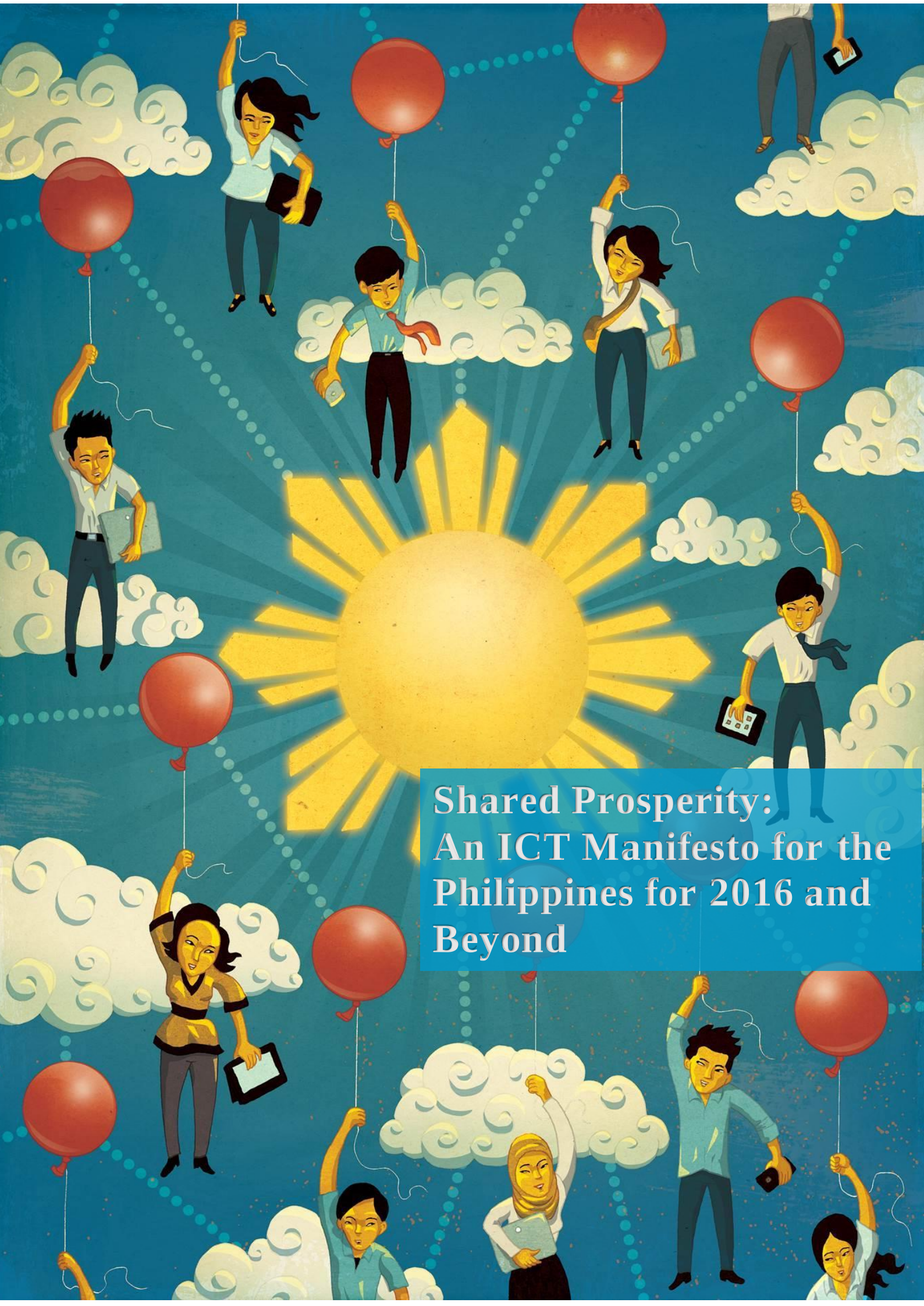

Shared Prosperity: An ICT Manifesto for the Philippines for 2016 and Beyond

Shared Prosperity:
An ICT Manifesto for the Philippines for 2016 and Beyond

Key Policy Recommendations

- **Implement additional reforms in the educational system to improve the competencies and compensation of teachers. This should include stepping up science, technology, engineering and mathematics (STEM) education and enhancing the digital literacy of educators.**

- **Address the digital divide and bring universal access to affordable broadband, using both policy and technical solutions (e.g., public-private partnership to deploy TV White Space-based connectivity). This will help create a foundation for long-term inclusive development for all Filipinos.**

- **Increase the adoption of information and communications technology (ICT) by national and local government units in order to improve the delivery of government services. Build on the innovation of local governments (e.g., Valenzuela City) and raise the Philippine ranking in the United Nation's E-Government Readiness index.**

- **Enhance national awareness of the massive power and benefits of cloud computing and, to this end, establish a favorable cloud regulatory environment by implementing data privacy and cybersecurity rules.**

- **Update the country's obsolete telecommunications laws. The speed of innovation favors a light-touch approach and regular review to ensure that laws remain relevant. New legislation can include sunset clauses to trigger automatic review, while older legislation that overly restrict competition should be liberalized.**

- **Work closely with the technology sector to develop mechanisms for enhancing cybersecurity, preventing cyberattacks, and creating a robust and trustworthy ICT ecosystem.**

- **Set up an effective, independent, transparent, accountable and unified government body to oversee the development of ICT and related services. This body should be resourced properly with people, technology and financing so that it can build a strong ICT foundation as a pillar of long-term shared prosperity for all Filipinos.**

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About this document:

This document was prepared by Lourdes O. Montenegro and Eduardo Araral Jr., Lee Kuan Yew School of Public Policy, National University of Singapore, in collaboration with Microsoft. Contributors: Adnan Ahmad and McRhon Banderlipe. Front illustration by Paul Lachine.

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For further inquiries, please contact: lourdes.montenegro@nus.edu.sg.

