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Going Digital: From Innovation to Inclusive Growth in the Philippines

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Going Digital: From Innovation to Inclusive Growth in the Philippines

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Abstract

The report begins by looking at the components of the digital economy in the Philippines to understand its current landscape. These include the physical infrastructure through which data is transmitted, the devices, software and the functionalities that these offer. This description proceeds to a more detailed example of the benefits of the digital economy by looking at specific case studies particularly the TESDA online portal for e-education and the konek2CARD for e-finance. The case studies show that the inclusion of the digital economy is facilitated by developments in infrastructure. An examination of the current policy environment shows that there are key plans in place for the development of a national broadband network in the Philippines. On the demand side, policies to take care of the privacy and data of the individual users are already in place. Finally, some conclusions and policy recommendations are made to further support the digital economy in the Philippines.

Keywords: *digital economy, internet, broad bank, TESDA online program, digital finance, Philippines, information and communications technology, e-education, last mile consumer*

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List of Acronyms

ASEAN	Association of South East Asian Nations
BIR	Bureau of Internal Revenue
BSP	Bangko Sentral ng Pilipinas
CARD	Center for Agriculture and Rural Development
CGAP	Consultative Group to Assist the Poor
CHITS	Community Health Information Tracking System
CIRC	CUTS Institute for Regulation and Competition
COA	Commission on Audit
CSC	Civil Service Commission
CUTS	Consumer Unity and Trust Society
DA	Department of Agriculture
DBM	Department of Budget and Management
DE	Digital Economy
DICT	Department of Information and Communications Technology
DOH	Department of Health
DOT	Department of Tourism
DTI	Department of Trade and Industry
e-GDI	e-Government Development Index
e-GMP	e-Government Master Plan
EMI	Electronic Money Issuer
FGD	Focus Group Discussion
GPS	Global Positioning System
HDI	Human Development Index
ICT	Information and Communications Technology
ISP	Internet Service Provider
ITU	International Telecommunication Union
LGU	Local Government Unit
Mbps	Megabits per second
MFS	Mobile Financial Services
MOA	Memorandum of Agreement
NGO	Non-Government Organization
NTC	National Telecommunications Commission
NTESDP	National Technical Education and Skills Development Plan

NTHC	National Telehealth Center
OFW	Overseas Filipino Worker
OS	Operating System
PIDS	Philippine Institute for Development Studies
PPP	Public-Private Partnership
RA	Republic Act
RBAP	Rural Bankers Association of the Philippines
SMS	Short Message Service
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCP	Tourism Congress of the Philippines
TESDA	Technical Education and Skills Development Authority
TOP	TESDA Online Program
TVET	Technical-Vocation Education and Training
TVI	TVET Institution
UN	United Nations
UP	University of the Philippines
VC	Virtual Currency

Glossary

Balance Luzon: A geopolitical grouping of provinces that includes the entirety of Luzon except for those in the National Capital Region.

Cryptocurrency: A digital record-keeping devices that uses balances to keep track of the obligations from trading and that is publicly known to all traders (Chiu and Koeppl 2017).

Digital Divide: The gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities (OECD 2001).

Disruptive Technology: A revolutionary technology that suddenly, and often unexpectedly, displaces an established technology (van Pelt 2009).

Fourth Industrial Revolution: A digital revolution characterized by a much more ubiquitous and mobile internet, by smaller and more powerful sensors that have become cheaper, and by artificial intelligence and machine learning. Occurring simultaneously are waves of further breakthroughs in areas ranging from gene sequencing to nanotechnology, from renewables to quantum computing. It is the fusion of these technologies and their interaction across the physical, digital, and biological domains that make the fourth industrial revolution fundamentally different from previous revolutions (Schwab 2017).

Human Development Index: A composite measure for human development that focuses in the three basic dimensions of a long and healthy life, access to knowledge, and a decent standard of living. It uses four basic indicators that includes life expectancy at birth, adult literacy rate, combined gross enrolment ratio, and GDP per capita at purchasing power parity (PPP) (Gallardo 2009).

Proxy Internet Users: Those who use the internet through another person, such as a family member, but who do not use it themselves in a more direct way (as cited in Labucay 2014).

Executive Summary

The birth and upsurge of mobile devices, information, infrastructure, and technical solutions have catalysed the assimilation of information technology with education, socio-political, and economic life. The Philippine Institute for Development Studies (PIDS) through the auspices of the Consumer Unity and Trust Society (CUTS) International, the CUTS Institute for Regulation and Competition (CIRC), and the CUTS Hanoi Resource Centre, has developed this report to provide a description of the state of the Digital Economy (DE) in the Philippines. Subsequently, the report touches on the potential benefits and risks that the DE may bring. Finally, the infrastructures, reforms, and initiatives needed to clear bottlenecks and obstacles to a functioning DE are identified.

The DE encompasses the physical infrastructure on which data and information are transmitted, the devices that are used for access, the applications and software powering these devices, and the functionality these applications provide (Dahlman et al 2016).

One of the strengths of the Philippines in terms of connectivity is the domestic connectivity infostructure (Ruddy 2013). This is attributable to the high investment in terrestrial and submarine fiber optic by the country's service providers and operators. Although, the Philippines suffers from high prices of ICT services such that the Philippines is among the highest in ASEAN (Albert et al 2016).

Two case studies were undertaken to illustrate the benefits of the DE in the Philippines. The first case study is about the digitalization of education in the Philippines particularly the case of the Technical Education and Skills Development Authority (TESDA) Online Program (TOP). The program was launched as a means of reaching more Filipinos through ICT.

As of December 2017, the TOP has been able to offer 59 courses for free. This has benefitted 791,617 non-unique users since the TOP was launched in 2012. Most enrollees take courses in ICT (51.0%) and Tourism (20.7%). The benefits of the TOP can be seen through its impact on the cost of training to students. This has been echoed by the focus group discussion (FGD) made wherein several respondents have found the TOP allows them to be productive at home.

On the other hand, the second case study would be about the digitalization of financial instruments in the Philippines particularly the case of CARD Bank's "konek2CARD." Building on its initial attempt to provide mobile, financial services to its members, the konek2CARD program aims to provide its members with real-time financial transaction services through the use of the internet.

In an FGD conducted with users of the konek2CARD, clients reported that the transaction process got easier, faster, and convenient. They noted that the members can now transact at any time of the day which is very important as most of them are either working or at home doing errands. Seemingly the younger ones tend to use the application more often as older clients let their grandchildren or younger relatives operate the mobile application (i.e., proxy internet users).

Insights from the case studies

There are linkages that can be drawn from the two case studies explored. One of the mechanisms through which digital technology spurs economic development is through the creation of opportunities and markets in which parties may undertake mutually beneficial transactions (World Bank 2016). Also, the birth of new internet-based business models and service providers as another mechanism for the internet to benefit the economy. For the TOP

and konek2CARD, the initial investment to establish their online platforms has allowed them to provide services to the marginal consumer at very little marginal cost.

The two case studies also point to similar weaknesses and challenges namely (1) the need to improve the digital technology infrastructure of the country, the reduction of the cost of internet access, and (2) the need to provide additional features to further engage their customers.

The results of the FGD done for both case studies pointed to the need to improve the access to the internet in the country as the weak and intermittent mobile network signal bars access to the service. For those in the far-flung areas, this factor is a major setback when it comes to the usability of the application.

For the case of the TOP, the additional features that the students would like to see in the future would include the presence of a discussion forum where students can interact and ask an instructor and even a means for online certification testing. With the konek2CARD, on the other hand, additional features that customers would like to see would be bills payment and interbank fund transfer features. Also, konek2CARD is accessible only through android mobile phone platforms; thus, there is room for expanding the service to other operating systems and even other devices.

Finally, the potential for blended services (i.e., combination of digital and face-to-face provision) should also be explored. The TOP and konek2CARD services indicated that there is room for blended services in order to address some cost concerns and circumventing the digital divide.

The regulatory environment affects the potential benefits that can be achieved from the DE. Government policies affects both the supply-side and the demand-side of the DE. The strategies and policies outlined in the National Broadband Plan of the Philippines follow the principles identified by the World Bank in providing internet services though there are a number of legislations that need to be revisited. Demand-side policies, meanwhile, include the National Cybersecurity Plan and the Data Privacy Act which aims to create an environment of trust through cybersecurity and privacy law, respectively.

Policy recommendations

With the circumstances surrounding the Philippines, policy recommendations to foster the continued development of the DE would include (1) reviewing of laws related to the provision of public goods and services particularly the internet, (2) ensuring that strategies of the National Broadband Plan are implemented, (3) establishing a secure and strong collaborative working relationship between key actors related to the DE, and (4) fostering stronger analog components (World Bank 2016) such as in rules, skills, and institutions.

Part of strengthening the provision of digital services of the government would be to prepare the service providers with the ability to use ICT to perform current and even new ICT-related tasks. Some of the benefits of the TOP and konek2CARD have been diminished by the access divide as some users are apprehensive on the use of technology. There is a need to promote the use of technology not only through intensive government promotion campaigns but also by assuring users that the ICT infrastructure is stable and resilient to cyber-attacks.

Specific policy recommendations on how to improve the TOP includes:

- TESDA to continuously lobby for the institutionalization of the e-TESDA division;
- Ensure continuous development of quality and relevant online program courses;
- Strengthen partnerships or linkages; and,

- Promote the TOP through advocacy activities.

Specific policy recommendations on how to foster the continued growth of digital finance in the Philippines includes:

- Strengthen the participation of the private sector;
- Empower collaborations among government agencies; and,
- Institutionalize the national ID system.

Going digital: From innovation to inclusive growth in the Philippines[1]

Francis Mark A. Quimba and Sylwyn C. Calizo Jr.[2]

1. Introduction

Globally, countries are witnessing how the technological revolution has fundamentally affected the way people live, work, and communicate. The birth and upsurge of mobile devices, information infrastructure, and technical solutions have catalyzed the assimilation of information technology with education, socio-political, and economic life.

Furthermore, governments and public sector institutions are able to utilize the benefits of digitalization through improving the reach and access to basic human services such as health, education, government transactions, and financial services. Paramount to this is reaching previously unreachable last mile consumers – individuals or households that are willing yet unable to pursue their human aspirations following a mixture of financial, geographic, or cultural obstacles (see Box 1: Decoding 'Last Mile Consumers')

Box 1 Decoding 'Last Mile Consumers'

The phrase 'Last Mile Consumers' bring to mind the marginalized sectors of society that are often interpreted to be the poorest of the poor. While the poor or those living at USD1.90 per day (Ferreira et al 2015) will easily qualify, there are other sections of society that are marginalized for various reasons ranging from economic to cultural.

In this country report, last mile consumers are understood to be *"individuals or households that are willing yet unable to pursue their human aspirations following a mixture of financial, geographic, or cultural obstacles."*

Example – Barriers to last mile education

Consider under the Universal Declaration of Human Rights, Article 26[1] that declares the universal right to education. In this regard, if an individual is unable to obtain education due to a combination of financial, geographic, or cultural obstacles, then that individual may be considered as a last mile consumer regardless of income level.

Similarly, housewives may be considered as a last mile consumer as well. Highly patriarchal societies which often relegate girls to be caretakers of the home and other children often at the cost of their education. With this, though she desires a basic human right, she is restricted from doing so.

[1] "Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit."

[1] This paper first appeared as a publication produced by the Consumer Unity and Trust Society (CUTS) International.

[2] Philippine Institute for Development Studies (PIDS), Fellow I and Research Analyst II, respectively. All errors are that of the authors.

1.1 The Diginomics project

The Philippine Institute for Development Studies (PIDS), through the auspices of the Consumer Unity and Trust Society (CUTS) International, the CUTS Institute for Regulation and Competition (CIRC), and the CUTS Hanoi Resource Centre, has developed this country report on the permeation of the Digital Economy (DE). This report provides a description of the state of the DE in the Philippines. Subsequently, the report touches on the potential benefits and risks that the DE may bring. Finally, the infrastructures, reforms, and initiatives needed to clear bottlenecks and obstacles to a functioning DE are identified.

In order to achieve these objectives, this country report explores the case of two facets of the DE namely e-education and e-finance. Section 2 will first present the results of the case studies separately before providing a discussion on the linkages and comparisons that can provide insights on the DE in the Philippines.

Meanwhile, Section 3 highlights the regulatory and policy challenges faced by the government in the transition towards the new business model of the DE. Particularly, macro challenges in legislative foundations and an analysis on the Philippine DE's Strengths, Weaknesses, Opportunities, and Threats (SWOT) will be discussed.

Finally, Section 4 will provide an answer to the country report's vision of the potential of DE to provide inclusion, efficiency, and innovation. Particularly, with an emphasis on reaching the last mile consumer in the country. Apart from this, policy recommendations are provided as ways forward for DE in the Philippines.

1.2 The digital economy in the Philippines

The definition of DE used in this report is that the DE is the "*amalgamation of several general purpose technologies and the range of economic and social activities carried out by people over the internet and information networks* (Dahlman et al 2016)." With this definition, DE encompasses the physical infrastructure on which data and information are transmitted, the devices that are used for access, the applications and software powering these devices, and the functionality these applications provide.

