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

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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

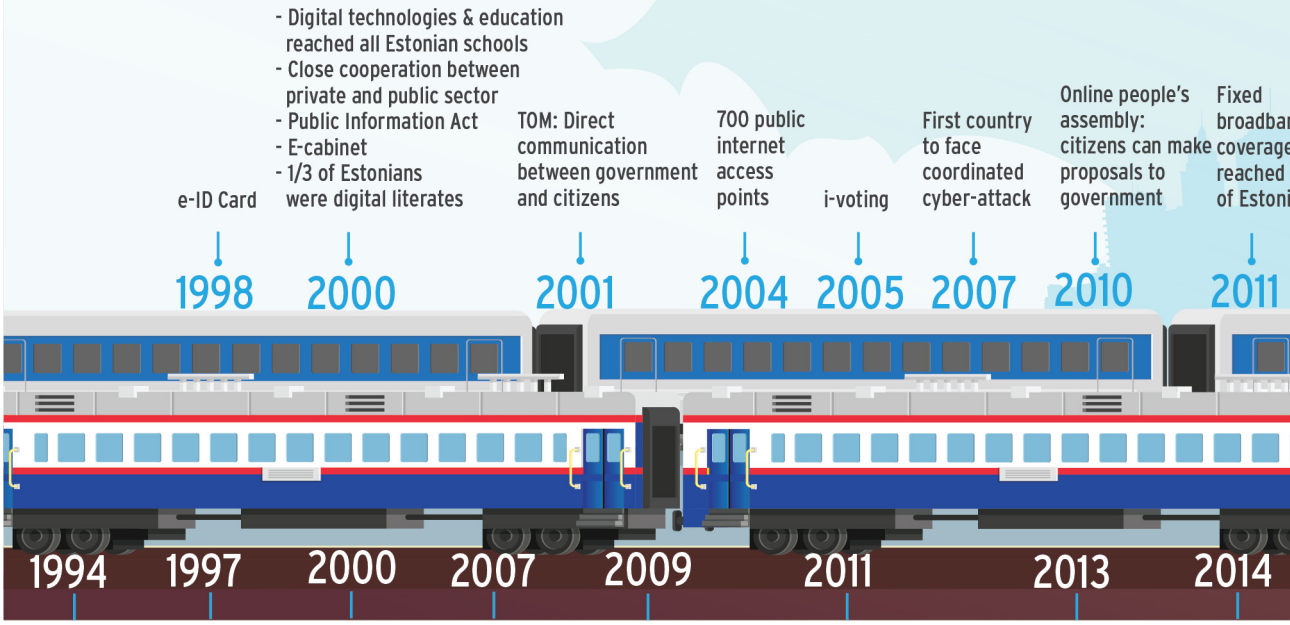
62 Sen David. Premier says that facebook allows him to help citizens. Khmer Times. May 22, 2018. Accessed July 7, 2019. https://www.khmertimeskh.com/492135/premier-says-facebook-allows-him-to-help-citizens/

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

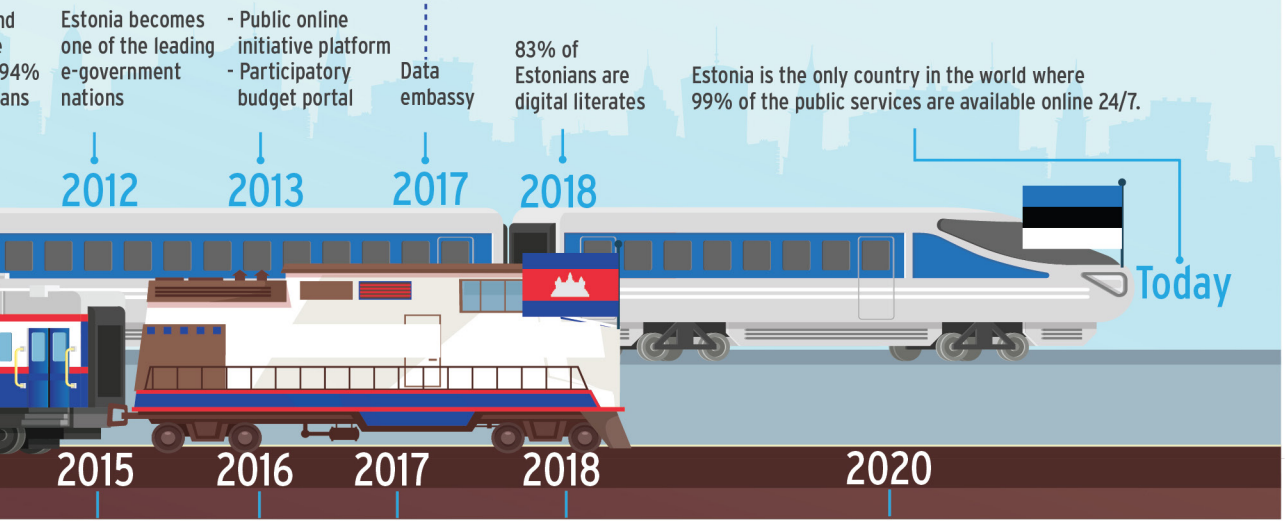
What can Cambodia learn from Estonia?

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.

Photo credits: Image by allPhoto Bangkok from Pixabay

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.