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25 November 2015

I. THE PATH TRAVERSED: ASSESSING THE ICT STATE OF AFFAIRS

No Time like the Present

The Philippines is on the cusp of change. Despite the slowdown in most of Southeast Asia and the rest of the world, the Philippine economy has continued to grow steadily in the last few years. The country's demographics are also entering a most favorable phase, with a marked rise in the working age population accompanied by a decline in the number of dependents. With a young and highly literate potential workforce of more than 60 million, the Philippines should be well-poised to sustain economic growth, raise living standards for the majority of its people, and join the ranks of Asia's and the world's most dynamic economies. But this can only happen if effective public policies are in place.

There is no time like the present to lay down the groundwork for a brighter future. The next couple of decades present a rare window of opportunity, during which the country can build on progress already made and implement further change to expedite development. In order to capitalize on the Philippines' demographic dividend, the public, the business sector, and, most of all, the government, must take strategic and urgent action. The large potential workforce will need to be more technology-savvy, better educated, healthier and more gainfully employed. To enhance economic competitiveness, more investment must be made in human capital, more efficient business processes, and public infrastructure, including energy, transportation, and communications. Last, but not least, the country will require good governance – a positive change in the policies and institutions of government.

Technology can be a key enabler for the changes urgently needed in the country. In fact, t*echnology gives us the tools to expand livelihood opportunities, provide more efficient government services, enhance economic competitiveness, and enable good governance*.

Bringing Up the Rear

Sadly, the Philippines is not maximizing the benefits of technology. For example, the country is clearly slipping in e-government league tables. According to the UN, the Philippines has fallen 50 places in the E-Government Readiness Index since 2003. This spells bad news for Filipinos who continue to suffer from inefficient and ineffective government services. Furthermore, an inadequate telecommunications infrastructure prevents firms and people from accessing a vast array of innovative applications to increase their productivity and widen their economic opportunities. As shown in Table 1 and Figure 1, the country underperforms relative to the ASEAN-5 on multiple internet service quality metrics, such as download/upload speed, latency, packet loss and jitter. As a consequence, it is harder for individual Filipinos to reap the benefits of quality-sensitive applications such as cloud computing, video streaming, voice-over-internet protocol (VoIP), network games and fast-execution electronic trading. Furthermore, it handicaps small and

According to the UN, the Philippines has fallen 50 places in the E-Government Readiness Index since 2003. This spells bad news for Filipinos who continue to suffer from inefficient and ineffective government services.

medium enterprises that need access to high-quality information and communication services to compete effectively in increasingly integrated ASEAN and global markets.

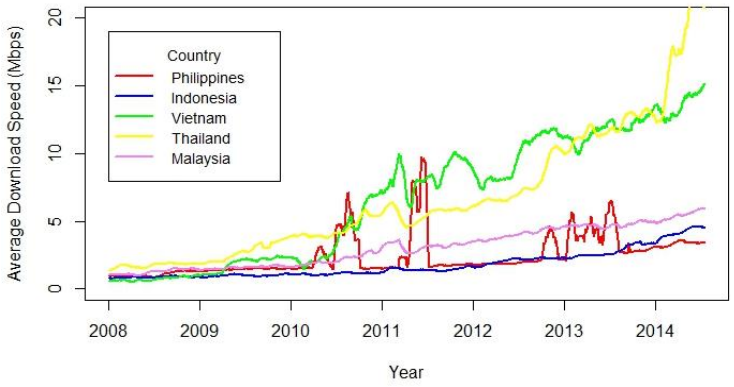
Table 1. Internet Service Quality among the ASEAN 5 (2013)

Country	Packet Loss (%)	Latency (milliseconds)	Jitter
Indonesia	1.19%	149.07	65.39
Malaysia	1.06%	114.14	52.25
Thailand	n/a	n/a	n/a
Philippines	1.35%	150.51	68.15
Vietnam	1.03%	98.87	41.32

Data source: Net Index by Ookla

Figure 1 below shows how average internet download speeds in the Philippines remain well below that of neighboring countries.

Figure 1. Average Broadband Download Speed among the ASEAN 5 (January 2008 – July 2014)



Data source: Net Index by Ookla

The Value of Partnerships

To realize the vision of a more dynamic and prosperous future, the Philippine government should consider opportunities to partner with the private sector, especially with technology companies. One successful example of such a partnership is the "TV White Space-Supported Fisherfolk Registration" program, a collaboration among the Department of Science and Technology's (DOST) ICT Office, the Department of Agriculture's (DA) Bureau of Fisheries and Aquatic Resources, the US Agency for International Development (USAID), and Microsoft Philippines. The TV White Space public-private partnership has brought broadband access to fisherfolk in Bohol, using unused TV spectrum.

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At the P3 Impact Awards ceremony held during the Concordia Summit 2015 in New York City, U.S. Secretary of State John Kerry said this about the partnership:

> *"Treaties are negotiated by governments, but lasting peace and prosperity are created by people. That's why governments need to combine their strengths with those of the private sector and civil society. And it's why the State Department's Office of Global Partnerships has teamed up with Concordia and the University of Virginia's Darden School of Business on the Public-Private Impact Award. The goal of this award is as clear as it is compelling: To recognize and inspire the next generation of public-private partnerships, because the best ideas are never limited by borders, and we need all the good ideas that we can get... And this year, I am very pleased to announce that our Public-Private Impact Awardee is the TV White Space-Supported Fisherfolk Registration Partnership. This partnership is drawing on unused television channels to make registration easier for fishing communities in the Philippines. It's also restoring the health of local ecosystems to produce more fish, feed more people, and create more jobs. As an industry, fishing is timeless, and so is the need for partnerships that bring us together in support of ideas that create shared prosperity".*

The Future is in Sight

Forty years ago Microsoft started small, but with a grand vision: a computer on every desk and in every home. This vision became a reality in developed economies, translating into resurgence in productivity and growth. For the rest of the world, including the Philippines, there is still a long way to go. In 2014, for example, only 18% of Philippine households had their own computers.[i] The numbers are even more dismal among rural and poor households.

In recent years, ICT has developed by leaps and bounds. Today, innovations in mobile and cloud computing have enabled unfettered access to information and communication. They have removed many of the barriers to growth and lowered the costs of business and other transactions. Tomorrow, we will see a world of truly ubiquitous computing, where people interact constantly and everywhere with sensors, screens and devices in highly intuitive and natural ways. Computing will become the pervasive backdrop to make everyday living a more productive and richer experience.