1.2.1 Physical infrastructure

The backbone of data or information transmission includes cell site towers, communication lines, broadband, fiber optic technology, and satellites. These devices are the highways and gateways of information interchange. The Internet Service Providers (ISPs) are at the forefront when it comes to establishing the internet infrastructure for the services to flow from all nodes.

The Philippines' international access and connectivity is through 7 undersea cable systems. Primarily, these are connected to the terrestrial landing points in the main island of Luzon. According to the National Broadband Plan, majority of these cable systems are hosted by only two major providers: PLDT and Globe, indicating very high market power in the international access and connectivity services. Internet access services in the Philippines are also supported by 17 satellite internet service providers (DICT 2017a).

One of the strengths of the Philippines in terms of connectivity is the domestic connectivity infostructure (Ruddy 2013). This is attributable to the high investment in terrestrial and submarine fiber optic by the country's service providers and operators. Another strength is the competing national fiber-backbone infrastructure which is comprised of PLDT's domestic

Fiber-optic Network (DFON), Globe Telecom's Fiber optic backbone network (FBON) and the National grid corporation's private telecommunication network (NGCP).

In the mobile landscape, both SMART and Globe, the two main mobile phone services providers claim to have a 99.0 percent coverage reach since 2007 (Alampay 2011). Figures for 2014 also show that 99.0 percent of the population is covered by a mobile network signal. According to the DICT PMESCD-NIGS, network coverage as a percentage of population with a minimum of 2G, 3G, and 4G is 92.7, 87.4, and 19.5, respectively. The number of cell sites in the country is about 16,300 translating to about 54.7 cell towers per 1000 square kilometers. This is much lower than ASEAN neighbors like Viet Nam (225.0 towers/1000 sq. km), Thailand (102.7 towers/1000 sq. km) and Malaysia (67.3 towers/1000 sq. km).

The Philippines suffers from high prices of ICT services. Prices of ICT services in the Philippines are among the highest in ASEAN (Albert et al 2016). Fixed telephone services are priced at USD36.2 per month, the highest in ASEAN. Moreover, the price of mobile cellular services placed as the second highest (USD22.2 per month) while the price of fixed broadband services ranked as the third highest (USD51.6 per month) in ASEAN.

The internet speed is not worth its cost. Akamai (2017), a cloud data network that monitors internet traffic, reports that the Philippines' average internet speed stands at the lowest in the Asia Pacific with only 5.5 Mbps in 2017. The global average speed stands at 7.2Mbps while the Asia Pacific average speed posted at 4.0Mbps.

While the Philippines ranks lower than some of its ASEAN neighbors in key ICT indices[3], there may be improvements to look forward to in the coming years with Philippine President Rodrigo Duterte's approval of a plan to deploy a national broadband network at an estimated cost of PhP77.0 billion to PhP200.0 billion (Reuters 2017). The network will be used to host a national portal and other online government services, as well as to connect remote areas of the country that are underserved by existing broadband providers.

1.2.2 Devices

Personal and shared gadgets pertain to computer servers, personal computers, laptops, smartphones, tablets, and of the similar range of mediums used. These hold the application software and its Operating Systems (OSs). Computer ownership from 1997 to 2013 was "*generally low and hardly changed until 2008 when it reached double-digit levels* (Labucay 2014)." There are approximately 3.8 million Filipino households owning a computer in 2013. More recent figures from ITU core household indicators, indicate that about 23.4 percent of households in 2016 (around 5.4 million households) own a computer.

Using the results of the SWS survey, Labucay (2014) finds that computer penetration is concentrated in Metro Manila, and in urban areas across the country with a bulk coming from middle-to-upper classes (53.0%). In contrast, computer ownership in provinces and rural areas together with the poor and very poor are disproportionately lower. This may result to an access divide.

Apart from computers, Filipinos also use mobile phones either as an addition or as an alternative. In a report by GSMA Intelligence (2014), unique mobile subscriber growth has averaged at 6.0 percent in a three-year period. Moreover, half of the population subscribes to

[3] According to the 2016 Network Readiness Index (NRI) of the World Economic Forum, which measures how economies use the opportunities offered by ICT for increased competitiveness based on 53 individual ICT indicators for environment, readiness, usage, and impact, the Philippines is at 77th place out of 139 economies. This leaves the country way behind Singapore, Malaysia, Thailand, and Indonesia despite having improved since 2013.

mobile services, primarily serviced by PLDT-Smart and Globe Telecom. Mobile services are available in bundles and are largely done through prepaid connections (95.0%). Also, smartphone ownership has been growing fast with a growth rate of 75.0 percent in a four-year period. This growth is above the South East Asia average of just 50.0 percent. Furthermore, a quarter of the population owns a smart phone. The same report explains that these rapid growth rates are a result of affordable local smartphone brands such as Cherry Mobile and MyPhone.

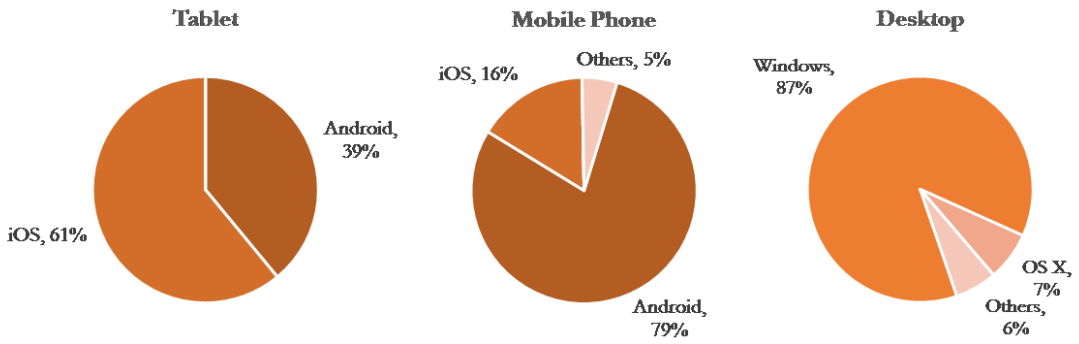
The amount of time spent on the internet by Filipinos is partly because of the amount of services that can be obtained through it. In the Global Digital Report (2018), about 58.0 percent access the internet daily while 28.0 percent access once a week. Only 8.0 percent use it once a month and 6.0 percent use it less than once a month. The same report also ranks the Philippines as first in terms of time spent in social media (almost 4.0 hours daily).

1.2.3 Applications and Software

OSs and Software plays an important role as a component enabling these devices to function. While OSs such as Windows, Mac, and iOS provide the backbone for operation, application software deliver the services.

The most common OSs used in the Philippines vary by type of device (Figure 1). For tablet users, the most common software used is iOS (61.0%) while for mobile phone users, iOS is only used by 16.0 percent. Majority of mobile phone users use the Android OS (79.0%). Around 87.0 percent of desktops operate using the Windows OS while seven percent use the OSX.

Figure 1 Popular operating systems in the Philippines by device (as of April 2018)



Source: StatCounter. http://gs.statcounter.com/

The OSs are important as this is the means for the people to download the application software in order to have access to services. Some applications are also available only on specific OSs like the konek2CARD.

1.2.4 Functionality that they offer

The services rendered by the applications form the final component of the DE. These services would encompass various daily activities such as online shopping, booking and hailing of transportation, education, cloud computing, banking and trading, and other similar services that could be reformed to be delivered electronically and remotely. Firms such as Uber, Grab,

Lazada, Alibaba, Spotify, and other similar firms are at the forefront of these new modes of providing services to consumers.

Among the activities Filipinos do online include using a search engine, visit a social media website, playing games, watch videos and look for product information. Online shopping is active in the Philippines as well with around 56.0 percent of Filipinos visiting online retail stores and 54.0 percent searching for products or services online (Global Digital Report 2018).

1.2.5 Examples of the functionalities and services of the DE in the Philippines:

1.2.5.1 The 'sharing economy' in the Philippines. The 'sharing economy,' is the collaborative use of resources owned by individuals. The Philippines ranks 4th among 60 countries in terms of willingness to participate in the sharing economy, and this promotes growth in the development of this business model (Valencia 2017).

Transportation Network Companies (TNCs) such as Uber, Grab, and Angkas, are providing ride-hailing services that can be accessed by the riding public through the use of GPS installed in their smartphones, allowing both parties to locate each other. This feature allows the TNC to calculate the distance from pick-up points to the desired drop-off point and compute travel expense prior to booking.

Apart from the transportation sector, accommodation sharing services such as Airbnb allow an alternative for travelers from the traditional hotel service. Considerably, accommodations booked through Airbnb are cheaper than booking a hotel reservation. While the sharing economy spans more than just the above, what can be taken is that inclusion to these markets have been delivered through the DE. Moreover, the frequency of use Filipinos have of mobile devices can support this new business model.

1.2.5.2 e-Education in the Philippines. The presence of institutions, organizations, and private businesses that offers training and specialization on technology courses have materialized in the Philippines, addressing the delivery of education training. The University of the Philippines (UP) System Information Technology Foundation, for instance, was organized and established for application development that utilizes the ICT. Their technology-based courses prepare the industry in the future of the DE.

Also, the education industry utilizes the ICT in establishing virtual learning systems to supplement the classroom learning experience. Universities practicing such includes the UP Open University Virtual Learning Center, New Era University Open and Online Education, and Mapua University. By simply deploying online learning platforms to supplement the classroom experience, students can take examinations, submit assignments, and discuss academic subjects conveniently and efficiently.

Following a vision to provide an effective and efficient way to deliver technical education and skills development services to more Filipinos, the government of the Philippines through the Technical Education and Skills Development Authority (TESDA) has launched the TESDA Online Program (TOP) in 2012. It utilizes an open education resource framework that aims to make technical education accessible and inclusive through the use of ICT. Its primary audience is catered to the needs of students, out-of-school youths, unemployed adults, local and overseas workers, and professionals interested to take TESDA courses.

1.2.5.3 e-Health in the Philippines. ICT has been an influential partner for the healthcare industry. It provides the benefit of harnessing information about the latest innovations and technology to unravel treatments and to improve services in providing better patient care.

Likewise, electronic platforms also make it convenient for patients to schedule appointments with a clinic, have access on their laboratory results, reserve hospital rooms, pay hospital bills, order medicine, and consult their doctors through mobile phones at a lower cost (see Box 2: MyPocketDoctor: Reducing the cost of medical consultations through digital technology). This is evident in areas where the internet is highly accessible such as in Metro Manila and in urban areas across the country, particularly because a number of hospitals and healthcare providers are furnished with up-to-date facilities. Rural areas, however, still has insufficient means to address healthcare issues.

Another notable project in the country is the creation of the National Telehealth Center (NTHC), a center mandated to improve the health of Filipinos in a cost-effective manner through the utilization of ICT. The Community Health Information Tracking System (CHITS) was launched as NTHC's initiative to transform manual and paper-based collection of patient and other health-related information into a systematized electronic medical record repository which noticeably improved the management of health information and access to health data in geographically isolated areas.

Box 2 MyPocketDoctor: Reducing the cost of medical consultations

Considering that the Philippines experiences the doctor-patient geographical separation problem, the private sector has initiated the first telemedicine application in the Philippines through its proponent Mediaxes Inc. using its MyPocketDoctor mobile application launched since 2006.

Its primary goal is to deliver medical consultation services to Filipinos through their mobile phones. Forming its backbone are doctors both from Europe and from the Philippines. Its services span across all specialties with consultations adhering to best practices taken from European telemedicine standards.

Based on their official website[1], MyPocketDoctor is actually cheaper (PhP450) than the traditional modes of doctor consultations in hospitals (PhP500). Moreover, accounting for waiting time and travel time spent (estimated at 6.0 hours in Manila) in traditional modes, that would translate to a total expense of PhP2,650. In contrast, the telemedicine service would only cost PhP450 (and potential mobile data expense) and would last only for about 14.0 minutes.

In several aspects, taking this hypothetical situation, the MyPocketDoctor is both easing the process for patients and at the same time delivering quality medical service to Filipinos down to geographically distant areas far from hospitals.

[1] The MyPocketDoctor comparison chart between hospitals and the application can be accessed through their official website at https://www.mypocketdoctor.com/comparison

1.2.5.4 e-Finance in the Philippines The Philippine central bank, Bangko Sentral ng Pilipinas (BSP), formulated regulations in the year 2000, which allowed local players to offer electronic banking services (Lopez 2017). The pioneer e-wallets, GCash and Smart Money, were identified to be one of the fruits of these regulations by the BSP, in collaboration with the financial services industry, to support digital finance. Since then, banks and non-bank entities have offered e-financial services such as e-banking (for banks) and e-money applications.[4] Through these channels, the government aims to reach the unbanked and unserved/underserved population.

A big chunk of e-money transactions, 78.2 percent, is reportedly done through banks while the rest can be accounted for other e-money issuers or EMIs (i.e., non-bank financial institutions and other entities) (Lopez 2017). There are two non-bank financial institutions and eight other entities listed as EMIs supervised by BSP, as of December 2017. As for banks, the BSP reported that as of June 2017, there are 70 banks with electronic banking facilities, of which 35 are universal and commercial banks, 24 are thrift banks, and 11 are rural and cooperative banks (Table 1). About 60.0 percent of banks with e-banking facilities offer internet banking, whether bank-owned internet facility or through BancNet, a Philippine-based interbank network. Mobile banking is offered by 25 banks (35.7%), while mobile apps have been introduced by 15 (21.4%). In terms of e-money instruments such as prepaid card, cash card or remittance card, 28 banks (48.0%) with e-banking are registered as EMIs.

