT-related roles is very difficult due to a shortage of supply of skilled labor in such occupations.

Therefore, the lack of human resources with ICT-related skills imposes a challenge for both users (businesses) and providers (the government) of digital government services. Businesses may need skilled workers who can understand and use available digital services while digital government may require skilled government officials to effectively and efficiently operate the online platforms or systems. Without sufficient digital knowledge and skills, users and providers of digital public services are more likely to prefer manual processes.

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Recommendations

Developing a Centralized Information System for Business Registration

Because of the lack of a centralized system for business registration, incorporating digital technology into business models can help reduce the inefficiencies that may arise from miscommunication and poor data. Similarly, also governments can use it to reduce the time and steps involved in its services. Taking New Zealand as an example, according to the World Bank it ranks 1st among the 190 countries for ease of starting a business. Almost no effort is required to submit a registration online and all the documentation can be processed in a single entry without the need to do anything in person.[31] This is a successful case thanks to a centralized registration agency. According to the World Bank report cited above, every application form will proceed to the New Zealand Companies Office, which is the sole agency in business registration. As mentioned before, registering a business in Cambodia can require an individual to visit multiple different agencies, when it can be solved through a central information system instead. This will also improve the communication between different government institutions and reduce redundant data in the systems.

On top of that, government institutions should also provide more user-friendly online platforms, for example through simple webpage design, mobile applications or one-click information access. From another international example, the South Korean bureaucratic system O.P.E.N. (Online Procedures Enhancement for Civil Applications) was a really successful initial step to draw Koreans to opt for a new E-platform. The system includes the procedures and the tracking of each submitted application on various sectors including business registration, so minimal time is spent and incidental corruption is minimized.

30 National Employment Agency, Cambodia Job Outlook, (Phnom Penh, Ministry of Labor and Vocational Training, 2018)

31 World Bank, Doing Business in New Zealand, (The World Bank Group Flagship Report, 2019), 8.

Hence, the successful story of South Korean municipality taught us that communication between government agencies and business can be very effective if the technology is used for that sole purpose rather than for the sake of technology itself.[32]

E-commerce and Business-Related Law Endorsement and Updates

From a legal point of view, the Royal Government of Cambodia should aim to speed up the process of drafting the E-commerce Law. Cambodia is the only country in ASEAN that does not have this yet. Additionally, the government should amend the existing investment law that is mostly addressed at big investments. Thus, to aim for higher growth, it should be amended to favor Small and Meduim Enterprises (SMEs) and Micro, Small and Medium Enterprises (MSMES) as well, especially those in the tech sector.

Building Human Resource in ICT-Related Skills

According to the data from MPTC (shown in Table. 1), virtually everyone in the country owns a mobile phone. Thus, they should be able to maximize the efficiency of their mobile phones through various different verified government apps which are user-friendly and intuitive. With availability of resources at their disposal, people will be able to catch up with the IoT world, regardless of their age and gender. On top of this, Cambodia is a country with very young population; therefore, exponential teaching from the younger generations to the older generations will be a more effective way to reach out. In the short run, this can be done through various community workshops that will raise awareness among citizens. Each government app should be publicized through social media along with instructional videos for self-guided learning.

Another possibility is to increase the ICT content in the education system, which will help future generations become more familiar with the benefits and risks of technology. Like the Thai government has planned, as cited above, the Cambodian government should aim to invest more into promoting students to develop knowledge and skills in S.T.E.M. (Science, Technology, Engineering, Mathematics). Additionally, the college curriculum should be embedded with ICT related subjects so that students will be more familiar with such skills once they need to embrace them in the working environment. And finally, building human capital can promote the effectiveness and efficiency of the system itself, tackling the issues of inefficacy at public sector workplace.

Conclusion

To sum up, catching up with and maintaining competitiveness amid the global trends of digital and the Fourth Industrial Revolution, the Royal Government of Cambodia has been striving to develop e-government, specifically digital government-to-business services, through various initiatives, policies, laws and regulations. Despite the government's efforts to do so, the country's E-Government Development Index (EGDI) and Doing Business rankings remain low, implying that there are challenges such as the lack of a centralized information system, lack of laws and regulations, and lack of human resources in digital skills. First, to tackle the issue of high costs

32 Bhatnagar Subhash, E-government and access to information, (Global Corruption Report, 2003), 25-26.

Photo credits: Image by Freepik

and complexity of doing business through multiple redundant steps, the government should aim to build a centralized information system connected to all the relevant government agencies. Secondly, Cambodia is facing major challenges because the labor force is not entirely ready to tackle the new era of digitalization; hence, in the long run, the government should try to mainstream the necessary digital skills in the curriculum of high school and higher education institutions, and in the short run it should support the delivery of vocational training and workshops, among other things, to improve the digital skills of young people and the current labor force.