The future is already within sight. Innovations improving the ability to store, retrieve and rapidly process massive amounts of data are generating new insights in finance, healthcare, entertainment, government, education, and many others. The advent of more cost-effective methods in additive manufacturing or 3D printing is threatening to disrupt the traditional organization of production. The Internet of Things (IoT) is exponentially expanding. Recent data estimate the number of connected sensors and devices at close to 5 billion and projected to reach 25 billion by 2020.[ii] Smart metering by utility companies and personal activity tracking through wearable devices are further examples of IoT development. Innovations in government are also abundant, helping to provide for more efficient and energy-saving methods of delivering public goods and services. The permutations and combinations of computing innovations are indeed as vast as the human imagination can fathom.

Leap Not Walk

The implications of ICT advances for countries like the Philippines are quite staggering. Rather than follow the technological trajectory taken by developed economies, the Philippines can *leapfrog* by experimenting with emerging technologies. Such leapfrogging has already occurred, for example, with the adoption of 2G mobile phones and SMS. The mobile network infrastructure in the country

was set up relatively easily and cheaply, especially in places not served by the legacy landline network. Rapid and widespread adoption of mobile phones followed, bypassing landline diffusion. The rest is history -- the Philippines, at one point, became known as the "texting capital of the world." In 2014, mobile subscription rates in the country exceeded 110%.[iii] Even taking into account the existence of multiple subscriptions by individuals, the numbers remain impressive. Filipinos have enthusiastically embraced mobile phones, using SMS not only for communication, but also for entertainment, banking and mobile payment, and news and information. Even small farmers and fisherman are using mobile devices for market arbitrage to raise their incomes. And those at the bottom of the income pyramid consider mobile phones to be a necessity, not a luxury, finding ways to cope with the costs by phone-sharing, using missed calls, and texting rather than calling.[iv]

> Rather than follow the technological trajectory taken by developed economies, the Philippines can *leapfrog* by experimenting with emerging technologies.

Technology is always changing, constantly presenting us with new tools to improve our lives. *Successfully implementing a leapfrog strategy for Philippine development will require more than just the acquisition of the latest technologies. It will require a growth and innovation mindset and institutional changes that embrace new initiatives and experimentation. It will also require a focus on affordable, adaptable and upgradeable technological solutions, while maintaining a secure digital environment that is compliant with the security and privacy requirements of the country and its citizens.*

Breakthroughs in cloud computing, for example, are ripe with leapfrogging possibilities. By paying only for computing services on an as-needed basis, businesses and governments can free themselves from large sunk capital expenses on hardware and back-end systems. The result is lower costs, more efficient and resilient systems, and better focus on upgrading performance and service delivery. Breakthroughs in financial technology such as blockchains and distributed ledgers could also make it possible to leapfrog brick-and-mortar banking. For a remittance-driven economy with vast numbers of unbanked persons, the potential benefits are huge.

ICT-Powered Prosperity

Innovations in ICT have already transformed the Philippine economy. The most compelling example is the rapid rise of the nearly US $20 billion business process outsourcing (BPO) industry. While data-entry, animation, and software development outsourcing firms were already operating in the country in the early 1980s,[v] it was not until 2004-2005 that the industry spiked as a driver of employment, foreign exchange earnings, and economic growth. This coincided with the expansion of the country's wired and wireless Internet infrastructure. By 2016, an estimated 1.3 million Filipinos will be working in voice and non-voice outsourcing services.[vi] Although BPO employment is still concentrated in major urban centers like Metro Manila and Metro Cebu, a notable expansion is already taking place in secondary cities like Bacolod, Sta. Rosa, Davao, Dumaguete, Baguio, Cagayan de Oro, Iloilo, Lipa, Clark and Malolos. The industry's large demand for labor definitely fosters more inclusive employment.

The information superhighway is also enabling the global expansion of a variety of new services. An overwhelmingly high share of Philippine service exports in 2014, about 71%, is classified as ICT services.[vii] Proportionally speaking, the country is more dependent on ICT service exports compared

to other ICT service exporters such as India, Israel and Ireland. But, comparatively speaking, the absolute value of the Philippines' ICT exports is meagre. In 2014, for example, Philippine ICT service exports were valued at less than a fifth of India's US $100 billion (current prices). Given that services comprise more than 60% of total world output but only 20% of world trade, there is still plenty of room to grow.

Technology is redefining where and how Filipinos work. The growing contingent of online freelancers or "online foreign workers" is now estimated at more than 1 million strong – a number that rivals the annual outflow of land-based overseas foreign workers (OFWs). One online job platform lists the Philippines as the third largest in number of registered freelancers (next to the United States and India) and the eighth largest in total earnings growth.[viii] Parents with young kids can work flexibly from home. Young graduates from the provinces can stay in hometowns located within this "cyberservices corridor" and earn a decent living without leaving the country. This retention of talent implies economic, social and other benefits that will impact the long-term foundation of Philippine prosperity.

The growing contingent of online freelancers or "online foreign workers" is now estimated at more than 1 million strong.

ICT, in general, and broadband technology, in particular, are key drivers of growth in the information age. One study shows that a 10% increase in the ICT capital stock of a country adds an extra .45 percentage points in real GDP growth.[ix] More importantly, the impact of ICT penetration on growth is more pronounced in countries with initially low levels of ICT penetration.[x] The diffusion of broadband technologies can have an even greater impact on economic growth. In the ASEAN region, other factors being equal, a 1 percentage point increase in internet penetration rates translates into an additional .65 percentage point of GDP growth, on average.[xi] This would mean at least PHP 75 billion more in GDP for the Philippines based on 2013 values. ICT not only encourages growth in the short-term, but also ensures that such growth is sustained in the long-term. This sustained growth is essential to eradicating poverty and promoting development. *Thus, from an investment perspective, it is not a matter of ICT versus poverty alleviation but ICT for poverty alleviation.*

Clearing the Way

The benefits from unleashing ICT are proven, tangible, and sizeable. However, transforming these benefits into sustained and inclusive growth for the next few decades will demand commitment to a shared mission: clearing the way for technology to flourish in the hands of the Filipino people.