While most of the banks that offer e-banking and e-money applications are universal and commercial banks, there are rural banks that offer mobile banking (1 bank), internet banking through BancNet online, BancNet cash-out aggregator/acquirer services (Business World 2017), and e-money prepaid card/cash card/remittance card.[5]

Table 1 Number of banks authorized by BSP to engage in e-banking operations

As of end-June 2017								
Bank Category	Number of banks with electronic facilities[1]	Number of banks with e-banking and e-money applications						
		Mobile banking	Phone banking	Internet banking (proprietary)	Internet banking thru BancNet[2] Online	Mobile financial services thru mobile apps	BancNet POS cash-out aggregator/ acquirer	Electronic money issuers (prepaid/ cash/ remittance)
Universal and commercial	**35**	**15**	**14**	**32**	**20**	**12**	**5**	**19**
Universal	19	13	13	18	12	9	3	13
Commercial	16	2	1	14	8	3	2	6
Thrift	**24**	**9**	**4**	**10**	**18**	**3**	**4**	**8**
Rural and cooperative	**11**	**1**	**-**	**-**	**4**	**-**	**6**	**1**
Total	**70**	**25**	**18**	**42**	**42**	**15**	**15**	**28**

[1] As approved by the BSP
[2] BancNet is a Philippine-based interbank network.
Source: Appendix 7, BSP (2017a)

The Rural Bankers Association of the Philippines (RBAP) also reported that rural banks have been using mobile banking in partnership with third-party entities (RBAP 2014). Many rural

[4] Collaborative efforts between the BSP and the telecommunication companies has remained intact and strong – a factor that has been deemed to be one of the success factors in the implementation of the electronic money (e-money) and electronic money issuers (EMI) operations in the country (Llanto and Rosellon 2017).
[5] The figures come from a BSP report with data as of June 2017. Some e-banking and e-money applications, for instance, CARD Bank's mobile app, Konek2CARD, may not have been counted.

banks have been offering mobile money-enabled services to their clients (e.g. GCash and Smart Money-enabled ATM card). SMS banking is also one mobile banking technology that is being offered in the rural banking industry. The rural banking industry has already processed more than PHP 16.0 million in mobile money transactions, which involved almost 100 rural banks, their 1,200 branches and other banking offices (RBAP 2014).

Meanwhile, looking closely at e-money transactions, data from the BSP indicate that from 2015 to 2016 the number and amount of inflow and outflow transactions and number of accounts increased, while e-money cards remained steady except for ATM debit cards (Table 2). Inflow and outflow transactions in 2016 are slowly approaching one trillion pesos, amounting to PHP 956.1 billion, which is a 4.3 percent increase from 2015. The number of registered and active e-wallet accounts also increased by 21.4 percent and 8.9 percent, respectively while an increase in issuances of ATM debit cards of 24.1 percent was recorded. However, the share of active e-money accounts decreased from 68.1 percent to 61.4 percent, and e-money prepaid cards and credit cards did not increase substantially (less than 1.0%), which suggests that current adoption of digital financial transactions leaves room for improvement.

Table 2 Electronic money in the Philippines

Number of transactions (in millions)	2015	2016	Growth (%)
Inflow	60.0	67.0	11.9
Outflow	267.0	299.0	11.9
Amount of transaction (in billion pesos)			
Inflow	456.4	477.7	4.7
Outflow	460.2	478.4	4.0
Number of e-money accounts (in millions)			
Registered e-money accounts (GCash, Smart Money)	9.4	11.4	21.4
Active e-money accounts (among registered users)	6.4	7.0	8.9
Cards (in millions)			
Prepaid cards (linked to e-money)[1]	26.0	26.1	0.6
ATM debit cards[2]	40.9	50.8	24.1
Credit cards[2]	8.4	8.4	0.1

[1] E-money accounts (excluding GCash and Smart Money) issued by other e-money issuers
[2] 2014 vs. 2015
Source: BSP (2017a)

Non-bank entities have also used financial technology (fintech) to enhance usage of financial services. Fintech firms in the Philippines have established a group called "FinTechAlliance.ph", composed of strategic non-bank, financial technology players (Business World 2017). The alliance generally aims to promote and support building a sustainable financial ecosystem. One of the members of this alliance is FINTQ and Voyager Innovations, the financial technology unit and digital innovations arm, respectively, of PLDT, a big telecommunications company in the Philippines, developed the product called "Lendr."

Lendr uses a mobile technology platform in applying and processing any type of loan. Subscribers of the mobiles networks in the Philippines, through their mobile device, are able to make use of a one-stop application/portal showing multiple loan products of all partner banks and microfinance institutions and companies, for faster, more convenient, dynamic and secure

application process. FINTQ also offers microinsurance through the KasamaKa microinsurance program.

1.2.5.5 e-Governance in the Philippines. Based on the UN e-Government Survey 2016, the Philippines' e-Government Development Index (e-GDI) ranked 71st out of 193 countries from its 95th spot in 2015. This huge leap in the Philippine ranking strongly suggests amassed progress in the use of ICT in the public arm, primarily to enhance government operations.

The Department of Information and Communications Technology (DICT), being the leader in the development of the e-Government Master Plan (e-GMP), strategizes an even more enhanced e-government presence, targeting a reduction of bureaucratic red tape and giving citizens better access to government services. The government eyes to evolve in some aspects such as payroll thru mobile-based e-money or e-banking, digital payments to suppliers upon avail of goods or services, and digital payments from the general public specifically to the Local Government Units (LGUs) and Non-Government Organizations (NGOs) where access to government services are infrequent.

Through partnerships with digital payment card companies, local governments have expanded the use of cashless payment systems in their jurisdiction using only their local government ID. Such is the case in the city of Malolos, Bulacan and in other cities throughout the country (see Box 3: Expanding local government reach through PayMaya). The all-in-one ID cards can be presented in schools, be used as pay-out cards by enterprises, and be used for ATM withdrawals. This suggests that LGUs are placing an effort to gain improvements in the delivery of government services.

Box 3 Expanding local government reach through PayMaya[1]

In December 23, 2017, PayMaya held a cashless gift-giving event to more than 2,000 citizens of Malolos, Bulacan. According to Malolos City Mayor Christian Natividad:

> Allowing citizens of Malolos to use their Malolos Citizen ID card in more establishments in the city is part of our big goal to make Malolos a digital city. We want to enable our citizens to have access to the digital economy and experience cashless payments with ease and security using their Citizen ID card, which is powered by PayMaya.

Paolo Azzola, PayMaya Chief Operating Officer and Managing Director also said during the launch that:

> With more establishments on-board, Malolos residents will now enjoy secure and convenient cashless payments in more establishments in the city. Businesses in Malolos adopting payments via PayMaya QR, on the other hand, are giving consumers more payment options and providing them with better customer experience.

PayMaya has gained popularity also in other local government units including Balanga City, Muntinlupa City, Cabalogan City, and Tacloban City reaching almost all age groups from senior citizens to millennials.

[1] Box 3 is based on the PayMaya Stories. Sourced from https://stories.paymaya.com/malolos-city-gears-cashless-payments-paymaya

While this would be the case, the DE faces still an obstacle through the 'digital divide.' The divide occurs in two stages. First is with 'accessing divide' and the second with 'using divide' (Labucay 2014). Accessing divide pertains to the capacity of individuals to access the DE through devices, primarily with personal computers. On the other hand, the using divide pertains to differences among users, primarily socio-demographic factors. The digital divide affects the DE's capacity to deliver inclusion, efficiency, and innovation to the three economic players of businesses, people, and government. In the Philippines, studies covering the extent of households with computer ownership is limited. A study by Labucay (2014), however, presents key information on Filipinos that can access online.

2. Benefits of digitalization in the Philippines

The first case study would be about the digitalization of education in the Philippines, particularly the case of the TOP. TESDA, which is the government agency established to encourage the full participation and mobilization of the industry, labor, local government units, and technical-vocational institutions in the skills development of the human resources of the country, has launched the TOP as a means of reaching more Filipinos through ICT. The case study presents some details of the TOP and analyzes its current performance.

On the other hand, the second case study would be about the digitalization of financial instruments in the Philippines, particularly the case of CARD Bank's "konek2CARD." Building on its initial attempt to provide mobile financial services to its members, the konek2CARD program aims to provide its members real-time financial transaction services through the use of the internet. A summary of the program's performance is presented as another case of the benefits of digitalization

2.1 e-Education in the Philippines: The case of e-TESDA[6]

Education and training for productive employment plays a crucial role in the social and economic plans of a developing country like the Philippines. Technical and Vocational Education and Training (TVET) in the country has been viewed as a tool to help equip the people with the necessary skills for employment, in effect increasing their income potential and eventually removing them from the state of poverty. Moreover, the skills of the current working population are improved by upgrading or developing new competencies resulting in increased productivity and enhanced employability.

In 2016, there are about 2.3 million TVET enrollees under the TESDA of which 2.2 million have graduated. With the massive demand for TVET, there is a need to reconsider new learning methods to accommodate those who cannot enter the TVET Institutions (TVIs) for reasons that include, for instance, limited space in classrooms and difficult to reach locations.

There is a need to expand access of quality TVET to reach out to more people, particularly those in the remotest places. Building additional TVIs to address this, requires substantial resources and time. With the advent of the ICT, fast tracking the expansion of the scope through eLearning becomes a likely possibility. eLearning may also increase the absorptive capacity of TVIs to deliver TVET programs and services. The growing percentage of Filipinos with internet connections of 63.6 percent in 2016 according to National Telecommunication

[6] This section draws heavily from Cabauatan et al. (2018).

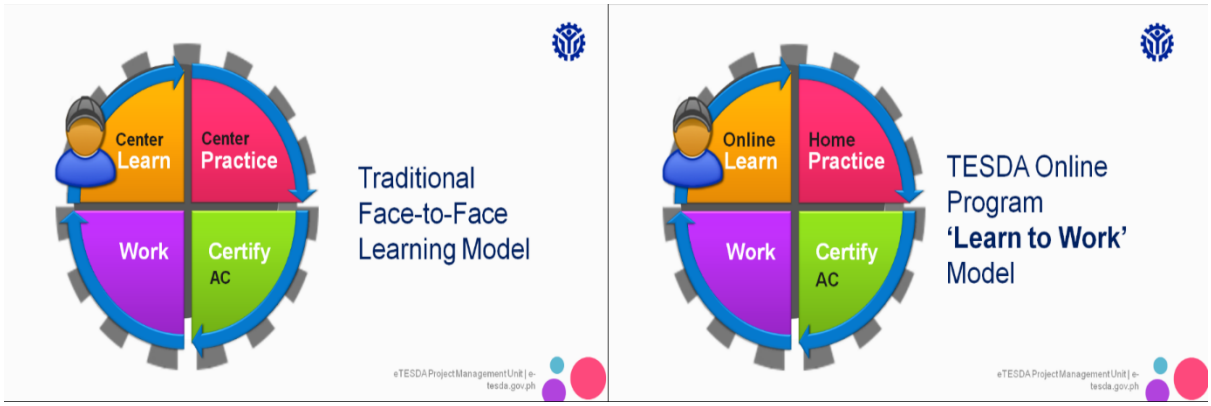
Commission (NTC), and the increasing trend of digitization of learning, tapping this technology had brought more people into enrolling in TVET.

2.1.1. Background of the TOP

In response to expanding the reach of TVET, the Philippines, through TESDA, initiated in 2011 and was officially launched in 2012 the TOP, the first Philippine Massive Open Online Courseware. Current statistics from TESDA estimates that more than a million Filipinos were able to access and utilize the TOP. This was a response to one of the strategies set forth in the National Technical Education and Skills Development Plan (NTESDP) of 2011 to 2016 which states that ICT must be integrated in vocational education. Conceptualized in 2008, the TOP has become an initiative to reach thousands of Filipinos globally through ICT providing more technology-driven and technology-managed teaching and learning tools. Thus, TESDA decided to move from the traditional classroom based on a 'face-to-face learning model' to an online program hybrid learning model which is the 'learn-to-work model' (Figure 2).

The TOP utilizes an open education resource framework that aims to make technical education accessible and inclusive using ICT. The goal of TOP is to "*learn at your own pace, in your own time, at your own place.*" Included is to relearn the lessons over and over for mastery online, to apply or to put into practice the learning (e.g., at home or in a similar workplace), to be assessed and to be certified[7], and to earn or get a work applying the skills learned in gainful activities. This will give students unlimited access and lifelong learning with e-TESDA.

Figure 2 The TESDA traditional and TOP models



Source: e-TESDA Project Management Unit (PMU)

With the vision of reaching the last mile consumer and to empower the reached, the TOP identifies as primary clientele students, out-of-school youths, unemployed adults, local and overseas workers, and professionals. Students may include high school graduates, secondary school leavers, or college undergraduates who want to acquire competencies in different occupational fields. Likewise, those unemployed or displaced workers actively looking for work and those employed but needing skills upgrading or acquiring new skills. Returning

[7] Under the Philippine TVET Qualification and Certification System (PTQCS), competencies (knowledge, skills, attitudes, and values) are assessed to determine the qualification level of individuals. Qualification levels are awarded as National Certificate (NC) I to IV, in order of increasing rank. Under the PTQCS, individuals that have accumulated a defined number of achieved units of competency are awarded a Certificate of Competency (COC) which can lead to an NC once they have undergone the Full National Qualification assessment.