The Philippines needs to expand access to affordable and high-quality broadband connectivity for all sectors, socio-economic classes and regions. Connectivity is the foundation of the current phase of ICT innovation. Guaranteeing this connectivity will require multiple policy levers to nudge investment, connection, competition and innovation. It will also call for meaningful partnerships between the public and private sectors.

The country also needs to set up a smart and responsive regulatory system that adapts to fast-paced technological change, while providing enough predictability to encourage long-term investments. Officials must ensure that regulation takes into account the convergence of communications technologies and incorporates principles of technology neutrality and open-

access. Policy and legal frameworks that facilitate trusted computing, such as regulations on privacy, data protection and cybersecurity, need to be in place. The Philippines does not have to reinvent the policy wheel. It can capitalize on its second-mover advantage by looking to regulatory best practices from countries ahead on the technological curve.

Government can lead by example in using technology to improve delivery of public goods and services. Examples abound of how ICT can be deployed to automate government requirements and exponentially ease the process of doing business. Sadly, the Philippines has slipped nine places during the last two years in the global Ease of Doing Business rankings. Since 2008, a number of reforms were perceived to have made doing business in the country easier by leveraging ICT. These included the introduction of electronic filing and payment systems for social security contributions, as well as the electronic customs systems that allowed online submission of declarations and payments. These efforts, however, did not match the brisk pace of improvements elsewhere in the world, leading to a decline in the country's relative standing.

> The benefits from unleashing ICT are proven, tangible, and sizeable. However, transforming these benefits into sustained and inclusive growth… will demand commitment to a shared mission.

Innovation is creative destruction. Technology disrupts but in a positive manner. Innovating government, business and daily life with the help of technology may just be what the Philippines needs to expedite a qualitatively better and faster pace of development

The rest of this Manifesto is intended as a guide for policy-makers as well as private sector influencers in making true the promises of ICT. It addresses five separate challenges:

- Preparing people for the future through 21st century education.
- Building a more equitable society by ensuring connectivity for all.
- Leveraging ICT to enhance competitiveness in a mobile-first, cloud-first world.
- Moving towards a 21st century government that uses technology to become more trusted, more efficient, and more responsive.
- Providing a safe and secure online environment for citizens, especially children, who represent the country's future.

II. THE WAY FORWARD: BUILDING A ROADMAP FOR ICT AND SHARED PROSPERITY

PREPARING PEOPLE FOR THE FUTURE THROUGH 21st CENTURY EDUCATION

Educate for a Digital Economy

A thriving digital economy, with its dynamic pace, instant connection, and voluminous amounts of information, demands more bandwidth from physical networks *and* people. The new generation of Filipino graduates will need a broader range of skills beyond the 3Rs. Those who are unprepared are likely to be left behind.

To ensure that all Filipinos have equal opportunity to participate in and benefit fully from the digital economy, we will need to *re-orient the educational system to cultivate a new breed of creators, not just consumers, of technology*. This would entail a number of strategies:

1) Focus on recruiting and training the country's best and brightest to teach the next generation.
2) Upgrade science, technology, engineering and mathematics education (STEM) at all levels and increase the number of STEM graduates.
3) Embrace technology as a learning tool and embed digital literacy in all aspects of the curricula, including those of technical/vocational schools.
4) Leverage advances in education technology, such as Massively Open Online Courses (MOOCs), video conferencing and mobile learning apps for adult continuing education, teacher training, and even parent training.
5) Collaborate with the private sector to provide students with internships and apprenticeships that develop their computing skills.

Since 2011, the Philippine government has engaged in efforts to reform the educational system. The K-12 educational reform program, in particular, aims to harmonize Philippine education with global standards by lengthening the duration of the pre-university cycle from 10 to 12 years of schooling. Reforms are going in the right direction, but further steps are needed, including the strategies mentioned above.

In March 2018, the country will graduate its first batch of high school students who have undergone the whole K-12 program. This will be a milestone to celebrate, but the next set of challenges urgently await. The K-12 program will correct basic deficiencies in schooling years, but will not address the overall problem of upgrading the quality of education.

Based on international metrics, Philippine education has fallen dangerously behind, especially in technology-relevant subjects like mathematics and science. For example, when the country participated in the 2003 Trends in Mathematics and Science Study (TIMSS), an international standardized assessment of student achievement in math and science, the country's mean scores for 2nd year high school students were dismally below the average of all 46 participating countries – only marginally outperforming Botswana, Ghana and South Africa. While it is true that scores for

the different Philippine schools had a wide dispersion, nonetheless even the highest scoring group of students performed significantly below the global average. Although standardized testing has its pitfalls and these results are dated (the country has not participated in subsequent regular assessments), they are still symptomatic of the shortcomings of Philippine education.

Countries that have successfully transformed their educational systems towards developing 21st century skills have learned that the key is to *focus on teachers* – recruit the best in sufficient numbers, train them well, improve their working conditions, enhance their professional prestige, raise their accountability in meeting clearly defined educational goals and, finally, free them to meet those goals in potentially innovative ways. *Teachers are the most effective instruments of digital inclusion*. If they are to train the next generation of technology innovators, they themselves must possess a familiarity with, if not a passion for, technology.

Countries that have successfully transformed their educational systems towards developing 21st century skills have learned that the key is to *focus on teachers*.

Improving the quality of STEM education and digital literacy in the Philippines thus requires a strategic focus on teachers. Compelling evidence from international experience indicates that teachers who possess strong content knowledge are the main determining factor behind high-performing students.[xii] Sadly, many of the teachers in the Philippines have been found to lack an understanding of the very content they are teaching. Nowhere is this truer than in science, technology and mathematics. *Government will need to instigate fundamental improvements in teacher recruitment, training and compensation*. At the same time, government can partner with the private sector to deploy technology that connects, from anywhere in the country, the current crop of teachers with the best trainers, content experts and learning resources available in global knowledge capitals. Modern communications technology makes this undertaking not only feasible but also cost-effective.

Technology is a learning tool that becomes truly transformative in the hands of excellent teachers. In the words of Ernani Fernandez, an award-winning high school teacher from Palo, Leyte, whose work was recognized under the global Microsoft Expert Educators Program: *"…innovative teaching requires students to use technology and, by themselves, realize the significance of the lesson [being taught]*."

Promote Lifetime Benefits from Digital Inclusion

There is a tangible economic impact in equipping school-aged children living below the poverty line with a low-cost computing device and internet access. Studies from many countries show that providing students and their families with a device/access reduces the hurdle of early education, improves engagement at school and with society, and increases the likelihood of graduating secondary school and attaining post-secondary education.

Publicly available data show the cascading and tremendous effects of this type of investment. For example, in the Philippines, an investment of $1,000 in a device/access would translate into an increase of $49,000 in an individual's life-long earning potential. Digital inclusivity would also translate into benefits beyond employability: tax revenues for the government, reduced

dependency on social and health care programs, reduced chances of incarceration, and increased efficiencies in the delivery of government services.

In fact, a model developed by the authors of the study predicts that by targeting the approximately 12 million Filipino children under the age of 17 who are living in poverty, the estimated life-long benefits would total $59.3 billion, broken down as follows:

- $43.5 billion in incremental lifetime earnings
- $10.1 billion in increased tax collections
- $300 million in reduced social entitlements
- $180 million in eliminated incarceration costs
- $3 billion in health dividend from a healthier cohort
- $2.2 billion in savings from digital delivery of government services.

If one were to factor in the impact on other members of a household (e.g. parents, older siblings), the total benefits would more than double to $143.7 billion.[xiii]

BUILDING A MORE EQUITABLE SOCIETY BY ENSURING CONNECTIVITY FOR ALL

Expand Access to High-Speed Affordable Broadband

The world has become divided between digital haves and have-nots. Those with no connectivity or limited connectivity today are unable to enjoy the immeasurable benefits of technology, including exponential increases in speed of access to information and the ability to save time, do more, and learn more. Broadband connectivity is the lifeblood of the digital economy. The broadband network is now considered as vital infrastructure. To be unconnected is to be excluded from economic opportunities in an increasingly mobile-first and cloud-first world.

Filipinos are embracing the benefits of connectivity and enthusiastically going online. About 37% of the population or 36 million individuals reported using the internet in 2013.[xiv] The proportion of internet users in the country, for example, is double that of neighboring Indonesia. Yet despite having some of the most net-savvy citizens in the world, the country's broadband service lags behind its neighbours. Subscription to wired broadband services is very low at an estimated 7% of internet users. A larger proportion, about 73%, access the internet through their wireless broadband subscription (e.g., USB sticks), while the rest connect from work, internet cafes or public wireless hotspots. Philippine broadband internet is known for its low quality of service experience.[xv] Not only are household download speeds the slowest in the ASEAN region, but the connection is also plagued by other issues such as high latency, packet loss and jitter. This dampens demand for bandwidth-intensive online services such as video, VoIP and online gaming. Furthermore, the digital divide between urban and rural areas, and between Metro Manila and the rest of the country, is widening.[xvi] This divide is evident in the increasingly uneven spread of internet access and usage of both households and firms across regions. These connectivity issues are stumbling blocks toward an ICT-powered shared prosperity, but they are not insurmountable.

The Philippines also has its upside in connectivity. First, the country has excellent access to multiple submarine cables and, consequently, has above average international bandwidth capacity.[xvii] This bodes well for the cost of connectivity in the coming years, given the rapid decline of international bandwidth prices. Second, Filipinos have a very high rate of mobile engagement, making the country one of the fastest growing smartphone markets in the world.[xviii] Such high rates of mobile engagement indicate a robust appetite for connectivity that will grow exponentially in the next few years. Third, although inflation-adjusted U.S. dollar prices for leasing local access circuits ("broadband for business") have risen during the period 2006-2013, median prices across all bitrates (except for Ethernet) are still lower compared to Indonesia, Malaysia and Vietnam.[xix]

The Philippines should set for itself ambitious goals with respect to ensuring universal access to high-speed, affordable broadband throughout the archipelago.

The Philippines should set for itself ambitious goals with respect to ensuring universal access to high-speed, affordable broadband throughout the archipelago. Aiming high means acknowledging the pivotal role of connectivity in powering economic growth. *Different sectors of society must think big and aim for a win-win solution that transforms the country into a hub of internet traffic and content in Southeast Asia*. To achieve this winning scenario, government will need to lay down a supportive policy and regulatory framework that includes doing the following, at a minimum:

1) *Promote the sharing of passive and active network infrastructure.* Passive infrastructure includes non-electrical elements of the network such as ducts and poles, while active infrastructure includes all electrical elements such as cell towers, lit fibre, access node switches and broadband remote access servers. Tried-and-tested approaches to promote infrastructure sharing in liberalized markets include mandated co-location of facilities and local loop unbundling (for both wired and wireless networks).

2) *Facilitate more cost-efficient infrastructure roll-out.* One approach is to coordinate telecom and non-telecom infrastructure (e.g., roads and power) investments to create synergies and lower roll-out costs. DOST is already following this approach in laying down the fibre optic network connecting government data centers in Metro Manila. To encourage cooperative approaches from the private sector, government will need to simplify the ground rules for obtaining rights-of-way.

3) *Liberalize the telecommunications licensing process and introduce a universal operator license that is technology neutral.* This would allow operators to make more efficient and rapid capital investments that would encourage the entry of greenfield backbone and backhaul operators. The current requirement of a legislative franchise for telcos is restricting entry and innovation in communication services.

4) *Incentivize the development of effective Internet Exchange Points* (IXPs) and support their proliferation in urban centers outside Metro Manila. Doing so will go a long way towards improving the speed, quality and cost of connectivity.

5) *Release new spectrum, both licensed and unlicensed*. This will ensure the country meets the ever-growing demand for wireless connectivity. More unlicensed spectrum below 900 MHz,

in particular, will pave the way for innovative technologies that increase the capacity of airwaves and lower the cost of delivering last-mile connectivity. This spectrum, which includes unused TV channels, is very useful because the equipment is easy to setup and the signal can cover long distances, as demonstrated during Microsoft's own collaboration with the Philippine government to re-establish critical communication by using TV White Spaces – in Bohol, right after the earthquake, and in Leyte, in the aftermath of Super Typhoon Haiyan.