Overseas Filipino Workers (OFWs) who decide to discontinue working abroad are also potential TOP clients. The DE and the digitalization of education has provided TESDA with a means to expand its coverage overseas.

2.1.2. The way the TOP works: Registration, enrolment, and course offerings

Participation in the TOP involves registering in the TOP website. Prospective participants or enrollees may access the TESDA website using whichever devices available to them. From there, users can browse through the wide range of categories being offered from hard skills to soft skills. In the early stages of the TOP, there were only six courses covering three sectors. These includes courses in ICT, food and beverage servicing, and housekeeping. As of February 2018, the TOP now offers 59 online courses across different sectors that includes agriculture, electronics, entrepreneurship, maritime, tourism, and ICT (Table 3). With the provision of a wider range of courses offered, courses have since been screened to guarantee quality learning.

Table 3 Number of eTESDA course offering (as of February 2018)

Sector	Number of Courses	Percentage
Agriculture	1	1.7
Automotive	2	3.4
Electrical and Electronics	1	1.7
Entrepreneurship	2	3.4
Human Health and Health Care	3	5.1
Heating, Ventilating, Air Conditioning, and Refrigeration	1	1.7
Information and Communications Technology	14	23.7
Lifelong Learning Skills	2	3.4
Maritime	1	1.7
Social, Community Development, and Other Services	1	1.7
Tourism	21	35.6
TVET	10	16.9
TOTAL	**59**	**100.0**

Source: eTESDA Project Management Unit

Private organizations like Microsoft Online, Intel, Udacity-Google, SMART SWEEP Lecture Series, Coca-Cola Philippines, Udemy, and Consuelo Foundation likewise have partnered with TESDA through sharing of their own courses or through jointly developing relevant online courses. Course offerings under the TOP are free of charge, however, online training certificates are not issued. Instead, once participants finish the online course, they may opt to take a face-to-face assessment for national certification at any TESDA accredited assessment center.

For some of the courses, OFWs may opt to be assessed remotely through applications such as Skype or Messenger. The same technology is applied throughout the duration of the enrolled course until such time that a certification is issued. This is to empower OFWs with skills upgrading opportunities and expand their capacities in accreditation and certification. This enables them to shift from a vulnerable position to decent jobs and increase their income opportunities.

The TOP is handled by the e-TESDA Project Monitoring Unit (PMU). They are tasked to assist e-TESDA centers through the training of managers and trainers in development of e-learning modules. The e-TESDA PMU also ensures that the online materials are innovative, standardized, learning-centered, and easy-to-understand for self-paced learning. Furthermore,

to ensure adequacy of the course contents, eTESDA PMU developed the in-house online courses not only by the in-house development team, but also through massive consultations from the subject matter experts.

With the growing demand for TOP and the current management structure, the e-TESDA PMU has since requested the Department of Budget and Management (DBM) in 2017 for it to become a permanent division handling all e-TESDA programs and projects as it is currently being supported only by two permanent staff members and eight job order staff[8].

2.1.3 Characteristics of TOP users

Using administrative data from e-TESDA PMU, this section presents some characteristics of TOP users. e-TESDA PMU has recorded, in total, about 1.1 million registered TOP users online with 71.0 percent enrolled in at least one TOP course (Table 4). The majority of registered users are female (60.0%) with male users accounting for (38.0%) and the rest are undisclosed (Figure 3). About 76.2 percent of sessions occur in the Philippines whereas 23.8 percent are overseas. As of May 2017, 46.8 percent of enrollees have already completed the courses they were enrolled in.

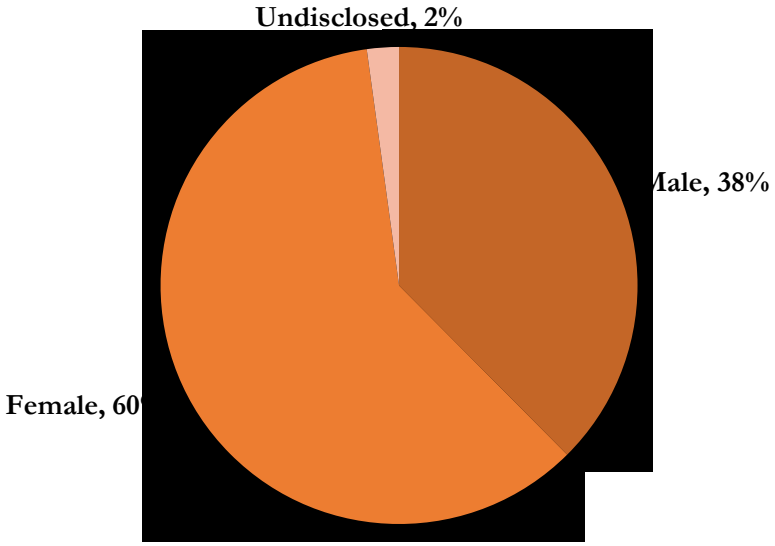
Table 4 Selected TESDA TOP statistics

Indicator	Number of Registered Users	Number of Enrollees
Yearly increase, non-unique users	(As of December 2017)	(As of December 2017)
2012	49,880	7,335
2013	152,352	15,346
2014	201,472	171,665
2015	207,453	221,393
2016	326,400	210,921
2017	176,888	164,957
Total	**1,114,445**	**791,617**

Source: eTESDA Project Management Unit

[8] Job order staff under the Philippine government is defined as "piece work (pakyaw) or intermittent or emergency jobs such as clearing of debris on the roads, canals, waterways, etc. after natural/man-made disasters/occurrences and other manual/trades and crafts services such as carpentry, plumbing, electrical and the like. These jobs are of short duration and for a specific piece of work." As defined under CSC-COA-DBM Joint Circular No. 1, series of 2017 "Rules and Regulations Governing Contract of Service and Job Order Workers in the Government." https://www.dbm.gov.ph/wp-content/uploads/Issuances/2017/Joint%20Circular/CSC-COA-DBM%20JOINT%20CIRCULAR%20NO.%201%20(1).pdf

Figure 3 Distribution of TOP users by sex, 2017



Source: eTESDA Project Management Unit

Courses that have had enrollment since its establishment are in ICT (51.0%), tourism (20.7%), TVET (5.9%), health (5.4%), and electronics (4.9%). It would also be informative to look at which courses have the highest and the lowest percentage of completers as a proportion of total enrollees. As for the courses that registered high percentage of completers as a proportion of enrollees, these are: Heating, Ventilating, Air Conditioning and Refrigeration (77.2%); Information and Communication Technology (65.5%); and TVET (59.9%). Those with the lowest ratios of completers to enrollees include Lifelong Learning Skills (0.0%), Automotive (7.0%) and Social, Community Development and Other Services (8.7 %). Overall, 46.8 percent of enrollees have already completed the courses they were enrolled in (Table 5).

Table 5 Number of enrollees by eTESDA course offering (as of December 2017)

Sector	Number of Enrollees	Percentage of Enrollees	Number of Completers	Percentage of Completers	Completers/ Enrollees[1] (%)
Agriculture	10,170	1.3	2,893	0.8	28.4
Automotive	22,072	2.8	1,548	0.4	7.0
Electrical and Electronics	38,869	4.9	8,294	2.2	21.3
Entrepreneurship	18,884	2.4	4,773	1.3	25.3
Human Health and Health Care	42,588	5.4	7,931	2.1	18.6
Heating, Ventilating, Air Conditioning and Refrigeration	25,704	3.2	19,832	5.4	77.2
Information and Communication Technology	403,869	51.0	264,501	71.4	65.5
Lifelong Learning Skills	2,721	0.3	-	-	-
Maritime	6,091	0.8	1,196	0.3	19.6
Social, Community Development and Other Services	10,064	1.3	872	0.2	8.7
Tourism	163,926	20.7	30,394	8.2	18.5
TVET	46,659	5.9	27,957	7.6	59.9
TOTAL	**791,617**	**100.0**	**370,191**	**100.0**	**46.8**

Source: eTESDA Project Management Unit

[1] Completers as of May 2017

In 2018, data was gathered on a small cross-section (4,018 observations) of TOP users in the Philippines who registered sometime during the period of January 8 to 22, to obtain further information on educational attainment, age group, and location of the TOP users (Table 6). The majority of users are college graduates (65.0%) followed by Grade 10 and below (16.0%), with technical-vocational education (12.0%), and senior high school (6.0%). The majority of users fall within the age group of 25-34 years old (43.6%). Most users are located in Balance Luzon (42.7%) followed by the National Capital Region (NCR) at 34.2 percent whereas Visayas and Mindanao comprise 23.1 percent combined.

Table 6 Selected TESDA TOP statistics (January 8-22, 2018)

Indicator	Number of Registered Users	Percentage
Total, unique users	4,018	100.0
Highest Educational Attainment		
Doctorate Level	11	0.3
Masters Degree	77	1.9
College Degree	2,602	64.8
Technical-Vocational	471	11.7
Senior High School	230	5.7
Grade 10 and below	627	15.6
Age Group		
17 years old and below	34	0.8
18-24	1,315	32.7
25-34	1,750	43.6
35-44	747	18.6
45-54	143	3.6
55-64	27	0.7
65 years old and above	2	0.1
Location		
National Capital Region (NCR)	1,373	34.2
Balance Luzon	1,716	42.7
Visayas	477	11.9
Mindanao	452	11.2

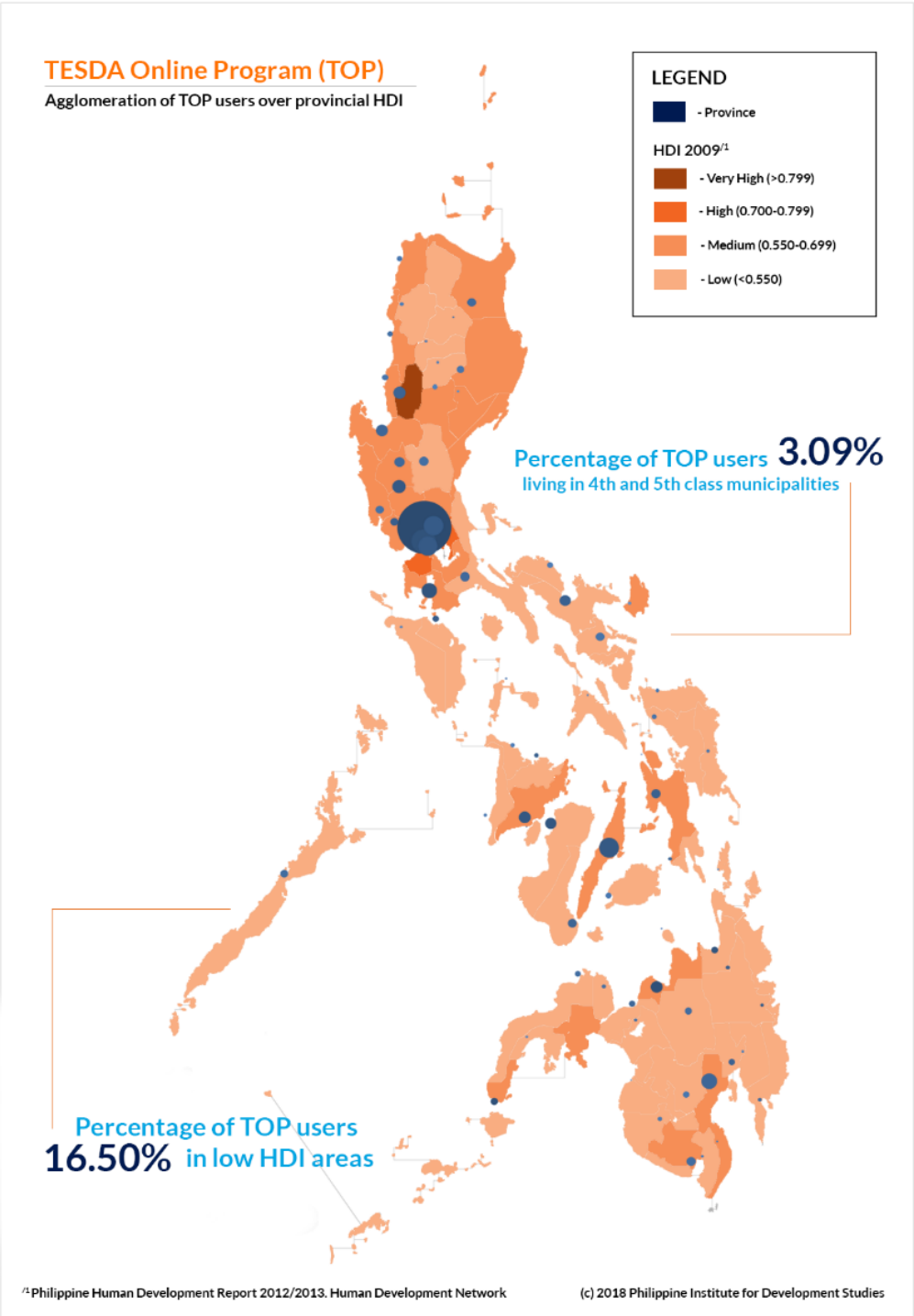
Source: eTESDA Project Management Unit

While TOP statistics indicate a larger proportion of beneficiaries relatively better off (i.e. located in the National Capital Region and are college graduates), the e-TESDA program still is able to benefit those that can be considered last mile customers. These would include those that have lower level of education (i.e., 21.0% for Senior High School and Grade 10 and below).