6) *Regularly update network industry regulation to ensure continued relevance and currency*. Better yet, the government can ensure that laws and regulations have built-in sunset clauses that force regular evaluation and faster adaptation to changing technological conditions.

7) *Finally and most crucially, improve regulatory institutions*. An effective regulatory body for a digital economy will require financial resources, independence, transparency, accountability and technical capacity, as well as a broader mandate and enhanced focus on ICT development. This could mean the creation of a converged regulator that overseas all aspects of ICT, broadcasting and telecommunications.

LEVERAGING ICT TO ENHANCE COMPETITIVENESS IN A MOBILE-FIRST, CLOUD-FIRST WORLD

Put Our Heads in the Cloud

Cloud computing is rapidly reshaping the ICT landscape. In a country where many businesses, government and non-profit organizations are not yet highly invested in legacy IT infrastructure, cloud computing will be even more of a game changer. Imagine a small business with big ideas, but not enough resources to set-up or maintain its own servers, storage, networking hardware and software to connect to the internet and sell to the world. By turning fixed cost into variable cost, cloud computing breaks down barriers to entry. Cloud computing thus allows small businesses with big ideas to conquer the world without spending too much on IT infrastructure. With cloud computing, any organization can access a virtually infinite supply of IT resources through a web browser and can easily dial its usage up or down. Best of all, users pay only as they go. By migrating to the cloud, organizations can avoid the cost and complication of having to maintain their own systems. They can access the most cutting-edge resources without facing most of the pains of in-house hardware and software upgrades, thus freeing their energies to focus on improving core operations, innovation, and delivery of goods and services.

Cloud computing allows small businesses with big ideas to conquer the world without spending too much on IT infrastructure.

Clouds come in many shapes and sizes. Public clouds involve multiple tenants sharing a pool of resources; private clouds run on dedicated IT infrastructure behind an organization's firewalls for added control; and hybrid clouds combine the best of both. Organizations can pick any or all three layers of cloud services. First, there is Infrastructure-as-a-Service (IaaS), which includes servers and storage. Above this sits Platform-as-a-Service (PaaS), which includes software development tools

and programming languages delivered as a service. Finally, there is Software-as-a-Service (SaaS), which combines the two bottom layers with software applications delivered as a service.

Many small organizations are not aware that they are already using cloud-based services. In a worldwide survey of non-profit organizations, for example (including Philippine NGOs), lack of awareness was cited as the leading barrier to adoption of cloud computing services.[xx] Such lack of awareness was evident in respondents' contradictory responses – e.g., when NGOs were asked if they were using a cloud-based app for web conferencing, about 76% said no; but, subsequently in the survey, a majority reported using specific cloud-based apps like Skype. The implication is that *improving the cloud awareness of small business and non-profit organizations (SMEs and NGOs) could go a long way towards helping them benefit from cloud computing*.

Continue to Develop ICT-Driven Industries like Business Process Outsourcing (BPO)

The Philippine BPO sector is one of the strongest drivers of the economy, projected to be as big as $25 billion by 2016. However, in order to take the BPO sector to the next level of competiveness, the country must improve its overall ICT environment and build IT systems that can compete better in the world market. The BPO workforce must also be equipped with necessary skills to meet changing the demands of the global market. More high-value BPO services like accounting, design, engineering, HR, medical transcription and healthcare provision must be developed, while maintaining the Philippine advantage in the voice support sector.

Through ICT we can also address the growing concern over how to expand the shrinking labor pool. Through reliable connectivity and a secure computing environment, many individuals who are now not active in the workforce can be put to work by meeting their needs for flexibility. These include: mothers who may prefer to work from home, people with disabilities, and others who wish to render quality services without having to keep regular office hours or travel long distances to get to work. This new work environment will also help ease the burden of traffic congestion, especially in Metro Manila and similarly situated urban centers.

Bring Philippine Talent Home

Demand for overseas Filipino workers (OFWs) continues to be high, but the government would do well to focus now on initiatives to provide opportunities for OFWs to return home and reintegrate with their families and society. Key opportunities for OFWs would be in entrepreneurship and the BPO industry. OFWs can be given opportunities to upskill themselves in ICT, and thus have the option to earn a decent living, stay with their families, and apply their talents to grow the Philippine economy. The process of up-skilling OFWs in ICT and reintegrating them will take time to implement fully. Meanwhile, technology can help address current issues that OFWs face. Through technology, they can keep in touch with their loved ones; have safe, affordable, and reliable means of transmitting their hard-earned income home; and work with their family members to plan for, and find, investment opportunities that will bring returns to OFWs and their families. Through technology, OFWs could receive income that is comparable to, if not higher than, what they are currently earning, while allowing them to stay in the country and be with their families.

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Establish a Favorable Regulatory Environment for Cloud Computing

To harness the full potential of cloud computing and grow the digital service export market, government will need to champion "friendlier skies". This means working closely with other countries to *hammer out a harmonized ASEAN and international framework to facilitate the cross-border flow of data*, while ensuring competition, transparency and respect for data privacy. The objective is to increase trust without stifling the provision of cloud computing and other digital services that involve the processing of any kind of personal information (e.g., information that identifies the individual or reveals personally sensitive information such as religion, marital status, age or political beliefs). *As a major digital service exporter, the Philippines is strategically positioned to reap the gains from a better integrated ASEAN digital marke*t.

To harness the full potential of cloud computing and grow the digital service export market, government will need to establish a favorable regulatory environment for cloud computing.

In order to demonstrate the country's commitment to a dynamic regional digital market, the government will need to speed up the implementation of its own data privacy law. We applaud the country's efforts to legislate privacy and data protection under Republic Act 10173, also known as the Data Privacy Act of 2012. The Philippine privacy law contains comprehensive provisions that align closely with the European Union (EU) directive on data protection, as well as the Asia Pacific Economic Cooperation (APEC) Information Privacy framework. The law clearly identifies liable parties, awards significant rights to "data subjects," and severely sanctions non-compliance. Unfortunately, approval of the Implementing Rules and Regulations (IRR) has been stalled because the National Privacy Commission (NPC) has yet to be formed. Immediate action by the government to set up the privacy commission would be helpful.

The private sector also has obligations to complement public sector efforts towards trusted computing. Microsoft, for example, already supports industry self-regulatory approaches, such as "Privacy by Design," which integrates privacy in the way products and services are engineered. In addition, Microsoft incorporates privacy in contracts with end users and has ensured that its enterprise cloud contracts meet stringent EU privacy standards, irrespective of the jurisdiction where the data is stored.

Deploy Cloud for Disaster Resilience

The Philippines is intimately familiar with disasters –i.e., natural or man-made events that disrupt the functioning of society and organizations and result in losses beyond the capability of such society or organizations to cope with on their own. The devastation left in the wake of Super Typhoon Haiyan, one of the strongest storms in recorded history, was horrendous. An estimated 6,268 lives were lost, with damages valued at almost USD $3 Billion (2013 prices). It could have been worse without the use of cloud-based technologies that enabled faster response and speedy recovery. One well-cited example is cloud-based, crowd-sourced mapping that aided relief efforts by identifying areas of greatest damage in real time.

Resilience is about being able to resist, absorb and recover from the effects of disasters, quickly and efficiently. Cloud-based solutions, which pool resources, could enhance resilience in two ways: (1) lower the costs of redundancy and back-ups and (2) diversify the location of IT infrastructure. Benefits from resilience can accrue to both government and private organizations. The Philippine

national government, through its Information and Communications Technology Office (ICTO), is already taking steps to strengthen its resilience by migrating several electronic functions to the cloud, but there is room to do more. For example, the under-digitization of government records and data is a cause for concern. Aside from putting at risk the government's ability to maintain resilience, lack of digitization also perpetrates inefficiencies that waste taxpayers' money and hobble markets with high transaction costs. Another example is the reluctance by a number of government agencies to utilize the benefits of the public cloud system. Admittedly, highly sensitive government information is best kept in a government cloud facility, but numerous government functions do not involve highly sensitive data and can be deployed cheaply and more efficiently by leveraging public cloud services. Spreading and speeding up digitization across all levels of government will facilitate adoption of cost-effective and more resilient cloud-based solutions.

Support the Scaling of SMEs and Startups

More than 98% of business establishments in the Philippines are SMEs. These establishments with less than 100 employees contribute to about one-third of total employment. Most SMEs are in wholesale and retail trade, manufacturing, or hotel and restaurant businesses. With the right policies, these SMEs could scale up and compete in the ASEAN and global markets using ICT. Many of them will likely not have to contend with the burden of writing off investments in older technologies or face the large costs of conversion. Instead, they can leapfrog and move directly to the cloud. Once there, they can elastically scale their IT resources to serve ever larger markets. A survey of SMEs in developed and emerging markets found that firms that lead in the use of cloud-based services and solutions increased their revenues by 15 percentage points faster than other firms, across all industries.[xxi] Additionally, these leaders in ICT usage also created jobs 2x faster than peers who were slower to adopt technology. Policies that ease access to finance and provide tax exemptions for the cost of internet access, software, services and devices, coupled with awareness-building programs, would help bring down barriers to SME adoption of cloud services.

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Technology startups are a recent source of excitement in the SME arena. By many accounts, the Philippine startup scene is heating up. This rising optimism over the country's innovation potential is reflected in the government-led, but crowd-sourced, 2015 Philippine Startup Roadmap, which envisions reaching the following milestones by 2020: 500 startups, total funding of US$200 million, combined valuation of US $2 billion, and more than 700,000 paying customers worldwide. Starting from scratch five years back, the country now has several accelerators, incubators, venture capitalists and more than 100 operating startups. This dynamic sector tends to be tech-savvy, and will be served best by policies that remove obstacles to their market growth. Government needs to look into legally enabling alternative funding models (e.g., crowdfunding), easing up multinational hiring restrictions, introducing tax incentives, and setting up government-backed venture funding.

BUILDING A 21st CENTURY GOVERNMENT THAT USES ICT TO BECOME MORE TRUSTED, EFFICIENT, AND RESPONSIVE

Use ICT for Good Governance

ICT provides the tools to ease access to information, improve the efficiency of public service delivery, and allow for new models of public participation. E-government refers to the application of ICT in discharging the functions of government. Having recognized its positive impact on good governance, the Philippines became an early adopter of e-government initiatives. In its first e-government survey in 2003, the United Nations identified the Philippines as a world leader in government ICT adoption, ranking it #6 out of 191 member countries in electronic participation. The UN noted that by leveraging ICT, the Philippines was not only providing information, but also facilitating consultation and decision-making with citizens. Eleven years later, the Philippines slipped to 51st place in electronic participation, while the country's overall E-Government Readiness ranking plummeted from 45th to 95th place in the same period. This decline suggests a lack of sustained effort in developing the government's electronic interface with citizens. The Philippine public sector is simply not keeping pace with the rest of the world in using technology to raise its transparency, effectiveness and accountability. The consequences are costly to businesses and citizens who continue to contend with slow, opaque and inefficient transactions with government.

Some national government departments and local governments are making great strides in using technology to deliver on their promises of good governance. We congratulate them on their efforts and enjoin other agencies and levels of government to emulate their trailblazing example.

At the national level, the Department of Budget and Management (DBM), through its Open Budget Initiative, is increasing budget transparency by providing detailed and timely information on public sector revenue collection, allocation and spending. This year, the country received the highest score on budget transparency in the ASEAN region and was ranked 21st in the world for transparent and open budget management.[xxii] Another national level agency, the Department of Trade and Industry (DTI) is migrating to cloud-based office productivity and moving to a digital and more efficient system for monitoring the prices of basic commodities.

We congratulate them on their efforts and enjoin other agencies and levels of government to emulate their trailblazing example.