To further analyze the reach of the TOP, analysis of the location of the registered users was conducted. Overlaying the location of the 4,018 users from the cross-section data of the TOP with the Human Development Index (HDI) of each province in the country shows that 16.5 percent of TOP users are residing in low HDI areas and 3.1 percent of TOP users live in 4th and 5th class municipalities (Figure 4)[9].

[9] Under the Philippine Standard Geographic Code (PSGC) system, municipality class is based on the average annual income generated for the past four fiscal years. Particularly, 4th Class municipalities have an average annual income of PhP300,000-PhP499,999 while 5th class municipalities at PhP100,000–PhP299,999. Meanwhile, 6th class municipalities are those with less than PhP100,000. The 4th, 5th and 6th class municipalities have the lowest average annual incomes.

Figure 4 Agglomeration of TOP users over provincial HDI



Source: Authors' rendition based on the analysis of the perception survey and primary data collection gathered from January 26-February 6, 2018

In order to probe deeper on the opinions of the users of the TOP, a perception survey was also conducted on a cross-section of TOP users. The perception survey aims to measure not only access and usage dimensions but also on the quality and impact of TOP to last mile consumers in terms of coverage, reach, and relevance. For two weeks from January 26-February 6, 2018,

the survey was available online via the TESDA online portal for any registered user to respond. Only those enrolled in any one of the TOP courses were shortlisted to further answer questions in terms of certification, employment, and income levels. This is done in order to ensure that the respondents to the survey have experienced participating in a TOP online course.

From the total of 592 registered users who answered the survey, only 218 were shortlisted as enrolled in at least one TOP course (Table 7). Respondents have enrolled in ICT, tourism, and entrepreneurship. Only 17.9 percent have already completed their taken course with 46.2 percent having taken a national assessment already. All but one was able to pass their national assessment exam.

Table 7 Selected indicators from the TOP perception survey

Indicator	Number of Respondents	Percentage
Total unique users	218	100.0
Course status		
Ongoing	179	82.1
Completed	39	17.9
Of which:		
National assessment not taken	21	53.9
National assessment taken	18	46.2
Of which:		
Passed national assessment	17	94.4
Failed national assessment	1	5.6

Source: Perception survey conducted by PIDS and TESDA from January 26-February 6, 2018

A Focus Group Discussion (FGD) and remote interviews (i.e., telephone and online) were also conducted to further probe additional questions. From a total of 145 invitations, 30 (20.7% success rate) individuals participated with the majority residing in Luzon/NCR. At least one representative each for Visayas, Mindanao, and OFWs was ensured.

Of the 218 respondents presently enrolled in at least one TOP course, the number one reason for enrolling in TOP is to upgrade or enhance their skills (56.0%) while to obtain employment is a distant second at 18.8 percent. This result may indicate that TOP contributes to the inclusion of the unemployed by providing them a means to find work by upgrading their skills (Table 8).

The majority of enrollees identified the convenience (78.0%) and opportunity to learn at your own pace (71.0%) as key reasons for using the TOP. In addition, the constantly available materials has been cited by about 57.0 percent of the enrollees as one of the benefits of enrolling at the TOP.

These results have been echoed by the FGD in which several of the respondents have found the TOP to be convenient and also allows them to be productive during their free time at home. This is particularly true for a number of respondents who want to upgrade their skills but are unable to do so at a traditional school because of lack of time.

Table 8 Selected indicators from the TOP perception survey

Indicator	Number of Respondents	Percentage
Total, unique users	218	100.0
Reasons for enrolling in the TOP		
Credit towards a degree taken	5	2.3
Employment	41	18.8
Promotion	3	1.4
Skills upgrading or enhancement	122	56.0
Job requirement	13	6.0
Personal use, interest, or hobby	16	7.3
TVET qualification is popular	2	0.9
Income increase	16	7.3
Benefits from learning through the TOP (multiple answers are allowed)		
Convenience	170	78.0
Affordable	106	48.6
Can learn at own pace	155	71.1
Unlimited access to materials	124	56.9
Added credibility	1	0.5

Source: Perception survey conducted by PIDS and TESDA from January 26-February 6, 2018

With regards to the challenges to the performance of the TOP, about 49.3 percent identifies their internet connection to be the greatest challenge including a slow internet speed, costly data usage, unstable data connection, and lack of internet access. FGD Participants also identified these challenges as a priority for improving the TOP. The internet connection problems are result to the video content buffering slowly or even access some of the resource materials or files.

Major bottlenecks also point towards time management and motivation to finish the course (31.7%). The FGD reveals some of the factors that might have affected time management of the students or their motivation. One major factor that might affect the motivation to finish the course is the buffering time resulting from slow internet connection. The lack of downloadable content is likewise problematic as users will need access to the internet at all times in order to learn. Other issues raised by the FGD participants that would negatively affect motivation include the lack of a Filipino language version for some courses, instructions being unclear, wordy texts, and frustrations in navigating the interface.

There seems to be a need to clearly identify the learning objectives of the courses in order to set the expectations of the students. This is based on two divergent themes from the FGD participants. One the one hand some participants mentioned their difficulty in doing technical courses because of the high learning curves while on the other hand, others have described some of the courses to be elementary and lacking stratification of difficulty levels. Regardless of the observation, both indicates a lack of introductory information on the course which the students could read to set their expectations before enrolling in the course.

Overall, survey respondents scored the TOP an overall weighted mean score of 4.41 points out of a maximum high of 5.00, suggesting an overall appreciation of the TOP. These responses were validated in the FGDs which indicate much potential for the TOP despite criticisms on some its aspects.

The benefits of the TOP can be seen through its impact on the cost of training to students. The cost of training is mainly in terms of time and money. Students have to be physically present in the training classroom to be able to receive training. Even if the course is provided without cost, the transportation cost and time spent going to the training area might still be substantial.

Results of the earlier studies conducted on TOP show that the TOP has the potential for reducing the training cost through the use of a blended program, where students combine face to face instruction with online learning.

The cost of access is also an important issue as only 49.0 percent of the respondents of the perception survey found the TOP affordable despite being provided for free. This is because users of the TOP would still require a reliable internet connection in order to fully appreciate the learning materials in TOP. This observation points to the need for a reliable internet infrastructure for e-education to be effective. While outside of the purview of TESDA, it would do well for the department to coordinate with the DICT to ensure that ICT infrastructure development projects are on track.

In two separate surveys, the eTESDA PMU have estimated the passing rate of TOP users who have opted to undergo National Assessment upon completing the online course. The high passing rate (above 90.0%) addresses the concern that online learning may not be as effective as face-to-face learning. The TOP also registered above 90.0 percent passing rate despite the lack of online forum where the students can interact with other students to address some questions or concerns. One possible explanation for the high passing rate could be the opportunity to learn at one's own pace and revisit some learning materials and videos (for some select courses). By focusing on learning at one's pace, the students can spend more time learning the topics in which they need more instruction rather than spending time on topics in which they are already familiar. This can easily be observed in classroom learning where the students of different backgrounds are lumped together and are instructed in the same pace.

The TOP offer unlimited opportunities through its courses and potential number of users/beneficiaries. The availability of online applications enables the framing of training materials that are strategically aligned for better understanding and appreciation of the target audience/clientele. Indeed, the vision of a globally competent Filipino workforce with advanced skills can be realized with the encouraging results of the TOP accreditation and certification. The mission to full accessibility in technical education and skills development program, either in online or offline mode, is an idea whose time has come to be implemented, to be realized.

More can still be done through courses in complete packages, institutionalization of TOP through blended programs in TESDA Technology partner-institutions and upgrading or capacity building of Trainers as well as e-Learning materials development.

2.2 e-Finance in the Philippines: The case of CARD Bank's "konek2CARD"[10]

In 1997, the Center for Agriculture and Rural Development (CARD) Bank, Inc. was formally established as the CARD, Inc.'s first microfinance-oriented rural bank in the Philippines. It then became a member of the CARD Mutually Reinforcing Institutions (MRI) which aims to provide various financial and non-financial services (e.g., social development services) to the poor especially among women and families (e.g., children) situated in the countryside.

Following this vision, in 2000, the CARD Bank allowed its members to become shareholders through the transfer of the members' compulsory savings to the Bank. It continues to grow with 69 micro banking offices (MBOs) and 2.3 million clients nationwide of which one million are with loans[11]. Almost 75.0 percent of CARD Bank's clients are female, close to 75.0 percent are married (or formerly married), and about 80.0 percent are over 30 years old (Box 4: CARD

[10] This section draws heavily from Llanto, Rosellon, and Ortiz (2018)

[11] https://cardbankph.com/wp-content/uploads/2017/10/2-CARD-BANK-AR-2016-final.pdf

Bank's Client Profile). Around 56.0 percent of the active clients are borrowers. Their loans are mostly under microfinance (72.3%), housing (8.7%), and agricultural loans (5.3%) while other loans include health, education and calamity loan among similar others. Most of the bank's clients are from rural municipalities/provinces and areas where most of the poor households are located. For instance, half of the ten poorest provinces in 2016 are from the Mindanao area (southernmost island group in the Philippines) which is one of the areas reached by CARD Bank's services.[12]

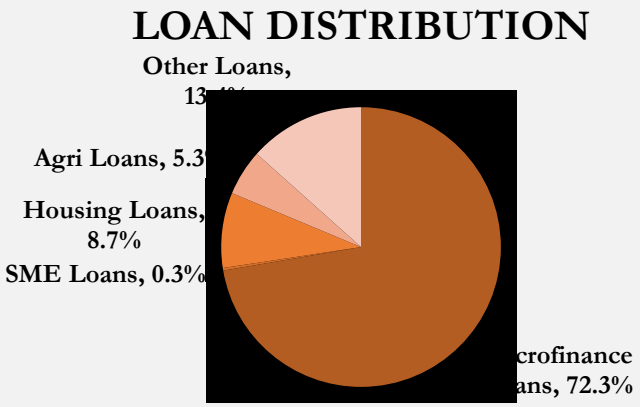
Box 4 CARD Bank's client profile[1]

SEX	1,843,154
Male	462,022
Female	1,381,132

AGE BRACKET	1,843,154
Below 18	925
18-30	378,977
31-40	475,659
41-50	451,380
51 and Above	536,213

CIVIL STATUS	1,843,154
Single	431,791
Married	1,356,236
Widowed	44,296
Other	10,831

	Borrowers	Active Clients
AREAS	1,025,616	1,843,154
Baguio	21,509	45,582
Bicol	171,619	285,346
Ilocos	25,187	34,741
La Union	18,409	26,627
Laguna	55,163	121,492
Marinduque	30,939	63,866
Masbate	77,187	141,982
Mindanao	78,844	120,891
National Capital Region	56,980	106,375
Occidental Mindoro	47,375	86,073
Oriental Mindoro	96,089	179,276
Panay	109,682	210,935
Pangasinan	35,710	48,776
Quezon	146,170	284,219
Tarlac	9,120	12,903
Visayas	45,633	74,070



[1] The statistics include only the bank branches that have migrated to their new core banking system. Data as of March 31, 2018.
Source: CARD Bank, Inc.

Having been awarded as a "Financial Inclusion Champion" by the BSP for three consecutive years, the CARD Bank perseveres to increase its client coverage and bring innovation to its

[12] https://www.philstar.com/headlines/2016/06/27/1597101/da-focus-10-poorest-provinces

services[13]. It initiated various innovations in its provision of services, aside from technological upgrade in its operations, as early as 2011. The first attempt was called the Mobile Financial Services (MFS) which allowed members to conduct financial transactions (e.g., balance inquiry, savings notification) through the clients' mobile phones. This makes use of SMS / text messages only so non-smartphone users can also access this mobile service. This was tested in nine centers across the provinces of Laguna and Quezon. However, despite the overall favorable response, the project was cut short because of issues with the service provider. Improvements were also called for because delays in the notification were later on reported by the users.

In September 2017, the CARD Bank rolled out its second attempt to digitalize its financial services. They called it the "konek2CARD (k2C)" program, which was inspired by the Bank's key success factor: its strong connection to the members. Unlike the MFS, the k2C, as a mobile banking application, makes use of mobile data (i.e., internet) which allows members to conduct real-time financial transactions online. The savings account of the members (i.e., "Capital Build Up") is now connected not only to their ATM accounts, but also to k2C. To date, k2C is the only digital application that is offered by the CARD Bank. Its module may be accessed via CARD Bank's ATMs.

K2C is installed in smartphones. The following are the available services in the k2C app, according to the members: (1) cash-in (deposit/savings); (2) cash-out (withdrawal/loans); (3) cash payment which may be agent-assisted/client-assisted; (4) balance inquiry; (5) fund transfer (accounts within the bank); (6) transaction history; and, (7) customer service. While members can access k2C on their own through their mobile phone, agents are also available to assist them in accessing or transacting using the mobile app.