At the local level, the City of Valenzuela offers an informative case study on the benefits of technology for local governance. The city deployed electronic terminals, online billing and payment, mobile payment and Geographic Information System (GIS) technologies to simplify, speed up, and streamline their local permit application processes. As a result, the city was able to use technology to reduce dramatically the time required for the following transactions with the local government:

Table 2. Reducing Transaction Costs with Local Government in Valenzuela, Metro Manila

Transaction	Duration (2004)	Duration (2012-present)
Obtaining a Business Permit	14-21 days	20 minutes
Releasing of Tax Declarations	2 days	15-30 minutes
Processing of Building and Construction Permits	2 months	1-2 days

Data source: Congressman Sherwin Gatchalian

The city's investment in GIS, for instance, was credited for increasing local tax revenues by more than 11x the cost of Valenzuela's initial investment. The city has also seen an increase of more than 113% in new business registrations since 2004. If all local governments were to innovate their processes with ICT, the country would undoubtedly see more entrepreneurship, more jobs for the community, and more government revenue to spend on education, health and other social services.

Public and private sector actors, together, can harness ICT for good governance. The Philippines has a long and rich history of civil society participation that can be tapped to help the public sector innovate its functions, crowd-source information, or deliver social services. Technical and financial barriers are coming down fast for technology-powered social enterprises and non-profits. With the shift to mobile and cloud-computing, it will take less time and cost to go from idea to execution, and we foresee a flourishing of initiatives using technology for social good.

Promote the Competitiveness of Secondary Cities

In the Philippines, poverty has a provincial face. The vast majority of the country's poorest households are clustered in the provinces of Mindanao and the Visayas. These persistent inequities in income and opportunity threaten the country's development as a whole. *One strategy for fighting this inequity and making technology-enabled growth truly inclusive is to spread economic opportunities to secondary cities – second- and third-tier cities outside the major urban hubs*. Microsoft actively supports initiatives to promote secondary cities in Southeast Asia, including the Philippines, and has invested in research to compare the usage of ICT for competitiveness in these cities.

Secondary cities are closer to rural wells of poverty. Yet, as population centers, they also have the potential to rise rapidly in economic development. Re-focusing national attention to their development needs will generate greater positive spillover effects to surrounding rural areas. Successful secondary cities are those that complement their cost competitiveness with better liveability and good local governance to attract investment. Working with local partners, Microsoft has developed a suite of scalable and cost-effective solutions to aid smaller cities address their governance challenges and enhance their competitive standing.

Re-focusing national attention to the development needs of secondary cities will generate greater positive spillover effects to surrounding rural areas.

Secondary cities are already attracting investment from the IT-enabled sector, resulting in a boom in local employment. To sustain this trend and transform it into inclusive growth for the surrounding region, local governments will need to increase the quality and quantity of public services. In facing public administration, health, transport, planning, education and other local governance challenges, secondary city leaders can collaborate with each other, share experiences and resources, and unlock private sector partnerships. National government can help facilitate this collaboration and also provide ample assistance.

PROVIDING A SAFE AND SECURE ONLINE ENVIRONMENT FOR CITIZENS

Protect Against Cybercrime and Increase Cybersecurity

Satya Nadella, CEO of Microsoft, has noted that "Businesses and users are going to embrace technology only if they can trust it." Trusted technology is a global issue, and the Philippines is no exception. Exponential increases in data sharing exposes the Philippines and its citizens to a new risk: cybercrime. Without confidence and trust in online safety and protection against cybercriminals, people may well shy away from the benefits of the digital economy.

Cybercriminals see profitable targets in developing economies like the Philippines. These criminals are particularly attracted by the widespread lack of awareness and weak regulatory enforcement.[xxiii] Some of the most common and fastest spreading types of cybercrime are cyberattacks that steal private data and personal identity to perpetrate online fraud. In 2014, the Philippine Department of Justice (DOJ) reported that 33% of the 614 recorded cybercrime incidents for the year involved internet/credit card/ATM fraud and identity theft. Children are also especially vulnerable to online trafficking and abuse. Several high profile cases reported by the national media have drawn public attention to the spread and horrific nature of such crimes.

Building online trust will require teamwork between industry and government agencies. While it is certainly useful to have a legal framework that penalizes cybercriminals, much of the battle against cyberattacks will be won through education and prevention. The judicious enforcement of the cybercrime law is needed, but must be balanced with freedom of expression. The Philippine government, as well as the private sector, can undertake (as applicable to their sector) the following supportive actions:

1) Invest in a robust and trustworthy digital environment that will make cybercrime harder to perpetrate. This means addressing security vulnerabilities, including: the use of unauthorized and/or outdated software, the operation of untrustworthy supply chains and fraudulent websites, and systems that do not meet international standards of security and privacy.

2) Access expertise from the technology sector in order to: (a) assess enterprise and systemic weaknesses, (b) design public/private IT systems that are resilient to cyberattacks, and (c) institute a regulatory framework that creates incentives for private organizations to embed cybersecurity from the ground up.

3) Spread training on cybersecurity best practices for IT professionals through higher education institutions and the Technical Education and Skills Development Authority (TESDA).

4) Work closely with the ASEAN community to harmonize and align a regional framework on cybersecurity with existing agreements like the Budapest Convention on Cybercrime. The government and private sector should support international standards that strengthen security, such as ISO 27034 for secure software development, and others.

Finally, government agencies must actively enforce protective rules for children and support civil society efforts against cybercrime. At the same time, citizens must report and flag offenders. After all, cybersecurity is everyone's business.

III. IN LIEU OF A CONCLUSION

The Philippines has made real progress in economic growth and development in the recent past. It has the advantage of a fairly well-educated and young population, many of whom are globally oriented and armed with competitive tools like English proficiency. It is also situated in an economically dynamic and technologically forward-looking region, where the potential for more inclusive and sustained growth is tremendous. It also has the initial foundation for a world-class ICT environment.

But the Philippines can do more and do better with ICT to empower both government and people. This manifesto has underlined the idea of "shared prosperity" as the ultimate goal that will be served by a more robust, affordable, and accessible ICT ecosystem in the Philippines. The document captures the current state of ICT affairs and highlights recommendations going forward. Philippine public sector leaders, with support from businesses and civil society, must exercise imagination, commitment, and doggedness in execution to implement the ideas outlined in this manifesto. These ideas are not comprehensive by any means, and much more can be elucidated to bring ICT to the next level and give Filipinos the technology tools to improve the way they study, work, live and are governed. More has yet to be written, studied, debated, and decided, but this manifesto, hopefully, launches the right conversations for shared prosperity and the Philippine future.

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