2.2.1 Results of the Focus Group Discussion with CARD Bank members

The succeeding discussion presents the results of the FGD with the members (i.e. clients and agents) of the CARD Bank. All of these members are registered in "konek2CARD" or "k2C".

The FGD was conducted with the members (i.e., clients and agents) of the CARD Bank. All of these members are registered in the recently launched mobile application of the Bank branded as, "konek2Card" or "k2C". The FGD was conducted in two parts – the first one was with the agents, who are also users of the mobile application and the second one, with the users only. The main objectives of the discussions are to determine the members' receptiveness in using digital financial services, usage behavior, challenges and issues, and the likelihood to continue using the k2C.

The total number of FGD participants[14] is 37 who are all active members and registered to the k2C. Looking at their educational background, most are at least high school graduates, of which three respondents have attained post-graduate degree (Table 9). Majority are also married (92.0%) while the rest are either widowed or single.

[13] The Bank is working for the full implementation of remittances services.

[14] Originally, the total number of invited participants was 40. However, due to unforeseen circumstances, only 37 participants arrived.

Table 9 Profile of the respondents: Level of education

Level of Education	Number of Respondents	Percentage
Elementary Graduate	2	5.4
Some High School	4	10.8
High School Graduate	9	24.3
Vocational Graduate	2	5.4
Some College	9	24.3
College Graduate	8	21.6
Post-Graduate Degree	3	8.1
Total	**37**	**100.0**

As for the job or occupation, most of the participants have their own "sari-sari" stores/neighborhood sundry stores (15 respondents) while the rest are engaged in direct selling/buy and sell, selling of electronic mobile load and digital financial transfer services (e.g., Smart Money Padala). This implies that majority of the participants acquire their income from their own businesses (Tables 10 and 11), while a considerable number relies on remittances from family/relatives and friends and from wages/salary from the companies they are employed in.

Table 10 Profile of the respondents: Job/Occupation

Job / Occupation	Number of Respondents[1]	Percentage
Sari-sari store (owner)	15	35.7
Direct selling/Buy and Sell (e.g., cosmetics, chicken, vendor)	5	11.9
E-load / Smart Money Padala	4	9.5
Computer shop rental	3	7.1
Family Business (i.e., small piggery, rental)	3	7.1
Business woman	2	4.8
Housekeeper / Care Taker	2	4.8
Professional (i.e., architect)	1	2.4
Farmer	1	2.4
Sewist	1	2.4
No job	3	7.1
No response	2	4.8
Total	**42**	**100.0**

[1] Multiple answers are allowed. Total may exceed actual number of respondents in the FGD (i.e., 37 individuals)

Table 11 Profile of the respondents: Source of income

Source of Income	Number of Respondents[1]	Percentage
Income from own business	28	63.6
Pension	2	4.5
Remittance	7	15.9
Receive wages or salary from a company	5	11.4
Rental income	1	2.3
No response	1	2.3
Total	**44**	**100.0**

[1] Multiple answers are allowed. Total may exceed actual number of respondents in the FGD (i.e., 37 individuals)

Meanwhile, 19 out of the 37 participants (51.4%) have been clients of CARD Bank for more than 5 to 10 years and seven have been members for more than 10 years now (Table 12). Their reasons for opening bank account are for savings (31 respondents) and loans (17 respondents) which will be primarily used for their businesses and tuition of their children. Notably, there were four participants who answered that one of their main considerations is having an insurance (Table 13).

Table 12 Profile of the respondents: Years of membership

Years of Membership	Number of Respondents	Percentage
0 to 1	2	5.4
Greater than 1 to 5	9	24.3
Greater than 5 to 10	19	51.4
Greater than 10 to 20	6	16.2
20 and above	1	2.7
Total	**37**	**100.0**

Table 13 Profile of the respondents: Reason/s for opening a bank account

Reason/s for Opening a Bank Account	Number of Respondents[1]	Percentage
Savings	31	57.4
Loans (e.g. business)	17	31.5
Insurance	4	7.4
No response	2	3.7
Total	**54**	**100.0**

[1] Multiple answers are allowed. Total may exceed actual number of respondents in the FGD (i.e., 37 individuals)

2.2.2. Impact of using konek2CARD

The clients reported that the transaction process got easier, faster, and convenient. They noted that the members can now transact at any time of the day (e.g., withdraw at night or beyond banking hours through agents) which is very important as most of them are either working or at home doing errands (e.g., picking up their children from school). There has also been less

cost. The amount of money that they pay to the agents (for agent-assisted transactions) is way lower than the cost of going to the banks themselves. Aside from paying a high amount of fare (e.g., PhP100.00), they need not spend a longer time (e.g., waiting in line which could take the entire day) in accomplishing the needed transactions. This is especially true for farmers who are distant from banks. With k2C, they only need to go to the nearest sari-sari store or agent to transact. In addition, late payments (loan payments or deposits after bank operations or center meetings[15]) can be accommodated by agents who are located just within the community. Late-paying members need not go to the bank.[16]

The extent of usage among registered clients varies from young to old and irrespective of educational attainment. Nonetheless, seemingly the younger ones tend to use the application more often since the respondents explained that most of the older clients let their grandchildren or younger relatives operate the mobile application. Moreover, much of the transactions are still agent-assisted.

Meanwhile, financial inclusion also entails relevance of financial services provided to customers. Members shared that through the k2C's mobile application, they are able to perform basic banking transactions, e.g. cash-in (deposit/savings), cash-out (withdrawal/loans), cash payment which may be agent-assisted or client-assisted; balance inquiry; fund transfer (accounts within the bank); transaction history, and customer service. As users of different financial services, members have been able to acquire knowledge and experience; hence, developed certain preferences and requirements in terms of services.

Having experienced the benefits of digital transactions, the members mentioned certain services that they wish to be included in the k2C application. These include money transfer (from CARD Bank to other banks, and vice versa), bills payment, and remittances. They also suggested having a multiple log-in feature in the application so that other members can access their accounts using other member's cellphones. As for the side of the Bank, it is on its way to implement its various digitalization initiatives. More features will be offered in the next phase of k2C, according to the bank executives. For instance, the electronic transactions that the members wish to be included will be eventually integrated in the mobile application, including electronic top-up. These added features, among others, will be implemented soon and by phases. Also, they are now targeting to expand their membership to all members of the household.

There is awareness of the benefits of using k2C, however, the resistance to learn and use such technology is still apparent among some of the members mainly due to the following factors: (1) misconception about technological upgrade; (2) presence of alternative options; (3) seemingly high overall charges; (4) absence of required gadget (i.e. android smartphone); and, (5) weak and/or intermittent mobile phone signal.

There is perception that it is difficult to use the digital application. According to the FGD participants, this notion particularly emanated from the elderly who have less patience to learn new technology and thereby resort to old practice (almost 30.0% of the Bank's clients are over 50 years old). Such misconception about the application easily discourages users from migrating to digital transactions. There is also the presence of other choices. For instance, in the case of one area (i.e, Alaminos, Laguna), there are members who opted not to connect to

[15] CARD Bank organizes its members into groups called 'centers'. Each center holds meetings, wherein the members discuss activities and current and future plans, voice out their concerns and issues, report about project status, repayment performance, as well as, develop the members' leadership and management skills. Center meetings are held either weekly or monthly, depending on the center's performance; and are attended by the Bank's Account Officers.

[16] According to the agents, the agent-assisted transactions occur almost every day, and these transactions are usually for late payments.

k2C because they can give their deposits to the Bank's Account Officer (sometimes to the elected Center Treasurer) during the center meetings[17] (they would later deposit the money to the bank), as has been the old practice.

The member's decision to resort to traditional banking over using k2C is not entirely due to the presence of an alternative choice, but also because of the direct charges that the members would have to pay. Some members think that it would be better if they pay at the centers (through the AOs/Treasurers) with a charge or "butaw"[18] amounting to PhP5.00 only (previously PhP10.00), regardless of the number of transactions rather than use k2C which charges excessively (e.g., "growing interest"), and per transaction.[19] Via the k2C application, the higher the amount of cash in/out, the higher the amount of fee charged. For instance, for cash-out requests ranging from PhP100.00 to PhP500.00, the total charge is PhP10.00, wherein PhP7.00 goes to the agent, while the remaining PhP3.00 goes to the Bank (Table 14).

Table 14 Comparison of costs (values are in PhP)

Cash-In Range	Collectible of Agent	Total Charge to CARD member
50-15,000	3.00	5.00
Cash-Out	**Collectible of Agent**	**Total Charge to CARD member**
Cash-Out Request	-	1.00
100-500	7.00	10.00
501-1,000	15.00	18.00
1,001-2,000	22.00	25.00
2,001-5,000	35.00	38.00
5,001-10,000	55.00	58.00
Agent-Assisted Payment	**Collectible of Agent**	**Total Charge to CARD member**
50-500	4.00	6.00
501-1,000	7.00	9.00
1,001-2,000	10.00	12.00
2,001-5,000	16.00	18.00
5,001-10,000	26.00	28.00
10,001-15,000	36.00	38.00

As CARD Bank has members from poor households, absence of the necessary gadget is an impediment to using k2C. As of now, the app can only be accessed via smart phones, which can cater one user/member only. This is not yet available on computers which could allow members who do not have android phones to simply go to computer/internet shops. According to the officers of CARD Bank, they are still working on this aspect (i.e., accessibility in terms of availability in other gadgets and multi-user feature.)

Connectivity is an important element in mobile application, and it is a concern raised by k2C users. Weak and intermittent mobile network signal from telecommunication service providers

[17] CARD Bank organizes its members into groups called 'centers'. Members in a center elect center officers – Chief, Secretary, and Treasurer. The centers hold meetings, wherein the members discuss activities and current and future plans, voice out their concerns and issues, report about project status, as well as, develop the members' leadership and management skills. Repayment performance is also monitored during meetings. Center meetings are held either weekly or monthly, depending on the center's performance; and are attended by the Bank's Account Officers.

[18] "Butaw" is a small fee (similar to the concept of membership fee) collected from each member on a regular basis. According to the center chiefs, the fund pool is used for special gatherings (e.g., Christmas party), buying of supplies (e.g., logbooks and pens) for the collector, delivery of remittance and other activities relevant to the conduct of CARD Bank transactions. The paying of this fee is optional.

[19] For instance, if there are three members in the household who need to conduct three separate transactions, they will be charged thrice as much (e.g. PhP10.00 times three or PhP30.00) as compared to the fee that they will be charged when they transact at the centers (e.g. PhP 10.00 only for the three transactions combined).

bars access to the application. For those in the farms, this factor is a major setback when it comes to the usability of the application. Due to this obstacle, members, especially the elderly ones, easily lose their interest in exploring the application and transacting through it. Moreover, according to the agents, there are also days when the application has downtime, especially during weekends. Recognizing these serious constraints, the Bank is already finding ways to allow members to connect to the application and transact offline. The Bank is also exploring other means to get around this major hurdle and they have been receiving suggestions from the private sector.

2.3 Insights from the case studies

From the two case studies of e-TESDA's TOP and CARD Bank's "konek2CARD," there are linkages that can be drawn. One of the mechanisms through which digital technology spurs economic development is through the creation of opportunities and markets in which parties may undertake mutually beneficial transactions (World Bank 2016). This has clearly been the case not only for TOP and konek2CARD but also for myPocketDoctor and TNCs. The TOP provides learning opportunities to people who have time but are not able to be physically present in classrooms. Konek2CARD provides banking services to customers who are usually excluded from the financial sector (i.e. farmers, students, housewives) because of the lack of access to physical banks.

The World Bank Development Report 2016 identifies the birth of new internet-based business models and service providers as another mechanism for the internet to benefit the economy. For the TOP and Konek2CARD, the initial investment to establish their online platforms has allowed them to provide services to the marginal consumer at very little marginal cost.

The two case studies also point to similar weaknesses and challenges: the need to improve the digital technology infrastructure of the country, the reduction of the cost of internet access, and the need to provide additional features to further engage their customers.

The result of the FGDs for both case studies pointed to the need to improve the access to the internet in the country as the weak and intermittent mobile network signal bars access to the service. For those in the far-flung areas, this factor is a major setback when it comes to the usability of the application. The high cost of using the internet has been cited as a factor affecting the use of TOP (despite the service being free). Internet Data plans are needed to have constant access to these services and thus, there is a need to have affordable plans available to consumers to maintain their access.

For the case of TOP, the additional features that the students would like to see in the future include the presence of a discussion forum where students can interact and ask an instructor and even a means for online certification testing. While for Konek2CARD, additional features that their customers would like to see would be bills payment and inter-bank fund transfer features. Also, Konek2CARD is only accessible through the android mobile phone platform so there is room for expanding the service to other OSs and even other devices.

Finally, the potential for blended services (i.e., combination of digital and face-to-face provision of services) should also be explored. The TOP and Konek2CARD services indicated that there is room for blended services in order to address some cost concerns and circumventing the digital divide.

3. Regulatory and policy environment

Government policies affects both the supply-side and the demand-side of the DE. Supply-side policies should ensure the adequate and affordable "supply" of internet service while demand side policies should permeate trust and encourage the use of the internet. Supply-side policies may include removing regulatory barriers to encourage businesses to explore and invest in more digital technology solutions and establishing clear and transparent regulations governing digital and traditional businesses belonging to the same sector. Examples of demand-side policies would include creating an environment of trust through cybersecurity and privacy laws. The following chapters describes the policy environment in the Philippines as it relates to the DE.

3.1 Supply-side regulations

3.1.1 Regulatory issues related to the internet

Broadband connection is a key enabler of economic growth and can lead towards economic transformation and productive efficiency. With the signing of RA 10844 in 2016, the DICT becomes the lead agency for ICT and ICT-related issues. The DICT has adopted an overall strategy of "*providing the necessary policy, regulatory and infrastructural interventions to ensure the availability, and accessibility of broadband services to Filipinos* (DICT 2017a)." Based on the National Broadband Plan, the DICT seems to be following the basic principles as outlined by the World Bank (2017).

To improve the entry of the internet in the country, the DICTs strategy includes adhering to an open access policy framework where players are granted access to international gateways and cable landing stations in an open, transparent and non-discriminatory manner. This would include the Modular Information Technology Facility that is aimed to serve as a landing station for international submarine cable lines. The government also aims to introduce incentives to new players that will establish connectivity facilities for fixed and mobile broadband services.

To strengthening the passage of the internet through the country, the DICT has also adopted a number of strategies which include opening up existing government-owned facilities, like the use of existing railroads and access roads for fiber rollout; the use of National Grid Corporation of the Philippines fiber cores for government backbone and DICT towers for use by market players through Public-Private Partnership (PPP), Memorandum of Agreement (MOA), or lease agreement.

The DICT also aims to support the invisible mile by partnering with the Philippine competition commission to have an effective and fair implementation of spectrum co-use. Part of the strategy also includes encouraging the co-use of spectrum which includes liberalization of existing market by allowing new market players such a mobile virtual network operators and providing reference access offers for spectrum lease or trading.

However, the National Broadband plan identified some regulatory and policy challenges that need to be addressed as these hamper some of the strategies identified in the plan. These include reforming the Commonwealth Act No. 146 (Public Service Act of 1936) which identified wire or wireless communications systems and wire or wireless broadcasting stations as public service provided by a public utility. As such, the 1987 Philippine constitution which limits ownership of public utilities to Filipino citizens or to corporations which 60.0 percent capital

owned by Filipinos. Considering the sizeable capitalization needed to establish an ICT company, this provision of the constitution is prohibitive in terms of expanding the market players and promoting competition.

Box 5 Policies on improving internet access

This box presents some policies based on the stages in which internet is supplied: from the point where the internet enters a country, passes through that country and finally to reach the end user, including certain hidden elements in between. By liberalizing the market for satellite dishes and eliminating monopoly status over the international gateway and cable landing stations, one can improve the entry of the internet in a country.

Strengthening the passage of the internet through that country involves liberalizing the market for building and operating backbone networks, encouraging open access to the incumbent's network, requiring all major infrastructure programs (such as roads, railways, pipelines, and energy distribution) to include provision for an optical fiber link, setting up internet exchange points, and creating local caches for frequently used content.

Government policies can encourage the provision of internet connectivity to the end user by permitting competing facilities, especially for intermodal competition (between cable, wireless, and digital subscriber line), and mandating the incumbent to make local access lines available to competitors at wholesale prices (local loop unbundling).

The most critical portion of the invisible mile involves spectrum management, which requires increasing the amount of spectrum available, ensuring competitive access, encouraging sharing of essential facilities, such as radio masts, and liberalizing the market for spectrum resale.

[1] World Bank 2016

Another key regulation that needs to be reviewed is the Public Telecommunications Policy Act (RA 7925). Some of the key provisions that the DICT is proposing would include adapting to the fast-changing ICT environment by classifying ICT industries as content provider, network provider or service provider. This would limit the application of the public service act and therefore open the sector to foreign players. In addition, the act aims to strengthen the role of the Phlippine competition commission in upholding competition in the telecommunications and ICT market.

Furthermore, there is a need to streamline and harmonize the permits, licenses and fees that telecommunication players are subjected to. According to the National Broadband Plan, there is no standard permit issued across local government units and this hampers the accelerated deployment of needed infrastructure (DICT 2017a).

3.1.2 Ensuring a fair and level playing field

Supply-side policies also include putting in an equal playing field internet and traditional firms, once the internet firms have reached scale economies. For the case of the Philippines, one of the agencies that has started doing so is the Bureau of Internal Revenue (BIR) which has detailed under the BIR Memorandum Circular 55-2013 that the taxation rules and guidelines on traditional transactions are the same as online transactions. This applies to online shopping, retailing, and intermediary services that operates within the country.

Putting the internet businesses and traditional businesses in equal regulatory footing is also a major issue for TNCs. The Transport group Drivers Unite for Mass Progress and Equal Rights (DUMPER) have protested at the Land Transportation Franchising and Regulatory Board (LTFRB) that TNCs in the Philippines are not paying taxes unlike conventional taxi operators and drivers (Cabuenas 2017). Similarly, the hotels and accommodation groups want to ensure that similar taxation rules are applied to online booking non-hotel accommodations (e.g. Airbnb). Representatives from the Tourism Congress of the Philippines (TCP) also would like to have a means of ensuring that accommodations follow national standards and have some form of Department of Tourism (DOT) accreditation similar to that of regular hotels (Baños 2015).

3.2 Demand-side policies on digital economy

3.2.1 Philippine National Cybersecurity Plan 2022[20]

With the shifting paradigm under the Fourth Industrial Revolution, new risks and threats emerge as well. With these threats in mind, the DICT drafted a National Cybersecurity Plan that covers the entire country. Cybersecurity in the Philippines is an important part of equipping the country towards the digital age. It acts as the first defense of a digital nation.

The DICT defines cybersecurity as "*the protection of information systems (hardware and software including associated and support infrastructure), the data within these systems, and the services that are provided by these systems from any unauthorized access, harm, or misuse, whether it includes intentional or accidental, or from natural disasters*." The DICT mentions the hacking of the server of the Philippine Voters' Database by Anonymous Philippines which resulted to least 54 million sensitive data leaking into the internet. Another recent cybersecurity issue that is related to the Philippines is the Bangladesh Central Bank cyber heist which has involved the Philippine banking system.

As businesses, banks, air transport and key utilities including government agencies that provides front line services increase the use of technology in their daily operations, the amount of information that is provided to them by their clients and stakeholders require that they institutionalize information security by identifying a data/information security officer who shall be tasked to ensure that the entire institution, public or private, adheres to the laws and regulations of cybersecurity and data privacy.

[20] This section draws heavily from the Philippine National Cybersecurity Plan 2022. For ease of reading, this would no longer be cited; thus, if there is no specific citation made, it is assumed to have been taken from the Philippine National Cybersecurity Plan 2022.

Key legislation related to cybersecurity include the Data Privacy Act of 2012 (RA 10173) and the Cybercrime Law of 2012 (RA 10175). RA 10173 defines and details important aspects of personal data security amidst growing usage in a DE. Its mandate is to ensure that sensitive information being collected by firms are to be held in utmost confidence and safety. RA 10173 has also led to the creation of the Data Privacy Commission directed to handle all concerns falling under data privacy and security risks.

RA 10175, on the other hand, covers the handling of cyber-related crimes. In order for RA 10175 to have an effect, cybersecurity incidents need to be reported. Many cybersecurity incidents have gone unreported, with the affected individuals, businesses, or organizations opting for non-disclosure lest they face legal challenges and risk incurring additional cost like damages to reputation, transaction costs, and even foregone income. The DICT needs establish an incident reporting system and to advocate for cooperation among all stakeholders to encourage reporting of incidents and providing information.

3.2.2 Industry specific policies

There are regulations specific to preserving the demand for the use of the digital technology. The policy environment for a particular sector is dependent on the eagerness of the regulator to regulate or promote the DE. There is also a need for regulators to interact with each other and with key ICT agencies like NTC and DICT (See Annex A).

For e-Commerce, the e-Commerce Law (RA 8792) recognizes electronic forms and signatures for official documents; expands definition of sectors to accommodate new technology; and ensures the country's capacity for digital activities like e-commerce to function properly. RA 8792 provided the foundation for e-commerce throughout the succeeding years and has empowered the Department of Trade and Industry (DTI) to lead and supervise e-commerce activities in the Philippines. In addition to this, various consumer protection regulations addressing value added services and transactions through e-commerce has been released across the years. For instance, the NTC issued Memorandum Circular 05-06-2007 that details the consumer protection guidelines. This circular upholds the right to privacy, right not to charge, and right to opt-out, among other pertinent provisions ensuring that consumers' welfare is protected.

Similarly, consumer protection joint circulars have been released by the DTI together with the Department of Agriculture (DA) and the Department of Health (DOH). This protects consumers on the selling of products and services through e-commerce. For instance, merchants are required to adopt fair and reasonable business practices, to refrain from engaging in any false, deceptive, and misleading advertisements, and to provide sufficient information to help consumers decide better.

The BSP regulates electronic banking transactions through the BSP Circular 542 released in 2006. This circular provides for an e-banking oversight function, risk management, and internal control. It also provides for a consumer awareness program to be developed as a key defense against fraud, identity theft, and security breach.

With the popularity of virtual currencies (VCs), the BSP has released Circular No. 944 governing the operations of virtual currency exchanges. The BSP Circular encourages financial innovation, one of which is through virtual currencies, but at the same time it wishes to ensure that Virtual currencies are not used as a tool for money laundering or terrorist financing activities and that the financial system and consumers are protected. While not explicitly

prohibiting investing in VCs, the BSP has released a number of security considerations such as: Setting-up and using a dedicated email account apart from the email accounts or username used in public platforms such as social media; keeping the VC-related email account and its password confidential; Setting a strong password; Observing basic internet security like using only secure Wi-Fi connections, avoiding software, browser plugins or attachments from unknown or suspicious websites and emails and always minding one's electronic device. Adding another layer of authentication to VC wallets to increase security and separating the funds and using two or more digital wallets for transactional purposes and a main, offline, wallet (i.e., cold storage) to store VC funds for future use (BSP 2017).

4. Conclusions and policy recommendations

With the DE in the Philippines having been explored in Section 1, and with the exploration of benefits of digital technologies have manifested in education and finance sectors, it can be inferred that the DE in the Philippines has a potential for being more inclusive through the development of supporting infrastructure.

Section 2 has provided with two case studies that present how digitalization of education and financial inclusion in the Philippines has enhanced the reach of their services. Despite being launched nationally, the TOP is able to reach poor municipalities and low HDI areas. The konek2CARD program, on the other hand, specifically targets those in the rural areas and provides them access to banking and financial services. The digital technology as applied in education and finance has indeed benefitted not only those living in urban areas but also those who are in the margins because of the ease of use and minimal cost that it offers. Still, there is room for improvement particularly improving the quality of service and the reach which is fundamentally an issue of internet infrastructure. Addressing the digital divide is also important in order to expand the use to older people who are apprehensive in using digital technology. Overall, the benefits of digital technology can already be glimpsed from these two case studies but there is potential for further improvement by addressing key issues.

The regulatory environment affects the potential benefits that can be achieved from the DE. Section 3 has laid out the supply side and demand side policies affecting the DE. Government policies affects both the supply-side and the demand-side of the DE. The strategies and policies outlined in the National Broadband Plan follow the principles identified by the World Bank in providing internet services but there are a number of legislation that need to be revisited. Demand-side policies include the National Cybersecurity Plan and Data Privacy Act which aims to create an environment of trust through cybersecurity and privacy law, respectively. Section 3 also identified policies affecting the protection of users of the digital technology.

As part of the conclusion, the strengths of, weaknesses of, opportunities to and threats to the DE of the Philippines will be discussed. Finally, some policy recommendations will be provided.

4.1 Philippine digital economy: Strengths, weaknesses, opportunities, and threats

4.1.1 Strengths of the Philippine digital economy

Perhaps the greatest strength of the Philippine DE is the strong and developed mobile market with 50.0 percent of the population subscribed to mobile services. Moreover, 87.0 percent of the population owns a mobile phone while 55.0 percent owns a smartphone. While statistics on computer ownership is low, the majority of Filipinos (70.0%) are actually 'proxy users' and could therefore be unaccounted in surveys. Households with OFWs are more likely to access the internet as well considering that long distance relationships with families can be bridged by digital means. It is favorable as well that Filipinos rank 4th among 60 countries in terms of willingness to participate in the sharing economy (Valencia 2017).

The Philippine DE, then, holds a strong foundation on the capacity and optimism of people and businesses to actually participate in digitalization. Filipinos could be described to be more welcoming than resisting changes in the status quo brought forth by the DE. The prevalent use of social media through Facebook, Twitter, and Instagram strengthens this idea. For instance, the delivery of information during calamities are quickened by tweets and Facebook posts that are able to reach the people in real time.

Apart from this, there are existing efforts from all stakeholders to improve digital literacy, increase financial inclusion, utilize remote learning, and foster digital delivery of services. This can be found both from private sector initiatives such as with CARD Bank's "konek2CARD" and MyPocketDoctor's remote healthcare consultation, and from government programs such as the TOP and the NTHC's initiatives in healthcare.

In terms of the regulatory environment, the needed plans and legislations such as for the protection of data privacy, enablement of electronic modes and means, and the acknowledgement of cybersecurity issues and DE potential are in place. The efficient implementation of these plans would serve as fertile ground for the DE to grow.

4.1.2 Weaknesses of the Philippine digital economy

Weaknesses, meanwhile, are primarily with having insufficient IT infrastructure. For instance, only 10.0 percent of needed towers in the ICT backbone of the country are in place. Average internet speeds stand the lowest in Asia-Pacific with just 5.5 Mbps. With the internet being the primary connection allowing the interlinked effects of the DE to manifest, having a weak internet capacity in the Philippines will weaken its potential.

Moreover, computer ownership is characterized as low in rural areas and with the poor and very poor sectors of society. This may translate to having localized access divides. Concentrations of computer usage are found in Metro Manila and in urban areas with the middle-to-upper classes mostly having it; thus, rural areas tend to face both a weak IT infrastructure and slow unstable internet connection and the lack of device ownership to access the internet. Nonetheless, mobile connections could be alternatives for personal computers albeit being weaker and less efficient.

Cybersecurity issues are also a major risk with the Filipino population characterized by having a low degree of awareness. This leads then to potential cases of online scam, data phishing,

hacking, or theft. With the prevalent use of the internet by Filipinos primarily through social media, this lack of awareness places individuals in vulnerable positions that they may not fully comprehend what the repercussions are.

4.1.3 Opportunities to the Philippine digital economy

Nonetheless, opportunities abound with improving conditions in the Philippine DE. For instance, both the IDI and the NRI are improving gradually in the Philippines; thus, signifying that efforts both in government and in businesses are manifesting favorably. Smartphone ownership is growing fast with a growth rate of 75.0 percent in just a four-year period. The Philippines is likewise considered to be a pioneer in the mobile market of the Asia-Pacific. Local mobile brands are also providing for cheaper alternatives. Again, this addresses the access divide of Filipinos in the ownership of mobile devices. Internet penetration, despite being slow and unstable, has been growing with it now having a 55.5 percent coverage in the country.

With opportunities for a growing digital market, the Philippines holds potential for accommodating digital technologies and innovative start-ups to grow. Particularly, with a large population characterized by a large youth base, the Philippines has a demographic advantage for fostering digitalization. Moreover, the Philippines has been experiencing high GDP growth rates in recent years.

Optimism in the Duterte administration's plans to deploy a national broadband network and with the flagship project of the Build, Build, Build are also present. The large budget allocated for strengthening the infrastructure of the country does not only prove promising for the DE, but also extends to the general landscape and business environment of the country. The political will is strong as well to push for strengthening the ICT infrastructure and to create opportunities locally for Filipinos.

4.1.4. Threats to the Philippine digital economy

Finally, threats to the Philippine DE are found in prices of ICT services being among the highest in ASEAN. This being the case despite having a slow and unstable connection as compared to other countries in ASEAN. In hindsight, the cost of internet connection is inefficient and discourages or threatens growth in the DE.

Moreover, 74.1 percent of provinces are characterized with having a low access to landline connection which suggests that line-based internet connection is inaccessible to a large portion of the country. This is particularly felt in rural areas that rely heavily on mobile connection which is less stable than with line access. Again, this threatens the delivery of the benefits of the DE primarily by creating localized access divides. Moreover, with the cost of ICT services being high, last mile consumers that are financially handicapped face less chances to access the DE on their own.

The labor market of the Philippines is also characterized with a job mismatch and a jobless growth despite rising GDP growth rates. This translates to affecting local market supply that could pose negative externalities to the development of the DE. Moreover, there is a lack of studies in the Philippines that explores the sector-level or firm-level effects of digitalization.

The lack of understanding could threaten or impede growth and may cause confusion or damage to the DE.

4.2 Policy recommendations

This section reiterates some of the discussions made in Section 3 highlighting particularly the policies needed to ensure a vibrant DE. These would include the following:

4.2.1 The most important policy would be reviewing the laws related to the provision of public goods and services particularly the internet. As mentioned in Section 3 and the National Broadband Plan, the entry of new players in the ICT sector is hampered by the limitations on ownership;

4.2.2 Ensure that the strategies of the Philippine Broadband plan are implemented. The discussion in Section 3 showed that a number of the strategies mentioned in the broadband plan are consistent with the recommendations of the World Bank in terms of policies necessary to reap digital dividends. It is therefore important that the National Broadband plan is implemented vigorously with support from the whole government;

4.2.3 There is a need to establish a secure strong collaborative working relationship between key actors related to the DE. Because of the number of industries and sectors making use of digital technology, there is now a need for a whole-of-government approach to it with the DICT taking the lead and supported by industry regulators;

4.2.4 Ensure that the analog components (World Bank 2016) are strengthened: rules, skills and institutions. New businesses can acquire internet technology to reduce prices and increase convenience for consumers, but they will not be able to enter the market and compete if local regulations protect incumbents. Related to this would be the DICT working closely with the PCC and sectoral regulatory agencies to ensure that new businesses can enter the market at low cost. At the same time, these new businesses are given the opportunity to grow and eventually would be treated like traditional businesses;

4.2.5 Part of strengthening the provision of e-health, e-education and other services of the government would be to prepare the service providers with the ability to use ICT to perform current and even new ICT-related tasks. As e-health services continue to evolve, there will be a need for stronger informatics training programs for health workers. Similarly, the key agencies tasked to investigate cybercrime like the National Bureau of Investigation and the Philippine National Police need to undertake ICT training in order to be more updated and informed in handling cybercrimes. The lesson from the TESDA PMU which monitors the TOP shows that there is a need for government structures to be more adaptive and responsive to the changes brought about by the ICT development. Forcing the current structures to address the changes may not be the most efficient and ideal way of reaping benefits from the DE; and,

4.2.6 Some of the benefits of TOP and konek2CARD have been diminished by the access divide because some of the target users are apprehensive on the use of technology. There is a need to further promote the use of technology not only through intensive government promotion campaigns but also by assuring users that the ICT infrastructure is stable and resilient to cyber-attacks;

4.2.7 Some policy recommendations on how to improve the TOP include the following:

4.2.7.1 *TESDA to continuously lobby for the institutionalization of eTESDA Division.* The increasing demand for online courses and availing of the online assessments indicate the high interest in the TOP. Being the First Philippine Massive Open Online Courseware, the program should go to the next level through the institutionalization of an eTESDA Division with plantilla position for recommendation to the DBM. The eTESDA PMU have already submitted its proposal to become a permanent division back-up by concrete justification. Staff recruitment and development, management and leadership are important in securing quality and sustainable TOP.

4.2.7.2 *Ensure continuous development of quality and relevant online program courses.* As the TOP continuously develops relevant and practical course offerings, there is a need to ensure that all online curricula and program content meet or exceed the minimum occupational and training standards of quality. Creating more courses means more opportunities for learners to become more productive. There is also a need to continuously review and update existing online courses and test for its effectiveness, making it continuously relevant to industry needs. TOP courses should be designed to meet the changing job requirements and labor market needs to produce globally competent Filipino workforce with acquired 21st century skills.

4.2.7.3 *Strengthen partnerships/linkages.* The eTESDA must establish strong collaborations with private organizations, employers, key stakeholders, labor market and industry, and government itself by encouraging them to take part in skills development through ICT. Partnerships and linkages are more effective approaches to skills development.

4.2.7.4 *Promote TOP through advocacy activities.* There is a need to intensify promotion of the TOP through advocacy activities and information campaigns. This may include the development of information, education, and communication materials to generate increased awareness on the program. Promotional face-to-face campaigns to reach the targeted disadvantaged groups in rural areas can be programmed in coordination with schools, local government units and private institutions.

4.2.8 Some recommendations to foster the continued growth of digital finance in the Philippines include:

4.2.8.1 *Continue to strengthen the participation of the private sector.* As exemplified by the CARD Bank and FINTQ, the private sector in the Philippines are very active and innovative in terms of bring about change in the financial landscape despite the existing constraints (e.g. weak infrastructure). Recognizing the size of the remaining underserved market and inevitable move toward digitalization, these companies should continue to find ways to extend more affordable, suitable, and convenient services to Filipinos especially those situated in hard-to-penetrate areas.

4.2.8.2 *Strengthen collaboration among government agencies.* The BSP remains committed in its goal to achieve financial inclusion. Necessary regulations have been put in place and complementary programs are currently ongoing. Today, their thrust is more on ensuring the adoption of the regulations among banks and in strengthening its financial literacy efforts among all Filipinos nationwide. Nonetheless, there seems to be a need for greater collaborative efforts among other national government agencies in expanding the usage of digital finance in the country. The government, through BSP, in collaboration with the private sector should continue to support and test competitive business models by companies that introduce innovations in the digital financial market. Having a financial market and business environment that is dynamic will be conducive to progress in digital finance.

4.2.8.3 *Institutionalize the national ID system.* The law to implement the national ID system is currently being reviewed in the Senate. If successfully legislated, this will help facilitate the inclusion of the unbanked Filipinos in the DE. Meanwhile, forward-looking, the private sector can explore investing in innovative methods of identification, such as biometric scans. The interoperability could be a source of concern in the future since this affects the costs of service provision. Regulators must be wary of its potential implications especially to the consumers and in pursuing financial inclusion.

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Annex A. Digital economy regulators

Sector	Regulator	Key Regulations
E-transport	Land Transportation Franchising and Regulatory Board (LTFRB) *The agency of the government mandated to promulgate, administer, enforce, and monitor compliance of policies, laws, and regulations of public land transportation services.*	1. Prescribe and regulate routes of service, economically viable capacities and zones or areas of operation of public land transportation services provided by motorized vehicles; 2. Issue, amend, revise, suspend, or cancel certificates of public convenience or permits authorizing the operation of public land transportation services provided by motorized vehicles; and, 3. Determine, prescribe, approve, and periodically review and adjust reasonable fares, rates, and other related charges.
E-health	Department of Health (DOH) *The agency of government mandated to develop national plans, technical standards, and guidelines on health. It serves as the overall technical authority on health.*	1. Formulate national policies and standards of health; 2. Prevent and control leading causes of death and disability; and, 3. Maintain national health facilities and hospitals with modern and advanced capabilities to support local services.
E-finance	Bangko Sentral ng Pilipinas (BSP) *The central bank of the Philippines that provides policy directions in the areas of money, banking, and credit. It also supervises operations of banks and exercises regulatory powers over non-bank financial institutions with quasi-banking functions.*	1. Formulates and implements monetary policy aimed at influencing money supply consistent with its primary objective to maintain price stability; and, 2. Supervises banks and exercises regulatory powers over non-bank institutions performing quasi-banking functions.
	Insurance Commission *The agency of government mandated to regulate and supervise the insurance, pre-need, and HMO industries in accordance with the provisions of the Insurance Code as amended by the Pre-Need Code of the Philippines and Executive Order No. 192, series of 2015.*	1. Promulgation and implementation of policies, rules, and regulations governing the operations of entities engaged in insurance, pre-need, and HMO activities; 2. Licensing of insurance, reinsurance companies, its intermediaries, mutual benefit associations, trusts for charitable uses, pre-need companies, pre-need intermediaries, and HMO companies; 3. Review of premium rates imposed by life and non-life companies, and mutual benefit associations; and, 4. Review and approval of all life and non-life policies, pre-need, and HMO plans before sale to prospective clients.

E-education	Commission on Higher Education (CHED) *The agency of government that promotes relevant and quality higher education, ensure that quality higher education is accessible to all who seek it, guarantees and protects academic freedom, and commits to moral ascendancy.*	1. Set minimum standards for programs and institutions of higher learning; 2. Rationalize programs and institutions of higher learning and set standards, policies, and guidelines for the creation of new ones as well as the conversion or elevation of schools to institutions of higher learning; and, 3. Direct or redirect purposive research by institutions of higher learning to meet the needs of agro-industrialization and development.
	Department of Education (DepEd) *The agency of government that is mandated to formulate, implement, and coordinate policies, plans, programs, and projects in the areas of formal and non-formal basic education. It supervises all elementary and secondary education institutions including alternative learning systems both public and private.*	1. Approving the establishment of public and private elementary and high school and learning centers; and, 2. Supervising the operations of all public and private elementary, secondary, and integrated schools, and learning centers.
E-commerce	Department of Trade and Investment (DTI) *The agency of government that is mandated to be the primary coordinative, promotive, facilitative and regulatory arm for trade, industry, and investment activities.*	1. Promote, develop, regulate and accredit repair and service enterprises; 2. Registration of investment projects; 3. Price and supply stabilization and business regulation; 4. Product certification scheme and product testing; 5. Accreditation of freight forwarders; and, 6. Regulation of importation of used motor vehicles and spare parts.
	Food and Drug Administration (FDA) formerly known as Bureau of Food and Drugs (BFAD) *The agency of government mandated to regulate drugs, medical devices, food, cosmetics and toys, and households/urban hazardous substances. The FDA consists of four centers regulating different health products namely the (1) Center for Drug Regulation and Research, (2) Center for Food Regulation and Research, (3) Center for Cosmetics Regulation and Research, and (4) Center for Device Regulation, Radiation Health, and Research.*	1. Assume primary jurisdiction in the collection of samples of health products; 2. Analyze and inspect health products; 3. Establish analytical data to serve as basis for the preparation of health products standards, and to recommend standards of identity, purity, safety, efficacy, quality, and fill of container; and, 4. Issue certificates of compliance with technical requirements to serve as basis for the issuance of appropriate authorization and spot-check for compliance with regulations.